# Final Remedial Investigation Report
# Boeing Isaacson-Thompson Site
# Tukwila, Washington

April 21, 2014

Prepared for

**The Boeing Company**

LANDAU ASSOCIATES
130 2nd Avenue South
Edmonds, WA 98020
(425) 778-0907

**AMEC Environment & Infrastructure, Inc.**
3500 188th Street SW, Suite 601
Lynnwood, WA 98037-4763
425.921.4000

## EXECUTIVE SUMMARY

### INTRODUCTION

This Remedial Investigation (RI) report describes investigations conducted at the Boeing Isaacson-Thompson Site (Site) and the results of these investigations. The Site is located adjacent to the Lower Duwamish Waterway (LDW) in the city of Tukwila, King County, Washington, as shown on Figure ES-1. The Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA) are evaluating sources of contamination to the LDW, source control actions, and cleanup options. Ecology and EPA have determined that the Site is a potential source of contamination to the LDW. Investigations and cleanups are being, or will soon be, conducted by upland property owners under Ecology Agreed Orders at several properties along the LDW near the Site. These properties include the former Kenworth Truck Company property [PACCAR Inc. (PACCAR)/8801 East Marginal Way South property (8801 site)] to the south, adjacent to the Thompson property, and the Jorgensen Forge Corporation property (Jorgensen site) to the north, adjacent to the Isaacson property. Ecology has identified The Boeing Company (Boeing), as current owner of the Site, as a potentially liable person (PLP) for contamination at the Site.

The RI at the Site was performed under Agreed Order No. DE 7088 between Boeing and Ecology (Ecology 2010). In accordance with the Agreed Order, a work plan was prepared for the RI and feasibility study (FS) (RI/FS Work Plan; Landau Associates 2011a) and approved by Ecology on September 21, 2011 (Ecology 2011a). The RI/FS Work Plan identified data gaps that required further information to determine if cleanup at the Site is necessary and to evaluate the potential for recontamination of the LDW. Also, because Boeing was in the process of re-occupying Building 14-01 prior to finalization of the RI/FS Work Plan and because re-occupation of the building could significantly restrict access to the interior of the building, a separate work plan was prepared for conducting an investigation inside Building 14-01 (Building 14-01 Investigation Work Plan; Landau Associates 2011b). The RI was conducted in accordance with these work plans to the extent practicable. At the request of Ecology, an additional work plan was prepared for conducting an investigation on the Port of Seattle property located immediately adjacent to the Site (Landau Associates 2012b) and implemented by Boeing; the results of that investigation are also included in this report. Deviations from the work plans were discussed with and approved by Ecology and are documented in this report.

### SITE DESCRIPTION

The Site is comprised of two parcels of land surrounded by a security fence, with limited access: the Isaacson property, located in the northern portion of the property, purchased by Boeing from the

Isaacson Corporation in 1984, and the Thompson property, located in the southern portion of the property, most of which was purchased from Charles Thompson in 1956. The entire Site is paved or covered with structures, except for a small strip of land located along the western and southern portion of the Site. The Site slopes slightly to the west and is at an average elevation of approximately 21 ft above mean lower low water (MLLW). The Site is underlain with 2 to 19.5 ft of fill consisting of silty sand to sandy gravel; bricks, wood debris, and slag material are also found in the fill material where Slip 5 of the LDW was formerly located. A steel bulkhead is located along the LDW shoreline in most of the northern portion of the Thompson property and a wooden bulkhead is located along the southern portion of the Thompson property, as shown on Figure ES-2.

Except for pavement and catch basins (CBs) that collect stormwater runoff, the northern portion of the Site (Isaacson property) is undeveloped. The southern portion of the Site (Thompson property) is developed with several structures that include a 316,000 square foot ($ft^2$) industrial building (Building 14-01) and several support structures including a boiler house (Building 14-02); two mechanical buildings (Buildings 14-03 and 14-14); a fire pump house (Building 14-13) and water tank; an electrical substation (Building 14-22); and a guard shack. Two pedestrian tunnels are located on the north side of Building 14-01. These features are shown on Figure ES-2.

There are three storage tanks currently located on the Thompson property: a 20,000-gallon boiler fuel underground storage tank (UST; TS-01) located on the west side of Building 14-02, which was decommissioned in-place in 2003; a 500-gallon diesel aboveground storage tank (AST; TS-57); and a 200-gallon diesel AST (TSA-25). Each AST is located within secondary containment. Five sumps exist on the Site, but none are connected to the stormdrain line and most just collect rainwater. The locations of these tanks and sumps are shown on Figure ES-3. There are no existing ASTs, USTs, or sumps on the Isaacson property.

Stormwater from the Site is collected in two Boeing-owned stormdrain systems that discharge to the LDW via two outfalls (Outfalls A and B), as shown on Figure ES-4.

The Site is located in an area of industrial properties and is bordered on the north by the Jorgensen site; on the east by East Marginal Way South and King County International Airport (KCIA); and on the south by the 8801 site, currently owned by Merrill Creek Holdings and leased by Insurance Auto Auctions. Both the Jorgensen site and the 8801 site have been identified by Ecology as cleanup sites, and the current or former owners or operators are conducting remedial activities under Ecology or EPA oversight. The west Site boundary along the Isaacson property and the north part of the Thompson property is bordered by a strip of land owned and/or controlled by the Port of Seattle (Port) and then the LDW, and along the remainder of the Thompson property by the LDW.

## SITE HISTORY

The first known development of the Site began in 1917 and included a sawmill on the land south of former Slip 5 and, in 1920, another on the western portion of the Site. Prior to development, meanders of the Duwamish River were present in the area of the Site including a segment of the river that flowed west to east through the approximate center of the Site. Between 1910 and 1917, extensive dredge and fill operations were conducted in the lower Duwamish River valley and the river was channelized and placed in its current location to the west of the Site. The river channel modifications resulted in the creation of Slip 5 through part of the Site. Slip 5 was oriented west to east near the current center of the Site and extended from the waterway across approximately two-thirds of the Site (Figure ES-2). In 1936, filling of the slip began to allow development of the Site. Filling occurred in phases and was completed in about 1966. The approximate placement of fill material during each phase is shown on Figure ES-5.

In 1943, the Isaacson property was purchased by Isaacson and was developed between 1943 and 1966. The Isaacson facility was used for various purposes associated with the Jorgenson Steel plant to the north, which included storage of scrap metal prior to it being melted down. Between 1943 and 1945, a galvanizing plant was constructed in the northeast corner of the Isaacson property; it was dismantled in 1967. The Mineralized Cell Wood Preserving Company operated on the northern side of Slip 5 for an unknown period of time beginning prior to 1945. The operations of this company involved heating a solution of arsenic and sulfate salts of copper and zinc and applying the solution under pressure to the base of logs. Storage tanks associated with this operation were reportedly cleaned twice per day and sludge and remaining chemicals in the tanks were reportedly drained directly to the ground surface. Boeing purchased the Isaacson property from Isaacson in 1984. Boeing proposed to redevelop the Isaacson property by demolishing the Isaacson building and constructing a new building; however, although the Isaacson building was dismantled prior to 1990, the planned new building was not constructed. The Thompson facility was developed in the southern portion of the Site beginning in 1966. Until 2011, the layout of the Thompson facility had remained relatively unchanged. In 2011, Boeing re-occupied Building 14-01 and building modifications were made, including removal of a loading dock and an inactive 5,000-gallon aqueous wastewater AST located west of Building 14-01 and removal of the aqueous degreaser formerly located in the western portion of Building 14-01. The sump associated with the aqueous degreaser was decommissioned in place when the aqueous degreaser was removed.

## SCOPE OF THE RI

The goal of the RI is to adequately characterize the Site, to evaluate the potential for recontamination of LDW sediments, and to provide sufficient data to support development and evaluation of cleanup action alternatives. The RI activities, when combined with information collected during previous Site investigations, are sufficient to meet the RI goal. The data gaps identified in the RI/FS Work Plan and the Building 14-01 Investigation Work Plan include the following: 1) information to assess the contaminant pathways to LDW sediment, 2) chemical data in specific areas of concern in the upland portion of the Site, 3) data regarding the extent to which volatile organic compounds (VOCs) are present in soil vapor below the building floor slab in Building 14-01, and 4) recent LDW sediment chemical data for the full list of Sediment Management Standards (SMS) constituents.

The RI activities conducted included extensive soil, groundwater, and sediment investigations; a sub-slab soil vapor investigation; an evaluation of the Boeing-owned stormdrain system as a potential source of contaminants to the LDW sediment; and monitoring of groundwater levels to better understand groundwater flow throughout the Site and influence of LDW tidal fluctuations on groundwater flow. The soil investigation consisted of collecting 176 soil samples from 47 soil explorations (soil borings and test pits) and three soil samples from behind the wooden bulkhead located at the southern portion of the Site and submittal of the samples to a laboratory for analysis. Although not part of the RI, soil samples were also collected from soil exposed during construction activities related to modification of Building 14-01.

The groundwater investigation consisted of installing 25 new monitoring wells and collecting groundwater samples from each of the new and from existing monitoring wells and piezometers on a quarterly basis and submittal of the samples to a laboratory for analysis. During three of the monitoring events, a groundwater sample was also collected from a seep present along the shoreline adjacent to the Site. All of the soil and groundwater samples were analyzed for the Potential Contaminants of Concern (PCOCs) identified in the RI/FS Work Plan: VOCs; semivolatile organic compounds (SVOCs); metals (antimony, arsenic, barium, beryllium, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc); polychlorinated biphenyls (PCBs); and gasoline-range, diesel-range, and motor oil-range petroleum hydrocarbons. Groundwater samples were also analyzed for sulfate, nitrate, and ferrous iron. The sediment investigation consisted of collecting surface grab samples and subsurface core samples at 15 locations offshore of the Site. A total of 73 samples were submitted to a laboratory and analyzed for the SMS list of analytes, carbazole, and total organic carbon (TOC) and 5 of the samples were also analyzed for dioxins and furans. The RI soil, groundwater, and sediment sampling locations are shown on Figures ES-6, ES-7, and ES-8, respectively. Five vapor samples were collected beneath the Building 14-01 floor slab and submitted to a laboratory for VOCs analysis. The soil vapor sample locations are shown on Figure ES-9.

The investigation of the Boeing-owned stormdrain system consisted of collecting samples of solids present in the stormdrain system CBs, oil/water separators, Vortechs vaults, and manholes that had accumulated since the last cleaning; collecting samples of stormwater discharged from Outfalls A and B; and a video survey of the Boeing-owned stormdrain pipelines and a 12-inch-diameter corrugated pipe located south of Building 14-01.  A total of 28 discrete solids samples and eight composite solids samples were submitted for laboratory analysis; at stormdrain structures where there were insufficient solids present for the required sample volume either no sample was collected or the solids were combined with solids from an upstream or downstream structure.  A total of four stormwater samples were collected (one from each outfall during two events) and submitted for analysis.  The stormdrain system solids samples and stormwater samples were analyzed for the Site PCOCs.

To better understand groundwater flow at the Site, groundwater levels were measured at each monitoring well and piezometer during each quarterly groundwater monitoring event and a 3-day tidal study was conducted.

In addition to the RI, soil samples were collected during construction activities related to modification of Building 14-01, and soil and groundwater samples were collected from the Port property to determine if contaminants are present in soil and groundwater on the Port property.

## RESULTS OF THE RI

To evaluate the analytical results for the RI, preliminary cleanup levels (pCULs) were developed and the results were compared to these pCULs.  Some of the groundwater and soil pCULs included in this RI are based on the Target Media Cleanup Levels (TMCLs) approved by EPA for the Boeing Plant 2 facility (Plant 2).  Plant 2 is located on the east bank of the LDW just north of the Jorgenson site and is a treatment, storage, and disposal (TSD) facility subject to Resource Conservation and Recovery Act (RCRA) regulation and permitting, which includes corrective action.  Other groundwater and soil pCULs are calculated in accordance with Model Toxics Control Act (MTCA) Method B, are calculated using the same procedure used for TMCL development, or are based on pCULs at other nearby sites, as requested by Ecology to provide consistency for various sites along the LDW.  The pCULs have not been adjusted to be no less than practical quantitation limits (PQLs) as provided for in the MTCA.  pCULs for some constituents including PCBs, most carcinogenic polycyclic aromatic hydrocarbons (cPAHs), and a few other constituents are less than PQLs and laboratory reporting limits (RLs).  PCULs will be adjusted after the RI to be no less than PQLs and, if needed, natural background.  Additional adjustments based on potential receptors, migration pathways, or exposure pathways may also be made at that time.

Soil vapor screening levels were developed by applying a vapor attenuation factor (VAF) to the pCULs developed for indoor air (MTCA Method B formula values, where available, and residential ambient air TMCLs developed for Plant 2 for those compounds for which Method B formula values are not available).

The pCULs for sediments offshore of the Site are the Preliminary Remediation Goals (PRGs) established in the EPA's *Proposed Plan for the Lower Duwamish Waterway (LDW) Superfund Site*

(EPA 2013). The PRGs are based on the SMS Sediment Cleanup Objectives (SCOs) or on other information such as toxicity thresholds that were identified in the LDW human health risk assessment or ecological risk assessment. Four contaminants (arsenic, cPAHs, total PCBs, and dioxins/furans) have pCULs that are based on human health risk PRGs. Total PCBs and arsenic have additional pCULs based on benthic organism PRGs (SMS criteria). In addition, an ecological risk-based PRG was developed for total PCBs for the river otter. The remaining SMS contaminants have pCULs based on benthic organism PRGs (SMS criteria).

The results of the comparison of RI analytical data to the pCULs, as well as pertinent field observations, are discussed below by media.

**SOIL**

For simplicity, the Site soil has been divided into three areas: North of the Former Slip 5 Area, Former Slip 5 Area, and South of the Former Slip 5 Area. The results of RI soil data compared to the pCULs are discussed by area below. The results also include soil data collected prior to the RI that may be representative of soil remaining at the Site.

**North of Former Slip 5 Area**

Constituents detected in soil samples from soil remaining in the North of Former Slip 5 Area (i.e., in soil samples that represent soil remaining in the Area, which include pre-RI samples) at concentrations greater than the pCULs are metals (arsenic, cadmium, copper, lead, mercury, and zinc); cPAHs; PCBs; and diesel-range, oil-range, and gasoline-range petroleum hydrocarbons. The contaminants of concern (COCs) in soil for this area are arsenic, cadmium, copper, and cPAHs, because exceedances for these constituents were the most numerous and widespread.

Areas of specific concern identified in the RI/FS Work Plan and located in the North of the Former Slip 5 Area include the Paint Storage Area, the Former Diesel and Gasoline Tanks Area, the Observed Tar-Like Substance Area; and the Former Slip 5 Outfall Area. No constituents were detected at concentrations exceeding the pCULs in the Former Diesel and Gasoline Tanks Area.

Constituents present at concentrations exceeding the pCULs in soil in the Former Paint Storage Area and the Former Slip 5 Outfall Area include cPAHs, PCBs, arsenic, copper and, in the Former Slip 5 Outfall Area only, cadmium. The majority of exceedances in both areas occur within the unsaturated zone. Soil contamination in the area of the Observed Tar-Like Substance consists of diesel-range, oil-range, and gasoline-range petroleum hydrocarbons; cPAHs; arsenic; and copper. The contamination appears to be associated with a tar-like substance encountered at a depth interval of 1 to 2 feet below ground surface (ft BGS).

Except for the tar-like substance and a non-hydrocarbon odor that was detected in the soil samples collected at MW-23 and MW-24, no signs of contamination were observed in the soil and no soil vapors were detected above 50 parts per million (ppm) using a photoionization detector (PID) at the RI explorations located North of the Former Slip 5 Area.

**Former Slip 5 Area**

Constituents detected in soil remaining in the Former Slip 5 Area (i.e., in soil samples that represent soil remaining in the Area, which include pre-RI samples) at concentrations greater than the pCULs include metals (arsenic, barium, cadmium, chromium, chromium VI, copper, lead, mercury, nickel, thallium, and zinc); cPAHs; PCBs; gasoline-range petroleum hydrocarbons; and naphthalene. The COCs in soil for this area are arsenic, cadmium, chromium, copper, lead, nickel, zinc, cPAHs, and PCBs, because exceedances for these constituents were the most numerous and widespread. The majority of the pCULs exceedances occurred in the fill materials identified as Fill C and Fill E. For example, all of the barium, chromium VI, and zinc exceedances; about 92 percent of the cadmium exceedances; about 85 percent of the lead exceedances; and about 75 percent of the PCB, arsenic, and copper exceedances occurred in samples of the Fill C material. All of the remaining lead exceedances and 57 percent of the remaining copper exceedances occurred in Fill E. Arsenic and cPAHs exceedances occurred in each of the five fill material types.

Areas of specific concern identified in the RI/FS Work Plan and located in the Former Slip 5 Area include the Former Hydraulic Test Pad Area, the Former Hazardous Waste/Hazardous Materials Storage Sheds Area, and the area in the Vicinity of I-205(s). No constituents were detected at concentrations greater than the pCULs in these three areas except for arsenic, cPAHs, and copper in the Former Hydraulic Test Pad Area; cPAHs and copper in the Former Hazardous Waste/Hazardous Materials Storage Sheds Area; and two arsenic exceedances and a single copper exceedance in soil samples collected from the pre-RI soil boring associated with the well I-205(s).

In general, the only signs of potential contamination were observed in Fill C and Fill E materials; including the presence of slag material and some hydrocarbon and non-hydrocarbon odors. The slag material and odors did not occur in the areas of specific concern.

**South of Former Slip 5 Area**

Constituents detected in soil remaining in the South of Former Slip 5 Area (i.e., in soil samples that represent soil remaining in the Area, which include pre-RI samples) at concentrations greater than the pCULs include arsenic, copper, cPAHs, PCBs, trichloroethene (TCE), and gasoline-range petroleum hydrocarbons. TCE was detected at concentrations greater than the pCUL in 3 percent of the soil samples that represent soil remaining in the Area; all of the exceedances are found near the southern property boundary and the source is likely to be on the 8801 site. The COCs in soil for this area are cPAHs, PCBs, arsenic, and copper, because exceedances for these constituents were the most numerous and widespread.

Areas of specific concern identified in the RI/FS Work Plan and located in the South of Former Slip 5 Area include the area in the Vicinity of I-206(s), the Former Washdown/Aqueous Degreaser Area, and the Former Washdown System Collection Tanks/Loading Dock Area. Arsenic was detected at concentrations exceeding the pCUL in 9 of 68 soil samples from the area in the Vicinity of I-206(s). cPAHs, PCBs, gasoline-range petroleum hydrocarbons, TCE, arsenic, and copper are present in soil at concentrations exceeding the pCULs in the Former Washdown/Aqueous Degreaser Area, but the exceedances are very limited. For example, PCBs, TCE, and gasoline-range petroleum hydrocarbon exceedances occurred in one soil sample each. cPAHs and PCBs are present in soil at concentrations exceeding the pCULs in the Former Washdown System Collection Tanks/Loading Dock Area; all of the exceedances occurred in shallow samples collected from construction-related excavations. cPAHs exceedances occurred in four samples and PCBs exceedances occurred in three samples.

Soil samples were collected from behind the wooden bulkhead on the Thompson property to evaluate the potential for soil erosion as a source of contaminants in offshore sediment. Arsenic was detected in a single sample at a concentration slightly above the sediment pCUL. The results were compared to the sediment pCULs because soil erosion to the sediments is the pathway of concern.

No visual signs of contamination were observed in the soil and no soil vapors were detected above 50 ppm using the PID at the explorations located South of the Former Slip 5 Area.

**GROUNDWATER**

The constituents detected at concentrations exceeding the pCULs in groundwater at one or more of the locations during the RI include VOCs [acrylonitrile; TCE; cis-1,2-dichloroethene (cis-1,2-DCE); 1,1-dichloroethene (1,1-DCE); and vinyl chloride]; SVOCs [benzoic acid and bis(2-ethylhexyl)phthalate (BEHP)]; cPAHs; PCBs; dissolved metals (arsenic, cadmium, copper, lead, nickel, selenium, thallium, and zinc); chromium VI; and total mercury. PCBs exceedances occurred only in groundwater at wells located in the Former Slip 5 Area and in wells located North of the Former Slip 5 Area. Metals exceedances primarily occurred in groundwater at the North of the Former Slip 5 Area in wells located within an area where arsenic-contaminated soil was treated and stabilized to prevent leaching of arsenic to groundwater and at piezometer PZ-1 located along the northern property boundary. The majority of TCE; cis-1,2-DCE; 1,1-DCE; and vinyl chloride exceedances occurred in groundwater near the southern property boundary. Vinyl Chloride exceedances also occurred south of the stabilized soil area.

The constituents detected at concentrations exceeding the pCULs in groundwater at one or more of the western-most well locations during the RI include cPAHs; PCBs; TCE; and dissolved metals (arsenic, cadmium, and nickel). The cPAHs and PCBs exceedances occurred in groundwater in the center of the western property boundary and in groundwater in the northwest corner of the property. The dissolved arsenic exceedances primarily occurred in those wells and piezometers located north of MW-9, with the highest arsenic concentrations in the western-most wells occurring at wells located downgradient of the Stabilized Soil Area. Dissolved arsenic concentrations downgradient of the Stabilized Soil Area ranged from 25.9 micrograms per liter (µg/L) to 2,460 µg/L.

**SOIL VAPOR**

VOCs were detected in the five soil vapor samples collected from beneath the Building 14-01 floor slab, but all of the concentrations were below the soil vapor screening levels.

**STORMWATER**

BEHP, total cadmium, and total zinc were present in stormwater at Outfall A at concentrations exceeding the groundwater pCULs; however, the cadmium and zinc groundwater pCULs apply only to the dissolved fraction. BEHP was present in the stormwater at Outfall B at concentrations exceeding the pCULs.

**STORMDRAIN SYSTEM SOLIDS**

A comparison of the analytical results for the stormdrain solids collected in September 2011 to sediment pCULs indicated that metals, PCBs, cPAHs, and SVOCs (primarily phthalates and benzyl alcohol) were present in some solids at concentrations exceeding the sediment pCULs. Metals (cadmium, chromium, copper, lead, mercury, and zinc) were detected at concentrations exceeding the sediment pCULs in samples from CBs located around Building 14-01 and in four other areas identified as Building 14-12 Area, Building 14-02/14-03 Area, Isaacson West Area, and Isaacson East Area. Additionally, arsenic was detected above the sediment pCUL in most CBs that also had SMS metals exceedances. Total PCBs were detected above the PRG throughout the Site.

**LOWER DUWAMISH WATERWAY SEDIMENT**

All of the surface sediment samples collected during the RI sediment investigation had detected concentrations of total PCBs and arsenic that were above the pCULs (based on human health risk PRGs). Surface sediments at four locations had total cPAH Toxic Equivalent Concentration (TEQ) results [expressed in units of micrograms per kilogram dry weight (µg/kg dw)] that were above the pCULs (based on human health risk PRGs). The calculated TEQ for dioxin and furan congeners analyzed in five surface samples [expressed in units of nanograms per kilogram dw (ng/kg dw)] were above the pCULs (based on human health risk PRGs).

However, if compared to SMS criteria, constituents that exceed the SMS criteria in the greatest number of samples are total PCBs (in 30 samples), arsenic (in 7 samples), and benzyl alcohol (in 5 samples). Detected concentrations of PCBs are widespread in the sediment offshore of the Site and exceed the SMS criteria in approximately 39 percent (30 of the 76) of the samples analyzed. At a majority of the sample locations, total PCBs concentrations that exceed the SMS criteria are found in deeper samples than other chemicals with exceedances of the SMS criteria; however, at four sample locations, arsenic concentrations that exceed the SMS criteria are found in deeper sample intervals where total PCBs concentrations are below the SMS criteria. The distribution of samples with total PCBs and arsenic concentrations that exceed the pCULS (including the SMS criteria) can be used to define the maximum horizontal and vertical extent of sediment contamination offshore of the Site.

Additional detected exceedances of the SMS criteria are two of the SMS list of metals (arsenic and zinc); two of the SMS Low Molecular Weight PAHs (LPAHs) (acenapthene and phenanthrene); four of the SMS High Molecular Weight PAHs (HPAHs) [fluoranthene, indeno(1,2,3-c,d)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene]; three of the SMS phthalate esters (diethyl phthalate, butyl benzyl phthalate, and BEHP); two of the chlorinated benzenes (1,2-dichlorobenzene and 1,4-dichlorobenzene); two ionizable organic compounds (benzyl alcohol and phenol); and total PCBs (by Aroclor). In general, chemical concentrations demonstrate either a steady decrease with depth or the concentrations remain stable within a sediment unit (e.g., silt or sandy silt unit) before dropping to nondetected concentrations in deeper sediment units with lower percentages of silt and TOC (e.g., poorly sorted sands or silty sands).

## CONCEPTUAL SITE MODEL

The potential receptors that may be exposed to contaminants at the Site and in offshore sediments include humans and, for contaminants present in the offshore sediment, also terrestrial ecological receptors and benthic organisms. Because nearly all of the Site is paved, terrestrial ecological receptors are not likely to be exposed to contaminants at the Site and the Site meets the requirements for ending a terrestrial ecological evaluation based on exposure analysis.

The potential sources for contaminants in soil and groundwater within the Former Slip 5 Area and the North of the Former Slip 5 Area include historical operations such as the former sawmills, the wood preserving facility, and the former steel forging and galvanizing plant. Boeing has not operated on the property North of Former Slip 5 except to conduct several cleanup activities, and paving and utilizing the area for equipment storage. Boeing operations are not considered a likely source of contamination in the area North of Former Slip 5. Boeing formerly operated two facilities that were located in the Former Slip 5 Area that had the potential for releasing contaminants to the Site: the Former Hazardous Waste/Hazardous Materials Sheds and the Former Hydraulic Test Pad Area. Based on results primarily from pre-RI soil investigations, the storage of hazardous waste/hazardous materials in the sheds did not result in a release of contaminants to the Site. In 1992, a release of hydraulic oil occurred from a holding tank associated with an oil/water separator located in the Former Hydraulic Test Pad Area. Approximately 900 tons of petroleum-contaminated soil was excavated from the area surrounding the oil/water separator and holding tank. Based on pre-RI and RI analytical results, the only residual contamination in soil in this area that may be related to the release is cPAHs. RI investigations conducted downgradient of the Former Hydraulic Test Pad Area indicate the presence of cPAHs and PCBs in groundwater; however, it is unlikely that the source of PCBs is the 1992 release of hydraulic oil because PCBs were never detected in soil and groundwater in that area. Debris and contaminants present in the material used to fill the former slip may also be a source of contaminants within the Former Slip 5 Area. Other potential sources for contaminants in soil and groundwater in the North of the Former Slip 5 Area include former sumps, the vein of tar-like substance, the stabilized soil material, and the material used to fill the former river meander.

The potential sources for contaminants in soil and groundwater in the South of the Former Slip 5 Area are offsite contamination, concrete joint material (CJM), and fill material. The most likely source for the VOCs (TCE, cis-1,2–DCE, 1,1,-DCE, and vinyl chloride) detected in soil and/or groundwater at concentrations exceeding the pCULs near the southern property boundary is located on the adjacent former PACCAR property (8801 site). PCE, TCE, and vinyl chloride are present in soil in two areas of concern that are adjacent to the Thompson property, and groundwater concentrations found at the 8801 site are more indicative of a nearby release than the concentrations detected in groundwater at the Thompson property. Furthermore, a draft focused FS states that a potential VOCs source area is located on the 8801 site and, based on the extensive data collected at the Site, there is not an identifiable source of VOCs on the Thompson property. The source of PCBs and cPAHs in soil in the South of the Former Slip 5 Area is unknown, but the contamination may be related to PCBs in CJM and PCBs and cPAHs in fill material.

Samples of various media present at the Site that could be a potential source of the contaminants present in the stormdrain solids (surface debris, paint chips, and CJM) were collected and analyzed during the RI. Based on the results, peeling paint, CJM on the Isaacson property, and surface debris may be a source of contaminants found in the stormdrain solids. Also, because the video-survey of the Boeing-owned stormdrain pipes identified cracks, soil infiltration may be a source of contaminants in the stormdrain system solids in some areas. Air deposition is also likely to be a source of contaminants in stormdrain solids. An evaluation of air deposition at Boeing Plant 2 identified moderate to high impacts from copper and zinc in dry deposition particulate samples. Other studies have identified air deposition as a source of PAHs, PCBs, metals, and phthalates. Analytical results for the stormwater samples indicate that constituents detected in stormdrain solids at concentrations above the SMS are not present in the stormwater at concentrations that result in stormwater concentrations above the pCULs for groundwater, except BEHP (Outfalls A and B) and cadmium and zinc (Outfall A only). Because these three constituents were detected in the stormdrain solids, although BEHP was only detected sporadically, particulates entrained in the stormwater samples may be the source of the constituents in the stormwater. Soil infiltration into the stormdrain system is not likely to be a source of these contaminants because BEHP was only sporadically detected in soil and concentrations were less than the pCUL, and cadmium and zinc were not detected at concentrations greater than the pCULs in areas where cracks or holes in the stormdrain piping were present that might allow soil intrusion. Groundwater infiltration is unlikely to be a source for these contaminants because BEHP is only detected sporadically in groundwater at concentrations exceeding the pCUL and concentrations of cadmium and zinc in groundwater do not exceed the pCULs in areas where cracks were observed in the stormdrain piping and the piping is likely to be submerged at some times of the year.

Potential past or current sources for contaminants in sediments offshore of the Site include discharge of Site groundwater and stormwater, erosion of bank soil, and offsite sources. Chemical results from the stormwater monitoring and the CBs solids indicate that Boeing Outfall B located at the south end of the Site and Boeing Outfall A located near the middle of the Site are currently not contributing to the sediment contamination offshore of the Site. Available information regarding the King County Outfall (King County International Airport Stormdrain #2) indicates stormwater from KCIA may be a past and continuing source. Except for arsenic in one soil sample at a concentration slightly above the sediment pCULs, soil samples collected through holes in the wooden bulkhead at the Thompson property did not contain metals or PCBs at concentrations exceeding the sediment pCULs and, therefore, erosion from this area is not likely to be a source of these contaminants in sediment. Concentrations in soil behind the Port bulkhead have not been determined. The placement of fill material within the footprint of the Former Slip 5 Area (a relic portion of a lower Duwamish River meander) may also have contributed to the elevated concentrations of some contaminants (e.g., arsenic) near the central portion of the offshore sediments prior to placement of the bulkheads.

**AREAS FOR CONSIDERATION IN THE FS**

Based on the evaluation of data presented in the RI compared to the pCULs, areas, contaminants, and source areas have been identified for further consideration in the FS. These are described below by general area and/or media:

- North of the Former Slip 5 Area. Contaminants in soil samples that represent soil remaining at the Site at concentrations greater than the pCULs include metals, cPAHs, PCBs, and total petroleum hydrocarbons. The COCs in soil for this area are arsenic, cadmium, copper, and cPAHs, because these exceedances are the most numerous and widespread. Contaminants in groundwater samples at concentrations greater than the pCULs include metals, cPAHs, PCBs, vinyl chloride, acrylonitrile, and two SVOCs. Detected SVOCs and acrylonitrile exceeded pCULs in a single sample each. COCs in groundwater for this area are metals, cPAHs, PCBs, and vinyl chloride, because these exceedances are the most numerous and widespread. Under and downgradient of the stabilized soil, the groundwater pH is elevated, which may affect the solubility of some metals. A specific source area to be considered in the FS is the area with the observed tar-like substance.

- Former Slip 5 Area. Contaminants in soil samples that represent soil remaining at the Site at concentrations greater than the pCULs include metals, cPAHs, PCBs, gasoline-range petroleum hydrocarbons, and naphthalene. The COCs in soil for this area are arsenic, cadmium, chromium, copper, lead, nickel, zinc, cPAHs, and PCBs, because these exceedances are the most numerous and widespread. Contaminants in groundwater samples at concentrations greater than the pCULs include metals, cPAHs, PCBs, and BEHP. COCs in groundwater for this area are arsenic, cadmium, cPAHs, and PCBs, because these exceedances are the most numerous and widespread. No specific source area was identified for consideration in the FS.

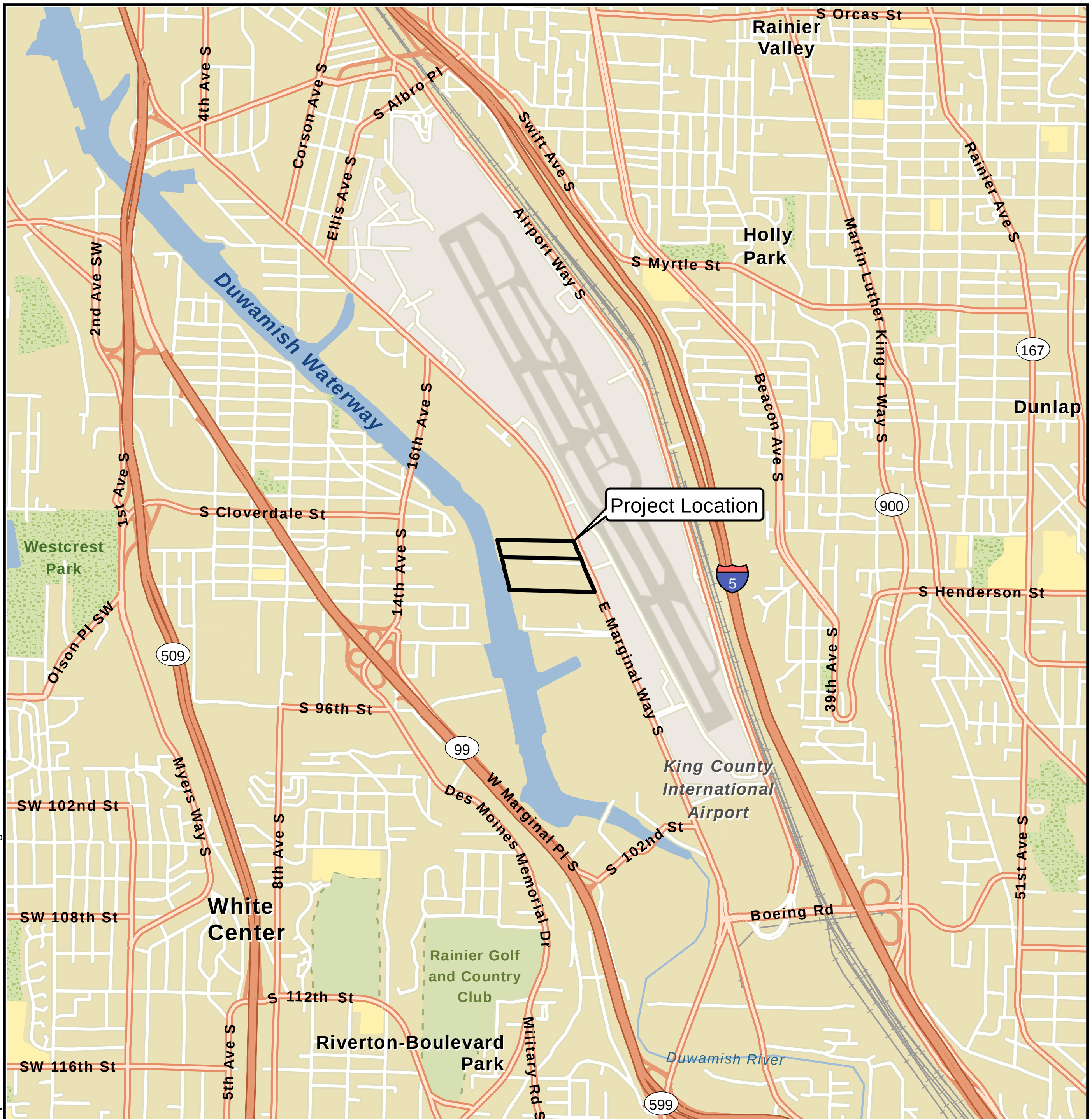
- South of Former Slip 5 Area. Contaminants present in soil samples that represent soil remaining at the Site at concentrations greater than the pCULs include cPAHs, PCBs, metals, TCE, and gasoline-range petroleum hydrocarbons. The COCs in soil for this area are cPAHs, PCBs, arsenic, and copper, because these exceedances are the most numerous and widespread. Contaminants in groundwater samples at concentrations greater than the pCULs include TCE and its breakdown products cis-1,2-DCE, 1,1-DCE, and vinyl chloride; metals; cPAHs; and, in a single sample, acrylonitrile. Of these, acrylonitrile; cis-1,2-DCE; and vinyl chloride were found only near the southern property boundary. The source for TCE and its breakdown products is likely to be on the 8801 site and they are, therefore, not considered COCs for the Site. The COCs in groundwater for this area are arsenic and chromium VI, because these exceedances are the most numerous and widespread.

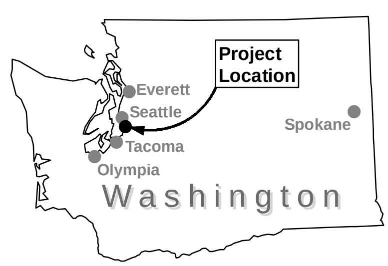
- Stormwater. Contaminants detected in stormwater at concentrations greater than the pCULs for groundwater are BEHP and, only at Outfall A at the northwestern portion of the Thompson property, cadmium and zinc. Concentrations of cadmium and zinc measured in stormwater are for total metals, although the pCULs for these metals are based on ambient water quality criteria for dissolved criteria. BEHP is detected sporadically in groundwater, stormwater, stormdrain solids, and source material samples at the Site.

- Stormdrain Solids. Contaminants present in stormdrain solids at concentrations greater than the sediment pCULs include metals, PCBs, cPAHs, and SVOCs. Peeling paint, CJM, and surface debris may be a source of these contaminants in stormdrain solids.

Based on the data collected during the RI, contaminants are present in sediment located offshore of the Site at concentrations exceeding the sediment pCULs. The need for cleanup and cleanup options will be evaluated as part of the LDW process and any sediment cleanup necessary offshore of the Isaacson-Thompson property will be conducted under EPA Record of Decision for the LDW.

Prior to preparation of the FS, proposed cleanup levels and points of compliance will be developed and submitted to Ecology for review and approval, incorporating adjustments for PQLs, cross-media protection, current and likely receptors, migration pathways, and exposure pathways, as appropriate. To the extent the proposed cleanup levels are higher than the pCULs, the contaminants and areas to be considered in the FS may change.



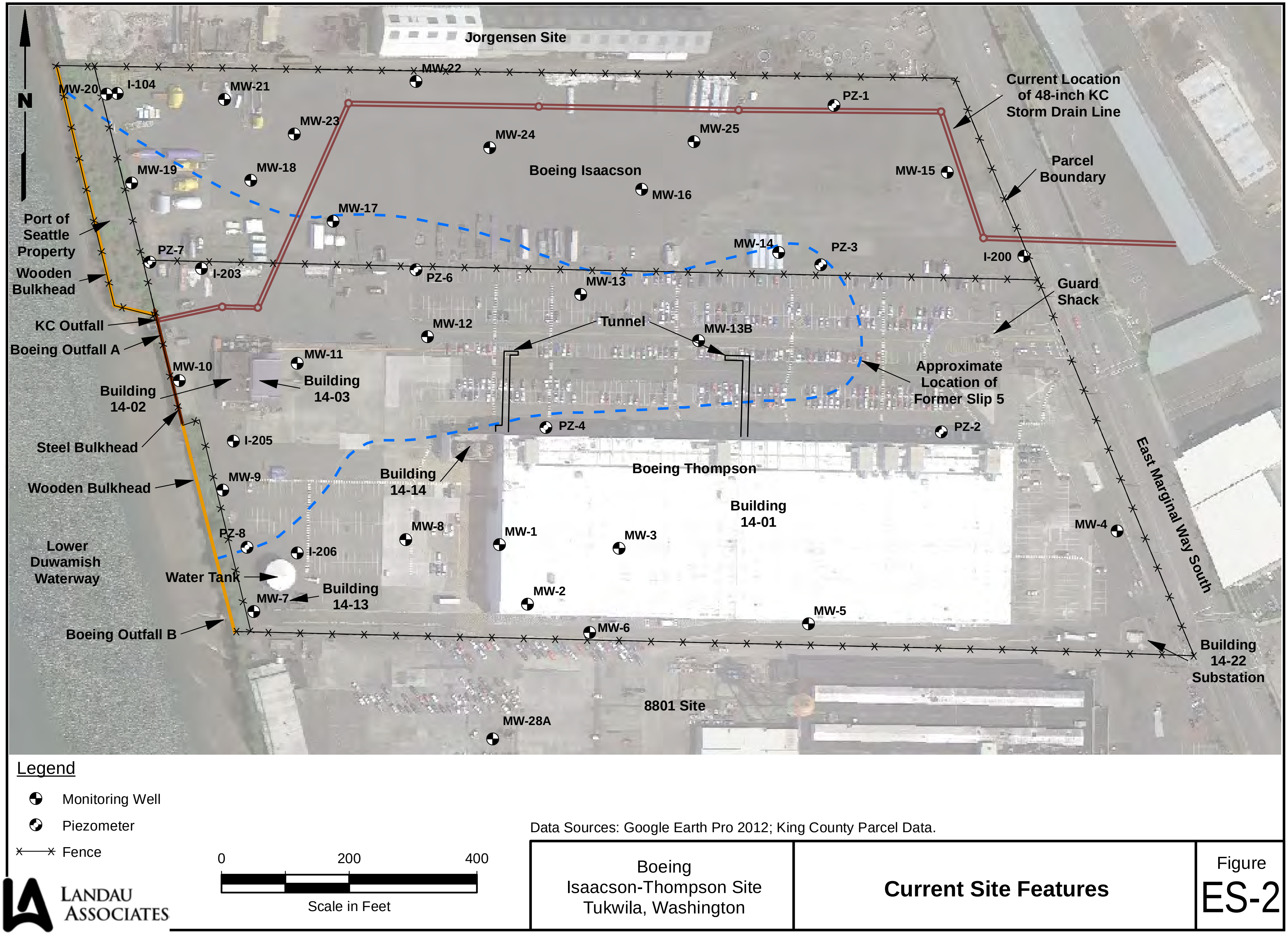

Data Source: Esri 2012

G:\Projects\025\190\213\013\RI\ES\FigureES-1VicinityMap.mxd 3/28/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Vicinity Map** | Figure<br>ES-1 |
|---|---|---|

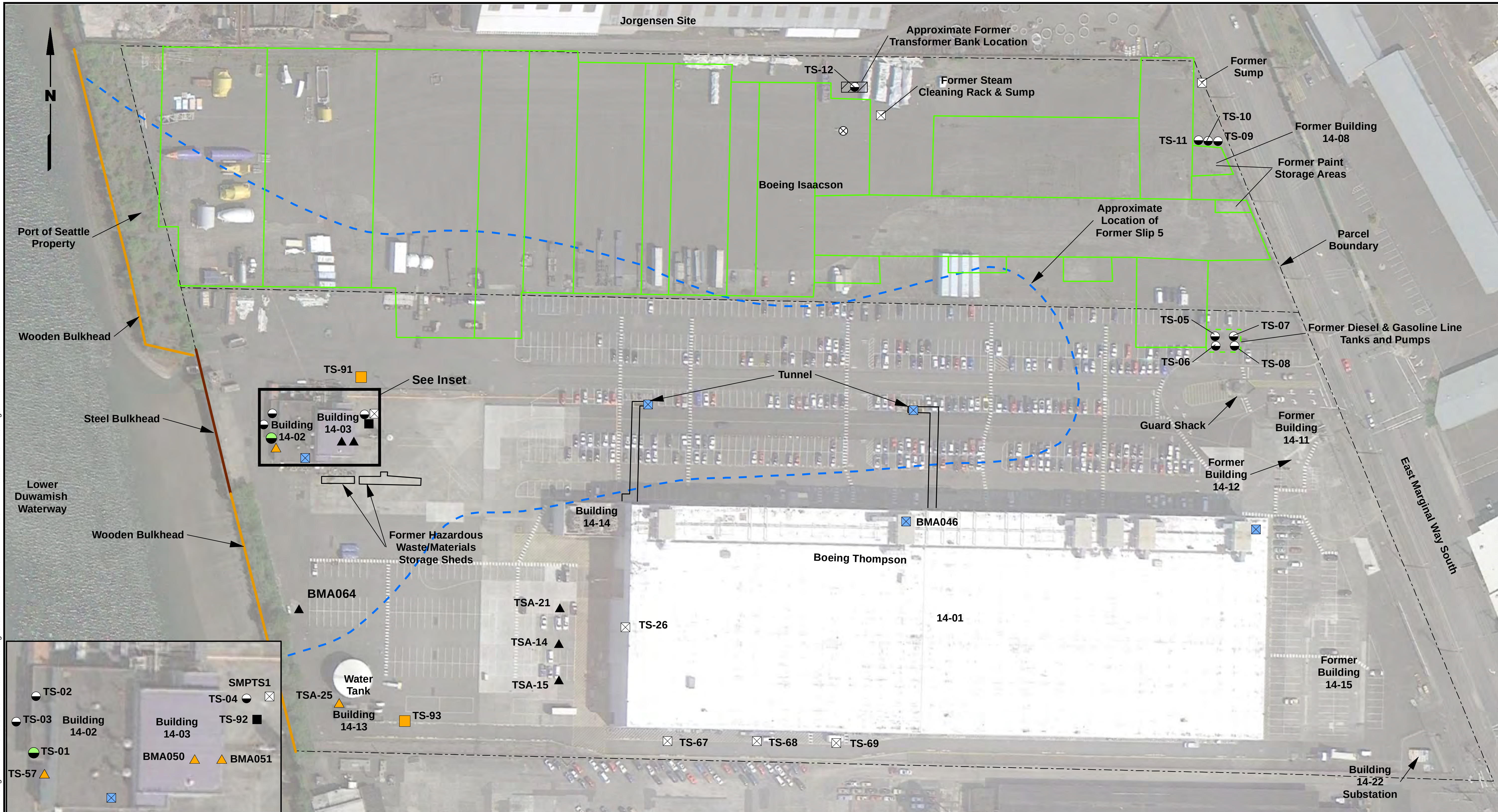
G:\Projects\025\190\213\013\RI\ES\FigureES-2CurrentSiteFeatures.mxd 3/28/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet




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

LANDAU ASSOCIATES

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




G:\Projects\025\190\213\013\RI\ES\FigureES-3PreviousGroundwaterMonitoringLocations.mxd 4/8/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

## Legend

- ▲ Former Aboveground Storage Tank (AST) Location
- ▲ Existing AST That is Used
- ■ Former Oil/Water (OWS) Separator
- ■ Existing OWS that is Used
- ☒ Former Sump Location
- ☒ Existing Sump Location
- ◒ Former Underground Storage Tank (UST) Location
- ◒ Existing UST That is Not Used
- ⊗ Former Boiler Tank Location
- ▭ Former Isaacson Building/ Building 14-05

0 120 240
Scale in Feet

Data Source: Google Earth Pro, 2012; King County Parcel Data

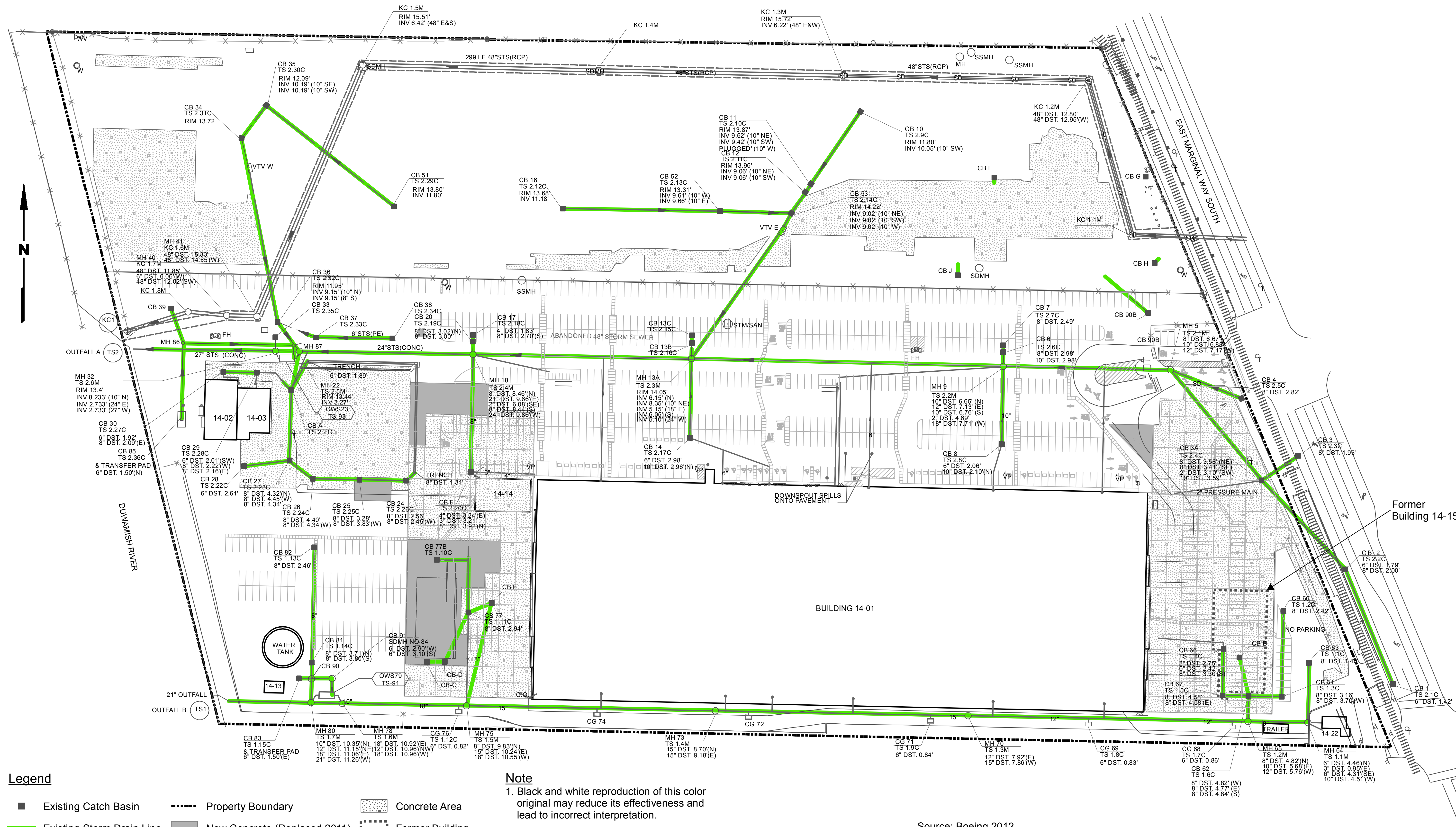
**Note**
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Approximate Former and Existing UST, AST, OWS and Sump Locations**

Figure
ES-3




## Legend

- Existing Catch Basin
- Existing Storm Drain Line
- Property Boundary
- New Concrete (Replaced 2011)
- Concrete Area
- Former Building

## Note

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

Source: Boeing 2012

0 120 240
Scale in Feet

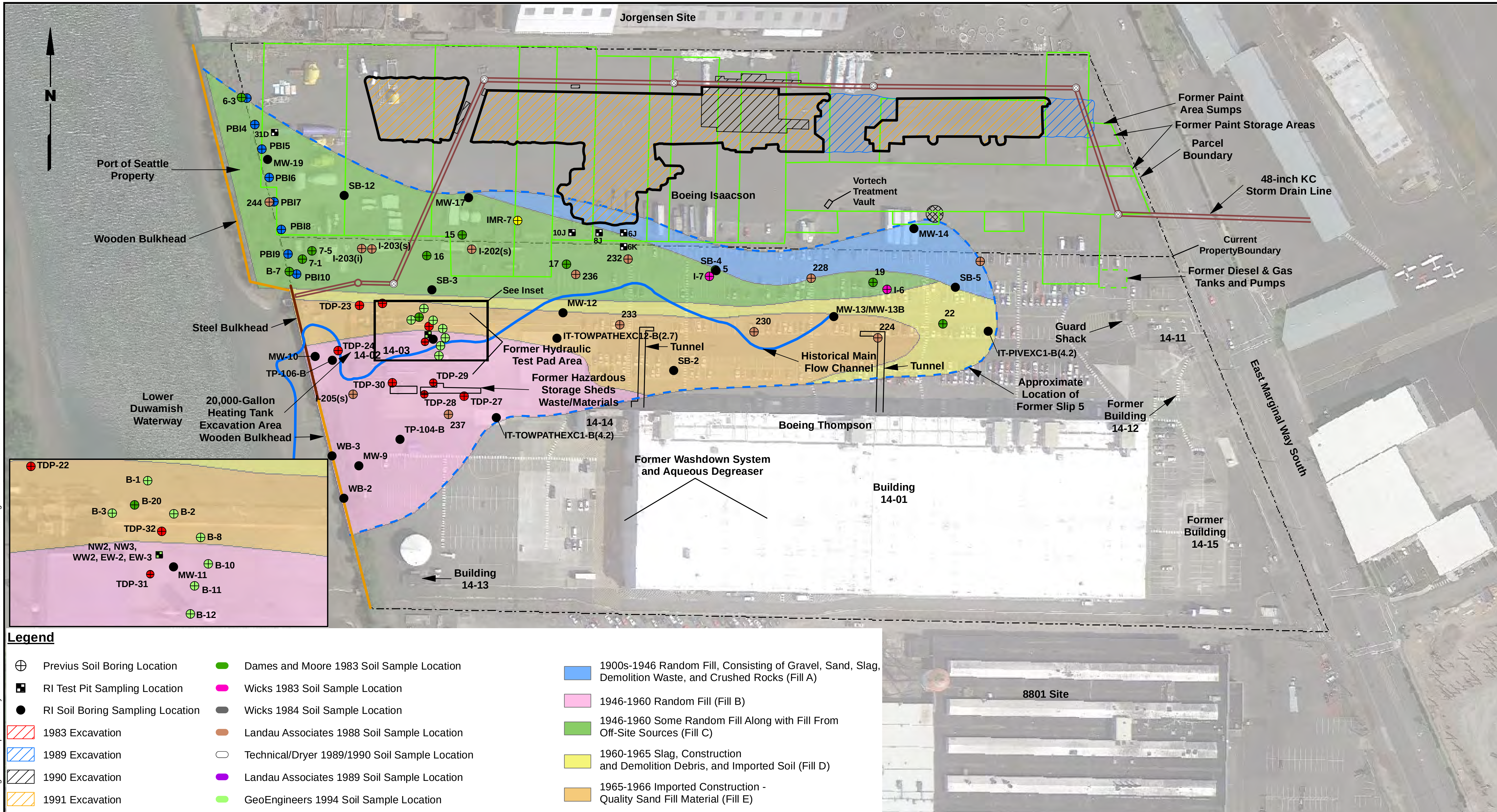
Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Current Storm Drain System**

Figure
ES-4

LANDAU ASSOCIATES

G:\Projects\025\190\213\013\RI\ES\FigureES-4CurrentStormDrainSystem.mxd 4/18/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




**Legend**

- Previus Soil Boring Location
- RI Test Pit Sampling Location
- RI Soil Boring Sampling Location
- 1983 Excavation
- 1989 Excavation
- 1990 Excavation
- 1991 Excavation
- Approximate Location of Former Slip 5
- Dames and Moore 1983 Soil Sample Location
- Wicks 1983 Soil Sample Location
- Wicks 1984 Soil Sample Location
- Landau Associates 1988 Soil Sample Location
- Technical/Dryer 1989/1990 Soil Sample Location
- Landau Associates 1989 Soil Sample Location
- GeoEngineers 1994 Soil Sample Location
- GeoEngineers 1996 Soil Sample Location
- Landau Associates 2006 Soil Sample Location
- Landau Associates 2009 Post-Excavation Soil Sample Location
- Landau Associates 2008/2009 Phase II ESA Soil Sample Location
- Landau Associates 2009 Property Boundary Soil Sample Location
- 1900s-1946 Random Fill, Consisting of Gravel, Sand, Slag, Demolition Waste, and Crushed Rocks (Fill A)
- 1946-1960 Random Fill (Fill B)
- 1946-1960 Some Random Fill Along with Fill From Off-Site Sources (Fill C)
- 1960-1965 Slag, Construction and Demolition Debris, and Imported Soil (Fill D)
- 1965-1966 Imported Construction - Quality Sand Fill Material (Fill E)
- Existing 48" King County Storm Drain Line
- Former Isaacson Building (Building 14-05)
- Current Extent of Stabilized Soil Material

0 150 300
Scale in Feet

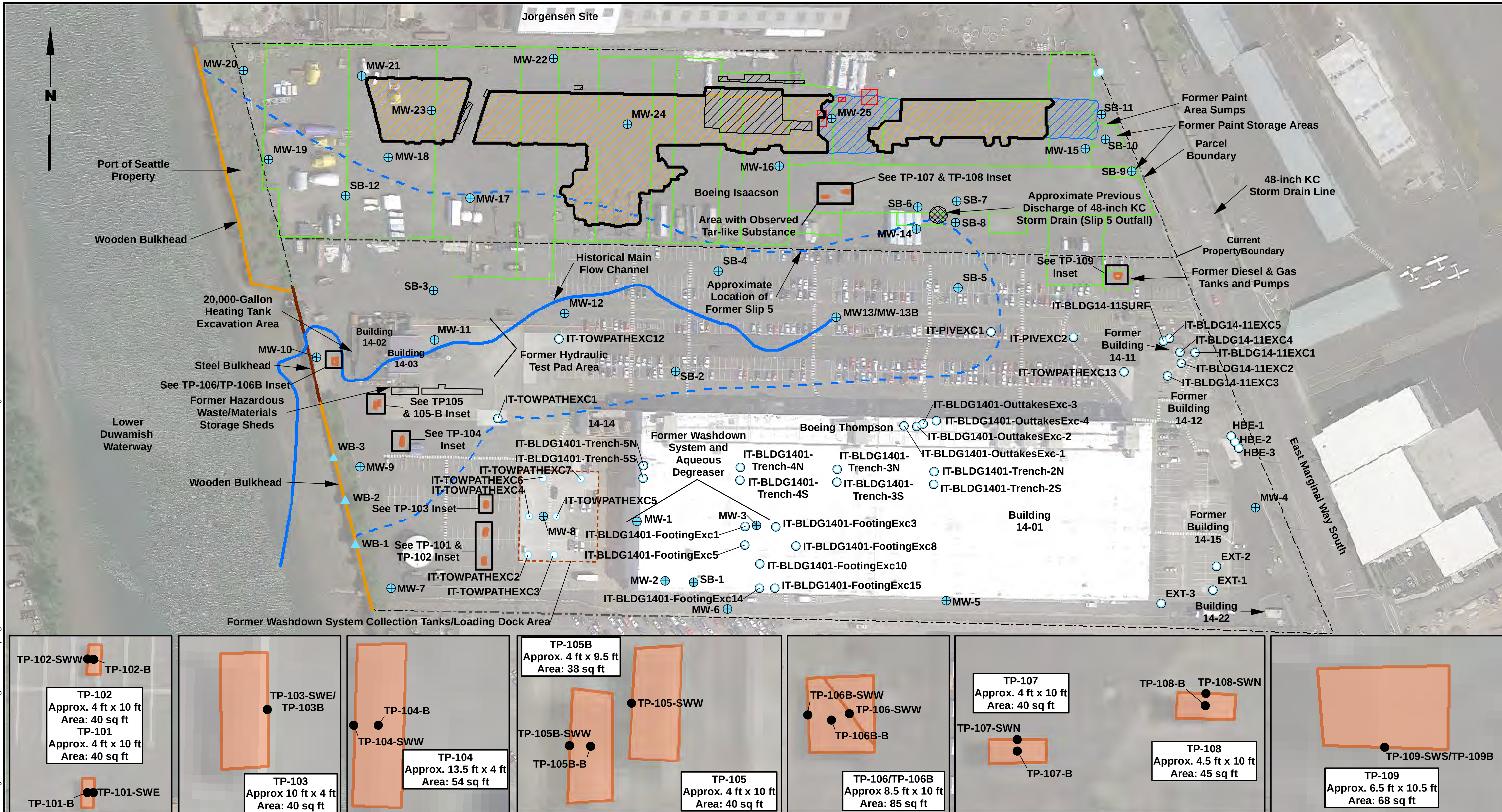
Data Sources: Google Earth Pro, 2012; King County Parcel Data

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

G:\Projects\025\190\213\013\RI\ES\FigureES-5Slip5FillHistory.mxd 3/28/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | Former Slip 5 Area Soil Sampling Locations Relative to Fill Material Placement | Figure ES-5 |
|---|---|---|




## Legend

- RI Soil Boring Sample Location
- RI Test Pit Soil Sampling Location
- RI Construction-Related Soil Sample Location
- RI Wooden Bulkhead Sample Location
- 1984 Excavation
- 1989 Excavation
- 1990 Excavation
- 1991 Excavation
- Former Isaacson Building/ Building 14-05
- Current Extent of Stabilized Soil Material
- Existing 48" King County Storm Drain Line
- Approximate Location of Former Slip 5

0 150 300

Scale in Feet

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

**Note**

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

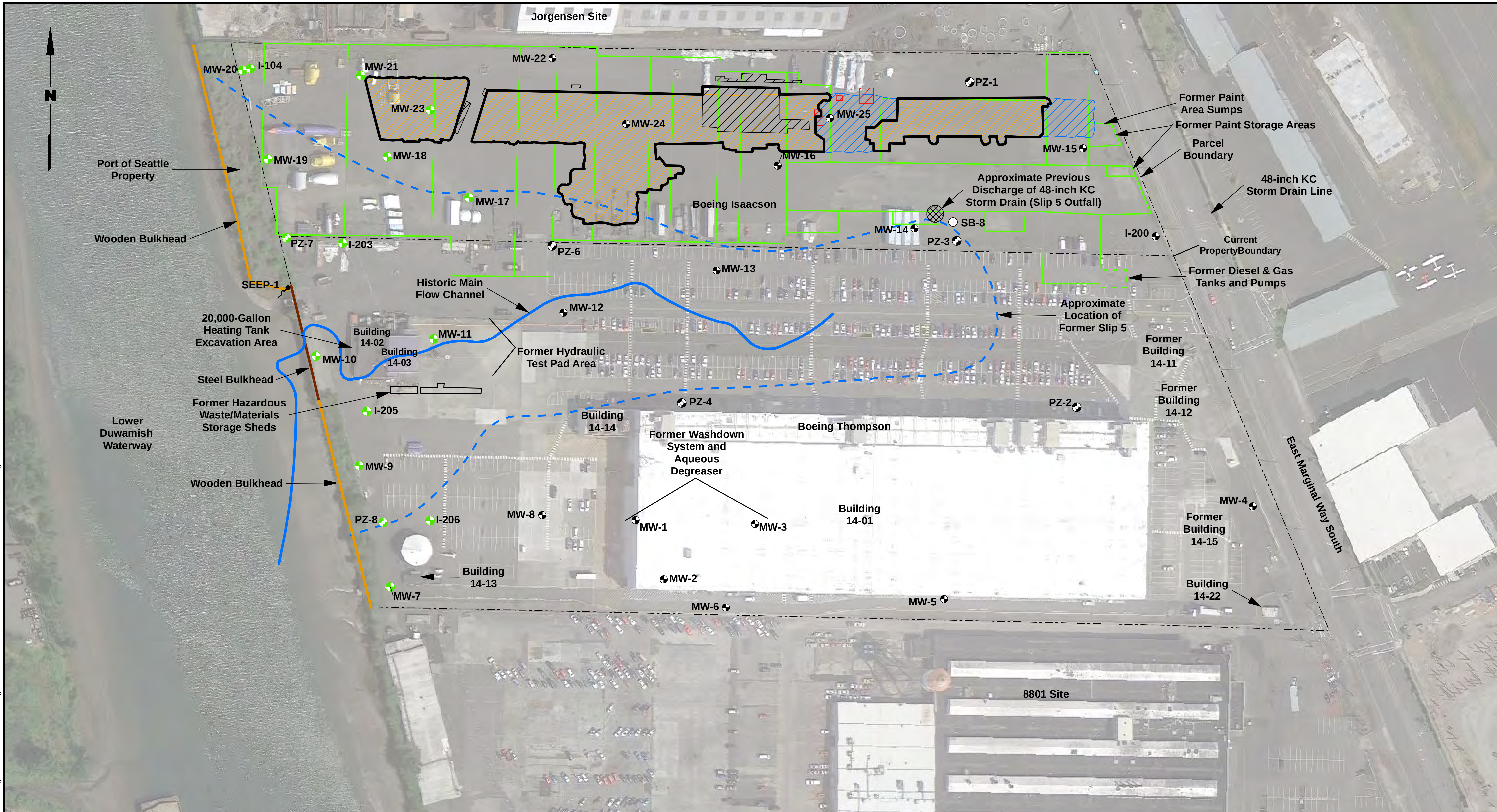
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**RI Soil Sampling Locations**

Figure
ES-6

G:\Projects\025\190\213\013\RI\ES\FigureES-6RemedialInvestigationSoilSamplingLocations.mxd 3/28/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet




G:\Projects\025\190\213\013\RI\ES\FigureES-7RIGWMonitoringLocations.mxd 3/28/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

**Legend**

- MW-22 — Monitoring Well Location
- MW-10 — Monitoring Well Location Where Groundwater Sampling Occured 1 Hour Before Low Tide and 1 Hour After a 0.0 Tide
- PZ-1 — Piezometer Location
- PZ-7 — Piezometer Location Where Groundwater Sampling Occured 1 Hour Before Low Tide and 1 Hour After a 0.0 Tide
- SB-8 — Direct-Push Boring Groundwater Sample Location
- SEEP-1 — Seep
- 1984 Excavation
- 1989 Excavation
- 1990 Excavation
- 1991 Excavation
- Current Extent of Stabilized Soil Material
- Former Isaacson Building (Building 14-05)
- Approximate Location of Former Slip 5

0 150 300

Scale in Feet

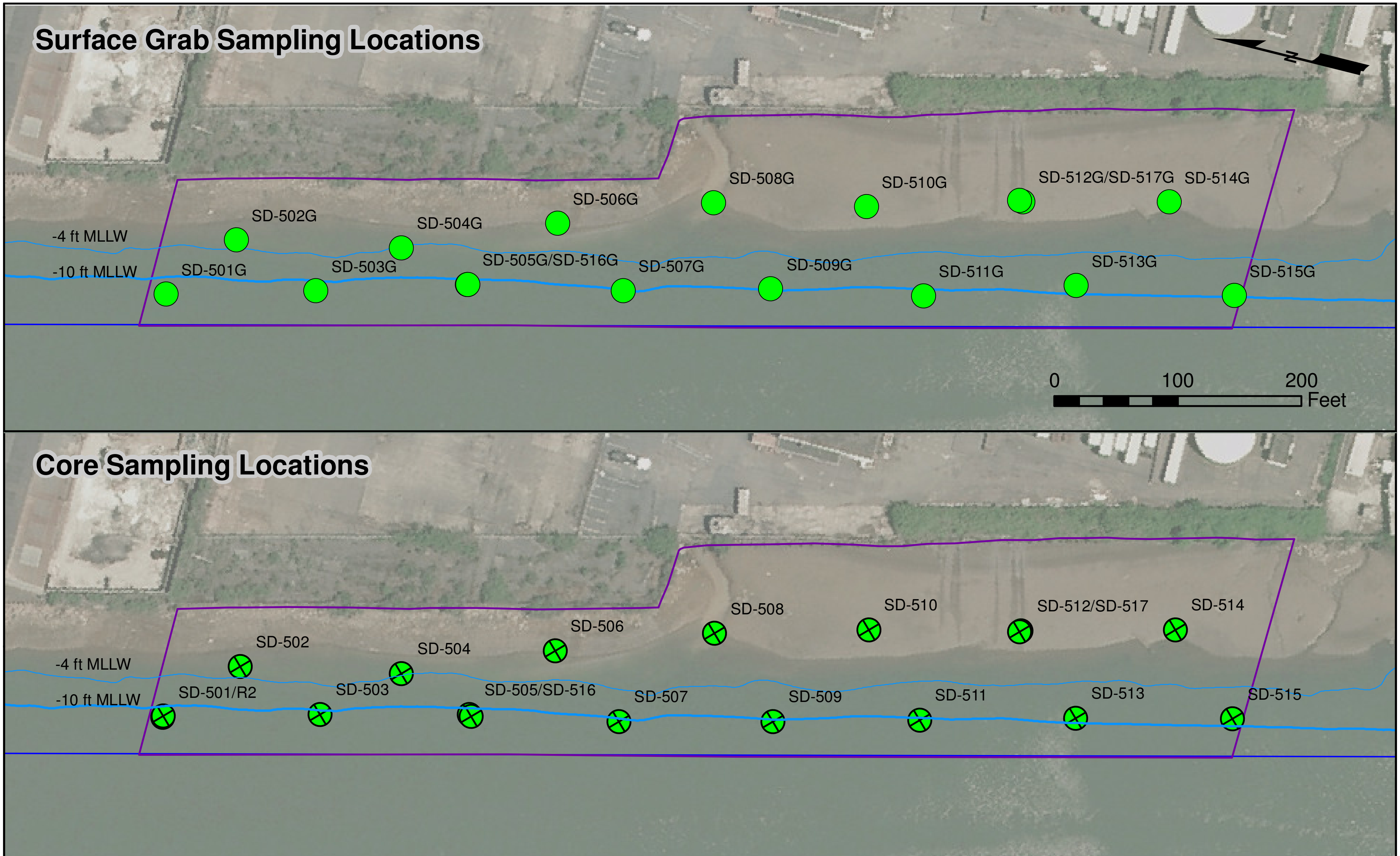
**Note**

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

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

LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | **RI Groundwater Monitoring Locations** | Figure ES-7 |
|---|---|---|




File path: P:\Boeing IT\LY12160140 Isaacson-Thompson 2012\BACKGROUND\Sampling Stations.mxd

**Legend**

- Surface (0-10 cm) Grab Sampling Locations
- Core Sampling Locations
- Edge of Navigation Channel

Note:
Bathymetric contour at -4 feet Mean Lower Low Water (MLLW) represents lower extent of intertidal zone, -10 feet MLLW lower extent of shallow subtidal zone.

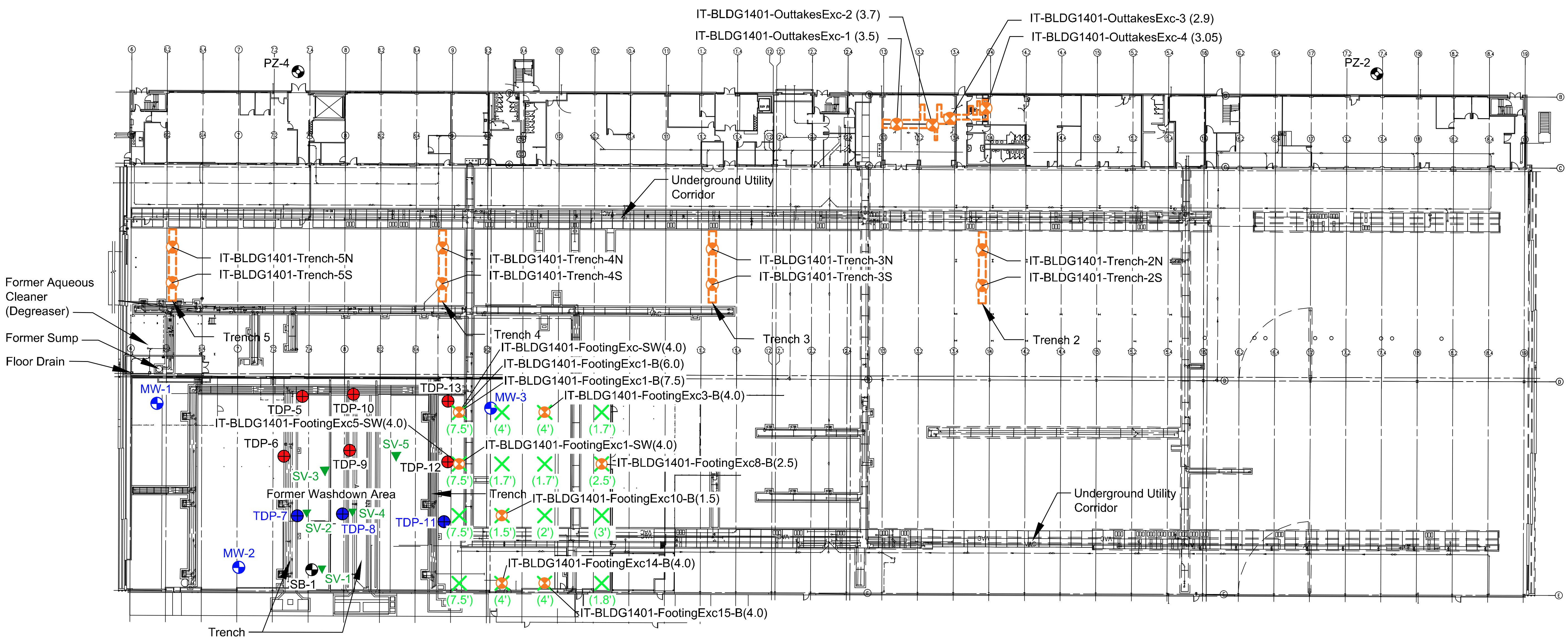
**RI SEDIMENT SURFACE GRAB AND CORE SAMPLING LOCATIONS**

Boeing Isaacson-Thompson Site
Tukwila, Washington

| By: RHG | Date:2/7/2013 | Project No. LY12160140 |
| --- | --- | --- |
| amec | | Figure **ES-8** |

## Legend

- 2011 Construction-Related Soil Sampling Locations
- (1.5') 2011 Construction-Related Excavation Location; (Depth of Excavation ft)
- Approximate Construction-Related Excavation Limits
- 2011 Building 14-01 RI Soil Boring Sampling Location
- 2011 Building 14-01 RI Soil Sampling and Monitoring Well Location
- 2011 Building 14-01 RI Soil Vapor Sampling Location
- 2008 Building 14-01 Soil Sampling Location
- 2008 Building 14-01 Soil and Groundwater Sampling Location
- Existing Piezometer Location




Base map source: Boeing Building 14-01 Mechanical Master (July 25, 1994)

Note

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

0 60 120
Scale in Feet

Landau Associates

Boeing
Isaacson - Thompson Site
Tukwila, Washington

**Soil Vapor and Other Sampling Locations Inside Building 14-01**

Figure ES-9

Building 14-01 Work Plan | V:\025\190\212.012\RI Report\Figure ES-9 Vapor.dwg (A) "Figure ES-9" 2/20/2013

# TABLE OF CONTENTS

Page

# TABLE OF CONTENTS

Page

# TABLE OF CONTENTS

Page

# TABLE OF CONTENTS

Page

# TABLE OF CONTENTS

Page

# FIGURES

## FIGURES CON'T

# TABLES

## TABLES CON'T

# APPENDICES

| Appendix | Title |
|---|---|
| A | Previous Sediment Sample Analytical Results |
| B | Summary of NPDES Stormwater Sample Analytical Results |
| C | RI Soil Boring and Test Pit Logs and RI Well As-Builts |
| D | Source Material Sampling and Evaluation Technical Memoranda |
| E | RI Sediment Sampling Field Forms |
| F | Port Property Investigation Data |
| G | Backup for Development of Non-TMCL pCULs |
| H | Boeing Plant 2 TMCL Technical Memoranda and EPA Approval Letter |
| I | Plant 2 TMCLs for Soil, Groundwater, and Ambient Air |
| J | Terrestrial Evaluation Exclusion Form |
| K | Tidal Study Calculations |
| L | RI Groundwater Analytical Results |
| M | RI Soil Analytical Results |
| N | RI Stormwater Sample, Storm Drain Solids Sample, and Source Material Sample Analytical Results |
| O | Corrugated Metal Pipe Video Survey (February 2012) |
| P | Storm Drain Pipeline Video Survey (October 2012) |
| Q | Detected Analytical Results for Soil Samples Representing Soil Remaining |
| R | Storm Drain System Evaluation/Source Material Sampling Technical Memorandum |
| S | Laboratory Analytical Data |
| T | Surface Water Effects on Groundwater Quality and Arsenic Mobility Figures |

# LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| µg/kg | Micrograms per Kilogram |
| µg/L | Micrograms per Liter |
| 1,1-DCE | 1,1-Dichloroethene |
| µS/cm | Microsiemens per Centimeter |
| APS | Applied Professional Services |
| ARAR | Applicable or Relevant and Appropriate Requirement |
| ARI | Analytical Resources, Inc. |
| AST | Aboveground Storage Tank |
| BAS | Boeing Abatement Services |
| BEHP | Bis(2-ethylhexyl)phthalate, also identified as di(2-ethylhexyl)phthalate |
| BGS | Below Ground Surface |
| BMP | Best Management Practice |
| CB | Catch Basin |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| cis-1,2-DCE | Cis-1,2-dichloroethene |
| CJM | Concrete Joint Material |
| CLARC | Cleanup Levels and Risk Calculations |
| cm | Centimeters |
| cm/s | Centimeters per Second |
| COC | Contaminant of Concern |
| cPAH | Carcinogenic polycyclic aromatic hydrocarbon [includes benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3cd)pyrene] |
| CSL | Cleanup Screening Level |
| CSM | Conceptual Site Model |
| DFFS | Draft Focused Feasibility Study |
| DGPS | Differential Global Positioning System |
| DO | Dissolved Oxygen |
| DQO | Data Quality Objectives |
| dw | Dry Weight |
| Ecology | Washington State Department of Ecology |
| EHS | Environment, Health and Safety |
| ENR | Enhanced Natural Recovery |
| EOF | Emergency Overflow |
| EP | Extraction Procedure |
| EPA | U.S. Environmental Protection Agency |
| ERA | Ecological Risk Assessment |
| ERM | Environmental Resources Management |
| ESA | Environmental Site Assessment |
| FS | Feasibility Study |
| ft | Feet |
| $ft^2$ | Square Feet |
| HPAH | High Molecular Weight Polycyclic Aromatic Hydrocarbon |

| | |
|---|---|
| HHRA | Human Health Risk Assessment |
| HVOCs | Halogenated Volatile Organic Compounds |
| IDW | Inverse Distance Weighting |
| IH | Industrial Hygiene |
| I-T | Isaacson-Thompson |
| KCDNRP | King County Department of Natural Resources and Parks |
| KCIA | King County International Airport |
| KCSD | King County Storm Drain |
| KCSWDM | King County Surface Water Design Manual |
| LAET | Lowest Apparent Effects Threshold |
| LDW | Lower Duwamish Waterway |
| LPAH | Low Molecular Weight Polycyclic Aromatic Hydrocarbon |
| $m^2$ | Square Meters |
| MDL | Method Detection Limit |
| mg/kg | Milligrams per Kilogram |
| mg/L | Milligrams per Liter |
| MIC/H | Manufacturing Industrial Center/Heavy Industrial |
| Min | Minute |
| MLLW | Mean Lower Low Water |
| mm | Millimeter |
| MSL | Mean Sea Level |
| MTCA | Model Toxics Control Act |
| mV | Millivolt |
| NFA | No Further Action |
| ng | Nanograms |
| ng/kg | Nanograms per Kilogram |
| NOAA | National Oceanic and Atmospheric Administration |
| NTU | Nephelometric Turbidity Unit |
| OC | Organic Carbon |
| OD | Outside Diameter |
| ORP | Oxidation Reduction Potential |
| PAH | Polycyclic Aromatic Hydrocarbon |
| PCB | Polychlorinated Biphenyl |
| PCE | Tetrachloroethene (also called Perchloroethylene) |
| PCOC | Potential Contaminant of Concern |
| PCP | Pentachlorophenol |
| pCUL | Preliminary Cleanup Level |
| PID | Photoionization Detector |
| PIV | Post Indicator Valve |
| PLP | Potentially Liable Person |
| Port | Port of Seattle |
| ppm | Parts per Million |
| pptr | Parts per Trillion |

## LIST OF ACRONYMS Con't

| | |
|---|---|
| PRG | Preliminary Remediation Goal |
| PQL | Practical Quantitation Limit |
| PVC | Polyvinyl chloride |
| QA | Quality Assurance |
| RAL | Remedial Action Level |
| RAO | Remedial Action Objective |
| RCRA | Resource Conservation and Recovery Act |
| RHP | Radiation Health Protection |
| RI | Remedial Investigation |
| RL | Reporting Limit |
| ROD | Record of Decision |
| SADA | Spatial Analysis Decision Assistance |
| SAP | Sampling and Analysis Plan |
| SCO | Sediment Cleanup Objective |
| Sediment SAP | Sediment Sample and Analysis Plan |
| SIM | Selective Ion Monitoring |
| Site | Boeing Isaacson-Thompson Site |
| SMS | Sediment Management Standards |
| SPCS | State Plane Coordinate System |
| SSL | Site Screening Level |
| SVOCs | Semivolatile Organic Compounds |
| SWPPP | Stormwater Pollution Prevention Plan |
| TCE | Trichloroethene |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TDS | Total Dissolved Solids |
| TEF | Toxicity Equivalency Factor |
| TEQ | Toxic Equivalent Concentration |
| TOC | Total Organic Carbon |
| TMCL | Target Media Cleanup Level (Used at Boeing Plant 2) |
| TPH | Total Petroleum Hydrocarbons |
| TSCA | Toxic Substances Control Act |
| TSD | Treatment, Storage, and Disposal |
| TSS | Total Suspended Solids |
| USACE | United States Army Corps of Engineers |
| USGS | U.S. Geologic Survey |
| UST | Underground Storage Tank |
| VAF | Vapor Attenuation Factor |
| VOCs | Volatile Organic Compounds |
| WAC | Washington Administrative Code |

# 1.0 INTRODUCTION

This report presents the results of a remedial investigation (RI) conducted for the Boeing Isaacson-Thompson (I-T) Site (Site) located in the city of Tukwila, King County, Washington (Figure 1). The Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA) are evaluating sources of contamination to the Lower Duwamish Waterway (LDW), source control actions, and cleanup options. A RI of the LDW, including the portion offshore of the Site, has been completed (Windward 2010) and a final feasibility study (FS) of the LDW (AECOM 2012) has been submitted to EPA and Ecology; EPA has prepared a Proposed Plan for the LDW that includes a description of the EPA's preferred alternative for cleanup of the LDW (EPA 2013). Ecology and EPA have determined that the Site is a potential source of contamination to the LDW. Investigations and cleanups are being, or will soon be, conducted by upland property owners under Ecology Agreed Orders at several properties along the LDW near the Site. These properties include the former Kenworth Truck Company property [PACCAR Inc. (PACCAR)/8801 East Marginal Way South property (8801 site)] adjacent to the Thompson property, and the Jorgensen Forge Corporation property (Jorgensen site) adjacent to the Isaacson property. Ecology has identified The Boeing Company (Boeing), as current owner of the Site, as a potentially liable person (PLP) for contamination at the Site.

The RI at the Site was performed under Agreed Order No. DE 7088 between Boeing and Ecology (Ecology 2010). In accordance with the Agreed Order, a work plan was prepared for the RI and FS (RI/FS Work Plan; Landau Associates 2011a) and approved by Ecology on September 21, 2011 (Ecology 2011a). Also, because Boeing was in the process of re-occupying Building 14-01 prior to finalization of the RI/FS Work Plan and because re-occupation of the building could significantly restrict access to the interior of the building, a separate work plan was prepared for conducting an investigation inside the building (Building 14-01 Investigation Work Plan; Landau Associates 2011b). This work plan was approved by Ecology on March 24, 2011 contingent on a change that was subsequently incorporated into the work plan (Ecology 2011b). The RI was conducted in accordance with these work plans. Deviations from these work plans are identified in Sections 4.0 and 5.0 of this report. At the request of Ecology, an additional work plan was prepared for conducting an investigation on the Port of Seattle Property located immediately adjacent to the Site (Landau Associates 2012a). This work plan was implemented by Boeing, as described in Section 6.0.

This report was prepared for submittal to Ecology in accordance with the provisions of the Agreed Order, and meets the general requirements for a RI as defined by the Washington Model Toxics Control Act (MTCA) Cleanup Regulation [Washington Administrative Code (WAC) 173-340-350]. The RI describes the environmental setting of the Site and field investigations that were conducted, identifies the nature and extent of contamination for affected media, and provides sufficient information to support development and evaluation of cleanup action alternatives.

# 2.0 SITE DESCRIPTION AND BACKGROUND

This section describes current Site features and land use, the history of development of the Site, and historical Site uses.

## 2.1 CURRENT SITE FEATURES AND LAND USE

The Site is comprised of two parcels of land surrounded by a security fence, with limited access. The Site is used for industrial purposes and, as described in Section 7.2, meets the criteria for industrial use. Parcel #0001600014 is a 9.84-acre parcel of land located near the east side of the LDW, at approximately river miles 3.7 to 3.8, as measured from the southern tip of Harbor Island. This parcel is known as the Isaacson property because, in 1984, it was purchased by Boeing from the Isaacson Corporation. The property was apparently owned or operated at various times by Isaacson Iron Works, Isaacson Steel Company, Isaacson Steel Works, and Isaacson Corporation. For this report, all of these entities will be identified as Isaacson. Parcel #0007400033 is a 19.35-acre parcel of land located on the eastern bank of the LDW, directly south of the Isaacson property. This parcel is known as the Thompson property because, in 1956, most of the property was purchased by Boeing from Charles Thompson. The parcels are referred to collectively as the Isaacson-Thompson Site. The total size of the Site is 29.19 acres. The Isaacson property and the northern portion of the Thompson property do not extend all the way to the LDW; a strip of land, under Port of Seattle (Port) ownership and/or control, consisting of the shoreline bulkhead (wooden), and approximately 20 to 30 feet (ft) landward of the bulkhead, separates this area from the LDW. A Site plan that shows the property features and boundaries is provided as Figure 2.

The Site is located in an area of industrial properties and is bordered on the north by the Jorgensen site; on the east by East Marginal Way South and King County International Airport (KCIA); and on the south by the 8801 site, currently owned by Merrill Creek Holdings and leased by Insurance Auto Auctions. As noted above, the Isaacson property and the northern portion of the Thompson property are bordered by a strip of land owned by the Port and then the LDW, and at the remainder of the Thompson property by the LDW.

The Site slopes slightly to the west and is at an average elevation of approximately 10 ft above mean sea level (MSL). Surface topography in the vicinity of the Site is generally level and slopes slightly to the west/southwest toward the LDW [U.S. Geologic Survey (USGS) 1983].

### 2.1.1 ISAACSON PROPERTY

The Isaacson property is the northern portion of the Site. The current Isaacson property boundaries are shown on Figure 2; however, prior to October 2001, the property boundary between the Isaacson property and the Thompson property was about 75 ft south of its current location. This portion of the Site consists of paved land and is separated from the Thompson property by a security fence. There are no buildings on this portion of the Site. A 48-inch-diameter King County storm drain line conveys stormwater from approximately 237 acres of the central portion of the KCIA, which consists of the flight line and industrial facilities that support the KCIA, along the northern Isaacson property boundary to an outfall (KCSD#2 Outfall) located on the Thompson property (Figure 3). The KCSD#2 Outfall also serves as an emergency overflow (EOF) for the city of Seattle. There are five storm drain manholes connected to the King County storm drain on the Isaacson property; stormwater from the Isaacson property does not enter this storm drain line. Thirteen stormwater catch basins (CBs) are present on the Isaacson property. Nine of these CBs are connected to a Boeing-owned storm drain line that conveys stormwater to the LDW via an outfall (Outfall A; also referred to as TS-2), which is located on the Thompson portion of the Site (Figure 3). Four of the CBs are not active; they are not connected to the Boeing-owned storm drain line and appear to have been connected to a former King County 48-inch storm drain line that was abandoned in 1990. Verification of the pipeline connections for these CBs was attempted during the RI and is discussed in Section 8.1.7. The Boeing storm drain system on the Isaacson portion of the Site includes two CONTECH® Vortechs® (Vortechs) treatment vaults that treat stormwater by allowing suspended solids to settle out prior to discharge to the LDW. The vaults were installed in 2008 during excavation activities (Section 3.1.22). These excavation activities were classified by the city of Tukwila as a "redevelopment" project because the project involved altering existing site grades; therefore, upgrades to the stormwater treatment and conveyance system including installation of the Vortechs system were required in accordance with the King County Surface Water Design Manual [KCSWDM; King County Department of Natural Resources and Parks (KCDNRP) 2005]. The Vortechs system at the Isaacson property is sized to accommodate peak storm events. The locations of the King County storm drain system and outfall, Vortechs treatment vaults (VTV-W and VTV-E), and the Boeing-owned storm drain system and outfalls are shown on Figure 3. The Isaacson property is occasionally used by Boeing for temporary trailer and container storage and vehicle parking. Boeing is currently evaluating options for industrial uses of the Isaacson property.

### 2.1.2 THOMPSON PROPERTY

The Thompson property is the southern portion of the Site. This portion of the Site is developed with several structures that include: a 316,000 square foot ($ft^2$) industrial building (Building 14-01) and several support structures including a boiler house (Building 14-02); two mechanical buildings (Buildings 14-03 and 14-14); a fire pump house (Building 14-13) and water tank; an electrical substation (Building 14-22); and a guard shack. Two pedestrian tunnels are located on the north side of Building 14-01 (Figure 2); the tunnels are approximately 100 ft long and extend 11 ft below ground surface (BGS) (above the groundwater table, which is generally encountered at about 11 to 12 ft BGS).

Existing structures on the Thompson property are shown on Figure 2. Three storage tanks are currently located on the Thompson property: a 20,000-gallon boiler fuel underground storage tank (UST; TS-01) located on the west side of Building 14-02, which was decommissioned in-place in 2003; a 500-gallon diesel aboveground storage tank (AST; TS-57) located on the west side Building 14-02; and a 200-gallon diesel AST (TSA-25) located on the northwest side of Building 14-13. Each AST is located within secondary containment. In addition, there is an aboveground water tank located northwest of Building 14-13. The approximate locations of these ASTs and UST are shown on Figure 4.

In addition to the ASTs and UST, five sumps exist at the Site. One of the sumps is located in the southeast corner of Building 14-02 (this has not been assigned a numerical designation), it is approximately 3 $ft^2$ and is located in a 10-$ft^2$ by 6-ft deep mechanical pit that houses underground utility pipes. The sump does not appear to be connected to the existing storm drain. At the time of the reconnaissance, a pump was present in the sump. The depth of the sump has not been determined. Sump BMA046 is located in the northern portion of Building 14-01, in an area that has historically been used for office space. Sump BMA046 is associated with a sanitary sewer lift station. The other three existing sumps are located outside of Building 14-01. Two of these sumps are associated with tunnels located north of Building 14-01. These sumps are 2-ft by 2-ft and 3-ft deep concrete structures located 11 ft BGS at the base of the stairs used to exit the tunnels. The sumps accumulate rainwater that collects at the base of the stairs. The third sump is located at the northeast corner of Building 14-01 at the base of the stairs that lead to a room housing piping and valves associated with the main water line. This sump also accumulates rainwater that collects at the base of the stairs. Construction details for this sump are not known, but are likely similar to the sumps associated with the tunnels. Rainwater collected in each of these three sumps is discharged, as needed, to the Site storm drain system. Other ASTs, USTs, and sumps shown on Figure 4 have been removed.

Fifty-five CBs, 15 storm drain manholes, and 2 oil/water separators (TS-91 and TS-93) are also present on the Thompson property. One of the CBs is not active and is not connected to the Boeing-owned storm drain line and appears to have been connected to a former King County 48-inch storm drain line that was abandoned in 1990. Verification of the pipeline connection for this CB was attempted during the RI and is discussed in Section 8.1.7. Stormwater collected in the remaining structures is discharged to the LDW via Boeing storm drain lines and two outfalls. The storm drain system is shown on Figure 3. One of the outfalls is located near the northwestern portion of the Thompson property, as described in Section 2.1.1, and is identified as Outfall A (also referred to as TS-2) on Figure 3. The second outfall is located at the southwest corner of the Thompson property near the 8801 site boundary and is identified as Outfall B (also referred to as TS-1) on Figure 3. There are also three KCIA storm drain manholes on the Thompson property that are connected to the KCIA storm drain that runs beneath the Isaacson and Thompson properties and discharges to the LDW. Stormwater from the Thompson property does not enter the KCIA drain line. The outfall for the KCIA storm drain is located just north of Boeing Outfall A, near the Thompson and Isaacson property lines, as shown on Figure 3.

A steel bulkhead is located along the LDW shoreline in the northern portion of the Thompson property and a wooden bulkhead is located along the southern portion of the shoreline, as shown on Figure 2.

Boeing ceased active operations at the Thompson property in December of 2008 and the property was used only for storage for several years. Currently, Boeing's P-8 program operates at the Thompson property, and building modifications to expand operations were conducted in 2011 and 2012.

### 2.1.3 Adjacent Properties

The Site is located in an urban industrial area. Current land uses surrounding the Site include steel and aluminum forging and milling (Jorgensen site), storage of damaged and wrecked vehicles (8801 site), and an airport (KCIA). The area has been used for industrial purposes since the 1920's and is likely to remain industrial in the future. Both the Jorgensen site and the 8801 site are contaminated properties that have been identified by Ecology as cleanup sites and are under Ecology Agreed Orders.

The 8801 site is located at 8801 East Marginal Way South in Tukwila, Washington, which is adjacent to the south Thompson property boundary. The site includes the upland area and the sediments in the LDW offshore of the upland area. The upland area of the site is about 25 acres and is covered with paved surfaces and buildings. The property has been used for industrial purposes since 1929. Ecology and PACCAR, a former property owner, signed an Agreed Order in 2006 requiring PACCAR to evaluate sediment contamination and whether upland contamination was reaching LDW sediments. Ecology, PACCAR, and Merrill Creek Holdings, the current property owner, signed an Agreed Order in 2008 to address the upland area of the site (Ecology Website 2013a). PACCAR and Merrill Creek Holdings prepared a RI report identifying contaminants of concern (COCs), areas of concern, and data gaps. They subsequently prepared a data gaps work plan to address the identified data gaps. Identified contamination at the upland portion of the 8801 site includes petroleum hydrocarbons; polycyclic aromatic hydrocarbons (PAHs); volatile organic compounds (VOCs); semivolatile organic compounds (SVOCs); polychlorinated biphenyls (PCBs); and metals (primarily chromium, copper, lead, nickel and zinc) (Ecology Website

2013a). VOCs including tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride are present in soil and groundwater at the 8801 site near the northern property boundary with the Thompson property. Contaminants present in sediments include PCBs and cPAHs.

The Jorgensen site is located at 8531 East Marginal Way South in Seattle, Washington, which is adjacent to the north Isaacson property boundary. The site is approximately 21.6 acres. Identified contamination at the Jorgensen site includes PCBs; petroleum hydrocarbons; and metals (arsenic, cadmium, chromium, lead, and nickel) in soil and petroleum hydrocarbons and metals in groundwater (Ecology Website 2013b). Slag has been stored in an unpaved area at the southwest corner of the site, near the southern boundary with the Isaacson property (Anchor QEA 2009). PCBs have been detected in sediments offshore of the Jorgensen site. Jorgensen Forge Corporation entered into an Agreed Order with Ecology and an Administrative Order on Consent with EPA to determine if the site is an ongoing source of contamination to sediments in the LDW and to determine a recommended sediment remedial action (Anchor QEA 2011).

## 2.2 SITE DEVELOPMENT

Meanders of the Duwamish River were formerly present in the area of the Site including a segment of the river that flowed west to east through the approximate center of the Site (Figure 5). Between 1910 and 1917, extensive dredge and fill operations were conducted in the lower Duwamish River valley and the river was channelized and placed in its current location to the west of the Site. The river channel modifications resulted in the creation of Slip 5 through part of the Site. Slip 5 was oriented west to east near the current center of the Site and extended from the waterway across approximately two-thirds of the Site (Figure 6). In 1936, filling of the slip began, to allow development of the Site. Filling occurred in phases and was completed in about 1966. Based on aerial photographs, much of the filling occurred prior to the mid-1960s. The fill history of Slip 5 is shown on Figure 7.

The first known development of the Site occurred in 1917 after the river channelization. The Bissell Lumber Company constructed a sawmill on land in the South of the Former Slip 5 Area. Shortly thereafter, in 1920, the Duwamish Lumber Company operated a sawmill on the western portion of the Site, in the North of the Former Slip 5 Area, and a planing mill was operated by the Tyee Lumber Company at the eastern end of Slip 5. The approximate locations of these operations are shown on Figure 6. Structures related to the operations are also visible in a 1936 aerial photograph (Figure 8). In 1943, the Isaacson property was purchased by Isaacson and was developed between 1943 and 1966. The Isaacson building was expanded from east to west in phases to cover nearly the entire land surface in the North of the Former Slip 5 Area (Figure 6). Boeing purchased the Isaacson property from Isaacson in 1984. In 1988, Boeing proposed to redevelop the Isaacson property by demolishing the Isaacson building (referred to by Boeing as Building 14-05) and constructing a new building (referred to as Building 14-09). The Isaacson building was dismantled prior to 1990, but Building 14-09 was never constructed. With the exception of various earthwork projects, which are discussed later in this document, the layout of the northern portion of the Site has remained relatively unchanged since 1990. The Thompson facility was developed in the southern portion of the Site beginning in 1966. Until 2011, the layout of the Thompson facility had remained relatively unchanged. In 2011, Boeing re-occupied Building 14-01 and building modifications were made, including removal of a loading dock and an inactive 5,000-gallon aqueous wastewater AST (TSA-21) located west of Building 14-01 and removal of the aqueous degreaser formerly located in the western portion of Building 14-01. The sump (TS-26) associated with the aqueous degreaser was decommissioned in place when the aqueous degreaser was removed (May 2011). Historical aerial photographs are provided in the Phase I Environmental Site Assessment (ESA) reports (Landau Associates 2008a,b), and are further discussed in Section 3.0.

## 2.3 HISTORICAL SITE USE AND FEATURES

This section identifies and describes the historical uses of the Site, based on information developed by previous Phase I ESAs (Landau Associates 2008a,b). These documents should be reviewed for a more thorough description of historical Site uses.

Historical uses of the Isaacson property (northern portion of the Site) include:

- **Duwamish Lumber Company.** The Duwamish Lumber Company operated a sawmill in the western portion of the Isaacson property, in the North of the Former Slip 5 Area, from approximately 1920 until sometime prior to 1946. Structures associated with the Duwamish Lumber Company included a sawmill, lunch room, engine room, blacksmith, lumber storage, wood bin, block bin, sawdust bin, and waste burner.
- **Tyee Lumber Company.** The Tyee Lumber Company operated a planing mill at the eastern end of Slip 5 during the approximate same time period as the Duwamish Lumber Company operations. Structures associated with the Tyee Lumber Company included garages, office, a planing mill, dry kilns, and a shavings bin. A storage tank was located north of the dry kilns building.
- **Mineralized Cell Wood Preserving Company.** The Mineralized Cell Wood Preserving Company operated on the northern side of Slip 5 for an unknown period of time beginning prior to 1945. The operations of this company involved heating a solution of arsenic and sulfate salts of copper and zinc and applying the solution under pressure to the base of logs. Storage tanks associated with this operation were reportedly cleaned twice per day and sludge and remaining chemicals in the tanks were reportedly drained directly to the ground surface.
- **Isaacson/United States Navy.** In 1941, the United States Navy constructed steel melting, forging, and fabricating facilities north of the Site. The facilities were known as the Isaacson Iron Works Plant No. 2. Portions of the Isaacson property were used for activities associated with the plant, which included storage of scrap metal prior to it being melted down. Between 1943 and 1945, a galvanizing plant was constructed in the northeast corner of the Isaacson property; it was dismantled in 1967.

- **Isaacson.** The Isaacson property was purchased by Isaacson in 1943. In the 1950's, Isaacson purchased Isaacson Iron Works Plant No. 2 and expanded facilities from east to west in phases to cover nearly the entire land surface of the Isaacson property in the North of the Former Slip 5 Area. Structures associated with the facility included tractor repair, welding, tractor sheds, storage shed, tractor parts warehouse, offices, a scrap iron yard, galvanizing plant, general warehouse, paint shop, and paint storage. A transformer yard was located to the north of the galvanizing plant; however, it is not clear if the yard was located on the Isaacson property or on the adjacent property to the north. Sections of the main building were used for storage of scrap metal and fabricating shops.

- **Isaacson Property Operations**. Boeing purchased the Isaacson property from Isaacson in 1984. Boeing used the large steel fabrication building (referred to by Boeing as Building 14-05) located on the Isaacson property for storage until it was demolished in 1989/1990, including temporary storage of gasoline- and Jet A fuel-contaminated soil excavated in the mid to late 1980s from other nearby Boeing properties during UST removal.

Historical uses of the Thompson property (southern portion of the Site) include:

- **Bissell Lumber Company.** The Bissell Lumber Company operated a sawmill from approximately 1917 until 1952. The sawmill operations were conducted primarily on the western portion of the Thompson property, adjacent to Slip 5. The structures associated with Bissell Lumber Company included a sawmill, wood bin, steam pump building, waste burner, transformer yard, blacksmith, and a building containing four storage tanks. Additionally, modifications to Slip 5, including piling installation, construction of log chutes, and dredging, were made to accommodate the sawmill operations. Title records and aerial photographs indicate that the sawmill was demolished in 1955.

- **Pre-Thompson Site Lessees.** Between approximately 1953 and 1956, the southern portion of the Site was leased to St. Johns Moto Express and Consolidated Freightways. Available information indicates that a rail spur and office building were located in this portion of the Site at the time of the leases.

- **Thompson Property Operations.** Boeing purchased the Thompson property from Charles Thompson in 1956. Boeing developed the Thompson facility in 1967. The facility was originally used to assemble one 737 aircraft, and to conduct fatigue testing of 757 aircraft. The facility was later used for assembly of a United States' B-2 bomber fuselage section, and, later, by Boeing's Propulsion Systems Division for jet engine build-up. The facility currently consists of an industrial building (Building 14-01) where airplane assembly, washing, and painting was formerly conducted, and several support structures including a boiler house (Building 14-02), two mechanical buildings (Buildings 14-03 and 14-14), a fire pump house (Building 14-13) and a water tank, an electrical substation (Building 14-22), and a guard shack (unnumbered). Former buildings and structures that have been removed include a cafeteria (Building 14-15), a restroom/shower facility (Building 14-12), a guard shack (Building 14-11), an office (Building 14-07), a loading dock located west of Building 14-11, and hazardous waste/hazardous materials storage sheds (unnumbered). The hazardous waste/hazardous materials storage sheds were used to temporarily store hazardous materials and accumulated waste material from facility operations (e.g., paint sludge, spent solvents, spent copper brush plating solutions, soiled rags, etc.).

A statement of hazardous waste disposal provided in the *Report of Evaluation of Site Contamination* (Dames & Moore 1983) and included in Appendix E of the RI/FS Work Plan indicates that petroleum distillates and solvents were stored and/or used on the property by Isaacson during

Isaacson ownership. This statement also suggests that PCBs may not have been used during Isaacson property ownership or present in the transformers at the time. A list of chemicals potentially used and/or stored by Boeing at the Thompson property is also provided in Appendix E of the RI/FS Work Plan.

Other features of significance include bulkheads constructed along the LDW. A wooden bulkhead was constructed along the LDW west of the northern portion of the Site during filling of Slip 5, on property currently owned by the Port. Construction details for this bulkhead are not known. A steel bulkhead was constructed along the central portion of the Site in the 1960s. This bulkhead consists of a sheetpile wall that extends 60 ft BGS (Alpha Engineers 1989). The sheetpile is supported with tiebacks and timber fender piles spaced on 9-ft centers. The tieback anchor rods are located about 6 ft BGS, extend 40 ft east behind the wall, and are supported by timber pile groups connected by a continuous concrete pile cap. A timber pile-supported concrete apron extends behind the bulkhead a distance of approximately 20 ft. A wooden bulkhead is also present along the southern portion of the Site, but the date of construction is unknown. A review of historical aerial photos indicates that a wooden bulkhead may have been present along this portion of the property since at least 1936. No other information for this bulkhead was available. The locations of these bulkheads are shown on Figure 2. A bulkhead oriented east to west at the edge of Former Slip 5 is visible in historical aerial photos taken in 1956, 1961, and 1965; no other information regarding this bulkhead is available.

Prior to the filling of Slip 5, a 48-inch-diameter storm sewer conveyance line, that conveyed stormwater from the east side of East Marginal Way South, discharged at the east end of Slip 5 (referred to as the Former Slip 5 Outfall Area and shown on Figure 6). In approximately 1966, and prior to the filling of Slip 5, the King County storm drain line was extended west to the LDW.

From 1966 to 1990, stormwater from the Isaacson property collected in 17 CBs that drained to the King County storm drain line. Stormwater from the Thompson property discharged to a separate Boeing storm drain system. The configuration of the storm drain systems at the Isaacson property in 1983 and at the Thompson property in 1999 are shown on Figure 9. This figure shows a 6-inch storm drain line west of Building 14-02 that may have discharged non-contact cooling water from Building 14-02 (formerly used as a boiler house) to the LDW. According to a report titled *Environmental Risk Assessment of the Boeing Field Division, Boeing Commercial Airplane Company* (Risk Science International 1985), about 4 million gallons of non-contact cooling water were discharged annually to the LDW. The report also suggests about 5.5 million gallons of washdown water may have been discharged annually to the LDW via an oil/water separator.

In 1990, the King County storm drain line was rerouted from along the northern Thompson property boundary to its current location, shown on Figure 3. After the storm drain line was rerouted, only Site stormwater collected by CB-39, which is located in the western portion of the Isaacson property, continued to discharge to the 48-inch King County storm drain line. In 2008, upgrades to the Site stormwater treatment and conveyance system were completed. As described in Section 2.1.1, these upgrades included the installation of two Vortechs treatment vaults on the Isaacson property for the collection of stormwater and the settling of suspended material from the stormwater prior to discharge via Outfall A, located near the northern Thompson property boundary. Following these upgrades, Boeing completed a project to re-route the stormwater collected by CB-39 to the south into the existing Boeing Site stormwater system to eliminate all discharges of Site stormwater to the King County stormwater system. There are currently no connections between the Site stormwater system and the King County storm drain line. The Site stormwater system investigations and improvements are discussed further in Section 3.3.

# 3.0 PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

Environmental investigations at the Site to date have been conducted to characterize and evaluate the chemical quality and physical condition of soil, groundwater, sediment, and storm drain solids. In 2002, Environmental Resources Management (ERM) summarized the investigations and remedial actions completed at the Isaacson property through 2000 in a *Comprehensive Data Summary Report* (ERM 2002). Investigations and remedial actions completed at the Site after 2000 have been documented in various reports, including a *Data Summary Report* (Landau Associates 2009a), which provides a comprehensive overview of the investigations conducted in 2008 and the first half of 2009. This section briefly describes the environmental investigations and the remedial actions previously conducted at the Site. This information was previously provided in the RI/FS Work Plan.

In addition to the investigations mentioned above, Phase I ESAs were conducted for the Isaacson property and the Thompson property to evaluate the environmental liabilities associated with the properties based on reasonably available documentation (both oral and written) and to support Boeing planning for future Site use. These Phase I ESAs include a review of records from Boeing's Environment, Health and Safety (EHS); Industrial Hygiene (IH); Radiation Health Protection (RHP); and Boeing Abatement Services (BAS) organizations; a review of historical information including aerial photographs, fire insurance maps, and historical tax records; and a site reconnaissance of the properties and adjacent properties to assess land use activities and environmental conditions. The results of the Phase I ESAs are documented in reports prepared by Landau Associates (Landau Associates 2008a,b). The 2008 Phase I ESA site reconnaissance results are provided in Appendix F of the RI/FS Work Plan (Landau Associates 2011a).

## 3.1 SOIL AND GROUNDWATER

Available records indicate that soil and groundwater investigations and a remedial action were initiated at the Site in 1983, prior to Boeing's purchase of the Isaacson property in 1984. Since then, several investigations and additional remedial actions have occurred at the Site with the most recent soil investigation occurring in the latter half of 2009. All of the soil and groundwater investigations and remedial actions are discussed below in chronological order. Analytical data for soil and groundwater samples collected during these investigations are provided in Appendices G (soil) and H (groundwater) of the RI/FS Work Plan.

### 3.1.1 AUGUST 1983 SOIL INVESTIGATIONS (DAMES & MOORE)

This initial environmental site investigation was conducted by Dames & Moore for Boeing in 1983 to identify possible contaminants in the soil and groundwater at the Isaacson property. The investigation was completed in two phases (Phase I and Phase II) and consisted of 22 soil borings (#1 through #22), shown on Figures 10 and 11, and installation of a monitoring well in each of three of the borings. These wells and the associated boreholes are identified as B-7, B-12, and B-20 in previous reports and are discussed in Section 3.1.3. Soil samples were collected at each location and analyzed for PCBs; metals (arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium, silver, zinc); total cyanide; oil and grease; and total organic carbon (TOC). The scope of the investigation and the results are presented in *The Report of the Evaluation of Site Contamination, Isaacson Steel Property* (Dames & Moore 1983). The soil characterization portion of this investigation is discussed below. The groundwater characterization portion is discussed in Section 3.1.3.

Part of the soil characterization focused on potential contaminant source areas as follows:

- **Former Diesel and Gasoline Tanks.** Four diesel and gasoline tanks were located in the eastern portion of the Isaacson property, as shown on Figure 4. Boring #1 was located in this area and one soil sample collected at 5.5 ft BGS was analyzed for PCBs, metals, and total cyanide. PCBs, total cyanide, mercury, and silver were not detected. Concentrations of other metals detected in the soil sample were low [e.g., arsenic and lead were detected at 3.4 milligrams per kilogram (mg/kg) and 1.3 mg/kg, respectively]. This soil sample may be representative of current soil conditions at this location since no known information is available to confirm that the tanks and soil surrounding the tanks were removed.

- **Former Paint Storage Areas.** Two paint storage areas were previously located in the eastern portion of the Isaacson property, as shown on Figure 4. Boring #2 was located in this area and one soil sample collected at 2.5 ft BGS was analyzed for metals and cyanide. Total cyanide and silver were not detected in the soil sample and the concentrations of other metals that were detected in the sample were low (e.g., arsenic and lead were detected at 8.7 mg/kg and 11 mg/kg, respectively). This soil sample may be representative of current soil conditions at this location because no known soil removal has occurred at this location.

- **Former Steam Cleaning Rack and Sump.** A steam cleaning rack and associated sump were formerly located in the northern portion of the Isaacson property as shown on Figure 4. The steam cleaning rack was used by Isaacson to clean equipment. Water, waste sludge, and solvents from the cleaning were placed into a 5-ft deep sand and gravel unlined sump. In about 1979 or 1980, a catch pan was placed above the sand and gravel in the sump to facilitate collection and disposal of waste sludge and solvent, but the sump was never connected to the sewer (Dames & Moore 1983). A sample of the sludge within the sump contained arsenic, zinc, and oil and grease at concentrations of 39.0 mg/kg, 94,950 mg/kg, and 350,000 mg/kg, respectively. Boring #3 was located adjacent to the sump and borings #11 and #B-12 were located east and south of the sump, respectively. Three soil samples were collected at boring #3 at depths ranging between 2.5 ft BGS and 10.5 ft BGS; two soil samples were collected at boring #11 at depths of 6.5 ft BGS and 11.5 ft BGS; and three soil samples were collected at boring #B-12 at depths ranging between 6.5 ft BGS and 14 ft BGS. The soil samples were analyzed for metals, total cyanide, and oil and grease. One sample at boring #3, the deepest, was also analyzed for PCBs. Arsenic was detected in the soil at concentrations up to 2,880 mg/kg, zinc at concentrations up to 2,030 mg/kg, and oil and grease at a concentration of 1,850 mg/kg. PCBs were not detected above a reporting limit (RL) of 0.2 mg/kg. The sump and associated soil were later removed as described in Section 3.1.4. Only the soil sample collected at boring #B-12 at a depth of 14 ft BGS may represent current soil conditions in this area because no subsequent soil removal is known to have occurred at this location.

- **Former Transformer Bank.** A former transformer bank was located in the northern portion of the Isaacson property, as shown on Figure 4 or in the southern portion of the Jorgensen site. Boring #4 was located adjacent to the potential transformer bank location at the Site. Three soil samples were collected (2.5 ft BGS, 6.5 ft BGS, and 10.5 ft BGS) and analyzed for metals, and one of the samples (6.5 ft BGS) was also analyzed for PCBs. PCBs were not detected above the RL of 0.2 mg/kg. These soil samples may represent current soil conditions at this location because no subsequent soil removal is known to have occurred at this location.

- **Fill Material Along Southern Property Boundary.** Seven soil borings (#5, #7-1, #7-5, #15, #16, #17, and #19) were completed in the fill material located near the southern Isaacson property boundary, as shown on Figure 10. This area was the location of the northern portion of Slip 5 that was filled in the 1960s. Soil samples were generally collected at shallow depths ranging between 1.5 ft and 3.5 ft BGS at these locations, except at boring #7-5, where soil samples were also collected at depths of 8.5 ft BGS, 13.5 ft BGS, and 18.5 ft BGS, and at borings #16 and #17 where soil samples were also collected at 6.5 ft BGS. All of the soil samples were analyzed for metals and some of the soil samples were analyzed for PCBs, total cyanide, and oil and grease. Total cyanide was not detected in any soil samples. Arsenic was detected at concentrations up to 36 mg/kg. Elevated concentrations of zinc (440 mg/kg to 3,640 mg/kg) were detected at borings #5, #7-1, #7-5, #15, #16, and #17, and elevated concentrations of cadmium, chromium, and lead were detected at one or more of the soil borings. The highest oil and grease concentration detected in the soil was 2,020 mg/kg at boring #15. PCB concentrations were less than 1 mg/kg or not detected in soil samples collected at each soil boring except at boring #5 where PCB Aroclor 1254 was detected at a concentration of 9.7 mg/kg. Soil samples collected at soil borings #5, #7-1, #7-5, #15, #16, #17, and #19 may represent current soil conditions in this area because no subsequent soil removal is known to have occurred at this location.

The remaining soil borings were located near the western and northern property boundaries (borings #6-3 and #10, respectively); within the former Isaacson building (borings #8, #9, #13, and #14); and at the Thompson property (borings #20, #21, #22). No samples were collected at boring #8 for laboratory analysis. Except at boring #6-3, no elevated concentrations of metals or PCBs were detected in the soil samples at these locations. At boring #6-3, elevated concentrations of cadmium (7.7 mg/kg), chromium (466 mg/kg), lead (580 mg/kg), and zinc (2,320 mg/kg) were detected in the soil and PCB Aroclor 1260 was detected at 1.2 mg/kg. Except for boring #9, these explorations are in areas where soil removal has not occurred; therefore, analytical results for these soil samples may represent soil remaining in this area because no subsequent soil removal is known to have occurred at this location.

One slag sample was collected from fill material located near the Isaacson southern property boundary. The sample was analyzed for major and trace components. Barium and chromium were detected at concentrations of 1,350 mg/kg and 4,330 mg/kg, respectively; arsenic was not detected above the RL of 30 mg/kg. The results are summarized in tabular format in Appendix I of the RI-FS Work Plan (Landau Associates 2011a).

### 3.1.2 October 1983 Soil Investigations (Wicks)

In October 1983, soil samples were collected from boreholes associated with the installation of seven monitoring wells [I-1(s) through I-7(s)] at the locations shown on Figures 10 and 11. The soil samples were analyzed for arsenic, total chromium, copper, lead, and zinc. Only one soil sample [I-7(s)] was analyzed for barium and cadmium. Elevated concentrations of arsenic (up to 3,800 mg/kg), copper (up to 2,400 mg/kg), lead (up to 440 mg/kg), and zinc (up to 380 mg/kg) were detected at I-1(s), which was located in the area of the former steam cleaning rack, and/or at I-2(s), which was located inside the former Isaacson building just south of the former transformer bank area (Figure 10). However, subsequent remedial actions removed most of the soil associated with elevated concentrations of arsenic, copper, lead, and zinc at these locations. Elevated concentrations of chromium (up to 740 mg/kg), copper (up to 360 mg/kg), lead (up to 3,900 mg/kg), and zinc (up to 1,500 mg/kg) were also detected in soil samples collected at I-7(s), which is located in the fill material along the southern Isaacson property boundary adjacent to boring #5. Soil at this location has not been removed.

Soil samples collected at locations I-1(s), I-2(s), and I-7(s) were also tested to determine the leachability of the metals to groundwater to determine if the soil would be classified as a hazardous waste using the Extraction Procedure (EP) Toxicity test. Metals analyzed using this procedure included those metals analyzed in the soil samples (arsenic, total chromium, copper, lead, and zinc) and additional metals including barium, cadmium, chromium VI, mercury, selenium, and silver. Barium, chromium VI, mercury, selenium, and silver were not detected using this procedure. The concentrations of those metals that were detected using this procedure are as follows: arsenic at 7.8 milligrams per liter (mg/L) and 7.3 mg/L [two depth intervals at I-1(s)]; cadmium at 0.02 mg/L [I-7(s)]; total chromium at 0.1 mg/L [I-7(s)]; and lead at 6.1 mg/L [I-7(s)].

In addition to the above soil samples, four samples of slag were collected and analyzed for arsenic, total chromium, copper, lead, and zinc. The slag samples were collected at I-4(s), I-6(s), and I-7(s), which were all located in fill material west and south of the former Isaacson building. One sample was collected from each location and one sample was a composite of slag collected at I-4(s) and I-6(s). The composite sample was also analyzed for barium. The results of the slag samples indicated relatively low concentrations of arsenic (18 mg/kg to 20 mg/kg) and elevated concentrations of total chromium (920 mg/kg to 2,200 mg/kg); copper (160 mg/kg to 1,200 mg/kg); and lead (120 mg/kg to 1,400 mg/kg). Barium and cadmium were detected in the composite sample at concentrations of 440 mg/kg and 2.2 mg/kg, respectively. EP Toxicity tests were also performed on the slag samples, but none of the metals were detected using this procedure.

The analytical results for the soil and slag samples are presented in the *Project Description for Remedial Work* report (Wicks 1984a).

### 3.1.3 1983 Groundwater Monitoring

In August 1983, groundwater samples were collected from monitoring wells B-7, B-12, and B-20 (Figure 12) and analyzed for metals (antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, selenium, silver, and zinc); fluoride; total cyanide; phenol; and TOC (Dames & Moore 1983). It is not documented whether the metals results are total or dissolved. Only mercury was not detected in the groundwater samples. Arsenic was detected at concentrations up to 310 micrograms per liter (µg/L), barium was detected at concentrations up to 390 µg/L, cadmium was detected at concentrations up to 3.6 µg/L, chromium was detected at concentrations up to 130 µg/L, lead was detected at concentrations up to 95 µg/L, selenium was detected at concentrations up to 4 µg/L, and silver was detected at concentrations up to 8.1 µg/L. Nickel and zinc were only analyzed in one sample, from well B-7, and were detected at a concentration of 10 µg/L and 110 µg/L, respectively. Total cyanide was detected only at well B-7 at a concentration of 13 µg/L. Fluoride and phenol were detected at concentrations up to 500 µg/L and 81 µg/L, respectively.

In October 1983, six monitoring wells [I-1(s), I-2(s), I-4(s), I-5(s), I-6(s), and I-7(s)] were installed on the Isaacson property and one monitoring well [I-3(s)] was installed off-property at the locations shown on Figure 12. Groundwater samples were collected from these wells and wells B-12 and B-20 in October and December 1983 and analyzed for dissolved metals (arsenic, chromium, copper, nickel, lead, zinc). Arsenic, chromium, copper, nickel, and zinc were detected in groundwater samples from each location, including the well located off-property and hydraulically upgradient of the Site [I-3(s)]. Lead was detected in less than half the samples analyzed and the concentrations detected were generally below 5.0 µg/L, except at well B-20 where lead was detected at a concentration of 30 µg/L. Elevated concentrations of dissolved zinc (14,000 µg/L and 8,000 µg/L) were detected at well B-12 in October 1983 and December 1983, respectively. Elevated concentrations of zinc were also detected in the soil at well B-12. Arsenic concentrations ranged from 8.5 µg/L to 590 µg/L, except at well I-2(s) where dissolved arsenic was detected at 9,200 µg/L and 4,400 µg/L in October and December 1983, respectively. The maximum chromium concentration (10.9 µg/L) occurred at well I-2(s) during the December event. As described below in Sections 3.1.4 and 3.1.10 and shown on Figure 11, remedial activities were later conducted in the area of wells B-12 and I-2(s).

The results for the October and December 1983 groundwater samples are reported in the *Project Description for Remedial Work* report (Wicks 1984a).

### 3.1.4 1984 Soil Remediation

In 1984, Isaacson implemented a remedial action that consisted of excavating arsenic- and zinc-contaminated soil from three areas located in the northern portion of the Site. These areas, identified as A, B, and C, are shown on Figure 13. The extent of contamination identified and excavation within each area are described below. Further detail on the basis and scope of the remedial action is provided in two reports: *Project Description for Remedial Work* (Wicks 1984a) and the *Report on Remedial Project and Recommendation for Project Completion at Isaacson Corporation Property* (Wicks 1984b).

The Area A excavation was located around well I-2(s) where elevated concentrations of arsenic were present in the soil and groundwater. Based on the analytical results for soil samples collected at this location, soil was excavated from an area about 13 ft by 25 ft, centered on this well. The excavation extended vertically to a depth of 11 ft BGS. Soil samples were collected from the base and sidewalls of the excavation and analyzed for arsenic. The concentration of arsenic in the soil sample collected from the base of the excavation, PZFA, was 530 mg/kg. This result may represent soil remaining at this location; however, the results for the sidewall samples may not represent remaining soil as the soil represented by the samples was removed during subsequent remedial actions.

The excavation at Area B occurred at the location of the former steam cleaning rack and a 5-ft deep sand and gravel sump where the previous investigations had identified elevated concentrations of arsenic and zinc in the soil. The excavation removed the sump and some soil surrounding the sump to a depth of 4.7 ft BGS. Soil samples were collected from the base and sidewalls of the excavation and analyzed for zinc; however, the results for these samples may not represent soil remaining at this location, as the soil represented by these samples was removed during subsequent remedial actions.

The excavation in Area C was conducted to address arsenic-contaminated soil at I-1(s) and boring #11. The excavation was about 23 ft by 23 ft and extended to a depth of 12 ft BGS. Soil samples were collected from the base and sidewalls of the excavation and analyzed for arsenic. The concentration of arsenic in the soil sample collected from the base of the excavation, PZFC, was 290 mg/kg. This result may represent soil conditions remaining at this location; however, the results for the sidewall samples may not represent current soil conditions because the soil represented by those samples was removed during subsequent remedial actions.

During this remedial action, arsenic EP Toxicity tests were performed on 11 soil samples. Arsenic concentrations ranged from less than 0.2 mg/L to 8.9 mg/L. The dry weight (dw) concentrations for these samples ranged from 67 mg/kg to 5,000 mg/kg.

After completion of the remedial action, Ecology issued a letter indicating that no further action (NFA) would be required unless groundwater monitoring indicated that arsenic was present in groundwater at concentrations greater than the identified cleanup level (Ecology 1985). As a result, a program for monitoring arsenic in groundwater was developed and implemented in 1985 and 1986. The groundwater monitoring program is described in Section 3.1.6.

### 3.1.5 1984 Wicks Soil Investigation and Installation of Well I-8(s)

In 1984, following excavation of soil in Areas A, B, and C, 12 soil samples were collected outside of the limits of the Area C excavation. All of the soil samples were collected from a depth of 8 ft BGS and analyzed for arsenic (Wicks 1984b). The soil samples are identified as PZTCS 7', PZTCS 14', PZTCS 20', PZTCW 5', PZTCW 10', PZTCE 7', PZTCE 14', PZTCE 20', T-1, T-2, T-3, and T-4. The locations of these soil samples are shown on Figures 10 and 11. Only the results for samples T-1 and T-4 (26 mg/kg and 10 mg/kg arsenic, respectively) and PZTCE 7', PZTCE 14', PZTCE 20' (1,800 mg/kg, 940 mg/kg, and 1,700 mg/kg, respectively) may represent current soil conditions at this location because no subsequent soil removal is known to have occurred at those locations. Soil represented by the other samples was removed by subsequent excavations. The analytical results for the post-excavation soil investigation samples are reported in the *Report on Remedial Project and Recommendation for Project Completion at Isaacson Corporation Property* (Wicks 1984b).

In November 1984, monitoring well I-8(s) and observation well I-8M were installed and hydraulic conductivity testing was performed at wells I-3(s), I-4(s), I-6(s), I-7(s), I-8(s), and I-8M (Sweet Edwards 1984).

### 3.1.6 1985 Groundwater Monitoring

Following remediation of arsenic-contaminated soil at the Isaacson property, Ecology requested that groundwater monitoring at the property be continued and annual reports be submitted to Ecology for 2 years (Ecology 1985). To comply with Ecology's request, groundwater samples were collected from wells I-2(s), I-7(s), and B-12 in June 1985 and analyzed for total and dissolved arsenic (Landau Associates 1986). According to the groundwater monitoring plan prepared by Landau Associates for

Boeing in 1985 (Landau Associates 1985), wells I-1(s), I-2(s), I-4(s), and I-5(s) were damaged or inaccessible and, in October 1985, Boeing installed two new monitoring wells [I-104(s) and I-105(s)] to replace damaged wells I-4(s) and I-5(s). The locations of monitoring wells I-104(s) and I-105(s) are shown on Figure 12. In December 1985, groundwater samples were collected from wells I-3(s), I-6(s), I-7(s), I-8(s), I-104(s), I-105(s), and B-12 and analyzed for total and dissolved arsenic.

For samples collected at the wells located on the property [I-6(s), I-7(s), I-8(s), I-104(s), I-105(s), and B-12], dissolved arsenic concentrations ranged from less than 5 µg/L [I-104(s) and I-6(s)] to 1,200 µg/L [I-105(s)] and total arsenic concentrations ranged from 18 µg/L [I-104(s)] to 2,400 µg/L [I-105(s)] during these two events. At the off-property well [I-3(s)], dissolved arsenic was not detected above the RL of 5 µg/L, and total arsenic was detected during both sampling events at concentrations of 12 µg/L and 15 µg/L.

The 1985 groundwater monitoring results are reported in the *First Annual Report Groundwater Monitoring Program Boeing Isaacson Property, 8541 East Marginal Way South, Seattle, Washington* report (Landau Associates 1986).

### 3.1.7 1986 AND 1987 GROUNDWATER MONITORING

In 1986 and 1987, groundwater samples were collected annually from wells I-3(s), I-6(s), I-7(s), I-8(s), I-104(s), I-105(s), and B-12(s) and analyzed for total and dissolved arsenic. In 1986, for those samples collected at the wells located on the property [I-6(s), I-7(s), I-8(s), I-104(s), I-105(s), and B-12], dissolved arsenic concentrations ranged from less than 5 µg/L [I-104(s)] to 510 µg/L (B-12), and total arsenic concentrations ranged from less than 5 µg/L [I-104(s)] to 1,500 µg/L [I-105(s)]. In 1987, dissolved arsenic concentrations ranged from less than 5 µg/L [I-104(s)] to 4,300 µg/L [I-105(s)], and total arsenic concentrations ranged from 6 µg/L [I-104(s)] to 4,300 µg/L [I-105(s)]. At the off-property well [I-3(s)], dissolved arsenic was not detected above the RL of 5 µg/L, and total arsenic was detected during the two sampling events at concentrations of 14 µg/L and 27 µg/L.

The 1986 and 1987 groundwater sample results are reported in Appendix D of the *Building 14-09 Thompson-Isaacson Site Investigation Data Report* (Landau Associates 1988).

### 3.1.8 1988 SOIL INVESTIGATION

In 1988, Boeing planned to demolish the Isaacson building (also referred to by Boeing as Building 14-05) and construct a new building (referred to as Building 14-09) along the north side of Building 14-01. Prior to the planned construction, Boeing conducted a soil and groundwater investigation to further evaluate soil and groundwater quality. Initially, the investigation consisted of collecting soil samples from 46 explorations [210-244, 250, 251, 252, 260, 290, I-8(i), I-200(s), I-202(s), I-203(i), I-205(s), and I-206(s)] and installing 8 wells [I-8(i), I-200(s), I-201(s), I-202(s), I-203(s), I-203(i), I-205(s), and I-206(s)]. Boeing identified the wells as shallow wells (s) if the wells extended to depths of 30 ft BGS or less and as intermediate wells (i) if the wells extended to depths greater than 30 ft BGS.

All of the soil samples were analyzed for arsenic. Additionally, all of the soil samples collected from the Slip 5 fill material were analyzed for chromium, copper, lead, nickel, and zinc, and a subset of these were also analyzed for cadmium, mercury, silver, total cyanide, PAHs, PCBs, and VOCs. Soil samples from three explorations located in the areas of previous excavation areas A, B, and C, and one exploration located near the northern Isaacson property boundary, were also analyzed for PCBs and VOCs.

Based on the results of the soil investigation, two areas of elevated arsenic concentrations were identified: Bay 13 of the former Isaacson building and in the courtyard between Bays 11, 12, and 14 of the former Isaacson building. Low concentrations of VOCs were also detected in the soil in this area. As recommended by Ecology, additional investigations were conducted in 1988 to better delineate the distribution of arsenic concentrations in soil in these areas. Soil samples were collected from 0 to 2.5 ft BGS, 2.5 to 6.5 ft BGS, and 6.5 to 9.5 BGS at seven borings (identified as 313, 317, 318, 328, 330, 416, and 417) and analyzed for arsenic. Four of the samples, 317, 318, 416, and 417 were located north of the courtyard and Bays 11, 12, and 14, and the others were located south of the courtyard and Bays 11, 12, and 14, as shown on Figures 10 and 11. Based on the results of the 1988 investigations, a work plan for excavating soil within the two areas was prepared by Landau Associates for Boeing (Landau Associates 1989a).

Elevated concentrations of chromium (up to 4,180 mg/kg); lead (up to 1,690 mg/kg); nickel (up to 2,460 mg/kg); and zinc (up to 5,770 mg/kg) were detected in soil samples collected from the Slip 5 fill material. EP Toxicity test results for those samples containing the maximum dw concentrations of these metals were non-detect for chromium, 0.090 mg/L for lead, 7.07 mg/L for nickel, and 132 mg/L for zinc. Other constituents detected in the Slip 5 fill included arsenic, cadmium, copper, silver, PAHs, toluene, and xylenes. Low concentrations of PCBs (0.06 mg/kg to 0.51 mg/kg) were also detected in the Slip 5 fill material.

All of the soil samples collected in 1988 may represent current soil conditions, except at explorations 210, 214, 220, 222, 226, 227, 231, 238, and 242, where only the deepest soil samples (greater than 10.0 ft BGS) may represent soil remaining at the Site; soil shallower than 10 ft BGS at these locations was removed during subsequent remediation activities as described in Sections 3.1.10 and 3.1.12.

The results for the initial 46 soil samples are reported in Appendix C of the *Building 14-09 Thompson-Isaacson Site Investigation Data Report* (Landau Associates 1988). The results for the remaining soil samples are reported in Appendix B of the *Comprehensive Data Summary Report Boeing Isaacson Site*, ERM 2002)

### 3.1.9 1988 Groundwater Investigation

In 1988, eight wells [I-8(i), I-200(s), I-201(s), I-202(s), I-203(s), I-203(i), I-205(s), and I-206(s)] were installed and, in February of 1988, groundwater samples were collected from the new wells and existing wells [B-12, B-20, I-6(s), I-7(s), I-8(s), I-104(s), and I-105(s); Landau Associates 1988]. All of the groundwater samples were analyzed for the following dissolved metals: arsenic, chromium, copper, lead, nickel, and zinc. Groundwater samples from B-20, I-6(s), I-7(s), I-202(s), I-203(s), I-203(i), I-205(s), and I-206(s) were also analyzed for dissolved cadmium, mercury, dissolved silver, VOCs, SVOCs, and pesticides. Groundwater samples from I-6(s) and I-105(s) were analyzed for dissolved barium, dissolved iron, dissolved manganese, dissolved selenium, oil and grease, dissolved oxygen (DO), and TOC. Elevated concentrations of arsenic (100 µg/L to 15,000 µg/L) were detected at wells B-12, B-20, I-105(s) I-201(s), I-202(s), I-203(i), and I-106(s). Elevated concentrations of copper (500 µg/L) and zinc (9,090 µg/L) were also detected at well B-12. Silver and selenium were not detected in any of the samples, and mercury and copper were detected in only one sample at or slightly above the RL. Barium was detected in the samples, but at low concentrations (6 µg/L and 22 µg/L). VOCs were detected at wells B-12, I-105(s), and I-202(s). Low concentrations of SVOCs were also detected in most of the groundwater samples analyzed for SVOCs. Pesticides were not detected in any of the samples.

The results for the 1988 groundwater samples are reported in Appendix D of the *Building 14-09 Thompson-Isaacson Site Investigation Data Report* (Landau Associates 1988).

### 3.1.10 1988 Soil Excavation

In 1988, prior to Boeing's planned removal of the Isaacson building and paving of the Isaacson property, Ecology requested that soil containing elevated arsenic concentrations be removed from Bay 13 and the courtyard between Bays 11, 12, and 14 of the former Isaacson building (Ecology 1988). In each area, soil was excavated to the groundwater table (approximately 10 to 12 ft BGS). The lateral extent of the excavations is shown on Figure 13. Excavations were backfilled with pea gravel, imported fill, and excavated soil. During the excavations, field screening tests and laboratory tests were performed on samples collected from the soil stockpiles to determine appropriate disposition of the excavated soil. Soil containing arsenic concentrations greater than or equal to 500 mg/kg was disposed of offsite. Soil containing less than 500 mg/kg arsenic was used as backfill for the excavations. Sidewall samples were collected from each excavation. If a sidewall sample contained arsenic at a concentration of 500 mg/kg or greater, additional excavation was conducted and additional sidewall samples were collected. For the courtyard excavation, five samples were collected from each of the north and south sidewalls, three from the east sidewall, and two from the west sidewall. Due to further remediation in the courtyard in 1991, only the samples collected from the north and south sidewalls may represent soil remaining in this area. These samples are identified as N-01 through N-04, N-05-A1, S-01-B1, and S-02 through S-05 on Figure 11. For the Bay 13 excavation, three samples were collected from each of the north and south sidewalls and one sample was collected from each of the west and east sidewalls. For the same reason, only the samples collected from the north and south sidewalls of the Bay 13 excavation may represent remaining soil. These samples are identified as N-01 through N-03, S-01, S-02, and S-03-A1 on Figure 10. The specific location of each sample along the sidewalls of each excavation is unknown; therefore, the locations shown on Figures 10 and 11 are approximate. The maximum arsenic concentration detected in the sidewall samples for soil remaining at the Site was 420 mg/kg.

Further details of the soil excavations are provided in the *Draft Thompson-Isaacson Site Soil Excavation Summary Report* (Landau Associates 1989b).

#### 3.1.11 1989/1990 Storm Drain Line Sampling

In late 1989 and early 1990, the former Isaacson building (Building 14-05) was demolished and the storm drain line that crossed the Isaacson property near the southern property boundary was rerouted along the northern property boundary as part of the planned development of the Site by Boeing. The new storm drain line was installed to an average depth of 13 ft BGS (Technical Dryer 1991). To evaluate proper disposition of the soil excavated along the alignment of the new storm drain, soil removed from each 10 to 12 ft length of the storm drain alignment was stockpiled separately (126 stockpiles total) and sampled. The stockpile samples were analyzed for arsenic. Soil stockpiles containing arsenic concentrations greater than or equal to 500 mg/kg were disposed of offsite. Soil stockpiles containing arsenic concentrations less than 500 mg/kg were used as backfill for the new storm drain line. The analytical results for the stockpile samples and the locations along the storm drain trench that they represent are shown on Figures 14A and 14B.

In general, soil excavated from the western half of the north portion of the trench contained arsenic at concentrations equal to or greater than 500 mg/kg. If a soil stockpile sample contained arsenic concentrations greater than or equal to 500 mg/kg, soil samples were collected from each sidewall corresponding to that portion of the trench where the soil was removed. The results of the sidewall samples are presented on Figures 14A and 14B. Based on the results of the sidewall samples, further excavation was conducted on both sides of the storm drain line in some areas. The lateral extent of these excavations is shown on Figure 13. The vertical extent of the excavations was approximately 11 ft BGS, at which depth groundwater was encountered. Sidewall samples were also collected from the additional excavations; however, achieving removal of all soil containing arsenic concentrations equal to or greater than 500 mg/kg was determined to be impracticable. Three sidewall samples collected from an excavation north of the trench contained arsenic concentrations up to 3,500 mg/kg; however, further excavation was not conducted due to the excavation's proximity to the northern property line. Following removal of additional soil on the opposite side of the storm drain line from these northern sidewall samples, elevated arsenic concentrations continued to be present in samples collected from the western sidewall of this excavation. Soil excavation ceased and 96 test pits were completed to evaluate the extent of arsenic-contaminated soil. At each test pit, soil samples were collected from the following depth intervals: 1 to 3 ft BGS, 3 to 5 ft BGS, and 5 to 9 ft BGS. The depth intervals were designated as AA, A, and B in the sample identifications; with AA being the shallowest and B being the deepest. The test pits were identified as 1A, 1B, 1C, 1D, 2A, 2B, 2C, and so on. The locations of the test pits are shown on Figure 15.

Soil samples collected from the sidewall samples that may represent current soil conditions along the storm drain line include SW-1 through SW-28, SW-33 through SW-40, SW-44 through SW-46, SW-50, and SW-54 through SW-60. Test pits where soil samples were collected that may represent current soil conditions in the North of the Former Slip 5 Area because no subsequent soil removal is known to have occurred at these locations include 6J, 6K, 8J, 10J, 18N, 18E, 22N, 24B, 25N, 25A through 25D, 26B, 27B, 28A, 28B, 28D, 29B, 30B, 31A, 31B, and 31D.

Details of the storm drain line sampling are provided in the *Thompson-Isaacson Site Storm Drain Line and Soil Core Sampling* report (Technical Dryer, Inc. 1991).

### 3.1.12 1991 Soil Stabilization

Due to elevated concentrations of arsenic in soil samples collected during the 1989/1990 storm drain line sampling, an area approximately 35 ft by 175 ft was remediated. The selected remediation method consisted of excavation of soil within the area to the depth of the groundwater table (approximately 12 ft BGS) and chemical treatment and stabilization of the excavated soil using soluble silicate solutions and cementitious materials. Because previous sampling results indicated arsenic concentrations in shallow soil were below the remediation cleanup level of 200 mg/kg, most of the soil removed from the upper 2 to 3 ft of the excavation was not treated and was used as backfill. The remediation activities occurred between August and November 1991. Excavation sidewall samples were collected as shown on Figures 16A and 16B. Excavation continued until all sidewall sample arsenic concentrations were below 200 mg/kg, except along the northern boundary of the excavation. Additional excavation to the north was not feasible due to the King County storm drain line located approximately 15 ft north of the excavation. Concentrations of arsenic greater than 200 mg/kg primarily occurred along the portion of the northern sidewall between Manhole 5 and Manhole 4, shown on Figures 16A and 16B. At several locations, the arsenic concentrations were greater than 1,000 mg/kg.

Following stabilization, the material was returned to the excavated area; however, the volume of treated material was greater than the excavated area and a mound of treated soil was created. The stabilized material, including the mound, was covered with asphalt pavement.

Soil samples that may represent current soil conditions in the North of the Former Slip 5 Area because no subsequent soil removal is known to have occurred at this location include storm drain line sidewall samples SW-1 through SW-60.

Further detail on the basis and scope of the remedial action and analytical results is provided in the *Thompson-Isaacson Site Soil Excavation Work Plan Final Report* (Landau Associates 1989a).

### 3.1.13 1991 Groundwater Monitoring

During treatment and stabilization of arsenic-contaminated soil in 1991, groundwater samples were collected four times at five monitoring wells [I-104(s), I-200(s), I-203(i), I-205(s), and I-206(s)] and analyzed for dissolved arsenic. The results indicated that the groundwater samples collected from wells located immediately downgradient from the soil remedial action area [wells I-104(s) and I-203(s)] had dissolved arsenic concentrations ranging from 15 µg/L to 576 µg/L. Dissolved arsenic concentrations at the wells located on the Thompson property [I-205(s), and I-206(s)] ranged from 6 µg/L at well I-205(s) to 1,790 µg/L at well I-206(s).

The results for the 1991 groundwater samples are reported in the *Evaluation of Ground Water Compliance Monitoring Program, Boeing Thompson-Isaacson Site, Seattle, Washington* report (GeoEngineers 1997).

### 3.1.14 1992-1996 Post-Soil Stabilization Groundwater Monitoring

Following treatment and stabilization of arsenic-contaminated soil at the Isaacson property in November 1991, voluntary compliance groundwater monitoring was conducted to establish a baseline for post-remediation groundwater conditions and to evaluate long-term effectiveness of Site remedial activities (GeoEngineers 1997). The monitoring was conducted semiannually at five monitoring wells

[I-104(s), I-200(s), I-203(i), I-205(s), and I-206(s)] between 1992 and 1994 for a total of five post-remediation sampling events and annually at the same wells in 1995 and 1996. Each semiannual event consisted of collecting groundwater samples at low tide weekly for 4 weeks and analyzing the samples for dissolved arsenic. Each annual event consisted of collecting a single sample at each location and analyzing the sample for total and dissolved arsenic. The results of the post-remediation monitoring are compiled in a report titled *Evaluation of Ground Water Compliance Monitoring Program, Boeing Thompson-Isaacson Site* (GeoEngineers 1997). The results indicated that the groundwater samples collected from wells located downgradient from the soil remedial action area [i.e., wells I-104(s), I-203(i), and I-205(s)] had concentrations of dissolved arsenic up to 640 µg/L. The samples from monitoring well I-206(s) had dissolved arsenic concentrations ranging from 1,360 µg/L to 2,000 µg/L.

#### 3.1.15 1996 Strataprobe Soil and Groundwater Sampling

In April 1996, six strataprobe borings (HP-1 through HP-6) were completed in the vicinity of monitoring well I-206(s), as shown on Figure 10, in an effort to identify a source for the arsenic previously detected in groundwater at well I-206(s) (GeoEngineers 1997). Sixty-three soil samples were collected from depths ranging between 1 to 20 ft BGS at the six borings and analyzed for arsenic. Arsenic concentrations ranged from 0.7 to 43.0 mg/kg. One grab sample of the groundwater at each boring was also collected and analyzed for dissolved and total arsenic. Dissolved arsenic concentrations in the groundwater samples ranged from 66 µg/L to 660 µg/L, and total arsenic concentrations ranged from 110 µg/L to 570 µg/L. The investigation did not identify a source for the arsenic in groundwater at well I-206(s) (GeoEngineers 1997).

The results for the 1996 soil and groundwater samples are reported in the *Evaluation of Ground Water Compliance Monitoring Program, Boeing Thompson-Isaacson Site, Seattle, Washington* report (GeoEngineers 1997).

#### 3.1.16 1993 – 1995 Hydraulic Test Pad Area Excavations

In late 1993, approximately 10 ft of petroleum product was observed in a monitoring well near an oil/water separator located in the Former Hydraulic Test Pad Area east of Building 14-03. Twelve soil borings (B-1 through B-12) were completed in the area of the well and a nearby oil/water separator. The boring locations are shown on Figure 10. Heavy sheens were observed on soil in the borings nearest the oil/water separator (B-4, B-5, B-6, and B-7). Soil samples were collected from all 12 borings and analyzed for diesel-range, oil-range, and/or gasoline-range petroleum hydrocarbons. Elevated concentrations of petroleum hydrocarbons were detected in borings B-4, B-6, and B-9. The analytical results for the soil borings are summarized in Appendix G of the RI/FS Work Plan. Based on the results of the soil investigation, the estimated volume of contaminated soil to be excavated was 825 cubic yards. Documentation showing the lateral and vertical extent of the excavation has not been identified; however, a figure showing planned excavation limits (GeoEngineers 1994) suggests that soil at borings B-4 through B-9 may have been removed. The results of the 1994 subsurface investigation are reported in *Report of Geotechnical Services, Subsurface Investigation Oil/Water Separator Area, Building 14-03, Thompson-Isaacson Facility* (GeoEngineers 1994).

The oil/water separator system consisted of a 5,000-gallon steel oil/water separator and an associated 4,000-gallon fiberglass holding tank (TS-04) (GeoEngineers 1994). A sample of the sludge present in the oil/water separator was collected and analyzed for VOCs; SVOCs; metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver); and PCBs. Several VOCs were detected in the sludge sample including acetone (1.4 mg/kg), 2-butanone (0.39 mg/kg), toluene (0.23 mg/kg), ethylbenzene (0.36 mg/kg), and xylenes (up to 0.16 mg/kg). PCB Aroclors 1254 and 1260 were detected in the sludge sample at concentrations of 1.3 mg/kg and 0.65 mg/kg, respectively. One SVOC, bis(2-ethylhexyl)phthalate (BEHP), was detected in the sludge sample at a concentration of 16 mg/kg. All of the metals analyzed for were detected in the sludge sample, except selenium. Arsenic was detected at a concentration of 10 mg/kg and lead was detected at a concentration of 6 mg/kg. The concentrations of the other detected metals were 1 mg/kg or less.

In August 1995, the oil/water separator system was removed. According to an undated internal Boeing memorandum, approximately 900 tons of petroleum-contaminated soil was excavated from the area surrounding the oil/water separator and holding tank. The soil was transported to a treatment facility in Oregon operated by TPS Technologies. Eleven soil samples (NW-2, NW-3, WW-2, EW-2, EW-3, EW-4, EW-5, EW-6, EW-7, EW-8, and SW-3-11.5) were collected from the excavation sidewalls and submitted to a laboratory for diesel-range and oil-range petroleum hydrocarbons analysis. However, only laboratory reports for NW-2, NW-3, WW-2, EW-2, EW-3, and SW-3-11.5 were available for review. The locations of the samples, other than SW-3-11.5, are shown on Figure 10. Except for SW-3-11.5, the depth of the samples has not been determined. Based on the results of the sidewall samples, diesel-range and hydraulic oil-range petroleum hydrocarbons remained in the soil at concentrations up to 7,400 mg/kg and 59,000 mg/kg, respectively. Subsurface soil and groundwater conditions in this area were investigated during the Phase II ESA investigation (Landau Associates 2009b).

### 3.1.17 2000 Groundwater and Seep Sampling and Hydrogeologic Characterization

Beginning in August 2000, eight piezometers (PZ-1 through PZ-8; shown on Figure 12) were installed at the Site. Groundwater samples were collected for laboratory analysis for dissolved arsenic, TOC, total iron, and ferrous iron from two of the piezometers (PZ-7 and PZ-8) and five existing monitoring wells [I-104(s), I-200(s), I-203(i), I-205(s), and I-206(s)]. Dissolved arsenic concentrations ranged from 2.0 µg/L at well I-200(s) located on the eastern property boundary to 1,600 µg/L at well I-104(s) located near the western boundary of the Isaacson property. One seep sample (Seep-1) was collected from a shoreline seep at the location shown on Figure 12. The seep emanated from rock and rubble material beneath the northern wooden bulkhead at an elevation of approximately -4 ft NGVD (29). The seep sample was analyzed for dissolved arsenic, which was detected at a concentration of 7 µg/L.

Also in August 2000, hydrogeologic characterization was completed that included a study of tidal effects on Site groundwater conditions. The results of the hydrogeologic characterization form the basis for the current understanding of the Site hydrogeology, which is described in Section 8.1.2.

The analytical results for the 2000 groundwater monitoring samples and seep sample, and the results of the hydrogeologic characterization, are reported in the *Request for Groundwater NFA Determination, Hydrogeologic Investigation and Site-Specific Action Level For Arsenic in Groundwater, Boeing Isaacson Site*, report (ERM and Exponent 2000).

### 3.1.18 2004 - 20,000-Gallon Heating Oil Tank Closure

In 2004, a 20,000-gallon heating oil UST located on the west side of Building 14-02 was decommissioned in-place. A soil sample was collected from stockpiled soil resulting from the excavation associated with the tank decommissioning and a groundwater sample was collected from a partial excavation at the north end of the tank. Both the soil and the groundwater samples were analyzed for diesel-range and motor oil-range petroleum hydrocarbons. Analytical results indicated the presence of diesel- and motor oil-range petroleum hydrocarbons in the groundwater sample at concentrations of 1.0 mg/L and 1.2 mg/L, respectively. The detected concentrations in the excavation groundwater sample were attributed to stormwater flowing into the excavation that was temporarily impacted by residual petroleum hydrocarbons on the excavation equipment.

The tank closure was documented in technical memorandum *Tank Closure Confirmation and Sampling, Former 20,000 Gallon Heating Oil Tank, Thompson Site* (Landau Associates 2004).

### 3.1.19 2004 Groundwater Confirmation Sampling

In 2004, two wells (TH-MW-1 and TH-MW-2) were installed downgradient of the 20,000-gallon heating oil UST located west of Building 14-02. The well locations are shown on Figure 12. The wells were installed after the tank was decommissioned in-place, as described in Section 3.1.18. Groundwater samples were collected from each well during two sampling events (January 19, 2004 and February 26, 2004) and were analyzed for diesel-range and motor oil-range petroleum hydrocarbons. Motor oil-range petroleum hydrocarbons were detected in the January 2004 sample collected from well TH-MW-2 at a concentration of 0.7 mg/L. Motor oil-range-petroleum hydrocarbons were not detected in the February 2004 sample collected from this well. Diesel-range petroleum hydrocarbons were not detected in the samples collected from well TH-MW-2, and motor oil-range and diesel-range petroleum hydrocarbons were not detected in the samples collected from well TH-MW-1. Subsequent attempts were made to re-sample these wells during the Phase II ESA investigations; however, no groundwater was present in the wells during the sampling attempts. Wells TH-MW-1 and TH-MW-2 were subsequently decommissioned as part of the 2011 RI described in Section 4.3.

The results for the 2004 groundwater monitoring samples at wells TH-MW-1 and TH-MW-2 are reported in the technical memorandum *Tank Closure Confirmation and Sampling, Former 20,000 Gallon Heating Oil Tank, Thompson Site* (Landau Associates 2004).

### 3.1.20 2006 Sump Removal

In November 2006, Boeing removed a sump located in the northeastern corner of the Site (identified as Former Sump on Figure 4). The sump was a below-grade, open-to-the-surface 55-gallon drum that was discovered under a steel plate. The sump reportedly had an inlet pipe and an outlet pipe (Landau Associates 2007). Prior to removal of the sump, two samples of soil in the sump were collected and analyzed for diesel-range and motor oil-range petroleum hydrocarbons; VOCs; SVOCs; and metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) to determine appropriate disposal of the sump and its contents. The excavation associated with the sump removal extended about 2 ft beyond the exterior of the sump and to about 5 ft in depth. One soil sample (IsaacEX-01-5) was collected from the base of the excavation (5 ft BGS) and two soil samples (IsaacEX-02-1.5 and IsaacEX-03-2) were collected from the excavation sidewalls at depths of 1.5 ft and 2 ft BGS. The sample locations are shown on Figure 10. These samples were analyzed for diesel-range and motor oil-range petroleum hydrocarbons; VOCs; SVOCs; PCBs; and metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). Diesel-range and motor oil-range petroleum hydrocarbons, acetone, PAHs, BEHP, and metals were detected in one or more of the samples collected from the excavation. PCB Aroclor 1260 was detected in one sidewall sample at a concentration of 0.041 mg/kg.

Further details of the sump removal and the results for the 2006 post-excavation soil samples are reported in technical memorandum *Sump Removal and Soil Excavation Boeing Isaacson Property, Seattle, Washington* (Landau Associates 2007).

#### 3.1.21 2007 – 2008 Groundwater and Seep Sampling

In September 2007 and June 2008, groundwater samples were collected from five existing monitoring wells [I-104(s), I-200(s), I-203(s), I-205(s), and I-206(s)]; two existing piezometers (PZ-7 and PZ-8); and one seep (Seep-1) and analyzed for dissolved arsenic. During the 2007 sampling event, dissolved arsenic was detected at concentrations ranging from 0.9 µg/L at I-200(s) to 3,600 µg/L at I-104(s). The detected concentration of dissolved arsenic in the seep sample was 5 µg/L (Landau Associates 2009a). During the 2008 sampling event, dissolved arsenic was detected at concentrations ranging from 0.7 µg/L at I-200(s) to 3,640 µg/L at I-104(s). The detected concentration of dissolved arsenic in the seep sample in 2008 was 3.4 µg/L (Landau Associates 2009a).

#### 3.1.22 2008 Removal of Stabilized Soil Mound

In late 2008, an independent action was conducted to remove the mound of stabilized soil in the northern portion of the Site. Independent action consisted of the removal and offsite disposal of the stabilized soil mound and non-stabilized surface soil surrounding the mound to reduce the grade, as necessary, for planned development at the Isaacson property. After the mound of stabilized material and the surrounding non-stabilized surface soil were removed, the area was recapped with asphalt. New stormwater treatment and conveyance system improvements (Vortechs vaults) were also installed as part of this action in compliance with the *King County Surface Water Design Manual* (KCDNRP 2005). The basis and scope of the independent action is discussed in detail in the *Redevelopment Activities: Stabilized Soil Mound Removal and Stormwater System Upgrades, Boeing Isaacson Property, Tukwila, Washington* report (Landau Associates 2008c).

To determine the appropriate disposal options for the stabilized soil designated for removal, samples of the stabilized soil were collected from seven test pits completed within the mound (Landau Associates 2008d). The samples, identified ISS-TP-1 through ISS-TP-7, were analyzed for total Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and zinc); Toxicity Characteristic Leachate Procedure (TCLP) RCRA metals; and gasoline-range, diesel-range, and oil-range petroleum hydrocarbons. Elevated concentrations of arsenic (up to 1,700 mg/kg) were detected in the samples, but the TCLP results were low (non-detect to 0.0017 mg/L). Barium, cadmium, chromium, and lead were also detected in the stabilized soil samples, but only barium was detected by TCLP. Barium concentrations ranged from 0.000051 mg/L to 0.00056 mg/L. Low concentrations (380 mg/kg or less) of diesel-range and motor oil-range petroleum hydrocarbons were also detected.

To determine appropriate disposal options for the non-stabilized soil that was removed, 20 samples of the surface soil were collected and analyzed for total arsenic and TCLP arsenic. The samples were identified as ISC-A through ISC-T. Although total arsenic concentrations were elevated, TCLP arsenic results were low (not detected to 1.7 µg/L).

Following removal of the mound of stabilized soil and surrounding non-stabilized soil, 18 samples were collected at 16 locations evenly distributed throughout the removal area (IMR-2 through IMR-8, IMR-10 through IMR-16, IMR-18, and IMR-19, locations shown on Figure 10). The samples consisted of stabilized soil and non-stabilized soil and were collected to document soil conditions at the surface of the finished grade. All of the soil samples were analyzed for total RCRA metals. Arsenic was detected in 16 of the 18 samples at concentrations ranging from 8 mg/kg to 2,440 mg/kg. In addition, although no field indications of petroleum contamination were observed during removal of the stabilized soil mound, sample IMR-6 was analyzed for diesel-range and motor oil-range petroleum hydrocarbons because these petroleum hydrocarbons were detected at concentrations up to 380 mg/kg in the samples collected from the stabilized soil mound that were used to evaluate disposal options. Diesel-range and motor oil-range petroleum hydrocarbons were detected in the post-mound removal sample (IMR-6) at concentrations of 17 mg/kg and 61 mg/kg, respectively.

During the project, a vein of tar-like substance was discovered outside of the stabilized soil perimeter on the northern side of the excavation for the eastern Vortechs vault (vault identified as VTV-E on Figure 3), at a depth of approximately 1.5 ft BGS. The extent of the tar-like substance is not known, as excavation of the material was completed before the substance was identified; however, the vein appeared to be approximately 6 inches thick and approximately 3 ft wide. A sample of the tar-like substance (IMR-1-081003) was collected and analyzed for VOCs, SVOCs, and diesel-range and motor oil-range petroleum hydrocarbons. Diesel-range and motor oil-range petroleum hydrocarbons were detected at concentrations of 7,400 mg/kg and 25,000 mg/kg, respectively. The following PAHs were detected in the sample: phenanthrene (2,400 mg/kg), pyrene (4,200 mg/kg), chrysene (8,800 mg/kg), and benzo(a)pyrene (2,400 mg/kg).

Samples IMR-2 through IMR-8, IMR-10 through IMR-16, IMR-18, and IMR-19 may represent current soil conditions in the northern portion of the Site because no subsequent soil removal is known to have occurred at this location.

### 3.1.23 2008/2009 Phase II ESA Soil Sampling

In 2008 and 2009, focused Phase II ESA investigations were conducted at the Site. During these investigations, 60 soil samples were collected from 49 soil borings located throughout the Site (borings IDP-1 through IDP-15, IDP-1a, IDP-6a, and TDP-1 through TDP-32). The Phase II ESA soil sampling locations are shown on Figure 10. The soil samples were selectively analyzed for metals (arsenic, cadmium, chromium, copper, lead, mercury, and zinc); VOCs; SVOCs; petroleum hydrocarbons; PCBs; and PAHs. The sampling locations and analyses for the Phase II ESA investigations were selected based on the findings from the Phase I ESAs conducted in 2008.

The highest concentrations of arsenic (333 mg/kg at IDP-5-8'), copper (624 mg/kg at IDP-14-11'), lead (420 mg/kg at IDP-7-3'), and zinc (estimated 1,390 mg/kg at IDP-7-3') in soil were detected in samples collected from the Former Slip 5 Area. Mercury was detected at concentrations ranging from 0.05 mg/kg to an estimated 0.52 mg/kg in samples collected from across the Site.

Thirty-eight soil samples were analyzed for VOCs. Trichloroethene was detected at a concentration of 66 micrograms per kilogram (µg/kg) in one soil sample (TDP-26-8') located near the southern property boundary, and benzene was detected at a concentration of 9.8 µg/kg in one soil sample (IDP-9-3') located on the Isaacson property. VOCs were not detected in the remaining 36 soil samples analyzed for VOCs. Twenty-two soil samples were analyzed for PCBs during the Phase II investigations. PCBs were not detected in any of the soil samples collected from the Site at concentrations greater than the laboratory RLs. Eighteen soil samples were analyzed for SVOCs. With the exception of a few SVOCs detected in soil at TDP-8-8', SVOCs were not detected in soil at concentrations greater than the laboratory RLs. Two PAHs, chrysene and benzo(b)fluoranthene, were detected in one soil sample (TDP-18-4') at slightly elevated concentrations (91 mg/kg and 76 mg/kg, respectively).

All of the soil samples collected during the Phase II ESA are representative of current soil conditions in the areas in which the samples were collected because no subsequent soil removal is known to have occurred at these locations.

The results of the Phase II ESA soil investigations are reported in the *Phase II Environmental Site Assessment, Boeing Isaacson Property, 8625 East Marginal Way South, Tukwila, Washington* report (Landau Associates 2009c) and the *Phase II Environmental Site Assessment, Boeing Thompson Property, 8625 East Marginal Way South, Tukwila, Washington* report (Landau Associates 2009b).

### 3.1.24 2008/2009 Phase II ESA Groundwater Sampling

In November 2008, groundwater samples were collected for laboratory analysis from eight direct-push borings (TDP-1, TDP-7, TDP-8, TDP-11, TDP-16, TDP-18, TDP-25, TDP-26) located in the southern portion of the Site and from three direct-push borings (TDP-28, TDP-29, and TDP-31) located in the west-central portion of the Site (Figure 12). In February 2009, groundwater samples were collected for laboratory analysis from eight direct-push borings (IDP-1a, IDP-2 through IDP-6, IDP-8, and IDP-14) located in the northwest corner of the Site and two direct-push borings (IDP-9 and IDP-12) located in the north-central portion of the Site, as shown on Figure 12. Additionally, groundwater samples were collected from twelve existing monitoring wells and piezometers. The groundwater samples were selectively analyzed for dissolved metals (arsenic, cadmium, chromium, copper, lead, mercury, and zinc); VOCs; SVOCs; petroleum hydrocarbons; PCBs; and PAHs.

Arsenic and chromium were the only metals detected in the groundwater samples collected in the southern portion of the Site. Detected arsenic concentrations ranged from 1.3 µg/L to 575 µg/L and detected chromium concentrations ranged from 6 µg/L to 14 µg/L. Arsenic, copper, and lead were detected in the groundwater samples collected from the northern portion of the Site. Arsenic concentrations ranged from 0.8 µg/L to 2,360 µg/L, except at IDP-8 and IDP-14 where arsenic concentrations were 13,600 µg/L and 16,000 µg/L, respectively. Copper concentrations ranged from 6 µg/L to 20 µg/L, and lead was detected in one sample (IDP-8) at a concentration of 1 µg/L. VOCs, SVOCs, and PAHs were also detected in groundwater from some wells. The VOC vinyl chloride was detected in five of eight groundwater samples collected from the area near the Thompson property/8801 site boundary (TDP-7, TDP-8, TDP-16, TDP-25, and TDP-26) and in groundwater samples collected from three locations in the western portion of the Site [IDP-8, I-104(s), and I-206(s)] at concentrations up to 140 µg/L. Other VOCs [cis-1,2-dichloroethene (cis-1,2-DCE); 1,1-dichloroethene (1,1-DCE); PCE; and TCE] were detected in the groundwater samples collected from two locations near (TDP-25 and TDP-26) near the Thompson property/8801 site boundary.

SVOCs (carbazole and BEHP) were detected in groundwater during the Phase II ESA investigations. Carbazole was only detected in one groundwater sample (TDP1-GW) at a concentration of 6.9 µg/L and BEHP was detected in seven groundwater samples (TDP-7, TDP-8, TDP-11, TDP-18, TDP-25, TDP-28, and TDP-31) at concentrations up to 3.8 µg/L. Neither carbazole nor BEHP was detected in soil at the Site. PAHs were detected in seven groundwater samples (TDP-1, TDP-16, TDP-18, TDP-25, TDP-28, TDP-29, and TDP-31) at concentrations up to 15 µg/L.

Diesel-range and motor oil-range petroleum hydrocarbons were detected in one direct-push groundwater sample (TDP31-GW) located in the Former Hydraulic Test Pad Area. PCBs were not detected in any of the groundwater samples.

The results of the Phase II ESA groundwater monitoring are reported in the *Phase II Environmental Site Assessment, Boeing Isaacson Property, 8625 East Marginal Way South, Tukwila, Washington* report (Landau Associates 2009c) and the *Phase II Environmental Site Assessment, Boeing Thompson Property, 8625 East Marginal Way South, Tukwila, Washington* report (Landau Associates 2009b).

#### 3.1.25 2009 Property Boundary Soil Investigation

The property boundary investigation was conducted in late July 2009 to evaluate soil conditions at locations along the west property boundary adjacent to the Port property and at the south property boundary adjacent to the 8801 site. Soil samples were collected at 10 locations (PBI-1 through PBI-10) near the Isaacson/Port property boundary and the Thompson/Port property boundary (Figure 10). These samples were analyzed for the constituents of concern at that time in this portion of the Site at that time: arsenic, cadmium, chromium, copper, lead, mercury, and zinc. Arsenic concentrations in the soil samples ranged from 0.5 mg/kg to 754 mg/kg. The highest concentrations, 329 mg/kg and 754 mg/kg, were detected in the 5-ft to 6-ft BGS interval at locations PBI-2 and PBI-3. Other metals detected included cadmium (0.6 to 11.1 mg/kg); chromium (14 to 940 mg/kg); copper (21 to 1,300 mg/kg); lead (3 to 4,200 mg/kg); mercury (0.03 to 2 mg/kg); and zinc (56 to 3,290 mg/kg).

Soil samples were also collected at five locations (PBI-11, PBI-12, PBI-13, PBI-14, and PBI-15) along the Thompson property/8801 site boundary and analyzed for the COCs in this portion of the Site at that time, which included halogenated VOCs (HVOCs): vinyl chloride; 1,1-DCE; cis-1,2-DCE; TCE; PCE; and 1,1,2,2-tetrachloroethane). The property boundary soil sampling locations are shown on Figure 10. The results of the investigation indicated the presence of TCE and PCE in soil along the property boundary. The highest concentrations were detected at PBI-13, which is the most central of the boring locations in this investigation. The concentrations of TCE detected in the soil at PBI-13 were 20 µg/kg at the 2- to 3-ft depth interval, 28 µg/kg at the 5- to 6-ft depth interval, and 35 µg/kg at the 8- to 9-ft depth interval. PCE concentrations at this location at these intervals were 1.7 µg/kg, 2.3 µg/kg, and 5.3 µg/kg, respectively, with concentrations increasing with depth. Because groundwater was encountered at depths of about 15 to 16 ft BGS, all of the soil samples were collected from the vadose zone.

The results of the Property Boundary soil investigation are reported in the *Property Boundary Investigation Thompson-Isaacson Property, Tukwila, Washington* report (Landau Associates 2009d).

### 3.1.26 2009 Property Boundary Groundwater Investigation

Groundwater samples were collected from four locations along the Thompson property/8801 site boundary (PBI-11, PBI-12, PBI-13, and PBI-15) during the 2009 property boundary investigation. No groundwater sample was collected from location PBI-14 due to an apparent buried concrete slab that did not allow drilling deep enough to encounter groundwater. The groundwater sample locations are shown on Figure 12. The groundwater samples were analyzed for HVOCs.

Vinyl chloride was detected at three locations (PBI-11, PBI-12, and PBI-13) at concentrations of 1.3 µg/L, 0.18 µg/L, and 0.051 µg/L, respectively. 1,1-DCE was detected at PBI-13 and PBI-15 at concentrations of 0.58 µg/L and 0.14 µg/L, respectively, and cis-1,2-DCE was detected at PBI-11 and PBI-13 at concentrations of 100 µg/L and 190 µg/L, respectively. TCE and PCE were detected only in the groundwater sample collected at PBI-13 at concentrations of 1,000 µg/L and 78 µg/L, respectively.

The results of the Property Boundary groundwater investigation are reported in the *Property Boundary Investigation Thompson-Isaacson Property, Tukwila, Washington* report (Landau Associates 2009d).

## 3.2 SEDIMENT QUALITY INVESTIGATIONS

The LDW FS Baseline Dataset (AECOM 2010) was reviewed for sediment chemistry for samples collected offshore of the Site. Sediments within and immediately adjacent to the area offshore of the Site were sampled at 39 surface (0 to 0.33 ft) grab locations and at 9 core locations between 1991 and 2009, as shown on Figure 17.

It should be noted that some of the sediment represented by samples that were collected in and immediately adjacent to the navigation channel prior to 1999 may have been subsequently removed during U.S. Army Corps of Engineers (USACE) maintenance dredging.

### 3.2.1 Surface Samples

Surface sediment grab samples from 23 of the surface sediment grab locations were analyzed for Washington State Sediment Management Standards (SMS) chemicals. A second grab sample was collected at sample location AN-046 as a field duplicate (Sample ID—AN-096-SS-080211). Sediments from an additional 16 locations were analyzed for PCBs and TOC. A table summarizing the results is provided in Appendix A.

The surface sediment results were initially screened using the SMS Sediment Cleanup Objectives (SCO) and the Cleanup Screening Level (CSL). There were detected exceedances of the SMS SCO for one or more of the SMS metals (including arsenic, lead, mercury, and zinc) at six locations. At five of the locations, one or more metals also exceeded the SMS CSL. There were detected exceedances of the SCO for one or more of the SMS list of PAHs at five locations. Although chlorinated benzenes were not detected, the RLs were above the SCO at multiple locations.

There were detected exceedances of the SCO for butyl benzyl phthalate at ten locations; concentrations at one of the locations also exceeded the CSL. Four locations had detected exceedances of the SCO for BEHP, with concentrations at two of the four locations also exceeding the CSL. Dibenzofuran exceeded the SCO at a single location. Although hexachlorobutadiene was not detected in any of the surface sediment samples, the RL was above the SCO at 2 locations. Total PCBs exceeded the SCO at 21 locations, with concentrations at one location also exceeding the CSL. Benzoic acid also exceeded the CSL at 2 locations. Although benzyl alcohol and several phenols were not detected in any of the surface sediment samples, the RLs exceeded the SCO at 4 locations.

In addition, the arsenic and total PCB concentrations were screened against the human health risk-based preliminary remediation goals (PRGs) presented in the EPA Proposed Plan for the Lower Duwamish Superfund Site (EPA 2013). Human health risk-based PRGs are also available for dioxins/furans and for carcinogenic polycyclic aromatic hydrocarbons (cPAHs). The development of the PRGs and the appropriateness of their use in the development of pCULs is discussed in Section 7.4.

All of the surface samples had concentrations of one or more contaminants that were above the LDW site-wide human health risk-based PRGs. All of the surface samples analyzed for total PCBs (by Aroclor) and arsenic were above the human health risk-based PRGs. Surface sediment samples from 3 locations were analyzed for dioxins/furans. The calculated dioxin Toxic Equivalent Concentration (TEQ) for the 3 locations ranged from 2.53 nanograms/kilogram dry weight [ng/kg dw or parts per trillion (pptr)] to 11 ng/kg dw. The dioxin TEQs were above the LDW site-wide PRG for human seafood consumption. The calculated TEQ for the cPAHs ranged from 62 micrograms/kilogram dry weight (µg/kg dw ) to 6,600 µg /kg dw. The cPAH TEQs were above the human health risk-based PRG for human direct contact at 17 of the 23 locations.

Surface sediment samples from 3 locations were also analyzed for selected organochlorine pesticides, but none were detected. Analysis of PCB congeners was also performed on samples from 15 surface sediment locations. A table summarizing the results is provided in Appendix A.

### 3.2.2 Core Samples

Subsurface sediment samples were collected using a coring device at nine locations shown on Figure 17. Core sample intervals submitted for chemical analyses were 2 ft or less at eight of the locations. At the remaining sample location (core location DU9120XX), sediments were composited from the surface to 3 ft below mudline within the navigation channel; that sample was used to characterize sediments for dredged material disposal. The deepest sample interval collected at any coring location in the vicinity of the Site was from 7.0 to 7.7 ft below mudline at location SD-216.

Eight of the core samples were analyzed for the complete SMS list of chemicals. The remaining samples were analyzed for a more limited list of chemicals. A table summarizing the results is provided in Appendix A. General trends in sediment concentrations for the SMS list of chemicals showed decreasing concentrations with depth. Sediment concentrations for metals and a majority of the organic compounds that exceeded the SMS criteria (SCO or CSL) in shallow sediments (generally less than 4 ft below mudline were below the SMS criteria in sample intervals collected deeper than 4 ft below mudline.

Total PCB concentrations at location SD-216 (located north and downstream of the Site were above the CSL criteria in the deepest sample interval collected (7 to 7.7 ft below mudline). However, samples SD-217 and SD-315C, which were immediately upstream of SD-216 and offshore of the Site, either had total PCB concentrations below the SCO in the 4.0- to 4.5-ft sample or PCBs were not detected at 4 ft below mudline and deeper.

The TOC content in some of the deeper sample intervals was less than 0.5 percent. These lower TOC values may be an indication of older native delta deposits that have low organic content. These older deposits are expected to show lower levels of contamination. In addition, comparison of the analytical results to the SMS criteria that are organic carbon (OC) normalized may not be appropriate if the TOC values are less than 0.5 percent. Comparison to the dry weight lowest apparent effects threshold (LAET) values is more appropriate and is consistent with Ecology guidance. There were no exceedances of the LAET values for sediment core samples with TOC values of less than 0.5 percent.

## 3.3 STORM DRAIN INVESTIGATIONS

This section describes investigations that were conducted prior to the RI to assess the storm drain system present at the Site.

### 3.3.1 2007 Catch Basin Rerouting Project

Prior to 2007, two CBs (CB-81 and CB-82) located in the southwest portion of the Thompson property bypassed the oil/water separator located in that portion of the property. In 2007, the storm drain lines from these CBs were rerouted to connect the CBs to the oil/water separator. The location of these CBs and the current storm drain configuration are shown on Figure 3.

### 3.3.2 2008 Drain Line Investigation

On February 25, 2008, Landau Associates and Applied Professional Services (APS) conducted a video tape investigation of a 12-inch corrugated metal pipe located within a retaining wall near the southern boundary of the Site; the pipe outlet is approximately 35 ft south of the southwest corner of Building 14-01 (Figure 18). Based on the results of this investigation, the 12-inch corrugated metal pipe appears to extend east to west parallel to the north side of the retaining wall along the southern property boundary. No inlets to the pipe were identified along its course. The pipe appears to serve as a drain to prevent buildup of groundwater behind the retaining wall. No connections between the pipe and the stormwater drains or sewer lines located on the Site in the vicinity of the pipe were identified during the investigation. There was no evidence of water draining from the pipe onto the property adjacent to the south of the Site. It was assumed that the pipe extends the full length of the retaining wall (approximately 460 ft); however, only 158 ft of the western portion of the pipe was investigated due to a three-prong, industrial-sized electrical plug that was present in the pipe during videotaping. This plug prevented advancement of the camera farther eastward.

A video survey of the full extent of the pipe was conducted as part of the RI and is discussed in Sections 4.5.4 and 8.1.7.

### 3.3.3 2008 Catch Basin Solids Sampling

In December 2008, an investigation was conducted of the solids present in the CBs and oil/water separators at the Site. The purpose of this investigation was to collect and analyze samples of solid material from the CBs and oil/water separators at the Site prior to planned cleaning of the storm drain system. The solid samples were analyzed for PCBs; SVOCs; total metals (arsenic, cadmium, chromium, copper, lead, mercury, and zinc); TOC; and total solids. Samples from some nearby CBs were composited prior to analysis. Twenty-two solids samples were analyzed for PCBs, SVOCs, total metals, TOC, and total solids.

PCBs were detected above the laboratory RLs in 19 of the 22 samples analyzed. One or more SVOCs were detected in 19 of the 22 samples collected. One or more metals were detected in all 22 samples collected. The analytical results for these samples were provided in the RI/FS Work Plan (Landau Associates 2011a).

### 3.3.4 2009 Catch Basin Rerouting Project

In 2009, Boeing completed a project to re-route stormwater collected by CB-39 so that no stormwater from the Site would enter the 48-inch King County storm drain line. CB-39 is located in the western portion of the Site, near the outfall of the King County storm drain line (Figure 3). Stormwater collected by CB-39 previously was conveyed to the 48-inch King County storm drain line. The King County storm drain line conveys stormwater from a portion of the KCIA to the LDW. Two pipes were previously connected to CB-39. One of the pipes was the outlet for CB-39 that connected to the King County storm drain. The purpose of the second pipe has not been determined. Both of the existing pipes were plugged with grout. The CB was inspected and found to be in good condition with a solid concrete bottom; therefore, the existing structure was retained and a new pipe was installed to route stormwater from the CB to the south into the existing Site stormwater system. There are currently no connections between the Site stormwater system and the King County storm drain line.

### 3.3.5 ONGOING STORMWATER OUTFALL SAMPLING

The Site operates under Industrial Stormwater General Permit #WAR000148. The permit requires quarterly sampling from the two stormwater outfalls (Outfalls A and B) located along the western Site boundary (Figure 3). Stormwater discharged from both outfalls met all applicable benchmark values in the first and second quarters of 2012 (per permit conditions, for quarters when multiple sampling events are conducted, the average of the sampling results is compared to the benchmark value). Copper was detected in stormwater at a concentration exceeding the permit benchmark of 14 µg/L during the third quarter 2012 sampling event at both Outfall A (TS-2) and at Outfall B (TS-1). Zinc was detected in stormwater at a concentration exceeding the permit benchmark of 117 µg/L during the third quarter 2012 sampling event at both Outfall A and Outfall B. After receiving third quarter sampling results, Boeing completed a Level One Corrective Action per the permit conditions. The corrective action included inspection of the facility to investigate the potential cause of the benchmark exceedances and review of and revisions to the Stormwater Pollution Prevention Plan (SWPPP) to include additional operational source control Best Management Practices (BMPs). Facility operational source control BMPs include sweeping, roof cleaning, and CB cleaning to remove accumulated solids. Fourth quarter 2012 sampling conducted in October indicated that stormwater discharged to both outfalls again met all applicable benchmark values. A summary of stormwater sampling results from 2010 through 2012 is included in Appendix B.

# 4.0 REMEDIAL INVESTIGATION ACTIVITIES

RI activities were designed to further investigate Site soil, groundwater, soil vapor, storm drain solids, stormwater, and sediment to adequately characterize the Site, to evaluate the potential for recontamination of LDW sediments, and to provide sufficient data to support development and evaluation of cleanup action alternatives. The RI activities address the data gaps identified in the RI/FS Work Plan (Landau Associates 2011a).

RI field activities were completed in general accordance with the RI/FS Work Plan (Landau Associates 2011a) and the Building 14-01 Work Plan (Landau Associates 2011b). This section describes the RI activities and any deviations from the procedures specified in the RI/FS work plan. Soil and groundwater investigations conducted in Building 14-01 and on the Port Property are described in Sections 5.0 and 6.0, respectively. RI results are presented in Section 8.0.

## 4.1 RI SOIL INVESTIGATION

The RI soil investigation was conducted in two phases. The first phase occurred in April 2011 and consisted of soil explorations located inside Building 14-01 and the second phase occurred in October and November 2011. A total of 179 soil samples were collected for laboratory analysis from 50 explorations and submitted for laboratory analysis. The explorations where soil samples were collected for laboratory analysis include:

- Twenty-four soil borings where new wells were installed. These borings are identified as MW-1 through MW-12 and MW-14 through MW-25.
- Two soil borings identified as MW-13 and MW-13B. Soil samples were collected, but no wells were installed in these borings because an obstruction was encountered during drilling preventing advancement of the drilling auger. The monitoring well MW-13 was eventually installed approximately 195ft away from these two soil borings. No soil samples were collected from the soil boring where monitoring well MW-13 was installed because it is near SB-4 where soil samples were collected.
- Twelve soil borings identified as SB-1 through SB-12.
- Nine test pits identified as TP-101 through TP-104, TP-105B, TP-106B, and TP-107 through TP-109
- Three grab samples identified as WB-1, WB-2, and WB-3. Samples WB-1, WB-2, and WB-3 were collected from outside of the bulkhead through gaps in the wooden bulkhead located at the southern portion of the Site.

The data gaps identified in the RI/FS Work Plan that were filled by the soil investigation scope include: 1) characterization of soil in the paint storage areas formerly located on the Isaacson property, 2) characterization of soil in the former diesel and gasoline tank areas located east of the former Isaacson building, 3) determination of the extent of the tar-like substance previously observed in the soil north of the eastern Vortechs vault, 4) evaluation of soil quality near the Former Slip 5 Outfall Area, 5) evaluation of the source of arsenic in groundwater at monitoring wells I-205(s) and I-206(s), 6) evaluation of subsurface conditions downgradient of the Former Hydraulic Test Pad Area, 7) evaluation of the potential for bank erosion to impact sediment quality, 8) characterization of the different fill material used to fill the Former Slip 5 Area, and 9) analysis of soil samples for an extended list of analytes.

Modifications of sample locations or sampling procedures were documented by Landau Associates and discussed with and approved by Ecology. Deviations from the RI/FS Work Plan are discussed below. RI soil sampling results are discussed in Section 9.1.1.

### 4.1.1 Soil Exploration Locations

Soil borings, test pit, and grab sample locations are shown on Figure 19. The explorations were generally located at or near the locations identified in the work plans (Landau Associates 2011a,b); however, some soil borings and test pits were moved due to subsurface conditions. The soil borings and test pits that were moved are described below.

#### 4.1.1.1 Soil Boring Location Adjustments

The soil borings that were moved greater than 10 ft are as follow:

- SB-1 was moved approximately 15 west to avoid underground utilities.
- SB-2 was moved approximately 25 ft southwest. The planned location was too near the newly constructed airplane tow path.
- MW-4 was moved approximately 15 ft southwest to a location inside the Boeing fence. The planned location was outside the fence line.
- MW-7 was moved approximately 15 ft northeast. The planned location was in an area with a steep slope.
- MW-9 was moved approximately 24 ft east. The planned location was in an area with a steep slope. MW-9 was also moved 5 ft north to avoid an electrical panel.
- MW-12 was moved approximately 14 ft north to avoid underground utilities.
- MW-13 was moved 40 ft east and 30 ft north of the planned location to avoid the newly constructed airplane tow path. At this approximate location, there are two soil borings identified as MW-13 and MW-13B. Soil samples were collected, but no wells were installed in these borings because an obstruction was encountered during drilling, preventing advancement of the drilling auger and installation of the planned monitoring well. No soil samples were collected from the soil boring where monitoring well MW-13 was installed because it was installed at the location of soil boring SB-4, approximately 150 ft northwest of the planned location identified in the RI/FS work plan.
- At boring SB-3, geotextile fabric was encountered at approximately 10 inches BGS and a thick plastic was encountered at approximately 12 inches BGS. A second boring was conducted approximately 10 ft north and the geotextile and thick plastic were encountered at the same depths. The plastic was not penetrated and no samples were collected. The geotextile and plastic material was later determined to be associated with the treatment and staging area for the soil stabilization activities on the Isaacson property and that penetration

through each was allowable. Boring SB-3 was then completed to 11 ft BGS in the original location, at which depth an obstruction was encountered.

- At boring SB-4, difficult drilling was encountered at 5.5 ft BGS and then the drill rods dropped 3 ft into the boring. Based on a review of historical drawings, it was determined that the drilling may have penetrated the old 48-inch King County storm drain line. The boring was then relocated approximately 20 ft south and difficult drilling was encountered at 4 ft BGS. Drilling at this second location was aborted. The location for soil boring SB-4 was moved to a third location, approximately 10 ft north and 8 ft west of the location identified in the RI/FS Work Plan. The third boring location for SB-4 was completed successfully to 25 ft BGS.

#### 4.1.1.2 Test Pit Location Adjustments

Test pits that required relocation are as follows:

- At test pit TP-104, a pipe that was not shown on drawings or identified by utility locator was encountered at 4.5 ft BGS. The pipe was nicked by the excavator bucket and some water leaked from the pipe. A sample of the water was collected and archived at the analytical laboratory. The pipe was later confirmed to be a transite pressure sewer pipe that is connected to Building 14-02 and Building 14-14. The pipe was repaired and the test pit was extended to the south approximately 4 ft to complete excavation to the groundwater table and collection of soil samples.
- At test pit TP-105, a pipe that was not shown on drawings or identified by utility locator was encountered at 3.5 ft BGS. This pipe was determined to be a hot water pipe connected to Building 14-02. The pipe was not damaged. The test pit was backfilled and a new test pit (TP-105B) was excavated immediately west and approximately 2 ft south of the planned location.
- At test pit TP-106, a concrete slab was encountered at approximately 4.5 ft BGS. The slab was oriented diagonally (northwest-southeast) through the center of the test pit. The total depth of the concrete was not determined, but it was observed that the concrete extended to at least 6.5 ft BGS. A new test pit (TP-106B) was excavated immediately west of the planned location.

### 4.1.2 Soil Sample Collection

The sample collection methods used for soil borings, test pits, and the wooden bulkhead grab samples are described below. All soil sampling equipment was decontaminated using a tap water rinse, Alconox wash, and distilled water rinse between samples.

#### 4.1.2.1 Soil Borings

The soil borings were completed using a truck-mounted, hollow-stem auger rig or truck-mounted, direct-push drill rig. A summary of the drilling method used for each borehole is provided in Table 1. Except for three soil boring locations, the depth of the soil borings range from 25 ft to 26 ft BGS to fully characterize fill material in the subsurface at the Site. Three soil borings (MW-13, SB-3, and MW-13B) completed on November 3, 8, and 10, 2011 extended to 18.5 ft, 11ft, and 13 ft BGS, respectively. Further advancement of the boreholes was prohibited due to obstructions in the subsurface (concrete rubble and rebar). The depth of each soil boring is summarized in Table 1. A record of the soil and groundwater conditions observed at each borehole was recorded and the logs are provided in Appendix C.

In general, at locations where the soil boring was drilled using a hollow-stem auger, soil samples were obtained using a 3.25-inch outside diameter (OD) split-spoon sampler and, at locations where soil borings were drilled using a direct-push method, soil samples were obtained using a closed-piston sampling device with a core sampler. However, at explorations MW-4, MW-5, MW-6, MW-7, MW-9, MW-10, MW-11, MW-13B, SB-3, and SB-4, samples from 2 to 3.5 ft BGS and 5 to 6.5ft BGS were collected using a hand auger instead of a split-spoon sampler. Also, the upper 2 ft of soil and the soil between the two sample depth intervals at each of these locations was removed using an air-knife instead of a hollow-stem auger and split-spoon sampler. The sampling and drilling modifications were made to provide extra assurance that unmarked underground utilities, if present at these locations, were not damaged. The modifications were approved by Ecology.

At soil boring SB-1 and at the soil borings associated with monitoring wells MW-1, MW-2, and MW-3, soil samples were collected from 3 to 4 ft BGS, 5 to 6 ft BGS, and 8 to 9 ft BGS in accordance with the Building 14-01 Work Plan. At each of the other soil boring locations, the planned soil sample depth intervals for laboratory analysis were 2 to 3 ft BGS, 5 to 6 ft BGS, 8 to 9 ft BGS, and 13 to 14 ft BGS, as specified in the RI/FS Work Plan. However, due to the expanded list of analyses required for all soil samples and the lack of sufficient soil volume collected in the sampler to fill the required laboratory-supplied sample jars, modifications to the sampling plan were made after approval by Ecology. Ecology approval was documented in the October 2011 progress report (Landau Associates 2012b). These modifications included the following:

- For the hollow-stem auger soil samples, the depth intervals collected were increased from 1.0 ft to 1.5 ft. At these soil borings, soil samples were generally collected from 2 to 3.5 ft BGS, 5 to 6.5 ft BGS, 8 to 9.5 ft BGS, and 13 to 14.5 ft BGS for laboratory analysis. In some cases, the depth intervals were modified slightly due to sample recovery.
- For direct-push soil samples, a second matching boring was advanced within one foot of the original boring and the soil from the same depth intervals was composited.

At the soil borings not located inside Building 14-01, soil samples were also collected from 3.5 to 5 ft BGS and 6.5 to 8 ft BGS when sufficient soil was available and archived for possible supplementary laboratory analysis. If the 13- to 14.5-ft depth interval was not at least 1 ft below the groundwater table at the time of drilling, the 13- to 14.5-ft depth interval sample was replaced with a sample from a depth interval starting at 1 ft below the groundwater table at the time of drilling. Also, additional samples were collected from the depth interval where field-screening [i.e., visual presence of potential contamination and/or a photoionization detector (PID) measurement greater than 50 parts per million (ppm)], as described in Section 4.1.3, indicated the likelihood for potential contamination, and from the depth interval below the zone of potential contamination to evaluate the vertical extent of potential impact.

Other changes to planned soil sample collection are described below:

- During drilling at the SB-3 location, an obstruction was encountered at 11 ft BGS that prohibited further advancement of the drilling auger; therefore, the boring could not extend to 25 ft BGS as planned. Also, soil samples could only be collected from the upper 6.5 ft of soil. No soil was retained in the sampler between 6.5 and 11 ft BGS.
- No soil boring was completed at the proposed monitoring well location in the eastern half of Building 14-01; therefore, no soil samples were collected at this location.
- At MW-1, a soil sample was collected by mistake from the 3- to 4-ft depth interval instead of the planned 2- to 3-ft depth interval.

A summary of the samples collected and submitted for laboratory analysis from the soil borings is provided in Table 1.

#### 4.1.2.2 Test Pits

The test pit explorations were excavated prior to the soil borings. The test pits were excavated at or near low tide to reduce the potential for water seepage into the excavation. Each test pit extended to the water table except at test pit TP-109. Loose sand was encountered at TP-109 and the test pit sidewalls began to cave when the test pit was 10 ft deep. Further excavation was not conducted; thus, the test pit did not extend to the groundwater table.

Soil samples were collected from one sidewall at each test pit at 1-ft depth intervals beginning at 2 ft BGS and from the base of the test pit, except at test pits TP-103 and TP-109. Samples representing soil at the base of test pits TP-103 and TP-109 were collected from the base of a sidewall due to the presence of groundwater at the base of test pit TP-103 and due to loose sands and caving sidewalls at test pit TP-109. Except at test pit TP-109, samples collected from the base of the test pits or base of the sidewalls were representative of soil within the capillary fringe zone. Test pit samples collected from 2 to 4 ft BGS were collected by scraping sidewalls with a stainless-steel spoon; samples from below 4 ft were collected from the excavator bucket, with care taken to collect soil that was not in contact with the sides of the bucket.

In accordance with the RI/FS Work Plan, all of the sidewall samples were archived at the laboratory except where field-screening (i.e., visual presence of potential contamination and/or a PID measurement greater than 50 ppm) indicated potential contamination. The only potential contamination observed was at TP-103 where wood and brick debris were observed between 5 and 6 ft BGS. At this test pit, sidewall samples collected from 5 to 6 ft BGS and just below the debris at 6 to 7 ft BGS were submitted for analysis. All of the soil samples representing the capillary fringe were submitted for laboratory analysis. A summary of the samples collected and submitted for laboratory analysis from the test pits is provided in Table 1.

#### 4.1.2.3 Wooden Bulkhead Sampling

On March 3, 2012, a reconnaissance of the wooden bulkhead located at the southern portion of the Thompson property was conducted. The reconnaissance identified gaps in the bulkhead where erosion could occur. Three soil grab samples were collected from the LDW side of the bulkhead where gaps in the bulkhead allowed collection of soil. The sample locations are shown on Figure 19. Photos of the cracks where the wooden bulkhead soil samples were collected are presented on Figures 20, 21, and 22. Soil samples were collected using procedures outlined in the Upland sampling and analysis plan (SAP) included in the RI/FS Work Plan and submitted for laboratory analysis as described below in Section 4.1.4.

#### 4.1.2.4 General Soil Sample Collection Procedures

At all explorations, soil samples to be submitted for the analysis of VOCs and gasoline-range petroleum hydrocarbons were collected and preserved in accordance with EPA Method 5035 before disturbing the sample. The remaining portion of the selected soil sample interval was placed into a decontaminated stainless-steel bowl and homogenized using a decontaminated stainless-steel spoon. Larger-sized material [gravel or wood fragments greater than 2 millimeters (mm) in diameter] was removed by hand-sorting. The sample was then transferred to the appropriate laboratory-supplied sample containers. All soil sampling equipment was decontaminated using a tap water rinse, Alconox wash, and distilled water rinse between samples.

### 4.1.3 SOIL SAMPLE FIELD SCREENING

The soil classification of each soil sample collected was evaluated by the Landau Associates' field representative and recorded on a Log of Exploration form (Appendix C), and the sample was field-screened for indications of contamination. Field-screening was conducted by visually inspecting the soil for staining and other evidence of environmental impact, and monitoring soil vapors for VOCs by performing headspace analysis using a PID. Headspace analysis was conducted by placing a representative portion of the soil in a sealable plastic bag, allowing any volatile constituents in the soil to vaporize inside the sealed container for 5 minutes, then inserting the PID tip into the bag to measure total VOCs. Field screening results were recorded on the Log of Exploration form (provided in Appendix C).

### 4.1.4 Soil Sample Analysis

Soil samples selected for laboratory analysis were analyzed for the Potential Contaminants of Concern (PCOCs) identified in the RI/FS Work Plan: VOCs; SVOCS; metals (antimony, arsenic, barium, beryllium, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc); PCBs; and gasoline-range, diesel-range, and motor oil-range petroleum hydrocarbons. Sample analysis was conducted in accordance with the RI/FS Work Plan and the Building 14-01 Work Plan. Except for the soil samples collected at SB-1, MW-1, MW-2, and MW-3, analytes detected in the soil samples at concentrations below the RL and above the method detection limit (MDL) were reported by the analytical laboratory. Results of soil sample laboratory analysis are discussed in Section 9.1.1.

## 4.2 GROUNDWATER INVESTIGATION

The groundwater investigation consisted of installing 25 additional monitoring wells; collecting groundwater samples from each of the new monitoring wells, from 5 of the existing monitoring wells, from each of the seven existing piezometers, and from 1 soil boring; laboratory analysis of the groundwater samples; monitoring groundwater levels; collecting seep samples at the western property boundary; decommissioning of 2 existing wells (TH-MW-1 and TH-MW-2); and re-evaluating tidal influences on Site groundwater.

The data gaps identified in the RI/FS Work Plan were filled by the completed groundwater investigation and included: 1) determining groundwater quality north of the King County storm drain, 2) evaluating groundwater quality near the Former Slip 5 Outfall Area, 3) evaluating the source of elevated dissolved arsenic concentrations in the vicinity of monitoring well I-104(s), 4) evaluating groundwater quality in the Former Hydraulic Test Pad Area, 5) providing better distribution of groundwater monitoring locations in the western and southern portions of the Site, 6) conducting extended laboratory analysis of groundwater and seep samples, and 7) evaluating the tidal efficiency anomaly observed in well I-205(s).

### 4.2.1 Installation and Construction of Monitoring Wells

In April 2011, three of seven monitoring wells planned for the southern portion of the Site (MW-1 through MW-3) were installed and developed. The three wells were installed inside Building 14-01 and developed in accordance with the Building 14-01 Work Plan (Landau Associates 2011b). A fourth well was planned to be installed inside Building 14-01, but drilling was obstructed by the thickness of the concrete floor slab at the planned location. The location of the well was moved outside of the building near the southern property boundary and is identified as MW-5.

In October and November 2011, Landau Associates installed 22 monitoring wells, including Well MW-5, in accordance with the RI/FS Work Plan. Boreholes for groundwater monitoring wells were drilled using hollow-stem auger drilling equipment. The borings were advanced to approximately 25 ft BGS. Monitoring wells were constructed by a drilling contractor licensed in the state of Washington, in accordance with the *Minimum Standards for Construction and Maintenance of Wells* (Chapter 173-160 WAC). Oversight of drilling and well installation activities was performed by a Landau Associates' environmental professional familiar with environmental sampling and construction of resource protection wells.

The monitoring wells were constructed with 2-inch diameter, flush-threaded, Schedule 40 polyvinyl chloride (PVC) pipe. With the exception of MW-6, MW-12 and MW-17, each well was constructed with a 10-ft screen and screened over a depth of 8 to 18 ft BGS or 10 to 20 ft BGS (wells MW-1, MW-2, and MW-3). Monitoring wells MW-6, MW-12 and MW-17 were constructed with 15-ft screens over a depth of 8 to 23 ft BGS. Depth intervals were modified at the time of construction so that the wells were screened across areas of suspected contamination observed in field screening. The well screens were constructed of a 0.010-inch machine-slotted casing. A filter pack material consisting of pre-washed, pre-sized number #2-12 silica sand was placed from the bottom of the well to approximately 2 ft above the top of the screen in all wells except MW-5, MW-6, MW-7, and MW-9, and MW-12, for which 20/40 Colorado sand filter pack was used. A bentonite seal was placed above the filter sand pack material to within about 3 ft of ground surface. Concrete was used to backfill each boring to the subgrade. Each well was completed with a flush-mounted, traffic-rated protective well monument. The monitoring wells were developed after construction to remove formation material from the well borehole and the filter pack prior to groundwater level measurement and sampling using procedures described in the Upland SAP in the RI/FS Work Plan. Monitoring well construction details are presented in Appendix C. Well depths, well elevations, and screen lengths are summarized in Table 2.

#### 4.2.2 MONITORING WELL LOCATIONS

The locations for the new monitoring wells are shown on Figure 23 and are as follows:

- MW-1 through MW-6 and MW-8 were installed in the southern portion of the Site to better determine groundwater flow direction and evaluate groundwater quality.
- MW-7, MW-9, MW-10, MW-19, and MW-20 were installed near the western Site boundary. MW-10 is located downgradient of the Former Hydraulic Test Pad Area.
- MW-11 was installed in the Former Hydraulic Test Pad Area.
- MW-12, MW-13, and MW-17 were installed within the limits of the Former Slip 5 Area.
- MW-14 was installed near the Former Slip 5 Outfall Area.
- MW-15 was installed immediately downgradient of the former paint storage areas on the Isaacson property, and MW-16 was installed approximately 500 ft downgradient of these former paint storage areas.

- MW-18 and MW-21 were installed upgradient (east) of well I-104(s) to evaluate potential sources for the elevated arsenic concentrations detected in groundwater at well I-104(s).
- MW-22 was installed along the northern Site property boundary.
- MW-23 and MW-24 were installed in the area containing stabilized arsenic-contaminated soil.
- MW-25 was installed in the courtyard area of the former Isaacson property.

All of the monitoring wells were installed at the planned locations identified in the Building 14-01 and RI/FS work plans except for well MW-6, as previously described, and monitoring well MW-13. The planned location for MW-13 was on the newly constructed airplane tow path, the location was, therefore, moved 40 ft east and 30 ft north. The new location was on the estimated historical main flow channel, but away from the tow path and is identified as MW-13 on Figure 19. During drilling at the revised location, an obstruction was encountered at 18.5 ft BGS prohibiting further advancement of the drilling auger. The soil boring for well MW-13 was then relocated 5 ft east, but an obstruction was encountered at 11 ft BGS at this location. After consultation with and as approved by Ecology on November 9, 2011, the well was relocated approximately 25 ft northeast of the location identified in the RI/FS Work Plan. The revised location is identified as MW-13B; however, an obstruction was encountered at 13.5 ft BGS and drilling at this location was aborted. Following consultation with and as approved by Ecology on November 14, 2011, monitoring well MW-13 was relocated to the same location as SB-4 (approximately 150 ft northwest of the location identified in the RI/FS Work Plan) and successfully installed at this location. Existing monitoring wells and piezometers included in the RI groundwater monitoring program are also shown on Figure 23.

### 4.2.3 Well Development

In April and November 2011, Landau Associates developed the 25 newly installed monitoring wells. The monitoring wells were developed after construction to remove formation material from the well borehole and the filter pack prior to groundwater level measurement and sampling. Development was achieved by repeatedly surging the well with a surge block and purging the well until the water ran clear, removing at least 5 well casing volumes. Additional details of well development procedures are described in the Upland SAP included as Appendix A of the RI/FS Work Plan.

### 4.2.4 Monitoring Well Groundwater Sampling

In December 2011, and March, June, and September 2012, Landau Associates conducted groundwater sampling activities. Water levels were measured and groundwater samples were collected from all 25 new monitoring wells, five existing monitoring wells, and seven existing piezometers. During each event, groundwater samples were collected from monitoring wells and piezometers located in the western portion of the Site within 1 hour before and 1 hour after a 1.0 or lower low tide, at a time when groundwater should be flowing from the Site to the LDW, as shown in Table 3. These wells include I-104(s), I-203(s), I-205(s), I-206(s), MW-7, MW-9, MW-10, MW-11, MW-17, MW-18, MW-19, MW-20, MW-21, and MW-23 and piezometers PZ-7 and PZ-8; these wells are identified on Figure 23.

Procedures for collecting groundwater samples from new and existing monitoring wells and piezometers are described in the Upland SAP included in the RI/FS Work Plan. The samples were submitted for laboratory analysis as described in Section 4.2.7.

#### 4.2.5 Soil Boring Groundwater Grab Sampling

On November 14, 2011, Landau Associates collected a grab groundwater sample from soil boring SB-8 located near the Former Slip 5 Outfall Area (Figures 19 and 23). The groundwater sample was collected using procedures described in the Upland SAP included in the RI/FS Work Plan and analyzed for compounds described in Section 4.2.7. Soil boring groundwater grab sample results are discussed in Section 8.1.3.2.

#### 4.2.6 Seep Sampling

A groundwater sample was collected from a seep located at the LDW shoreline on March 15, June 20, and September 25, 2012 and submitted for laboratory analysis. A seep sample was not collected during the December 2011 groundwater sampling event due to insufficient low tides during daylight hours. A reconnaissance of the shoreline on March 12, 2012 did not identify other seeps along the shoreline. The seep sample location is shown on Figure 23.

The seep samples were submitted for laboratory analyses as described below in Section 4.2.7. Seep sampling analytical results are discussed in Section 8.1.3.2.

#### 4.2.7 Groundwater Laboratory Analysis

All groundwater samples, including the grab sample collected from soil boring SB-8 and seep samples, were analyzed for the PCOCs identified in the RI/FS Work Plan: VOCs; SVOCS; total and dissolved metals (antimony, arsenic, barium, beryllium, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc); PCBs; and diesel-range, motor oil-range, and gasoline-range petroleum hydrocarbons.

Groundwater samples collected at each new and existing monitoring well were also analyzed for sulfate and nitrate, and ferrous iron was measured by using a field test kit to assist in evaluating the extent to which concentrations of arsenic in groundwater are the result of reducing groundwater conditions. Sample analysis was conducted in accordance with the RI/FS Work Plan and the Building 14-01 Work

Plan. Analytes detected in the groundwater samples at concentrations below the RL and above the MDL were reported. Groundwater analytical results are discussed in Section 8.1.3.

### 4.2.8 Field Parameters

Field parameters, including pH, temperature, specific conductance, DO, and turbidity, were measured during groundwater sample collection using a flow cell and recorded on a sample collection form. After measurements stabilized, the average measurement for each parameter was calculated. The measurements are discussed in Section 8.1.4.

### 4.2.9 Groundwater Flow Evaluation

To evaluate groundwater flow direction, depth to groundwater was measured at each new well, five existing wells, and each piezometer during each sampling event. Also, a tidal study was conducted to evaluate tidal influence on groundwater flow and to calculate hydraulic conductivity. Procedures for monitoring groundwater flow and evaluating tidal influence are discussed below and in the Upland SAP included in the RI/FS Work Plan.

#### 4.2.9.1 Monitoring Well Surveying

The location of each new and existing monitoring well and each piezometer was surveyed using Differential Global Positioning System (DGPS) equipment and by a professional land surveyor to facilitate accurate placement of these features on project figures and drawings, as well as for submittal to Ecology. Monitoring well reference elevations at both new and existing monitoring wells were surveyed by a professional licensed surveyor to the nearest 0.01 ft for use in evaluating groundwater and lithologic unit elevations. Both the top of monitoring well casing elevation and ground surface elevation adjacent to the monitoring well were obtained. The well survey data are summarized in Table 2.

#### 4.2.9.2 Water level Measurements

Water level measurements were obtained at each monitoring well and piezometer for each monitoring event prior to purging and sample collection. Water levels were recorded to the nearest 0.01 ft and were measured from the top of the well casing. Due to access limitations, surface water levels in the LDW were not measured. The water level measurements were used to develop groundwater elevation contour maps as discussed in Section 8.1.2.

#### 4.2.9.3 Tidal Study

Pressure transducers were installed in six wells and in a PVC pipe attached to the existing dock in Slip 6 on the LDW. The monitoring wells identified in the RI/FS Work Plan for the study were selected to provide a general understanding of the tidal influence on groundwater across the western portion of the Site. These locations included MW-7, MW-10, MW-20, I-205(s), PZ-4, and PZ-6. However, due to standing water in the monuments at piezometers PZ-4 and PZ-6, water levels at these piezometers were not included in the tidal study. As agreed by Ecology (Ecology 2012a), monitoring wells MW-8 and MW-12 were included in the study instead.

The pressure transducer in the PVC pipe in the LDW recorded the actual tide elevations. A barometer was also installed in MW-20, above the highest groundwater level, to correct pressure transducer data for changing barometric pressure.

Pressure transducers and the barometer were installed on Tuesday, January 24, 2012. Groundwater levels and approximate pressure transducer elevations were recorded at the time of installation. Data was collected over a 3-day period, from Tuesday, January 24 to Friday, January 27, 2012. A mixed semidiurnal tidal pattern resulted in the once-daily occurrence of a lower low tide during the study. Additional groundwater elevations were manually recorded in the field on January 24, 25, and 26, 2012, and when the pressure transducers were removed and data was downloaded.

Results of the tidal study are discussed in Section 8.1.2.3.

## 4.3 WELL DECOMMISSIONING

On November 15 2011, two wells (TH-MW-1 and TH-MW-2) located on the western Site boundary, as shown on Figure 12, were decommissioned. Well decommissioning was conducted in accordance with the requirements set forth in WAC 173-160-420 and WAC 173-160-460. Prior to the start of decommissioning activities, a Notice of Intent to Decommission Wells and an as-built well log for each well was submitted to Ecology at least 72 hours prior to the start of decommissioning activities. The wells were decommissioned by backfilling the well screens, casings, and filter pack with bentonite grout. Well monuments at each well were removed and the ground surface was repaired with concrete pavement to match the surrounding grade. A Water Well Report accompanied by as-built well decommissioning logs and a copy of the original Resource Protection Well Report form were subsequently submitted to Ecology.

## 4.4 SOIL VAPOR INVESTIGATION

In April 2011, five vapor samples, (SV-1 through SV-5) were collected beneath the Building 14-01 floor slab. Samples were collected at the sample locations identified in the Building 14-01 Work Plan, except sample SV-1, which was moved approximately 15 ft west due to the presence of underground utilities at the proposed location. All of the samples were located in the southwest corner of the building, as shown on Figure 24. The vapor samples were collected in accordance with the Building 14-01 Work Plan with the following exception: 6-liter SUMMA canisters were used to collect samples instead of the planned 1-liter canisters. Six-liter canisters were required to provide the necessary sample volume to achieve the target RLs specified in the Building 14-01 Work Plan.

The vapor samples were analyzed for VOCs. Based on the results of the soil vapor samples (discussed in Section 8.3), no indoor air samples were deemed necessary and no indoor air samples were collected.

## 4.5 STORM DRAIN SYSTEM INVESTIGATION

The storm drain investigation was conducted to fill the following data gaps: 1) information on the Site storm drain system solids that have accumulated since the last cleaning, 2) characterization of stormwater discharged from Outfalls A and B for Site PCOCs, 3) information on the source of PCOCs in storm drain system solids, if found, and 4) information on the full length of the 12-inch-diameter corrugated pipe located south of Building 14-01.

### 4.5.1 STORM DRAIN SYSTEM SOLIDS

In September 2011, samples of solids present in 68 CBs, 2 oil/water separators, 2 Vortechs vaults, and 1 manhole connected to the Site's storm drain system were collected and analyzed for the Site PCOCs: VOCs; SVOCS; metals (antimony, arsenic, barium beryllium, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc); PCBs; and gasoline-range, diesel-range, and motor oil-range petroleum hydrocarbons. In addition to the PCOCs, the storm drain solids were analyzed for TOC and solids from three locations were analyzed for dioxins/furans. Insufficient solids were present in 15 CBs and 18 storm drain system manholes; therefore, no samples were collected at these locations. A total of 28 discrete solids samples and eight composite solids samples were submitted for laboratory analysis. The locations where storm drain solids samples were collected are shown on Figure 25.

The results of the investigation were compared to SMS criteria to determine the potential for impacts to LDW sediments, in accordance with the RI/FS Work Plan. Although the SMS criteria are not applicable to solids contained within storm drain system structures, these criteria provided a conservative approach for evaluation of potential sources to the sediment offshore of the Site. Because the results of the investigation exceeded SMS criteria, in accordance with the RI/FS Work Plan, the source of the contaminants was investigated, as described in Section 4.5.3. Analytical results of storm drain system solids are discussed in Section 8.1.6.2.

### 4.5.2 Stormwater

On March 14 and April 20, 2012, grab samples of stormwater discharged from Outfalls A and B were collected during a storm event. In accordance with the RI/FS Work Plan, samples representative of discharge at Outfall B were collected at manhole 80, shown on Figure 25. A sample representative of discharge at Outfall A was collected from MH-32 instead of from manhole MH 40 or MH 86, as indicated in the RI/FS Work Plan. The sample location was revised and the revision approved by Ecology (Ecology 2012b) because detailed information received during the RI shows MH-40 is part of the King County storm drain line and a stormwater sample at this location would not represent stormwater from Outfall A. The detailed information also indicates that stormwater at MH-86 flows into the oil/water separator and that MH-32 is downgradient of the oil/water separator.

All of the samples were collected when river water was absent from the storm drain pipes and flow direction at the sample locations was west toward the river. The stormwater samples were analyzed for the Site PCOCs: VOCs; SVOCS; metals (antimony, arsenic, barium beryllium, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc); PCBs; and gasoline-range, diesel-range, and motor oil-range petroleum hydrocarbons. Analytes detected in the solids samples at concentrations below the RL and above the MDL were reported. Stormwater analytical results are discussed in Section 8.1.6.1.

### 4.5.3 Source Material Sampling

The RI/FS Work Plan specifies collection of samples of building materials or other source material if exceedances of the SMS criteria are found in the storm drain system solids samples and analysis of the source material samples for those constituents in the storm drain solids that exceed the SMS criteria. A comparison of the storm drain solids data to the SMS indicated metals, PCBs, and SVOCs, primarily phthalates and benzyl alcohol, were present in some solids at concentrations exceeding the SMS criteria; therefore, a SAP for investigating potential source materials was prepared by Landau Associates and submitted to Ecology (provided in Appendix D). Ecology approved this SAP. The SAP identifies planned media to be sampled, the number of samples to be collected, the analyses to be performed, and the areas where the samples were to be collected. The media identified in the SAP include surface debris, paint chips, and concrete joint material (CJM). Also, at locations where these media were not present, storm drain system solids were to be collected from the structure where contaminants were previously present in the solids at concentrations exceeding the SMS criteria. Immediately following collection of the 36 storm drain solids in September 2011, solids present in the storm drain structures were removed; therefore, the storm drain solids sampled for source material evaluation represent solids collected in the structures since September 2011.

In April 2012, 29 source material samples were collected, including 16 surface debris samples, 6 paint chip samples, 2 concrete joint material samples, and 5 CB solids samples. Surface debris, paint chips, and storm drain structure solids were analyzed for SVOCs, PAHs, PCBs, and metals. Concrete joint material was analyzed for SVOCs, PAHs, and PCBs. Although the SAP did not include analysis for SVOCs and PAHs, these analyses were included at the request of Ecology. Source materials were sampled in eight general areas listed below:

- Building 14-01 South Area
- Building 14-01 East Area
- Building 14-01 North Area
- Building 14-01 West Area
- Building 14-13 Area
- Building 14-02/14-03 Area
- Isaacson East Area
- Isaacson West Area.

These general areas and source material sampling locations are shown on Figure 26.

Each of the general areas listed above was inspected by field personnel prior to sampling to identify potential source materials and sampling locations. The source material sampling was conducted in accordance with the RI/FS Work Plan (Landau Associates 2011a) and the *Source Material Sampling and Analysis Plan* Technical Memorandum (provided in Appendix D) with the following exceptions:

- Due to the absence of surface debris south of the Building 14-01, no surface debris could be collected as identified in the *Source Material Sampling and Analysis Plan* Technical Memorandum. Solids were collected from CBs instead.
- Due to the absence of peeling paint on the exterior north wall of Building 14-02/14-03, no exterior paint chips were collected as identified in the *Source Material Sampling and Analysis Plan* Technical Memorandum.
- In addition to source material samples identified in the *Source Material Sampling and Analysis Plan* Technical Memorandum, a sample was collected from paint peeling from a conex box located on the north side of Building 14-02/14-03.

Source material sample descriptions and detailed sample collection procedures for each of the sampling media are described in the *Storm Drain System Evaluation* Technical Memorandum and the *Source Material Sampling and Analysis Plan* Technical Memorandum that are provided in Appendix D of this report.

In addition to the source material samples collected in April 2012, two samples (SBW091710001 and SBW091710002) were collected of Galbestos exterior siding from Building 14-01 on September 17, 2010, prior to storm drain system solids sampling. Sample SBW091710001was submitted to the Boeing

Environmental Analysis laboratory for PCB analysis. Sample SBW091710002 was submitted to NVL Laboratories in Seattle, Washington for TCLP metals analysis.

A summary of the source material samples collected is presented in Table 4. Results of the source material sampling are discussed in Section 8.1.6.3.

#### 4.5.4 12-Inch Metal Corrugated Pipe

On February10, 2012, a video survey of the remaining portion of the 12-inch metal corrugated pipe located south of Building 14-01 that was not surveyed in 2008 was conducted. Information regarding the 2008 video tape investigation is provided in Section 3.3.2. The electrical plug blocking the eastern portion of the pipe in 2008 was bypassed using a smaller camera. Video survey of the full-length of the pipe was completed in 2012 (a DVD of the 2012 video survey is included in Appendix O) and results of the video survey are discussed in Section 8.1.7.1. The location of the 12-inch metal corrugated pipe relative to the parcel boundary and surrounding area is provided on Figure 18.

#### 4.5.5 Storm Drain Inspection and Video Survey

In late September and early October 2012, all accessible lines and structures (CBs, manholes, oil/water separators, and Vortex vaults) of the Boeing storm drain system were cleaned and a video inspection conducted. Storm drain cleaning and video inspection work was performed by Bravo Environmental of Kenmore, Washington. Video inspection of the storm drain lines was performed to confirm that jet-cleaning activities had adequately removed solids and debris from the storm drain lines, and to inspect for cracks, fractures, or breaks in the storm drain line segments that could potentially allow intrusion or infiltration of soil or groundwater. Placement of plugs at the discharge pipes of the oil/water separators prevented discharge of jetting water to the LDW. All of the solids and water generated during the cleaning were processed at the North Boeing Field Decant Treatment Facility.

The storm drain inspection also included verification of connection of four CBs (CB-G, CB-H, CB-I, and CB-J) present on the eastern portion of the Isaacson property and one CB (CB-90B) present on the eastern portion of the Thompson property to a storm drain line. The storm drain system, and those segments that were video-inspected, are shown on Figure 27. Results of the video survey are discussed in Section 8.1.7.2.

### 4.6 SEDIMENT INVESTIGATION

The sediment investigation was conducted in accordance with the RI/FS Work Plan (Landau Associates 2011a), which was approved by Ecology in September 2011 (Ecology 2011a). A sediment investigation sample and analysis plan (Sediment SAP) was developed and included as Appendix B of the Work Plan (Landau Associates 2011a).

#### 4.6.1 Sample Collection

Sediments were collected in January and February 2012 using the procedures specified in the Sediment SAP. Sampling locations were determined using a DGPS, with coordinates in the Washington State Plane Coordinate System (SPCS), North Zone, referenced to the North American Datum 1983 (NAD 83), survey feet (Table 5). The accuracy of the DGPS is approximately ±1 m. The operation of the DGPS unit was checked each day before work and at the conclusion of each day's operation by comparing the coordinates with a known reference point (Appendix E).

Recorded water depths during sampling were determined using either a lead line (at shallow stations) or a depth meter deployed by a diver (at deeper stations). Diver-obtained water depths are likely to be more accurate than lead-line measurements of water depth at the deeper sampling stations during periods of higher current flow.

Horizontal coordinates were converted from SPCS to latitude and longitude (NAD 83) using Corpscon Version 6.0.1. Estimated mudline elevations at the time of sampling were calculated from the recorded water depths and the predicted tidal elevations from published National Oceanic and Atmospheric Administration (NOAA) tide tables with correction for the Duwamish Waterway. Higher than normal river discharge rates during the sediment sampling field work may have resulted in the estimated mudline elevations being biased high.

All field forms from the collection of sediment are provided in Appendix E.

#### 4.6.2 Sediment Impact Cores

Successful sediment core samples were collected at the 15 proposed stations (Figure 28). The cores at each location were driven to refusal. The full penetration depth proposed in the RI/FS work plan was 15 ft below mudline, but that was achieved at only one location. Sediments were collected from 11 to 12 ft below mudline (i.e., 75 percent of the proposed sampling depth) at three locations. Additional sampling attempts were made to recover deeper samples at six locations. Duplicate cores were collected at two stations, SD-505 and SD-512 (duplicates were identified as SD-516 and SD-517, respectively).

Core penetration into the deeper sediments was difficult due to the dense nature of the deeper sand deposits. In addition, under some conditions, the lack of sediment cohesion allowed the deeper sandy sediments (characterized by a low percentage of silts) to be washed out past the core catcher.

#### 4.6.3 Surface Sediment Grab Samples

Acceptable surface (0 to 10 cm) sediment grab samples were collected at the 15 proposed grab sample locations using a 0.2 square meters ($m^2$) stainless-steel van Veen grab sampler (Figure 28).

Duplicate grab samples were collected at two stations, SD-505G and SD-512G (duplicates were identified as SD-516G and SD-517G, respectively).

### 4.6.4 SEDIMENT SAMPLE ANALYSIS

Sample material from each grab sample or core segment scheduled for analysis was first homogenized before sample aliquots were removed for analysis. TOC was analyzed using the EPA Methods 9060 and Plumb 1981, as described in Analytical Resources, Inc. (ARI), Standard Operating Procedure 602S. Arsenic was analyzed using EPA Method 200.8. The remaining SMS metals (with the exception of mercury) were analyzed using EPA Method 6010. Mercury was analyzed using EPA Method 7471A. The organic compounds were analyzed using EPA Method 8270D. Dioxins and furans were analyzed using EPA Method 1613B. Several compounds were also quantified using a Selective Ion Monitoring (SIM) method to achieve lower RLs. Total low molecular weight PAH (LPAH) and high molecular weight PAH (HPAH) concentrations were summed using the SMS rules.

Samples were analyzed for PCB Aroclors according to EPA Method 8082. Total PCBs concentrations were summed from individual Aroclor concentrations using the SMS rules (i.e., the sum of the detected Aroclor concentrations or if all of the Aroclors were not detected, then the highest RL for any individual Aroclor was used as the RL for the total PCBs).

## 4.7 QUALITY ASSURANCE (QA) SAMPLES

In accordance with the RI/FS Work Plan, blind field duplicate samples were collected for groundwater and LDW sediment samples and matrix spike samples were collected for soil, groundwater, LDW sediment, and stormwater system solids samples. Blind field duplicate groundwater samples were collected at a frequency of one per 20 groundwater samples per sampling event for all analyses. Blind field duplicate sediment samples were collected at a frequency of at least one per 10 sediment samples. Matrix spike samples were collected at a rate of 1 per 20 samples. Field trip blanks accompanied samples collected for the analysis of VOCs and gasoline-range petroleum hydrocarbons during transportation to and from the field and were analyzed for VOCs and gasoline-range petroleum hydrocarbons.

# 5.0 CONSTRUCTION-RELATED SAMPLING ACTIVITIES

In August 2010, Boeing began Building 14-01 modification construction activities to accommodate Boeing's P-8 program operations. These activities included installation of underground utilities in Building 14-01, relocation of CBs east of Building 14-01, removal of the former loading dock and an AST west of Building 14-01, and construction of a new airplane towpath. Landau Associates assisted in documenting environmental conditions related to Building 14-01 construction activities that were not related to the Agreed Order. The following provides a summary of construction-related sampling activities. Laboratory analytical results of construction sampling activities are discussed in Section 8.0.

## 5.1 EXCAVATION SOIL SAMPLING

Construction activities associated with Building 14-01 modifications included several excavations in and around the building footprint from which soil samples were collected and submitted to ARI laboratory for analysis. The construction-related soil samples that were collected are summarized below and in Table 1; the locations of the soil samples are shown on Figure 19 and samples collected inside Building 14-01 are also shown on Figure 24:

- From September 2 through 7, 2010, six soil samples were collected from an excavation associated with the relocation of a hotbox located east of Building 14-01. Three of the samples (IT-HBE-1A-1, IT-HBE-2-1, and IT-HBE-3-1) were collected from a depth interval of 0 to 1 ft BGS. Samples IT-HBE-1A(4.5-5.5) and IT-HBE-3(4.5-5.5) were collected from the 4.5- to 5.5-ft depth interval and sample IT-HBE-2(4.0-5.0) was collected from the 4.0- to 5.0-ft depth interval. All of the samples were submitted to ARI laboratory for analysis of VOCs, SVOCs, PCBs, metals, and TCLP metals.
- On September 3, 2010, a sample was collected from a small soil stockpile located east of Building 14-01. The stockpiled soil was excavated from a small, shallow hole associated with construction activities. The soil sample (IT-HBE-SS1) was submitted to ARI laboratory for analysis of VOCs, SVOCs, PCBs, metals, and TCLP metals.
- On September 15, 2010, six soil samples were collected from excavations associated with reactivation of a CB located east of Building 14-01 (excavation locations are shown on Figure 19). Three of the soil samples [IT-EXT-1(0-1), IT-EXT-2(0-1), IT-EXT-3(0-1)], were collected from a depth interval of 0 to 1 ft BGS. Samples IT-EXT-2(3-4) and IT-EXT-3(3-4) were collected from the 3.0- to 4.0-ft depth interval and sample IT-EXT-1(4-5) was collected from the 4.0- to 5.0-ft depth interval. All of the samples were submitted to ARI laboratory for analysis of VOCs, SVOCs, PCBs, metals, and TCLP metals.
- In May 2011, four trenches, each approximately 47.5 ft in length, 4 to 6.5 ft wide, and 3 ft deep, were excavated inside Building 14-01 as part of construction activities related to building redevelopment. These trenches are identified by the construction contractor as trenches 2 through 5. Two soil samples were collected from the base of each excavation (one from the north end and one from the south end) and submitted for laboratory analysis in accordance with the SAP approved by Ecology via e-mail on April 22, 2011 (Ecology

2011c). The soil samples were labeled: IT-Bldg1401-Trench-2N, IT-Bldg1401-Trench-2S, IT-Bldg1401-Trench-3N, IT-Bldg1401-Trench-3S, IT-Bldg1401-Trench-4N, IT-Bldg1401-Trench-4S, ITBldg1401-Trench-5N, and IT-Bldg1401-Trench-5S. An additional excavation, approximately 80 ft in length, 4 ft wide, and 2 ft deep, was completed in the northern portion of Building 14-01, in an area currently used as a cafeteria. The cafeteria is named Outtakes and, therefore, the excavation was referred to as the Outtakes excavation. A plan for collecting soil samples from the excavation for laboratory analysis was submitted to Ecology via e-mail on May 9, 2011 (Landau Associates 2011c). Ecology approved the plan via e-mail on May 13, 2011. In accordance with the plan, four soil samples were collected from the base of the excavation at the locations shown on Figure 19. The samples were labeled: IT-Bldg1401-OuttakesExc-1(3.5), IT-Bldg1401-OuttakesExc-2(3.7), IT-Bldg1401-OuttakesExc-3(2.9), and IT-Bldg1401-OuttakesExc-4(3.05).

- In June 2011, 16 excavations ranging in size from 6 ft x 6 ft to about 12 ft x 12 ft were excavated inside the southern portion of the building where footings to support new building columns were to be installed; the approximate locations are shown on Figure 24. A plan for collecting 5 soil samples (a sidewall sample from one excavation and a bottom sample from each of the 4 excavations with depths of at least 3.5 ft) was submitted to Ecology via email on June 9, 2011 (Boeing 2011a) and approved by Ecology on June 21, 2011 (Ecology 2011d). Soil samples were collected in general accordance with the SAP with the following changes:
  - No soil samples were collected from the base of excavations # 4, #13, and #16 as planned because the final depths of these excavations were less than 2 ft BGS. Instead, soil samples were collected from the base of excavations #3, #14, and #15, where the final excavation depths were 4 ft BGS. No excavation sidewall sample was collected from excavation #13 as planned because the excavation was less than 2 ft BGS. Instead, sidewall samples were collected from a depth of 4.0 ft BGS at excavations #1 and #5.
  - Soil samples were collected from 6.0 ft BGS at excavations #1 and #5 where an asphalt surface was encountered at 7.0 ft BGS. The asphalt surface was also encountered at 7.0 ft BGS at excavation #9. At each of these three excavations, the asphalt was broken up in place and removed; therefore, the final depth of each of these three excavations was 7.5 ft BGS. A soil sample was collected from below the asphalt at 7.5 ft BGS at excavation #1.
  - No soil sample was collected from the base of excavation #11 as planned, but, instead, was collected from the base of excavation #10 for better spatial distribution of the samples.
  - A soil sample was collected from excavation #8 for better spatial distribution of the samples.
  - The depth of each of the 16 excavations is shown on Figure 24. All of the soil samples were submitted to ARI laboratory for analysis in accordance with the SAP.
- In July 2011, 11 soil samples were collected from areas where construction activities required soil excavation. These areas were located west and northwest of Building 14-01. The samples were identified as:

| | | |
|---|---|---|
| IT-TOWPATHEXC1-B(.8) | IT-TOWPATHEXC5-B(.7) | IT-TOWPATHEXC9-B(.7) |
| IT-TOWPATHEXC2-B(.7) | IT-TOWPATHEXC6-B(.7) | IT-TOWPATHEXC10-B(.7) |
| IT-TOWPATHEXC3-B(.7) | IT-TOWPATHEXC7-B(.7) | IT-TOWPATHEXC11-B(.7) |
| IT-TOWPATHEXC4-B(.7) | IT-TOWPATHEXC8-B(.7) | |

- On July 26, 2011, one soil sample was collected from an area northwest of Building 14-14 where construction activities required additional soil excavation. This sample was collected from the base of the additional excavation and identified as IT-TOWPATH-EXC12-B(2.7)-110726. These samples were collected and submitted to ARI laboratory for analysis in accordance with the SAP submitted to Ecology on June 29, 2011 (Boeing 2011b) and approved by Ecology on July 11, 2011 (Ecology 2011e).
- In July 2011, four soil samples were collected from a utility trench related to construction activities and located south of Building 14-11. The soil samples were identified as IT-Bldg14-11-Exc1-B(2.1)-110728, IT-Bldg14-11-Exc2-B(2.5)-110728, IT-Bldg14-11-Exc3-B(3.0)-110728, and IT-Bldg14-11-Exc4-B(2.4)-110728. The samples were submitted to ARI laboratory for analysis consistent with previous construction-related SAPs submitted to and approved by Ecology.
- In August 2011, one soil sample was collected from an area northeast of Building 14-01 where construction activities required soil excavation. This sample was collected from the base of the excavation and identified as IT-TowpathExc13(1.3)110802. The sample was submitted to ARI laboratory for analysis consistent with previous construction-related SAPs submitted to and approved by Ecology.
- In August 2011, four soil samples were collected from two areas north of Building 14-01 where construction activities required soil excavation. The excavations were related to the removal of two post-indicator valves (PIVs). Samples were collected from the sidewall and the base of each excavation and were identified as IT-PIVEXC1-B(4.2)-110808, IT-PIVEXC1-SW(2.1)-110808, IT-PIVEXC2-SW(2.5)-110809, and IT-PIVEXC2-B(5.0)-110809. The samples were submitted to ARI laboratory for analysis consistent with previous construction-related SAPs submitted to and approved by Ecology.
- In August 2011, two soil sample were collected from the area of the former guard shack (Building 14-11) where construction activities required demolition of and excavation below the building. One sample was collected directly beneath the location where a sample of CJM was previously collected and another sample was collected from the base of the excavation. The samples were identified as IT-BLDG14-11-SURF-1108 and IT-BLDG14-11EXC5-B(.5)1108. The samples were collected and submitted to ARI laboratory for analysis in accordance with the SAP submitted to Ecology on June 29, 2011 (Boeing 2011b) and approved by Ecology on July 11, 2011 (Ecology 2011e).

## 5.2 CONCRETE AND CONCRETE JOINT MATERIAL SAMPLING

During Building 14-01 modification construction activities, several samples of concrete and CJM were collected and submitted to ARI laboratory for chemical analysis. The sample locations are shown on Figure 26:

- A sample, AXP054211-001, of the CJM located west of Building 14-01 was collected on May 24, 2011 and analyzed for PCBs.
- Six samples of the CJM located west and north of Building 14-01 and in the area of Building 14-11 (formerly used as a guard shack) were collected on June 6, 2011. The samples were identified as CJM-1 through CJM-6 and were analyzed for PCBS. The samples were also analyzed for PAHs for disposal characterization purposes.

- Six samples of concrete were collected on June 27, 2011 from areas or near areas where concrete was removed as part of the Building 14-01 construction activities. The samples were identified as CON-1 through CON-6. One of the concrete samples (CON-6) was collected adjacent to a CJM sample located in the Building 14-11 area (CJM-5). All of the samples were submitted to ARI laboratory for PCB analysis.

## 5.3 BUILDING MATERIAL SAMPLING

During Building 14-01 modification construction activities, samples of various building materials were collected as follows:

- In July 2010, eight samples of metals-based paint were collected from various locations on the outside of Building 14-01 and analyzed for metals.
- In September 2011, new roofing material was being installed over the existing roof of Building 14-01. One sample (IT-RoofMatBldg1401-110921) of the existing roof material was collected prior to placement of the new roofing material and archived at ARI laboratory. The sample has not been and is not planned to be analyzed.

# 6.0 PORT PROPERTY INVESTIGATION

In August 2012, an investigation was conducted on the Port property located immediately adjacent to the Site (Figures 19 and 23, Figure F-1 in Appendix F). The investigation was conducted separately from the Site RI, although the sample locations and results are included on RI figures. The purpose of the investigation was to determine if contaminants were present in soil or groundwater on the Port property; therefore, the scope of the investigation was limited to four explorations located on the eastern edge of the Port property, collection of soil and groundwater samples from each boring, and analysis of the samples for metals. A work plan for conducting the investigation was prepared by Landau Associates (Landau Associates 2012a) and approved by Ecology.

The four explorations consisted of soil borings (PS-SB-1 through PS-SB-4) advanced using a truck-mounted direct-push drill rig. Soil sampling locations are shown on Figure 19. Each boring extended below the groundwater table (generally encountered between 13 and 15 ft BGS) to a depth of 20 ft BGS; however, at soil boring PS-SB-1, the boring was discontinued at 15 ft BGS due to refusal. A second borehole, PS-SB-1a, was advanced approximately 2 ft south of PS-SB-1. Four soil samples were collected from each borehole from the following depth intervals: 2 to 3 ft BGS, 5 to 6 ft BGS, 8 to 9 ft BGS, and 13 to 14 ft BGS, and submitted for laboratory analysis, except at soil boring PS-SB-2 where a sample was collected from a depth interval of 7.5 to 8.5 ft BGS instead of from 8 to 9 ft BGS.

One groundwater sample was collected from each borehole (PS-SB-1a, PS-SB-2, PS-SB-3, and PS-SB-4). Groundwater sample locations are shown on Figure 23 with all RI groundwater monitoring locations. The groundwater samples were collected from temporary well points installed in each borehole. The temporary well points consisted of a 4-ft-long, wire-wrapped, stainless-steel screen (0.010-inch slot size) with a retractable protective steel sheath. Low-flow purging was performed for 10 minutes or until the purge water was clear, using a peristaltic pump. During purging, pH, conductivity, and temperature were measured using a flow-through cell and recorded on a field sample collection form. Groundwater samples were collected directly into the appropriate sample containers using disposable polyethylene tubing and a peristaltic pump. Groundwater samples for dissolved arsenic analyses were collected last and were field-filtered through a 0.45 micron, in-line disposable filter. Following collection of the groundwater samples, the temporary well point was removed and the soil boring was backfilled with bentonite chips.

The soil and groundwater samples were analyzed for priority pollutant metals (antimony, arsenic, beryllium, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc) and barium. The groundwater samples were analyzed for both the total and dissolved fractions of these metals.

A figure showing the sample locations, soil boring logs, and tables summarizing the analytical results are provided in Appendix F. Soil and groundwater results are also included on relevant concentration range figures (Figures 29, 45 through 64).

# 7.0 PRELIMINARY CLEANUP LEVELS PCULS

Groundwater, soil, and air preliminary cleanup levels (pCULs) and soil vapor screening levels for all of the constituents detected in these media are presented in Table 6 (groundwater and soil) and Table 7 (air and sub-slab soil vapor). The bases for the groundwater and soil pCULs are identified in Table G-16. The air pCULs are based on MTCA Method B or Plant 2 TMCLs as indicated in Table 6. The vapor attenuation factors used to calculate soil vapor screening levels from the air pCULs are also presented in Table 6. Sediment pCULs are presented in Table 8 and are based on SMS SCO and the sediment PRGs presented in the Proposed Plan for the LDW Superfund Site (EPA 2013).

The RI/FS Work Plan (Landau Associates 2011a) identifies preliminary screening levels that were used in the RI/FS Work Plan to screen existing data and to evaluate proposed MDLs and RLs for analytical data collected during the RI. These preliminary screening levels were not adjusted as allowed under MTCA [WAC 173-340-705(7)(c ) and WAC 173-340-740(5)(c )] to be no less than the practical quantitation limits (PQLs) and natural background; that adjustment was to be done in the RI. Further adjustments to the preliminary screening levels, based on identification of appropriate receptors and exposure pathways, were also planned for the RI.

Some of the groundwater and soil pCULs included in this RI are based on the Target Media Cleanup Levels (TMCLs) for the Boeing Plant 2 facility (Plant 2). Plant 2 is located on the east bank of the LDW just north of the Jorgenson site and is a treatment, storage, and disposal (TSD) facility subject to RCRA regulation and permitting, which includes corrective action. Other groundwater and soil pCULs are calculated in accordance with MTCA Method B or are based on pCULs at other nearby sites, as requested by Ecology to provide consistency for various sites along the LDW. Table G-1 in Appendix G identifies the bases for groundwater and soil pCULs.

The Plant 2 TMCLs were developed consistent with RCRA, including EPA's Regional Screening Levels; the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) *Risk Assessment Guidance for Superfund* (EPA 1989); *Framework for Selecting and Using Tribal Fish and Shellfish Consumption Rates for Risk-Based Decision Making at CERCLA and RCRA Cleanup Sites in Puget Sound and the Strait of Georgia* (EPA 2007); and MTCA regulations. The process used to develop the TMCLs is documented in the May 26, 2011 Boeing Plant 2 Target Media Cleanup Levels Technical Memorandum prepared by Boeing (Boeing 2011c). The TMCLs were approved by EPA on May 31, 2011. Several TMCLs were adjusted by EPA in early winter 2013 to update toxicity factors that were revised in 2011 and 2012 and to correct a few related issues (the barium bioconcentration factor, a calculation error for vinyl chloride, etc.). Appendix H includes the May 26, 2011 TMCL Technical Memorandum; the May 31, 2011 email indicating EPA approval of the May 26, 2011 TMCLs; and a

February 14, 2013 Memorandum from Floyd|Snider documenting the revisions to the 2011 TMCLs. Although written approval for the 2013 revisions has not yet been received, EPA has verbally approved the changes. These revisions have been included in the development of the pCUL.

For some constituents detected in Site groundwater or soil for which no Plant 2 TMCL was developed, a pCUL was developed using the same procedure used for TMCL development. Spreadsheets summarizing the development are provided in Appendix G. Groundwater and soil pCULs for other constituents were identified by Ecology in their comments on the draft RI report (Ecology 2013) for use in the RI or were agreed to during subsequent discussions with Ecology.

The pCULs for some metals in soil and groundwater have been adjusted for natural background, as appropriate. The pCULs have not been adjusted to be no less than PQLs as is provided for in MTCA. pCULs for some constituents including PCBs, most cPAHs, and a few other constituents are less than PQLs and RLs. PCULs will be adjusted after the RI to be no less than PQLs. Additional adjustments based on potential receptors, migration pathways, or exposure pathways may also be made at that time.

## 7.1 GROUNDWATER

Groundwater pCULs protective of human health and the environment were developed for all constituents detected in groundwater and are presented in Table 6. pCULs are based on protection of groundwater using the Plant 2 TMCLs, MTCA Method B, or modified Method B cleanup levels identified by Ecology for use at the Site. Under MTCA (WAC 173-340-720), groundwater cleanup levels are to 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. Ecology has determined that, at most sites, use of groundwater as a source of drinking water is the beneficial use requiring the highest quality of groundwater and that exposure to hazardous substances through ingestion of drinking water and other domestic uses represents the reasonable maximum exposure. As described in Section 7.1.1, groundwater at or potentially affected by the Site is not considered potable. Groundwater at the Site discharges into the LDW; therefore, the highest beneficial use of groundwater at the Site is protection of surface water quality in the LDW.

At Plant 2, the maximum beneficial use of groundwater was also found to be protection of surface water quality in the LDW; therefore, the Plant 2 TMCLs are relevant for use at the Site. Plant 2 groundwater TMCLs are provided in Table I-2 of Appendix I. Specifically, the Plant 2 TMCLs considered the following pathways to define the surface water quality that needed to be protected by groundwater discharge:

- Protection of Aquatic Species based on standards for both marine and freshwater species contained in WAC 173-201A, the Federal National Toxics Rule, and the Federal Ambient Water Quality Criteria (promulgated under the Federal Clean Water Act).
- Protection of human health based on consumption of fish and shell fish harvested from the LDW at consumption rates protective of tribal families (the highest consumption rate). This also protects recreational and Asian/Pacific Island consumption rates.

The Plant 2 TMCLs only consider criteria protective of drinking water use when insufficient information exists to calculate a criterion protective of human health based on surface water Method B pCULs are also based on protection of human health based on discharge of groundwater to surface water.

### 7.1.1 POTABILITY OF SITE GROUNDWATER

Groundwater is to be considered potable unless it can be demonstrated that certain criteria can be met [WAC 173-340-720(2)(b)]. However, MTCA [WAC 173-340-720(2)(d)] acknowledges that, even if groundwater is considered potable under WAC 173-340-720(2)(b), groundwater near surface water that is not a drinking water source may be unlikely to be used as drinking water and provides criteria for classifying groundwater as non-potable. These criteria, together with a description of how the criteria are met, are provided below.

- **The groundwater is not a current drinking water source.** No one is currently using the groundwater at or near the Site as drinking water.
- **It is unlikely that hazardous substances will be transported from contaminated groundwater to groundwater that is a current or potential future source of drinking water at concentrations that exceed groundwater quality criteria published in Chapter 173-200 WAC.** Hydraulic gradients are generally upward between the upper and lower groundwater zones, limiting the potential for contaminants in the upper groundwater zone to migrate to the lower groundwater zone (Booth and Herman 1998).
- **There are known or projected points of entry of the groundwater into the surface water.** Shallow groundwater is known to discharge to the LDW (Booth and Herman 1998) and the RI included sampling a seep located at the LDW shoreline where groundwater from the Site was discharging.
- **The surface water is not classified as a suitable domestic water supply source.** As described in Section 7.1.2, the designated uses of the LDW do not include use as a domestic water supply (WAC 173-201A-602).
- **The groundwater is sufficiently hydraulically connected to the surface water that the groundwater is not practicable to use as a drinking water source.** Groundwater at the Site is hydraulically connected with the adjacent LDW; tidal effects on groundwater are described in Section 8.1.2.3. If groundwater at the Site was pumped for drinking water use, saltwater intrusion due to the juxtaposition of the Site to the marine surface water of the LDW is likely to result in increased salinity in groundwater at the Site.

Because groundwater at the Site meets these criteria, it should be considered non-potable, consistent with the determination made at the adjacent 8801 site [AMEC Environment and Infrastructure, Inc. (AMEC) 2011].

### 7.1.2 Lower Duwamish Waterway Surface Water Designation

The use designation of the LDW is set forth in WAC 173-201A-602 (see Table 602). The Washington State-designated uses of the Duwamish River from its mouth to River Mile 11.0 are: salmonid rearing and migration, industrial/agricultural water supply, stock watering, wildlife habitat, secondary contact recreation, boating and sport fishing, commerce, and navigation. Importantly, the LDW is not designated as a potential drinking-water source. Therefore, numerical surface water standards for human health are based on consumption of aquatic organisms (fish and shellfish), and do not include consumption of water. Although Chapter 173-201A WAC designates the Duwamish River as fresh surface water; the Duwamish Waterway in the vicinity of the Site is actually a tidally controlled marine embayment with a thin freshwater lens of outgoing river water on top of the denser (more saline) and more predominant marine waters. Consistent with decisions made at Plant 2, the surface water at the Site will be considered to include both “freshwater” and “marine” sections. Therefore, for determining water quality criteria, both freshwater and marine standards have been considered,

## 7.2 SOIL

Soil pCULs protective of human health and the environment were developed for all constituents detected in soil and are presented in Table 6. pCULs are based on direct human contact and protection of groundwater using the Plant 2 TMCLs, MTCA Method B, or other cleanup levels identified by Ecology for use at the Site. Plant 2 soil TMCLs are provided in Table I-1 of I. pCULs are not based on protection of terrestrial ecological receptors as described below.

Terrestrial ecological receptors (wildlife, soil biota, and plants) are currently not considered to be potential receptors for contaminants in soil at the Site. The Site is currently almost entirely covered with buildings and pavement, with only a small strip of undeveloped land along the western and southern portion of the Site (approximately 0.3 acres). The adjacent Port property (approximately 0.5 acres) is paved; however, the paving is in poor condition and vegetation is present. Contaminated soil at the Site is and will continue to be covered by buildings and pavement, preventing plants or wildlife from being exposed to soil contamination; as required, an institutional control to maintain the physical barriers at the Site will be implemented. Future Port land use plans, including remediation plans, are not known. Ecology’s Terrestrial Ecological Evaluation form Table 749-1 documenting the exposure analysis procedure is included as Appendix J. The analysis indicates that the simplified terrestrial ecological evaluation may be ended. If, during the remedy evaluation and selection process, exposure of terrestrial ecological receptors is determined to be important at the Site, cleanup levels will be adjusted, as appropriate, to provide for protection of terrestrial ecological receptors.

The Site is used for industrial purposes and, as described in Section 2.1.3, is located in an urban industrial area. The Site meets the criteria under MTCA [WAC 173-340-754(1)(a)(i)] for an industrial property as follows:

- No one lives at the Site.
- Access to the Site by the general public is not allowed and/or is highly limited since the perimeter of the Site is surrounded by a security fence with a guard at the entrance.
- No food is grown or raised on the Site.
- The majority of the surface of the land is covered by buildings and pavement.
- Support services at the facility are devoted to administrative functions necessary for the industrial use and employees (e.g., offices and a cafeteria).

Additionally, the Site is zoned Manufacturing Industrial Center/Heavy Industrial (MIC/H) and is located in an industrial corridor that is likely to remain industrial in the future. However, as required by Ecology, the pCULs are based on unrestricted land use; after the RI, the pCULs may be adjusted based on current and future land use, potential receptors, migration pathways, and exposure pathways. The Plant 2 TMCLs for soil used as pCULs for some constituents consider residential and industrial direct contact exposures and leaching of contaminants from soil to groundwater and subsequently to surface water. The Plant 2 TMCLs do not consider exposure of terrestrial ecological receptors to soil because at Plant 2, like at the Site, exposure is blocked by pavement and buildings.

Under WAC 173-340-740, Method B soil cleanup levels must be as stringent as:

- Concentrations established under applicable state and federal laws
- Concentrations protective of direct human contact with soil
- Concentrations protective of terrestrial ecological receptors
- Concentrations protective of groundwater.

As described above, the Site meets the criteria to end evaluation of terrestrial ecological exposure. The other criteria were considered during development of the pCULs. The only Applicable or Relevant and Appropriate Requirement (ARAR) for soil is the Toxic Substances Control Act (TSCA); there are no other soil concentrations established under applicable federal laws. Except for total petroleum hydrocarbon (TPH) and lead, standard MTCA Method B pCULs protective of direct human contact were determined in accordance with WAC 173-340-740(3) using Ecology's Cleanup Levels and Risk

Calculations (CLARC) database. MTCA Method A soil cleanup levels for unrestricted land uses were used for TPH and lead. Soil pCULs protective of groundwater were determined using the fixed parameter three-phase partitioning model in accordance with WAC 173-340-747(4). The three-phase model provides a conservative estimate of the concentration of a contaminant in soil that is protective of groundwater.

To develop a Method B pCUL, the lowest protective criterion was selected as the pCUL. WAC 173-340-740(5)(c) provides for adjustments to cleanup levels, as needed, so that cleanup levels are not less than the PQL and are not less than natural background. The pCULs have not yet been adjusted for PQL; the adjustment for natural background, if appropriate, has already been made. Adjustments for PQL, if appropriate, will be made after the RI. For those constituents where the lowest criterion is protection of groundwater, the criterion may not be applicable if it can be demonstrated empirically using the procedures specified in WAC 173-340-747 that soil concentrations do not cause an exceedance of the applicable groundwater pCULs. An empirical demonstration for some constituents is made in Section 9.1.

## 7.3 SOIL VAPOR

Soil vapor screening levels were developed by applying a vapor attenuation factor (VAF) to pCULs developed for indoor air. As shown in Table 7, the pCULs for indoor air are the MTCA Method B formula values, where available, and the Plant 2 residential ambient air TMCLs for those compounds for which Method B formula values are not available. Guidance on calculating screening levels for soil vapor is presented in Ecology's draft vapor intrusion guidance (Ecology 2009). The guidance provides an equation for calculating screening levels for shallow soil vapor where the screening level for soil vapor is equal to the cleanup level for indoor air divided by a shallow soil vapor-to-indoor air VAF. The shallow soil vapor-to-indoor air VAF value (0.1) recommended in Ecology's draft guidance was based on EPA's studies at the time of publication. EPA updated its study in March 2012, incorporating data that has been collected in recent years. EPA now recommends using a shallow soil vapor-to-indoor air VAF of 0.03 (EPA 2012b). The VAF of 0.03 was applied to the indoor air pCULs to develop the soil vapor screening levels presented in Table 7. Plant 2 residential ambient air TMCLs are provided in Table I-3 of Appendix I.

## 7.4 SEDIMENT

The pCULs for sediments offshore of the Site are expected to be the same as the PRGs that were established in the EPA's *Proposed Plan for the Lower Duwamish Waterway (LDW) Superfund Site* (EPA

2013). The PRGs identified in EPA's Proposed Plan were used to assess the likelihood that various cleanup alternatives considered in the LDW FS (AECOM 2012) could achieve the remedial action objectives (RAOs) identified for the LDW Superfund site. Those PRGs were based either on ARARs, which provide minimum legal requirements, or on other information such as toxicity thresholds that were identified in the LDW human health risk assessment (HHRA) or ecological risk assessment (ERA), both of which are part of the LDW RI (Windward 2010). The PRGs put forth in EPA's Proposed Plan for the LDW will be refined into final contaminant-specific cleanup levels in EPA's Record of Decision (ROD) for the LDW, which is anticipated to be completed in 2014.

The most significant ARARs for sediments within the LDW are those in the Washington State SMS. The SMS include numerical sediment standards (referred to as SCOs) for 47 individual sediment contaminants or classes of contaminants (Table 8). Contaminant concentrations in surface sediments that are below the SCOs are considered to not have any harmful effects on benthic organisms inhabiting the sediments. The SCO are equally applicable to surface sediments in both intertidal and subtidal areas throughout the LDW. Other than benthic invertebrates, the only other ecological receptor for which it was necessary to develop sediment PRGs was the river otter. River otters are exposed to PCBs through ingestion of contaminated prey (e.g., fish); sediment PRGs for the protection of river otters from PCBs in their prey were identified by estimating (using a food web model) the sediment PCB concentrations that would be associated with tissue PCB concentrations sufficiently low to result in no adverse effects on river otters. Those sediment PCB concentrations were expressed as a range (128 – 159 µg/kg dw), depending on differences in the diet assumed for river otters (Table 8).

The Washington State SMS do not include numerical sediment standards for the protection of humans that may be directly exposed to contaminated sediments. In the absence of such standards, the LDW HHRA evaluated the potential for adverse effects to humans that might result from exposure through direct contact with contaminated sediments or incidental ingestion of those sediments. Although a broad range of sediment contaminants was considered, it was concluded that only four contaminants (PCBs, arsenic, dioxins/furans, and cPAHs) occurred in LDW sediments in high enough concentrations to warrant the development of sediment PRGs for the protection of human health. Human exposure to contaminated sediments was assumed to occur through activities such as netfishing, which might occur throughout the LDW, as well as clamming and beach play, which might occur only in intertidal areas [above -4 feet mean lower low water (MLLW)]. Human exposure to contaminated sediments through beach play is not expected to occur adjacent to the Site due to restricted public access and the industrial nature of the Site. The sediment PRGs for each of these human health contaminants varied (Table 8), depending on the exposure regime (both intertidal and subtidal areas site-wide for netfishing and intertidal areas site-wide for clamming) and the exposure parameters (e.g., frequency, duration) assumed in the

HHRA for each activity. In the case of arsenic, the sediment concentrations that would be necessary to achieve acceptable risk levels for both direct contact exposure scenarios (netfishing and clamming) are below natural background. In such instances, the PRG defaults to natural background because the lower risk-based concentrations are assumed to be unattainable.

The same four human health contaminants were also considered to be present at sufficiently high concentrations in the tissues of resident seafood species that they would represent unacceptable risks to humans who might consume those species. In the case of PCBs and dioxins/furans, the sediment concentrations that would be associated with tissue concentrations of those contaminants sufficiently low to result in acceptable risks to human seafood consumers were assumed to be below natural background concentrations of those contaminants. Just as in the case of the direct contact PRGs for arsenic, the sediment PRGs for PCBs and dioxins/furans for the protection of human seafood consumers default to natural background because the lower risk-based concentrations are assumed to be unattainable. In the LDW HHRA, it was not possible to estimate the sediment concentrations of arsenic and cPAHs associated with tissue concentrations of those contaminants in resident seafood species that would represent acceptable risks to humans that might consume those species, so sediment PRGs for the protection of human seafood consumers were not identified for those contaminants.

The PRGs established for the LDW in the EPA Proposed Plan (EPA 2013) (and consequently the pCULs for sediments adjacent to the Site) represent long-term goals for sediment quality in the LDW. As indicated above, several of the human health PRGs (PCBs, dioxins/furans, and arsenic) defaulted to natural background concentrations because sediment concentrations sufficiently low to represent acceptable risks to humans were below natural background concentrations. It was recognized in EPA's Proposed Plan for the LDW that it would not be practical to interpret exceedances of the PRGs based on natural background as identifying sediments requiring active remediation [e.g., dredging, capping, enhanced natural recovery (ENR), or a combination thereof]. Given the urban, industrial nature of the LDW, sediments virtually everywhere within the LDW have concentrations of those contaminants that exceed natural background concentrations. Hence, there would be little reason to delimit areas offshore of the Site where sediment contaminant concentrations exceed one or more PRGs, because it is likely that all of the sediments exceed one or more of the human health PRGs that are based on natural background concentrations.

## 7.5 POINT OF COMPLIANCE

Under MTCA, the point of compliance is the point or points where the cleanup levels must be attained. For this RI, the point of compliance for soil is considered to be in soil throughout the Site and the point of compliance for groundwater is considered to be in groundwater throughout the Site from the uppermost level of the saturated zone to the lowest depth, which could potentially be affected by contaminants from the Site. Conditional points of compliance different from these may be proposed after completion of the RI.

# 8.0 RI RESULTS

As previously mentioned in Section 4.0, the goal of the RI is to adequately characterize the Site, to evaluate the potential for recontamination of LDW sediments, and to provide sufficient data to support development and evaluation of cleanup action alternatives. The RI activities, when combined with information collected during previous Site investigations, are sufficient to meet the RI goal. The data gaps identified in the RI/FS Work Plan and the Building 14-01 Investigation Work Plan include the following: 1) information to assess the contaminant pathways to LDW sediment, 2) chemical data in specific areas of concern in the upland portion of the Site, 3) data regarding the extent to which VOCs are present in soil vapor below the building floor slab in Building 14-01, and 4) recent LDW sediment chemical data for the full list of SMS constituents. The RI results that address the information needed to assess the contaminant pathways to the LDW are presented in Section 8.1. The RI results that address data gaps for specific areas of concern are addressed in Section 8.2. Soil vapor results are discussed in Section 8.3 and the recent sediment data for the LDW is addressed in Section 8.4. Laboratory analytical data are included in Appendix S.

## 8.1 RI RESULTS FOR EVALUATING CONTAMINANT PATHWAYS TO LDW SEDIMENT

One of the data gaps identified in the RI/FS Work Plan was the need for additional information to adequately assess the potential for recontamination of LDW sediments and the potential need for source control. The potential pathways for recontamination of sediment from the Site include leaching of contaminants from soil to groundwater and transport in groundwater, transport of contaminants in stormwater, and transport of contaminants in soil via bank erosion. To evaluate these pathways, additional geologic and hydrogeologic data was obtained during the RI, chemical data for each of the media were obtained, and the physical condition of the Site storm drain system was evaluated.

### 8.1.1 GEOLOGIC CONDITIONS

During the RI, subsurface soil conditions were observed and documented at 50 exploration locations. Based on the conditions observed at these locations and at pre-RI subsurface explorations, the Site consists of approximately 2 to 19.5 ft of fill overlying river deposits with the thickest layers of fill occurring in the Former Slip 5 Area. The depth at which river deposits were encountered at each RI soil boring is summarized in Table 9. The fill generally consists of silty sand to sandy gravel. Fill materials within the Former Slip 5 Area include bricks, wood debris, and slag material. The native deposits typically consist of fine sand and silty fine sand with silt lenses. The native surficial deposits are characterized by the presence of small in-place roots, wood fragments, and peat, which are indicators of the original ground surface elevation prior to filling. Underlying the silt and silty fine sand is a series of interbedded alluvial sand and silt layers that were deposited within the floodplain of the lower Duwamish River. Beneath the interbedded alluvial silt and fine sand is a layer of very dark to black, fine to medium sand. This naturally deposited sand is found throughout the lower Duwamish River valley and was likely deposited from flood waters. Three north-south trending cross-sections across the Site (extending into the 8801 site) and two east-west trending cross-sections across the Site (extending into the offshore sediments) at the locations shown on Figure 30, are presented on Figures 31, 32, 33, 34, 35, and 36.

### 8.1.2 Hydrogeologic Conditions

During the RI, water levels were measured at 37 well/piezometer locations (shown on Figure 23) and a tidal study was conducted to better understand groundwater flow at the Site and the potential for groundwater to discharge contaminants to LDW sediment. Two specific hydrogeologic data gaps identified in the RI/FS Work Plan were the lack of information on the groundwater flow direction in the southern half of the Site and an explanation for the tidal efficiency anomaly observed in well I-205(s) during the tidal study conducted in 2000. These data gaps are addressed below.

#### 8.1.2.1 Groundwater Levels

The near-surface groundwater regime within the lower Duwamish River valley is generally characterized as a shallow, single-aquifer system. The Site is located at and near the east bank of the LDW, at approximately 16.5 to 19.5 ft above MLLW. Ground surface elevations were measured at each monitoring well location during the RI and are summarized in Table 2. Shallow groundwater is present throughout the area of the Site.

Water level measurements were recorded at each monitoring well and piezometer on December 5, 2011, and March 6, June 13, and September 10, 2012. For each event, water levels were measured during an intermediate tide. The estimated surface water level elevation (ft MLLW) for the LDW during the time that water levels were measured ranged from about 1.4 to 4.2 (December), 5.0 to 5.6 (March), 2.2 to 4.2 (June), and 2.1 to 4.4 (September). Also, the mean stage heights of the surface water (ft MLLW) measured upstream at the Green River, which is not tidally influenced, during groundwater level measurements on December 5, 2011, and March 6, June 12, and September 10, 2012 were 5.13, 8.12, 7.03, and 2.95 ft, respectively, indicating that surface water levels in the LDW may have been lowest in September. The measured mean stage heights of the Green River are summarized in Table 10.

The depth to water typically ranged from 11 ft to 17 ft BGS and on average was 13.5 ft BGS. Measured depths to groundwater are summarized in Table 11. As previously discussed, the groundwater levels during each event were measured during similar tidal fluctuation levels.

#### 8.1.2.2 Groundwater Flow Direction

The measured water levels were converted to elevations (ft MLLW) so groundwater flow directions could be characterized throughout the Site. The calculated groundwater elevations for each event are presented in Table 11. Groundwater elevation contour maps for December 5, 2011 and March 6, June 13, and September 10, 2012 are presented on Figures 37, 38, 39, and 40, respectively. As shown on Figures 37 and 38, groundwater elevations ranged from 4.76 to 9.07 ft MLLW on December 5, 2011 and from 7.27 to 10.63 ft MLLW on March 6, 2012. During both of these events, groundwater generally flowed to the west toward the LDW, except at some locations along the immediate shoreline where groundwater is tidally influenced and groundwater flowed north or south prior to discharge to the LDW. Groundwater flow directions near the shoreline may be affected by existing bulkheads described in Section 2.3 and a sheetpile bulkhead present at the 8801 site (AMEC 2011).

As shown on Figures 39 and 40, on June 13 and September 10, 2012, groundwater elevations ranged from 2.89 to 8.81 ft MLLW and 5.70 to 8.33 ft MLLW, respectively. Groundwater flow patterns during the September 10, 2012 event (Figure 40) were similar to the groundwater flow patterns observed during the December 5, 2011 and March 6, 2012 events, except that groundwater flow in the southeastern portion of the Site was to the southeast. On June 13, 2012, groundwater flow patterns in the eastern half of the Site varied significantly from the groundwater flow patterns observed during the December 5, 2011 and March 6, 2012 events. On this date, the lowest groundwater elevation was observed at I-200 (the eastern-most monitoring well) and groundwater elevation contours indicated groundwater flow in the eastern portion of the Site to be to the east. Groundwater flow in the western portion of the Site, however, was similar to the other three events. The easterly groundwater flow in the eastern portion of the Site appears to be due to dewatering of an excavation immediately east of the Site on KCIA property. The excavation location is shown on Figure 38. According to a representative for the King County Airfield (Bergam, Mark, Personal Communication 2012), the dewatering began on April 20, 2012 and continued until June 30, 2012. The pumping rate was approximately 500 gallons/min or 720,000 gallons/day. The southeasterly flow of groundwater in the southeast corner of the Site in September may be a remnant of the dewatering activities because groundwater elevations had not fully recovered due to limited precipitation between June and September 2012.

The LDW is comprised of both marine and fresh surface water. Following the initial dredging and realignment of the LDW, saltwater from Puget Sound extended back into the waterway and infiltrated the upland groundwater (ERM and Exponent 2000). As a result of the saltwater intrusion into the LDW, a saltwater wedge is present in the LDW. The saltwater also intruded from the LDW to groundwater at properties along its shoreline. The presence of brackish or saline water in the aquifer can affect groundwater flow because the less dense fresh groundwater tends to move above the higher density saline water. The density difference between the freshwater aquifer system and the saltwater of the LDW tends to concentrate the outflow of the surficial aquifer into the intertidal areas. Based on previous studies conducted along the LDW, including at Boeing Plant 2 (AMEC & Floyd Snider 2011), the shallow groundwater in the vicinity of the Site discharges to the waterway above -5 ft MLLW.

#### 8.1.2.3 Tidal Influences

Tidal influences in upland groundwater monitoring wells are dependent on several factors including soil type, distance from the shoreline, and the presence of hydraulic barriers. These factors cause the magnitude of tidal influences in upland monitoring wells to be reduced, or altogether eliminated, in comparison to tidal fluctuations observed in water bodies like the LDW. In addition to attenuation of the magnitude of tidal influences, the timing of any observed tidal extremes (i.e., minimum or maximum groundwater elevation fluctuations caused by tidal influences) in upland monitoring wells typically lags behind the timing observed in the adjacent water body. A tidal study was conducted during the RI to observe the nature of tidal influences of the LDW in three types of groundwater monitoring wells at the Site:

- Near-shore wells east of the Thompson property wooden bulkhead (MW-7 approximately 35 ft and MW-20 approximately 65 ft from the bulkhead)

- Near-shore wells east of the steel bulkhead (MW-10 approximately 10 ft and I-205(s) approximately 75 ft from the bulkhead)

- Inland wells (MW-8 approximately 300 ft and MW-12 approximately 400 ft east from the bulkhead).

The tidal study was conducted by measuring water levels with pressure transducers at 2-minute (min) intervals at each of the above-listed monitoring wells and at the LDW over a 3-day period in January 2012. A mixed semidiurnal tidal pattern resulted in the once-daily occurrence of a lower low tide during the study.

The results of the tidal study show that groundwater elevations at all wells included in the study are influenced by tidal elevations by varying degrees. The amplitude of tidal fluctuations is dependent on the distance from the LDW (the amplitude decreases as distance increases) and the bulkhead material between the well and the LDW (the steel bulkhead appears to mute the amplitude more than the wooden bulkheads). Tidal fluctuations at MW-12, which is located approximately 400 ft from the LDW, were extremely small, indicating that groundwater east of this location may not be tidally influenced. Lag times also generally increase with distance from the LDW.

The surface water and groundwater fluctuations observed during the tidal study are discussed further below.

### *Lower Duwamish Waterway*

The pressure transducer placed in the LDW measured tidal fluctuations generally comparable to those predicted by published tide tables. Measured high tides were up to 2 ft lower than predicted high tides and measured low tides were up to 1.3 ft lower than predicted low tides in the beginning of the study, but these discrepancies gradually lessened to 0.1 and 0.2 ft, respectively, by the end of the study. Transducer-measured tide elevations were used for comparison to groundwater elevations in monitoring wells. Figure 41 illustrates the LDW tidal fluctuations over the 3-day period in addition to fluctuations in all other measured wells.

### *Near-shore Wells East of the Wooden Bulkhead (MW-7 and MW-20)*

Monitoring wells MW-7 and MW-20 are located near the western edge of the Site. MW-7 is located south of the Former Slip 5 Area and MW-20 is located north of the Former Slip 5 Area, as shown on Figure 23. The pressure transducers in MW-7 and MW-20 measured groundwater oscillations with a smaller amplitude and a slight time lag compared to the measured tide in the LDW (Figure 42). Groundwater highs and lows were observed in MW-7 and MW-20 approximately 1 hour after the tidal highs and lows.

### *Near-shore Wells East of the Steel Bulkhead [MW-10 and I-205(s)]*

Monitoring well MW-10 is located near the western edge of the Site between MW-7 and MW-20, as shown on Figure 23. The well is located behind the steel bulkhead and within the Former Slip 5 Area. The pressure transducer in MW-10 measured groundwater oscillations with a smaller amplitude and a slight time lag compared to the measured tide in the LDW (Figure 43). Groundwater elevations in both wells were higher than tidal elevations a majority of the time, with LDW water levels higher only during tides above 10 ft MLLW. Groundwater highs and lows were observed in MW-10 approximately 1 hour after the tidal highs and lows.

Monitoring well I-205(s) is located approximately 70 ft from the western edge of the Site and approximately 85 ft south of MW-10, as shown on Figure 23. Although the well is located near the shoreline, the pressure transducer in this well only measured minor groundwater oscillations. The only notable oscillation appears to be at high tide. Once the rising tide reached approximately 11 ft MLLW, the groundwater level in I-205(s) increased by about 0.8 ft with a lag of approximately 1-½ hours behind the ultimate high tide. After a high tide peak, the groundwater level then decreased gradually until the next high tide reached approximately 11 ft MLLW (Figure 43). This asymmetrical cycle suggests that a hydraulic barrier extends from at least -3.7 ft MLLW (the bottom of the well screen) up to approximately

11 ft MLLW. The barrier is either located in the soil around the well or as fouling in the well itself. Once the barrier is topped and the groundwater level in the well rises to a high tide peak, the groundwater gradually drains away until the next high tide tops the hydraulic barrier. Aerial photographs taken in 1956, 1961, and 1965 indicate a bulkhead, oriented east to west, existed between the present location of I-205(s) and the Former Slip 5. This bulkhead may still be present and may be the hydraulic barrier.

*Inland Wells (Wells MW-8 and MW-12)*

Monitoring wells MW-8 and MW-12 are located approximately 300 ft and 400 ft inland, respectively, of the western edge of the Site, as shown on Figure 23. The pressure transducers in these wells measured minor groundwater oscillations. At MW-8, the oscillation had a muted wavelength, an amplitude of up to 0.8 ft, and a lag of approximately 1 ½ hours. The pressure transducer in MW-12 measured an oscillation of less than 0.2 ft during the swing between the highest high tide and the lowest low tide. A lag of approximately 3-½ to 4 hours was measured (Figure 44).

#### 8.1.2.4 Estimated Transmissivity and Hydraulic Conductivity

Transmissivity and hydraulic conductivity of the shallow water-bearing zone was estimated from the data collected using a technique for estimating transmissivity in tidally influenced aquifers. Transmissivity using this technique is computed from the following equation (Ferris 1951):

$$T = (x^2 S t_0)/(4\pi t_1^2)$$

where:

- $T$ = transmissivity ($L^2/t$)
- $S$ = specific yield (dimensionless)
- $x$ = distance from well to the LDW (L)
- $t_0$ = time between tidal maxima or minima in the LDW (t)
- $t_1$ = time lag between the occurrence of the maxima or minima in the LDW and in the monitoring well (t).

The time ($t_0$) between tidal maxima and minima in the LDW and the time lag ($t_1$), or difference between the maxima or minima of a cyclical tidal fluctuation, at each well location was computed from the transducer data and the results are provided in Appendix K. Approximate distances from the monitoring wells to the mean tidal level of the LDW adjacent to the Site are also provided in Appendix K. Aquifer-specific yield was assumed to be 0.05. Based on the deepest exploration in the area, the saturated aquifer thickness (b) was estimated to be 130 ft. This saturated aquifer thickness estimation is an estimation for two reasons: first, the aquifer is unconfined and the thickness changes with time and distance; second, an aquitard below the uppermost hydrogeologic unit was not encountered, indicating

130 ft as only a minimum thickness. Transmissivity and hydraulic conductivity calculations and results are provided in Appendix K.

Based on the transducer data and assumptions described above, the transmissivity is estimated to be 921ft$^2$/day and 1,263 ft$^2$/day at near-shore wells east of the wooden bulkheads (MW-7 and MW-20); 2,001 ft$^2$/day and 39 ft$^2$/day at near-shore wells east of the steel bulkhead [I-205(s) and MW-10]; and 19,495 ft$^2$ day and 6,807 ft$^2$/day at inland wells (MW-8 and MW-12). These values yield estimated values for the hydraulic conductivity (K) of 2.50 x $10^{-3}$ centimeters per second (cm/s) and 3.43 x $10^{-3}$ cm/s (MW-7 and MW-20), 5.43 x $10^{-3}$ cm/s and 1.05 x $10^{-4}$ cm/s [I-205(s) and MW-10[, 5.29 x $10^{-2}$ cm/s and 1.85 x $10^{-2}$ cm/s ft/day (MW-8 and MW-12) using the relationship K = T/b.

Estimated K values were generally consistent among the wells grouped by location, as described above. I-205(s) was the only outlier, with a K value with the same magnitude as the near-shore wells east of the wooden bulkhead. Overall, K values calculated at wells near both the wooden and steel bulkhead are one to two orders of magnitude lower than K values calculated at the inland wells, demonstrating that both bulkheads may influence the westward migration of groundwater. The steel bulkhead is most efficient, as the lowest K (by one order of magnitude) was calculated at MW-10.

Single-well hydraulic conductivity tests, performed by ERM in August 2000 (ERM and Exponent 2000) at piezometers PZ-1 through PZ-8 indicated that hydraulic conductivity values for the shallow water-bearing zone ranged from 1.52 x $10^{-4}$ cm/s to 1.89 x $10^{-3}$ cm/s, with an average hydraulic conductivity of 8.84 x $10^{-4}$ cm/s. Also in August 2000, ERM completed a tidal study at the Boeing Isaacson property (ERM and Exponent 2000). Tidal effects on groundwater elevations were observed at each of the wells and piezometers; however, the most significant tidal fluctuations were observed at locations within 400 ft of the LDW. Tidal efficiencies near the LDW were extremely variable, ranging from 0.93 percent at well I-205(s) to 37.84 percent at well I-203(s). The low tidal efficiency at well I-205(s) was considered an anomaly possibly due to equipment malfunction or aquifer heterogeneity, but, as previously discussed in Section 8.1.2.3, a hydraulic barrier at this location may be the cause of the tidal efficiency anomaly.

Hydraulic conductivities were calculated for the soil between the LDW and all measured wells. Lag times for the highest high tides and the lowest low tides were used for calculations. Additionally, hydraulic conductivities of the soil between the LDW and inland wells, including MW-8, MW-12, and I-205(s), were calculated by omitting the transit time and distance between the LDW and the closest near-water well. Hydraulic conductivity calculations and results are presented in Appendix K. The lowest hydraulic conductivity, 0.06 cm/s, is through the steel bulkhead between the LDW and MW-10. Hydraulic conductivities through the wooden bulkhead are 0.28 cm/s and 0.34 cm/s at MW-7 and MW-20, respectively. Inland hydraulic conductivities between the Thompson property wooden bulkhead and the nearest well included in the tidal study are 1.45 cm/s, 2.45 cm/s, and 1.38 cm/s at I-205(s), MW-8, and MW-12, respectively. As discussed in Section 8.1.2.3, groundwater fluctuations on the inland side of the bulkheads could be the result of either a difference in head between the LDW and near-shore wells or the lack of actual groundwater movement through the bulkhead. Although slower hydraulic conductivities through the steel and wooden bulkheads do not necessarily indicate groundwater flow through the bulkhead, they are useful indications of the hydraulic barrier quality of the bulkhead. The hydraulic conductivity of inland soil west of I-205(s) is comparable to that of the other inland soil, indicating the soil above the hydraulic barrier at elevation 11 ft MLLW discussed earlier is comparable to the remainder of the Site. Hydraulic conductivity was only calculated from high tides at this location due to the lack of a precise low tide, though it is likely that the gradual decrease in groundwater elevation after high tide is due to the lower hydraulic conductivity in the hydraulic barrier below 11 ft MLLW in elevation.

The data also confirm the existence of groundwater mounding behind the steel bulkhead. This mounding is indicated by the higher overall groundwater elevations at MW-10 and the low hydraulic conductivity between MW-10 and the steel bulkhead. Average groundwater levels decrease in wells to the north and south, in addition to wells to the east.

#### 8.1.2.5 LDW Surface Water Effects on Groundwater Quality

This section provides an evaluation of the potential influence of marine surface water on RI monitoring well results. Near the shoreline, tidal pressure may result in groundwater elevation fluctuations and the near-shore mixing of marine surface water with groundwater. The tidal influence on near-shore, upland, and Former Slip 5 area groundwater quality was evaluated using standard groundwater parameters, which include conductivity, pH, temperature, turbidity, DO, ferrous iron, oxidation-reduction potential (ORP), and conventional analytical parameters ( chloride, nitrate, sulfate, and total dissolved solid (TDS) concentrations). Review of results shows that the most applicable results for this evaluation are conductivity results (Figure T-1 in Appendix T). Monitoring results (Tables 12, 13, and 14) were reviewed and characteristics and constituents associated with marine surface water (including conductivity and chloride) noted. The results were also evaluated to determine if there was a clear association between the result and the sample location relative to the LDW.

Three groups of groundwater monitoring wells were used in the evaluation. All wells monitor the shallow groundwater zone. The wells are: near-shore wells (MW-7, MW-9, MW-10, MW-19, MW-20, PZ-7, PZ-8, and I-104); upland wells (MW-4, MW-5, PZ-2, and I-200); and wells located in the Former Slip 5 Area (MW-11, MW-12, MW-13). Wells in these groups were selected to best represent groundwater parameters without influence from other areas or from other onsite features, such as the stabilized fill area on the Isaacson portion of the Site.

To limit the potential effects of surface water influence on upland groundwater quality samples collected during the RI, near-shore monitoring wells and piezometers were sampled within 1 hour before and 1 hour after a 1.0 ft MLLW or lower low tide. Field parameters and conventional parameters at the near-shore locations were not measured during higher tidal stages (when samples were not collected), and, therefore, the short-term influence of possible marine water intrusion at higher tide levels on groundwater quality cannot be evaluated with these data.

Marine surface water influence is not expected to extend a significant distance inland in the shallow groundwater zone. Groundwater quality data confirm this expectation. Appropriate parameters were used to compare results from near-shore wells to parameters at upland monitoring wells farther from the shoreline. Although the variability of results among wells appeared to be greatest in the near-shore wells (Tables 12, 13, and 14), data show no significant difference in results between near-shore wells at low tidal stages and wells in upland and the Former Slip 5 areas. The data plot for conductivity is included in Appendix T.

### 8.1.3 Groundwater Analytical Results

The following gaps in understanding the groundwater quality at the Site and the potential for recontamination of the LDW sediments were identified:

- A comprehensive soil and groundwater investigation at the Thompson property to evaluate the source of arsenic in groundwater at wells I-205(s) and I-206(s), and to evaluate the potential for other PCOCs to be present at the Site.
- Groundwater data for metals, other than arsenic, and for other PCOCs (SVOCs). Ecology notes that lead, silver, and zinc were detected in 1983 and 1988 groundwater investigations at concentrations above preliminary groundwater to sediment site screening levels (SSLs) developed in 2004 by SAIC for Ecology for Slip 4 of the LDW (SAIC 2004), and that metals, other than arsenic, may be present in fill material used at the Site.
- Groundwater data for PCOCs from additional wells near the western Thompson property boundary.
- Seep groundwater data for Site PCOCs. Two seep samples had previously been collected and analyzed for dissolved arsenic.

To address these data gaps, 25 monitoring wells were installed during the RI and groundwater samples were collected at each of these wells and the existing 12 wells and piezometers in December 2011, March 2012, June 2012, and September 2012. The samples were analyzed for an extended list of analytes, which included VOCs; SVOCS; total and dissolved metals (antimony, arsenic, barium, beryllium, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc); PCBs; diesel-range, motor oil-range, and gasoline-range petroleum hydrocarbons; and conventional parameters [chloride, nitrate, sulfate, and TDS]. Additionally, a groundwater sample was collected from the seep location in conjunction with the groundwater samples in March, June, and September 2012 and analyzed for the same list of analytes as the samples collected from the monitoring wells and piezometers. A seep sample was not collected during the December 2011 groundwater sampling event due to lack of sufficiently low tides during daylight hours.

The results of the groundwater and seep sampling are discussed in this section by three general areas: North of the Former Slip 5 Area, within the Former Slip 5 Area, and South of the Former Slip 5 Area. The analytical results for the constituents detected in groundwater in each of these areas are presented in Tables 12, 13, and 14. As previously mentioned in Section 4.2.7, analytical results were reported to the MDL. Concentrations detected above the MDL, but below the RL, were qualified as estimates (J flagged) due to uncertainty in the concentration and are included in Tables 12, 13, and 14. Concentrations that have been J flagged, but are above the pCUL, are included on figures as exceeding cleanup levels. For non-detected constituents, only the RLs are presented in Tables 12, 13, and 14. Analytical results for all constituents including the RLs and the MDLs are provided in tabular format in Appendix L. Except for some total metal analytical results, the groundwater analytical results were compared to the pCULs presented in Section 7.1 and these comparisons are presented in Tables 12, 13, and 14. For metals for which the ambient water quality criteria are based on dissolved concentrations, dissolved results are compared to the pCULs (antimony, arsenic, barium, beryllium, cadmium, copper, lead, nickel, selenium, silver, thallium, and zinc). For the remainder (mercury, chromium VI), the total results are compared to the pCULs. Figures showing concentration ranges for some of the constituents that exceed pCULs during the RI are shown on Figures 45 through 54. The constituents include total cPAHs (Figure 45); total PCBs (Figure 46); dissolved arsenic (Figure 47); dissolved cadmium (Figure 48); chromium VI (Figure 49); dissolved copper (Figure 50); dissolved lead (Figure 51); dissolved nickel (Figure 52); dissolved zinc (Figure 53); and TCE (Figure 54). Figures are not provided for constituents without widespread exceedances.

#### 8.1.3.1 North of Former Slip 5 Area

Groundwater samples collected in the North of the Former Slip 5 Area include samples collected from 12 monitoring wells in the following areas:

- Western Property Boundary (West of Stabilized Soil Area): I-104(s) and MW-20
- Northern Property Boundary: MW-21, MW-22, and PZ-1
- Stabilized Soil Area: MW-23, MW-24, and MW-25
- South of Stabilized Soil Area: I-200(s), MW-15, MW-16, and MW-18.

Analytical results for constituents detected in groundwater in the North of the Former Slip 5 Area during the RI and a comparison to pCULs are provided in Table 12. Based on the comparison, the constituents detected at concentrations exceeding the pCULs in groundwater in the North of the Former Slip 5 Area during the RI include two VOCs (vinyl chloride and acrylonitrile); two SVOCs (BEHP and benzoic acid); total cPAHs; PCBs (Aroclors 1248 and 1260); dissolved metals (arsenic, cadmium, copper, lead, nickel, selenium, thallium, and zinc); total mercury; and chromium VI. TPHs were not detected at concentrations exceeding the pCULs. The occurrence of pCUL exceedances in groundwater at each well located in the North of the Former Slip 5 Area is summarized in Table 15. A discussion of the constituents detected and concentrations exceeding the pCULs is provided below.

*VOCs, SVOCs, and TPH*

TPH was not detected at concentrations exceeding the pCULs at any of the groundwater monitoring locations in the North of the Former Slip 5 Area. Only two SVOCs were detected above the pCUL during one monitoring event. BEHP was detected at 1.8 µg/L at MW-18 (south of the stabilized soil material) and benzoic acid was detected at 3,400 µg/L at MW-24 (in the stabilized soil material area) during the December 2011 sampling event. BEHP was not detected at concentrations above the RL or MDL during the three subsequent sampling events. Benzoic acid was detected at concentrations below the pCUL during the three subsequent sampling events. VOCs were detected above the pCULs in and south of the stabilized soil area. Vinyl chloride exceeded the pCUL at MW-18 during the December 2011 monitoring event; at MW-23, MW-16, and MW-25 during the June 2012 monitoring event; and at MW-25 during the September 2012 monitoring event. Acrylonitrile was detected in one sample (December 2011 sample from MW-18) at 0.059 µg/L, slightly above the pCUL of 0.057 µg/L; however, the detection had a low spectral match and was qualified as an estimate. Acrylonitrile was not detected in any other sample.

*cPAHs*

cPAHs were not detected in most groundwater samples collected from the North of the Former Slip 5 Area. cPAHs were detected in groundwater in the North of the Former Slip 5 Area at concentrations exceeding the pCULs (which are lower than the RLs) in March, June, and September 2012. The exceedances occurred once at I-104(s), twice at wells MW-23 and MW-24, and three times at well MW-25, as shown on Figure 45 and discussed below.

- **Western Property Boundary** (West of the Stabilized Soil Area). One cPAH, benzo(a)anthracene, was the only cPAH detected in groundwater samples from near the western property boundary. It was detected in only one groundwater sample from one well. The detection occurred in the blind field duplicate sample collected at well I-104(s) in September 2012. No cPAHs were detected in the other six samples from this well (four parent samples, two duplicate samples). The calculated cPAHs TEQ is 0.0005 µg/L, which exceeds the cPAHs pCUL of 0.0002 µg/L.

- **Northern Property Boundary**. No cPAHs were detected in groundwater samples from wells MW-21, MW-22, or PZ-1 during the RI.
- **Stabilized Soil Area**. Concentrations exceeding the pCULs were detected at each of the wells located within the stabilized soil area (MW-23, MW-24, and MW-25). The exceedances occurred in March, June, and September 2012. Concentrations of cPAHs (calculated cPAHs TEQ) exceeding the pCUL of 0.0002 µg/L range from 0.0007 µg/L to 0.008 µg/L.
- **South of the Stabilized Soil Area.** No cPAHs were detected in samples from the groundwater at wells I-200(s), MW-15, MW-16, and MW-18 during the four RI sampling events.

*PCBs*

PCBs were not detected in most groundwater samples collected from the North of the Former Slip 5 Area. PCBs (Aroclors 1248 and 1260) were detected in groundwater in the North of the Former Slip 5 Area in March, June, and September 2012. The detections occurred once at piezometer PZ-1 and well I-104(s) and three times at well MW-25, as shown on Figure 46. The pCULs are below the RLs; all of the detected concentrations exceed the pCULs as described below.

- **Western Property Boundary (West of the Stabilized Soil Area)**. No PCBs were detected in samples from one of the wells (MW-20) in this area. There was only one detection of PCBs (Aroclor 1260) in samples collected in this area. The detection was in the June 2012 duplicate sample collected from well I-104(s) at a concentration of 0.0075 µg/L, which exceeds the pCUL of 0.00002 µg/L. There were no PCB detections in the other six samples from this well (four parent samples and two duplicate samples).
- **Northern Property Boundary**. No PCBs were detected in samples from two of the wells in this area. There was only one detection of PCBs (Aroclor 1248) in a sample collected in this area. The detection was in the March 2012 sample collected from piezometer PZ-1 at a concentration of 0.0086 µg/L, which exceeds the pCUL. This was the only PCB detection along the northern property boundary.
- **Stabilized Soil Area**. No PCBs were detected in samples from two of the wells in this area. PCBs (Aroclor 1260) were detected in samples collected during the March, June, and September 2012 sampling events from well MW-25. The concentrations were 0.017 µg/L, 0.024 µg/L, and 0.011 µg/L, respectively, which exceed the pCUL. No PCBs were detected in samples from this well during the December 2011 sampling event.
- **South of the Stabilized Soil Area.** No PCBs were detected in any samples from wells I-200(s), MW-15, MW-16, and MW-18 during the four RI sampling events.

*Metals*

There were no exceedances of pCULs for antimony, barium, beryllium, and silver in groundwater in the North of the Former Slip 5 Area. Metals that exceed pCULs in one or more groundwater samples include arsenic, cadmium, copper, lead, mercury, nickel, selenium, thallium, and zinc. Chromium VI also exceeds the pCULs in groundwater in the North of the Former Slip 5 Area during the RI. Most of the exceedances occurred in groundwater below the stabilized soil material and lead, selenium, and thallium exceedances occurred only in groundwater samples from below the stabilized soil area. The concentrations above the pCULs are summarized by area below:

- **Western Property Boundary (West of Stabilized Soil Area).** Total mercury and arsenic were detected in groundwater samples from near the western property boundary at concentrations exceeding the pCULs. Total mercury slightly exceeded the cleanup level of 12 ng/L at a single sample from I-104 with a concentration of 12.8 ng/L; the concentration in the duplicate sample was 10.6 ng/L. Dissolved arsenic was detected at concentrations greater than the pCUL of 8 µg/L at both wells (I-104 and MW-20) located along the western property boundary during all four RI monitoring events. Detected concentrations of dissolved arsenic greater than the pCUL range from 135 µg/L to 2,460 µg/L. Total arsenic concentrations were similar to the dissolved arsenic concentrations at each location.

- **Northern Property Boundary.** Arsenic, cadmium, copper, nickel, zinc, and chromium VI were detected in one or more samples of groundwater from near the northern property boundary at concentrations greater than the pCULs. As shown on Figure 47, dissolved arsenic was detected at concentrations greater than the pCUL during all four RI monitoring events at wells MW-21 and MW-22; concentrations range from 4,000 µg/L to 24,000 µg/L. Arsenic was not detected at concentrations greater than the pCUL at PZ-1. As shown on Figures 48 (cadmium), 50 (copper), 52 (nickel), and 53 (zinc), the dissolved fractions of cadmium, copper, nickel, and zinc were detected at concentrations greater than the pCULs at piezometer PZ-1. As shown on Figure 49, chromium VI was detected at a concentration of 0.010 mg/L, which exceeds the pCUL of 0.00058 mg/L at well MW-21 in March 2012.

- **Stabilized Soil Area.** Arsenic, cadmium, chromium VI, copper, lead, mercury, nickel, selenium, thallium, and zinc were detected in groundwater samples from below the Stabilized Soil Area at concentrations exceeding the pCULs. As shown on Figure 47, dissolved arsenic was detected at concentrations several orders of magnitude greater than the pCUL (3,290 µg/L to 285,000 µg/L). The exceedances occurred at all three wells located in this area (MW-23, MW-24, and MW-25) during each of the four RI monitoring events. Dissolved copper (Figure 50), total mercury (no figure due to limited exceedances), dissolved nickel (Figure 52), and dissolved zinc (Figure 53) were also detected in at least one sample from each of the three wells at concentrations exceeding the pCULs. Dissolved copper was detected at a maximum concentration of 2,050 µg/L; total mercury was detected at a maximum concentration of 1750 ng/L; dissolved nickel was detected at a maximum concentration of 297 µg/L; dissolved zinc was detected at a maximum concentration of 290 µg/L. As shown on Figure 49, chromium VI was detected at concentrations (0.037 mg/L and 0.018 mg/L) that exceed the pCUL (0.00058 mg/L) at well MW-23 in December 2011 and March 2012. Other metals detected above the pCULs in the Stabilized Soil Area include cadmium (Figure 48), lead (Figure 51), selenium (no figure due to limited exceedances), and thallium (no figure due to limited exceedances). These exceedances occurred at wells MW-23 and MW-24 primarily during the first two monitoring events (December 2011 and March 2012).

- **South of Stabilized Soil Area.** There were no metals that exceeded pCULs in samples from well I-200(s). Arsenic, copper, and zinc were detected in groundwater from at least two wells south of the Stabilized Soil Area at concentrations exceeding the pCULs. As shown on Figure 47, dissolved arsenic was detected at concentrations greater than the pCUL during all four RI monitoring events at MW-15 and MW-18 and during the December 2011 and September 2012 monitoring events at MW-16. Detected concentrations of dissolved arsenic exceeding the pCUL (8 µg/L) range from 17.1 µg/L to 6,650 µg/L. No other metals were detected at concentrations exceeding pCULs at well MW-15. Dissolved zinc (Figure 53) was detected at concentrations exceeding the pCULs during two or three events, but not every event, at wells MW-16 and MW-18. Dissolved copper (Figure 50) and dissolved nickel (Figure 52) were detected at a concentration exceeding the pCUL at well MW-16. The dissolved copper exceedances occurred during three of the four monitoring events and the dissolved nickel exceedance occurred during one of the four monitoring events.

#### 8.1.3.2 Former Slip 5 Area

Groundwater samples collected within the Former Slip 5 Area include samples collected from 15 monitoring locations in the following areas:

- Western Property Boundary: I-205(s), MW-9, MW-10, MW-19, PZ-7, and Seep-1
- Former Hydraulic Test Pad Area: MW-11
- Former Slip 5 Outfall Area: MW-14, PZ-3, and SB-8 (grab sample)
- Other: I-203(s), MW-12, MW-13, MW-17, and PZ-6.

Analytical results for constituents detected in groundwater within Former Slip 5 Area during the RI and a comparison to pCULs are provided in Table 13. Based on the comparison, the constituents detected at concentrations exceeding the pCUL in groundwater within Former Slip 5 Area include some SVOCs (chrysene and BEHP); cPAHs; PCBs (Aroclors 1248, 1254, and 1260); and metals (arsenic, cadmium, and nickel). VOCs and TPH were not detected at concentrations exceeding the pCULs. The occurrence of pCUL exceedances in groundwater at each well located within the Former Slip 5 Area is summarized in Table 16. A discussion of the constituents detected and the concentrations exceeding the pCULs is provided below.

*VOCs, SVOCs, and TPH*

VOCs, TPH, and most SVOCs were not detected at concentrations exceeding the pCULs at any of the groundwater monitoring locations located within the Former Slip 5 Area. The only SVOC detected above the pCUL (1.2 µg/L) was BEHP, which was detected during the December 2011 sampling event at wells MW-12, MW-13, and MW-17 at concentrations of 1.5 µg/L, 3.3 µg/L and 3.7 µg/L, respectively. BEHP was not detected at wells MW-12, MW-13, or MW-17 during the three subsequent sampling events.

*cPAHs*

No cPAHs were detected at nine locations within the Former Slip 5 Area. cPAHs concentrations greater than the pCULs were detected at six groundwater monitoring locations within the Former Slip 5

Area. The exceedances occurred in March, June, and September 2012. The detected cPAHs concentrations are shown on Figure 45 and summarized by area below:

- **Western Property Boundary.** cPAHs were not detected at three of the wells near the western property boundary. Three of the six locations where cPAHs were detected at concentrations exceeding the pCULs are located near the western property boundary (MW-10, PZ-7, and the seep). The cPAHs concentrations (calculated cPAHs TEQ) exceeding the pCUL (0.0002 µg/L) range from 0.0005 µg/L to 0.152 µg/L. The highest concentration occurred at the seep in September 2012.
- **Hydraulic Test Pad Area.** No cPAHs were detected in the groundwater at well MW-11 during the RI. As noted above, cPAHs were detected at concentrations exceeding the pCUL at well MW-10, which is located downgradient of the hydraulic test pad area.
- **Former Slip 5 Outfall Area.** Except for chrysene, cPAHs were not detected in the groundwater at wells MW-14 and PZ-3 or in the grab sample collected at boring SB-8. Chrysene was detected at a concentration (0.1 µg/L) slightly exceeding the pCUL (0.018 µg/L) during the June 2012 sampling event at well MW-14.
- **Other.** No cPAHs were detected in samples from wells MW-13 and PZ-6. cPAHs exceedances occurred twice at wells I-203(s) and MW-17 and once at well MW-12. The cPAHs TEQ concentrations range from 0.0005 µg/L to 0.0016 µg/L.

***PCBs***

PCBs were not detected in samples from 8 of the 14 sampling locations in the Former Slip 5 Area or in the grab sample collected from that area. PCBs (Aroclors 1248, 1254, and 1260) were detected in groundwater within the Former Slip 5 Area during all four RI monitoring events. The detections occurred at wells MW-10, MW-12, MW-13, and MW-17, and I-203(s) and the seep, as shown on Figure 46. All of the detected concentrations exceed the pCUL as described below.

- **Western Property Boundary.** PCBs were not detected in any samples from four of the wells in this area. PCBs were detected twice (June and September 2012) at well MW-10 and twice (March and June 2012) at the seep. The total PCBs concentration detected at well MW-10 (0.0060 µg/L) was less than the total PCBs concentrations detected at the seep (0.0097 µg/L and 0.011 µg/L).
- **Hydraulic Test Pad Area.** No PCBs were detected in the groundwater at well MW-11. As noted above, PCBs were detected at concentrations exceeding the pCUL at well MW-10, which is located downgradient of the hydraulic test pad area.
- **Former Slip 5 Outfall Area.** No PCBs were detected in the groundwater samples from wells MW-14 and PZ-3 or in the grab sample collected at boring SB-8.
- **Other.** PCBs were not detected in any samples from piezometer PZ-6. PCBs were detected at concentrations exceeding the pCULs during all four monitoring events at wells MW-13 and I-203(s). The concentrations range from 0.011 µg/L to 0.015 µg/L at well MW-13 and 0.010 µg/L to 0.024 µg/L at well I-203(s). PCBs concentrations exceeding the pCUL also occurred in the samples collected at MW-12 in December 2011, but were not detected in samples collected during the other three monitoring events. PCBs exceedances also occurred in well MW-17 in March 2012 (0.012 µg/L) and June 2012 (0.016 µg/L).

***Metals***

There were no exceedances of pCULs for antimony, barium, beryllium, chromium, copper, lead, mercury, selenium, silver, and zinc in groundwater in the Former Slip 5 Area. Dissolved fractions of the following metals were detected in groundwater within the Former Slip 5 Area at concentrations exceeding the pCULs: arsenic, cadmium, and nickel. Detected concentrations are summarized by area below:

- **Western Property Boundary.** Arsenic, cadmium, and nickel were detected at concentrations exceeding the pCULs along the western property boundary. As shown on Figure 47, dissolved arsenic was detected at concentrations exceeding the pCULs at three of the six monitoring well locations: I-205(s), MW-10, and MW-19. Detected concentrations of arsenic exceeding the pCUL range from 25.9 µg/L to 226 µg/L. Dissolved arsenic was not detected at concentrations exceeding the pCULs at the seep. As shown on Figures 48 and 52, dissolved fractions of cadmium and nickel were detected at concentrations exceeding the pCUL at MW-9 during the September 2012 sampling event.
- **Hydraulic Test Pad Area.** Only one exceedance of pCULs for metals at MW-11 was detected during the RI. Arsenic was detected at 9.4 µg/L during the December 2011 monitoring event. As noted above, dissolved arsenic was detected at concentrations exceeding the pCUL at well MW-10, which is located downgradient of the hydraulic test pad area, although the source is not likely to be the hydraulic test pad area.
- **Former Outfall Area.** Arsenic and cadmium were detected at concentrations exceeding the pCULs in groundwater in the Former Outfall Area. Dissolved arsenic was detected at a concentration of 14.4 µg/L at PZ-3 in September 2012. Dissolved cadmium was detected at concentrations greater than the pCUL (0.25 µg/L) at boring SB-8 and during the December 2011, March 2012, and September 2012 monitoring events at MW-14. Cadmium concentrations exceeding the pCULs range 0.30 µg/L to 0.4 µg/L.
- **Other.** Dissolved arsenic is the metal most frequently detected at concentrations greater than the pCULs in the Former Slip 5 Area. At wells MW-12, MW-13, and MW-17, and at piezometer PZ-6, arsenic concentrations exceeding the pCUL range from 9.6 µg/L to 8,010 µg/L.

#### 8.1.3.3 South of Former Slip 5 Area

Groundwater samples collected in the South of the Former Slip 5 Area include samples collected from 12 monitoring locations in the following areas:

- Western Property Boundary: I-206(s), MW-7, PZ-8
- Southern Property Boundary: MW-5 and MW-6
- Eastern Property Boundary: MW-4, PZ-2
- Former Washdown/Aqueous Degreaser Area: MW-1, MW-2, and MW-3
- North of Building 14-01: PZ-4
- Storage Tank Area: MW-8.

Analytical results for constituents detected in groundwater in the South of the Former Slip 5 Area during the RI and a comparison to pCULs are provided in Table 14. Based on the comparison, the constituents detected at concentrations exceeding the pCUL in groundwater in the South of the Former Slip 5 Area during the RI include VOCs [acrylonitrile, TCE, cis-1,2-DCE, 1,1-dichloroethene, and vinyl chloride]; cPAHs [benzo(b)fluoranthene]; and metals (arsenic, nickel, total mercury, and chromium VI). SVOCs, TPH, and PCBs were not detected at concentrations exceeding the pCULs. The occurrence of pCUL exceedances in groundwater at each well located in the South of the Former Slip 5 Area is summarized in Table 17. A discussion of the constituents detected and concentrations exceeding the pCULs is provided below.

### *VOCs, SVOCs, and TPH*

SVOCs and TPH were not detected at concentrations exceeding the pCULs at any of the groundwater monitoring locations located in the South of the Former Slip 5 Area. VOCs were detected in groundwater in the South of the Former Slip 5 Area during all four RI monitoring events. The only detections occurred at wells MW-6 and MW-7, near the southern property boundary. Figure 54 shows concentrations for TCE during all four monitoring events.

- **Western Property Boundary.** TCE was detected once at a concentration (1.8 µg/L) exceeding the pCUL (1.4 µg/L) at one well, MW-7, near the western property boundary and the southern property boundary. The exceedance occurred in December 2011.
- **Southern Property Boundary.** TCE; cis-1,2-DCE; 1,1-DCE; and vinyl chloride were detected at concentrations exceeding the pCULs in one well along the southern property, MW-6. The exceedances occurred during all four monitoring events, except for 1,1-DCE, which only had one exceedance at 4.3 µg/L (compared to a pCUL of 3.2 µg/L) in June 2012. Concentrations of TCE range from 71 µg/L to 150 µg/L (compared to a pCUL of 1.4 µg/L); concentrations of cis-1,2-DCE range from 140 µg/L to 260 µg/L (compared to a pCUL of 130 µg/L); and concentrations of vinyl chloride range from 94 µg/L to 140 µg/L (compared to a pCUL of 0.53 µg/L). A single acrylonitrile exceedance occurred at MW-6 in December 2011. This exceedance was J flagged as an approximate concentration.
- **Eastern Property Boundary.** No VOCs were detected at concentrations exceeding the pCULs in the groundwater at wells MW-4 and PZ-2.
- **Former Washdown/Aqueous Degreaser Area:** No VOCs were detected at concentrations exceeding the pCULs in the groundwater samples from wells MW-1, MW-2, and MW-3.
- **North of Building 14-01:** No VOCs were detected at concentrations exceeding the pCULs in the groundwater samples from piezometer PZ-4.
- **Storage Tank Area:** No VOCs were detected at concentrations exceeding the pCULs in the groundwater samples from well MW-8.

*cPAHs*

cPAHs were only detected once in one groundwater sample from near the southern property boundary, at well MW-5. In March 2012, benzo(b)fluoranthene was detected at a concentration of 0.007 µg/L, which exceeds the pCUL of 0.002 µg/L. The cPAHs TEQ (0.0007 µg/L) also exceeds the cPAHs TEQ pCUL (0.0002 µg/L). Benzo(b)fluoranthene was not detected during the other three monitoring events at well MW-5. The detected cPAHs concentrations are shown on Figure 45.

*PCBs*

As shown on Figure 46 and summarized in Table 14, PCBs were not detected in samples from any of the groundwater monitoring locations located in the South of the Former Slip 5 Area.

*Metals*

There were no exceedances of pCULs for antimony, barium, beryllium, cadmium, chromium, copper, lead, selenium, silver, thallium, and zinc in groundwater in the South of the Former Slip 5 Area. Dissolved arsenic and nickel, total mercury, and chromium VI, were detected in groundwater in the South of the Former Slip 5 Area at concentrations exceeding the pCULs. Detected concentrations exceeding the pCUL are summarized by area below:

- **Western Property Boundary.** No metals except arsenic were detected at concentrations exceeding the pCULs in samples from near the western property boundary. As shown on Figure 47, dissolved arsenic was detected at concentrations exceeding the pCUL only at wells I-206(s) and MW-7. No concentrations of arsenic exceeding the pCUL were detected at piezometer PZ-8. The exceedance at MW-7 occurred during the March 2012 monitoring event. The exceedances at I-206(s) occurred during all four monitoring events. Detected concentrations of arsenic exceeding the pCUL range from 8.7 µg/L to 464 µg/L.
- **Southern Property Boundary.** Nickel and total mercury were detected at concentrations exceeding the pCULs in samples from near the southern property boundary. As shown on Figure 52, a concentration of dissolved nickel (10.3 µg/L) exceeded the pCUL (8.2 µg/L) in a single sample collected from well MW-5 during the first monitoring event (December 2011). A single total mercury exceedance occurred in a duplicate sample at MW-6 during March 2012 with a concentration of 37.4 ng/L. The result was J flagged as an estimated value. The concentration in the primary sample collected at this time was below the mercury pCUL.
- **Eastern Property Boundary.** No metals except arsenic were detected at concentrations exceeding the pCUL in samples from near the eastern property boundary; dissolved arsenic was detected at concentrations exceeding the pCUL only at piezometer PZ-2. As shown on Figure 47, dissolved arsenic was detected at concentrations exceeding the pCUL (8 µg/L), in March and September 2012. The arsenic concentrations exceeding the pCUL range from 9.7 µg/L to 20.0 µg/L.
- **Former Washdown/ Aqueous Degreaser Area.** No metals except dissolved arsenic and chromium VI were detected at concentrations exceeding the pCUL in samples from this area. As shown on Figure 49, the chromium VI exceedances occurred at all three wells (MW-1, MW-2, and MW-3) and concentrations range from 0.010 mg/L to 0.019 mg/L compared to a

pCUL of 0.00058 mg/L. As shown on Figure 47, dissolved arsenic was detected at concentrations exceeding the pCUL in samples from MW-1 during all four monitoring events. The arsenic concentrations exceeding the pCUL range from 10.7 µg/L to 11.9 µg/L.

- **North of Building 14-01.** No metals except dissolved arsenic were detected at concentrations exceeding the pCUL in samples from the area north of Building 14-01; dissolved arsenic was detected at concentrations exceeding the pCUL in samples from PZ-4 during all four monitoring events. Dissolved arsenic concentrations range from 22.0 µg/L to 26.2 µg/L.
- **Storage Tank Area.** No dissolved metals were detected at concentrations above the pCUL in groundwater at the former storage tank area (well MW-8).

#### 8.1.4 GROUNDWATER FIELD PARAMETERS.

Conductivity, pH, temperature, turbidity, DO, and ORP were measured in all monitoring wells, piezometers and the direct-push boring, SB-8, from which a groundwater sample was collected; the results are presented in Tables 12, 13, and 14.

Conductivity measured in groundwater ranges from 13.1 to 26,823 micro-Siemens per centimeter (µS/cm). The highest conductivity measurement occurred during the first groundwater monitoring event at monitoring well MW-17 located in the Former Slip 5 Area. Elevated conductivity measurements also occurred at piezometer PZ-7 (16,504 µS/cm) and monitoring well MW-13 (22,255 µS/cm), located in the Former Slip 5 Area, and at well MW-5 (20,248 µS/cm), located along the southern property boundary, during the first monitoring event. Conductivity measurements were much less during the other three groundwater monitoring events with a maximum of 9,596 µS/cm measured at I-203(s), also located in the Former Slip 5 Area.

Groundwater pH ranges from 5.1 to 13.6, with the maximum measurement occurring at monitoring well MW-24. At this well, and well MW-23, which are both screened in the groundwater below the stabilized soil material, the groundwater pH levels were greater than 9.0 during each sampling event. Groundwater pH levels at or greater than 9.0 also occurred at wells MW-20 (9.8), MW-22 (9.0), MW-25 (10.5), and I-104 (9.0) All of these wells are located downgradient or adjacent to the Stabilized Soil Area.

Groundwater temperature ranges from 9.3 to 20.1 degrees Celsius. The warmest groundwater temperatures occurred during the September 2012 monitoring event. DO concentrations range from 0.22 mg/L to 8.8 mg/L, with the highest concentrations at each well generally occurring during the December 2011 monitoring event. Turbidity ranged from 0.08 nephelometric turbidity units (NTU) to 300 NTU.

ORP measurements range from -485 to 354 millivolt (mv). However, ORP was negative, indicating reduced groundwater conditions, in approximately three-quarters of the wells during the December 2011 and September 2012 monitoring events and in approximately two-thirds of the wells during the March 2012 and June 2012 monitoring events.

### 8.1.5 SOIL CHEMICAL AND FIELD SCREENING RESULTS

The following gaps in the understanding of the soil quality at the Site and the potential for recontamination of the LDW sediments by leaching of contaminants to groundwater or by erosion were identified:

- A comprehensive soil investigation at the Thompson property to evaluate the source of arsenic in groundwater at wells I-205(s) and I-206(s) and to evaluate the potential for other PCOCs to be present at the Site.
- Soil data for metals, other than arsenic, and other PCOCs (SVOCs). Ecology notes that lead, silver, and zinc were detected in 1983 and 1988 groundwater investigations at concentrations above preliminary groundwater to sediment SSLs developed in 2004 by SAIC for Ecology for Slip 4 of the LDW (SAIC 2004), and that metals, other than arsenic, may be present in fill material used at the Site.
- Evaluation of the potential for bank erosion to impact sediments.
- Characterization of the different fill materials placed in the Former Slip 5 Area during different periods and potentially imported from different sources.

To address these data gaps, 47 soil explorations (soil borings and test pits) were completed during the RI. A total of 179 soil samples were collected from the explorations and submitted to a laboratory for analysis and three samples were collected from behind the wooden bulkhead located at the southern portion of the Site and submitted to a laboratory for chemical analysis. The samples were analyzed for an extended list of constituents, which consisted of VOCs; SVOCS; metals (antimony, arsenic, barium, beryllium, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc); PCBs; and gasoline-range, diesel-range, and motor oil-range petroleum hydrocarbons. Field-screening was also conducted by visually inspecting the soil for staining and other evidence of environmental impact, and monitoring soil vapors for VOCs by performing headspace analysis using PID.

The results for the soil samples are discussed in this section by three general areas: North of the Former Slip 5 Area, the Former Slip 5 Area, and South of the Former Slip 5 Area, and are presented in Tables 18 through 23. The results pertaining to the area around wells I-205(s) and I-206(s) and the wooden bulkhead at the southern portion of the Site are not discussed here, but, instead, are discussed with other areas of specific concern under Section 8.2. As previously mentioned in Section 4.1.4, analytical results were reported to the MDL. Concentrations detected above the MDL, but below the RL, were qualified as estimates (J flagged) due to uncertainty in the concentration and are included in Tables 18 through 23. For non-detected constituents, only the RLs are presented in Tables 18 through 23. Analytical results for all constituents including the RLs and the MDLs are provided in tabular format in Appendix M.

In addition to summarizing the results in tabular format, concentrations of cPAHs (calculated cPAHs TEQ) are shown on Figure 55; concentrations of PCBs in soil are shown on Figure 56; concentrations of arsenic, barium, cadmium, copper, lead, and zinc in soil are shown on Figures 57 through Figures 62; and concentrations of TCE and PCE in soil are shown on Figures 63 and 64. Concentrations that have been J flagged, but are above the pCUL, are included on figures as exceeding cleanup levels. Figures are not provided for constituents without widespread exceedances. Field screening results are provided in Table 1. PID measurements less than 50 ppm are not considered to be indications of potential contamination and are not included in Table 1 or discussed below. On Figures 55 through 64, the maximum concentrations detected in soil in samples during and prior to the RI are shown for the following depth intervals: 0 to 5 ft BGS, 5 to 11 ft BGS, and greater than 11 ft BGS. Depth intervals above 11 ft BGS are typically above the groundwater table.

In general, PCOCs were not frequently found in soil at concentrations exceeding the pCULs. Arsenic, TCE, PCBs, copper, and total cPAHs TEQ exceedances occurred in soil in the South of the Former Slip 5 Area. Arsenic and total cPAHs TEQ exceedances primarily occurred in soil within the Former Slip 5 Area and in the North of the Former Slip 5 Area.

#### 8.1.5.1 North of the Former Slip 5 Area

Soil samples collected in the North of the Former Slip 5 Area include samples collected from nine explorations in the following areas:

- Western Property Boundary (West of Stabilized Soil Area): MW-20
- Northern Property Boundary: MW-21, MW-22
- Stabilized Soil Area: MW-23, MW-24, and MW-25
- South of Stabilized Soil Area: MW-15, MW-16, and MW-18.

Arsenic concentrations detected in the above explorations during the RI are provided in Table 18 and all other detected concentrations for the soil samples collected in these explorations are provided in Table 19. A comparison of the detected concentrations to pCULs is provided in both tables. Although VOCs, individual SVOCs, and TPH were detected in some samples, none of the concentrations exceed the pCULs. Based on the comparisons, the constituents detected at concentrations exceeding the pCUL in one or more samples collected from the above explorations include cPAHs, PCBs, and metals (arsenic, cadmium, copper, lead, and zinc). A discussion of the constituents detected and the concentrations exceeding the pCULs is provided below.

In addition to those explorations listed above, soil samples were collected from explorations located in specific areas of concern in the North of the Former Slip 5 Area. These areas include the Paint Storage Area (explorations SB-9, SB-10, SB-11); the Former Diesel and Gasoline Tanks Area (exploration TP-109); the Observed Tar-Like Substance Area (explorations TP-107 and TP-108); and the Former Slip 5 Outfall Area (explorations SB-6, SB-7, and SB-8). Analytical results for these specific areas of concern are discussed in Section 8.2.

#### *Field Screening*

No visual signs of contamination were observed in the soil and no soil vapors were detected using the PID at most of the explorations in the North of the Former Slip 5 Area (MW-15, MW-16, MW-18, MW-20, MW-21, MW-22, and MW-25). A non-hydrocarbon odor was detected in the soil samples collected at MW-23 and MW-24, which were collected from soil below the stabilized material. No soil vapors were detected using the PID at MW-23. Concentrations ranging from 0.1 to 1.5 ppm were measured using the PID at MW-24. Although not necessarily a sign of contamination, a sulfur odor was detected at depth (17 to 18.5 ft BGS) at MW-21, which is also collected from soil below the stabilized material.

#### *VOCs, SVOCs, and TPH*

VOCs; SVOCs; and TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons) were detected in the soil samples from each soil boring except MW-15. At MW-15, only VOCs and SVOCs were detected in samples of the soil. None of the VOCs, SVOCs, and TPH concentrations exceed the pCULs.

#### *CPAHs*

As shown on Figure 55, cPAHs were detected in the soil in the North of the Former Slip 5 Area, primarily in soil above 8 ft BGS. Of the 33 soil samples collected from borings MW-15, MW-16, MW-18, MW-20, MW-21, MW-22, MW-23, MW-24, and MW-25, cPAHs concentrations (calculated total cPAHs TEQ) exceeding the total cPAHs TEQ pCUL (15 µg/kg) occurred in 14 samples. The concentrations exceeding the pCUL range from 15.8 µg/kg to 303 µg/kg. No exceedances of the total cPAHs TEQ pCUL occurred in the soil samples collected from below the stabilized material. Only one sample collected from a depth greater than 9.5 ft BGS contained cPAHs at a concentration that exceeds the pCUL. This sample was collected at MW-22 located near the northern property boundary.

Concentrations of cPAHs exceeding the total cPAHs TEQ pCUL also occurred in the Former Paint Storage Area, the Observed Tar-Like Substance Area, and the Former Slip 5 Outfall Area. These exceedances are discussed in Sections 8.2.2, 8.2.4, and 8.2.5, respectively.

#### *PCBs*

PCBs were detected in just one of the 33 soil samples collected from the nine soil borings. The sample was collected from the 8- to 9.5-ft depth interval at boring MW-18, which is located south of the Stabilized Soil Area. Only PCB Aroclor 1260 was detected; the concentration (29 µg/kg) exceeds the Aroclor 1260 pCUL of 5.4 µg/kg and the total PCB pCUL of 1.8 µg/kg.

Concentrations of PCBs exceeding the pCULs also occurred in the Former Paint Storage Area and the Former Slip 5 Outfall Area. These exceedances are discussed in Sections 8.2.2 and 8.2.5, respectively.

#### *Metals*

Arsenic, cadmium, copper, lead, and zinc were detected at concentrations exceeding the pCULs in one or more soil samples from locations MW-15, MW-16, MW-18, MW-20, MW-21, MW-22, MW-23, MW-24, and MW-25. Copper exceedances occurred at seven of the nine locations (MW-16, MW-20, MW-21, MW-22, MW-23, MW-24, and MW-25). Arsenic and copper exceedances occurred in the deepest sample tested at locations MW-22, MW-23, MW-24, and MW-25 (i.e., between 13.5 and 17 ft BGS) and arsenic only at MW-21. Only one location, MW-15, had arsenic exceedances only at shallow depths and not deeper than 3.5 ft BGS. Other copper exceedances occurred to depths of 6.5 ft , 9.5 ft, and 15 ft BGS at MW-20, MW-16, and MW-21, respectively. The arsenic concentrations exceeding the pCUL (7 mg/kg) range from 7.3 mg/kg to 1,640 mg/kg, and the copper concentrations exceeding the pCUL (36 mg/kg) range from 44.4 mg/kg to 804 mg/kg. Cadmium, lead, and zinc exceedances occurred in one sample collected from the 2- to 3.5-ft depth interval at MW-20, which is located west of the Stabilized Soil Area. Cadmium also exceeded the pCUL in one sample collected from 2 to 3.5 ft BGS at MW-21, which is located east of MW-20 and near the stabilized soil area.

### 8.1.5.2 Former Slip 5 Area

Soil sampling explorations located within the Former Slip 5 Area include MW-9, MW-10, MW-11, MW-12, MW-13, MW-13B, MW-14, MW-17, MW-19, SB-2, SB-3, SB-4, SB-5, SB-12, TP-104, TP-105B, TP-106B, TOWPATHEXC1, TOWPATHEXC12, and PIVEXC1. These explorations are divided into groups based on their location within the different fill material placed in the Former Slip 5 Area during different periods as follows:

- Fill A (1900s-1946 random fill consisting of gravel, sand, slag, demolition waste, and crushed rocks): MW-14
- Fill B (1946-1960 random fill): MW-9, MW-10, MW-11, TP-104, TP-105B, TP-106B, and TOWPATHEXC1.

- Fill C (1946-1960 some random fill along with fill from offsite sources): MW-17, MW-19, SB-3, SB-4, and SB-12
- Fill D (1960-1965 slag, construction, demolition debris, and imported soil): PIVEXC1 and SB-5
- Fill E (1965-1966 Imported construction – quality sand fill material): SB-2, MW-12, MW-13, MW-13B, and TOWPATHEXC12.

The exploration locations relative to the different fill materials are shown on Figure 65.

Arsenic concentrations detected in the above explorations during the RI are provided in Table 20 and all other detected concentrations for the soil samples collected in these explorations are provided in Table 21. A comparison of the detected concentrations to pCULs is provided in both tables. Based on the comparison, the constituents detected at concentrations exceeding the pCUL in one or more samples from the above explorations include cPAHs; PCBs; gasoline-range petroleum hydrocarbons; one SVOC (napthalene); and metals (arsenic, barium, cadmium, total chromium, chromium VI, copper, lead, nickel, mercury, thallium, and zinc). A discussion of the constituents detected and the concentrations exceeding the pCUL is provided below.

In addition to representing different fill material, exploration MW-11 was conducted in the Hydraulic Test Pad Area. Analytical results for MW-11 are discussed below and in Section 8.2.

*Fill A*

PCBs were not detected in any samples from this area. VOCs (acetone, methylene chloride, 2-butanone, and carbon disulfide); SVOCs; cPAHs; TPH (diesel-range and oil-range petroleum hydrocarbons); and metals were detected in the soil at MW-14, but only cPAHs (calculated total cPAHs TEQ), arsenic, and copper exceed pCULs. The concentrations exceeding the cPAHs TEQ pCUL (15 µg/kg) range from 19 µg/kg to 54 µg/kg. The exceedances occurred between 5 and 9.5 ft BGS. A single arsenic exceedance occurred from 8 to 9.5 ft BGS with a concentration (7.2 mg/kg) slightly over the pCUL (7 mg/kg). Copper exceedances with concentrations of 37.1 mg/kg and 42.8 mg/kg occurred at sample depths from 2 to 3.5 ft BGS and 13 to 14.5 ft BGS, respectively. No visual signs of potential contamination were observed in the soil and no soil vapors were detected using the PID at MW-14. No slag was observed at this location.

*Fill B*

VOCs (primarily acetone, methylene chloride, and carbon disulfide); SVOCs; cPAHs; PCBs (Aroclors 1248, 1254, and 1260); TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons); and metals were detected in the soil at the explorations completed in the Fill B material.

Concentrations of VOCs; diesel-range, oil-range petroleum, and gasoline-range hydrocarbons; and SVOCs detected in the soil samples do not exceed the pCULs.

PCBs and gasoline-range petroleum hydrocarbons were only detected in soil samples from boring MW-10. The detections were at depth, between 8 ft and 15 ft BGS. The detected concentrations of gasoline-range petroleum hydrocarbons (7.8 mg/kg and 8.7 mg/kg) were well below the pCULs of 100 mg/kg and 30 mg/kg. The detected PCBs concentrations for Aroclor 1254 (160 µg/kg) and Aroclor 1260 (64 µg/kg) in a single sample exceed the pCULs of 0.29 µg/kg and 5.4 µg/kg, respectively. The total PCBs concentration (293 µg/kg) also exceeds the total PCBs pCUL of 1.8 µg/kg.

cPAHs were detected at concentrations exceeding the pCULs in one or more samples from MW-9, MW-10, MW-11, and IT-TOWPATHEXC1-B(.8). The only metals detected at concentrations exceeding a pCUL at the explorations completed in the Fill B material were arsenic and copper. Of the 16 soil samples collected from these explorations, three samples exceeded the pCUL for arsenic (7 mg/kg). Arsenic was detected at 11.1mg/kg and 7.8 mg/kg in samples collected from 8 to 9.5 ft BGS at MW-9 and MW-11, respectively. The other arsenic exceedance was detected in the MW-10 sample from a depth of 13.5 ft to 15 ft BGS at a concentration of 209 mg/kg pCUL. The soil boring log for MW-10, provided in Appendix C, indicates that wood chunks are present from about 12.5 to 17.5 ft BGS. Three samples exceeded the pCUL for copper of 36 mg/kg. These exceedances occurred in samples from MW-9, TOWPATHEXC1, and MW-11 with concentrations ranging from 38.7 to 54.2 mg/kg.

No visual signs of potential contamination were observed in the soil and no soil vapors were detected using the PID at any of the explorations. No slag material was observed at any of the explorations.

#### *Fill C*

VOCs (primarily acetone, methylene chloride, and carbon disulfide); SVOCs; cPAHs; PCBs (Aroclors 1254 and 1260); TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons); and metals were detected in the soil at the explorations completed in the Fill C material. Concentrations of cPAHs; PCBs; TPH-G; and metals (arsenic, barium, cadmium, chromium VI, copper, lead, nickel, thallium, and zinc) exceed the pCULs in one or more samples.

Concentrations of cPAHs (calculated cPAHs TEQ) exceeding the cPAHs TEQ pCUL were detected. The maximum depth at which the exceedances occurred was 21.5-23 ft BGS at MW-17; however, no sample was tested below the deepest exceedance at MW-19. The cPAHs TEQ concentrations exceeding the pCUL range from 16 µg/kg to 482 µg/kg. The maximum concentration occurred at MW-17 at a depth of 14-15.5 ft BGS. A single TPH-G exceedance also occurred from 15.5-17 ft BGS at MW-17 with a concentration of 33 mg/kg.

Concentrations of PCB Aroclors 1254 and 1260 exceeding the pCUL were detected at soil borings MW-17, SB-3, SB-4, and SB-12. The total PCBs concentrations also exceed the total PCBs pCUL at these locations. At MW-17, the exceedances occurred between 2 ft and 17 ft BGS. At SB-3, the exceedances occurred between 5 ft and 7 ft BGS. A deeper sample was not collected at SB-3 due to an obstruction below 7 ft. At SB-4, the exceedances occurred between 2 ft and 6.5 ft and, at SB-12, exceedances only occurred in the 2- to 3.5-ft depth interval. The total PCBs concentrations range from 49 µg/kg to 1,780 µg/kg compared to a total PCBs pCUL of 1.8 µg/kg.

Arsenic, barium, cadmium, chromium VI, copper, lead, nickel, thallium, and zinc were detected at concentrations exceeding the pCULs in one or more of the explorations completed in Fill C material. The exceedances primarily occurred at MW-17 and extended to a depth of 17 ft BGS, although arsenic and copper were detected at a concentration exceeding the pCUL at 21.5 to 23 ft BGS. At SB-3, copper exceeded the pCUL in the sample from 5 to 5.5 ft BGS and arsenic, copper, and nickel exceedances occurred in the deepest sample tested (6.5 to 7 ft BGS). A deeper sample was not collected at SB-3 due to poor recovery of soil in the sampler and an obstruction at 11 ft BGS. At SB-12, lead was detected at a concentration exceeding the pCUL in the shallowest soil sample tested (2 to 3 ft BGS), cadmium and copper exceedances occurred at all sample intervals tested except the deepest, and an arsenic exceedance occurred at all four sample depths down to 15.5 ft BGS. At SB-4, copper, arsenic, and lead exceedances occurred in the shallowest sample tested (2 to 3.5 ft BGS) and copper and arsenic exceedances also occurred in the sample from 5 to 6.5 ft BGS. At MW-19, arsenic exccedances occurred in three samples and a single copper exceedance occurred from depths between 5 to 14.5 ft BGS.

No visual signs of potential contamination were observed in the soil and no soil vapors were detected using the PID at any of the explorations except MW-17, SB-3, and SB-12. Slag material was observed at borings MW-17 and SB-3. Slag material was encountered from 10 ft to 11 ft BGS at MW-17 and in the upper 7.0 ft at SB-3. At MW-17, a sulfur odor was observed between 14 and 20 ft BGS.

*Fill D*

VOCs (primarily acetone, methylene chloride, and carbon disulfide); SVOCs; cPAHs; PCBs (Aroclors 1254 and 1260); TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons); and metals were detected in the soil at the explorations completed in the Fill D material. Concentrations of cPAHs, PCBs, copper, and mercury in one or more soil samples exceed the pCULs.

Concentrations of cPAHs (calculated cPAHs TEQ) exceeding the cPAHs TEQ pCUL occurred in each sample tested at SB-5, including the deepest sample, which was collected from the 16- to 17.5-ft depth interval. The cPAHs TEQ concentrations exceeding the pCUL range from 18 µg/kg to 8,394 µg/kg. Concentrations of PCB Aroclors 1254 and 1260 exceeding the pCUL were detected only in the soil sample collected at the 2- to 3.5-ft depth interval at SB-5. The total PCBs concentration (82 µg/kg) also exceeds the total PCBs pCUL (1.8 µg/kg). Mercury, arsenic, and copper were the only metals detected at concentrations exceeding pCULs. A single exceedance of mercury and arsenic each occurred in the shallowest sample depth (2 to 3.5 ft BGS) at SB-5. Copper exceedances occurred in three samples down to a depth of 9.5 ft BGS.

No visual signs of potential contamination were observed in the soil, no soil vapors were detected using the PID, and no slag material was observed.

*Fill E*

VOCs (primarily acetone, methylene chloride, and carbon disulfide); SVOCs; cPAHs; PCBs (Aroclors 1254 and 1260); TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons); and metals were detected in the soil at the explorations completed in the Fill E material. Concentrations of cPAHs, PCBs, TPH, and metals (arsenic, cadmium, chromium, copper, lead, and nickel) exceed the pCULs. None of the exceedances occurred at SB-2.

Concentrations of cPAHs (calculated cPAHs TEQ) exceeding the cPAHs TEQ pCUL were detected in samples from soil borings MW-12, MW-13, MW-13B, and TOWPATH-EXC12. The exceedances occurred at several depth intervals, but also in the deepest sample tested at each location. The deepest that an exceedance occurred was at depth interval 23 to 24.5 ft BGS at MW-12. cPAHs only exceed the pCULs in the two deepest samples at MW-12. PCBs and arsenic were also detected at concentrations exceeding the pCUL in these two samples and gasoline-range petroleum hydrocarbons exceed the pCUL of 30 mg/kg in the shallower of the two soil samples. The soil at these depths was black and contained organic material, whereas soil above the two samples was grey or brown and contained trace to no organics. The total PCBs concentrations for the two samples were 292 µg/kg and 40 µg/kg. PCBs were also detected at concentrations exceeding the pCULs at depth at MW-13B. The total PCBs concentrations range from 3,420 µg/kg to 12,000 µg/kg and occurred in samples collected from 6.5 to 13.5 ft BGS. A concentration of gasoline-range petroleum hydrocarbons exceeds the pCUL of 100 mg/kg in the soil sample collected from the 6.5- to 8-ft depth interval at MW-13B.

Concentrations of arsenic, lead, cadmium, chromium, copper, and nickel exceeding the pCULs were detected in the samples collected below 9.5 ft at boring MW-13 and cadmium, copper, and lead were detected at concentrations exceeding the pCUL in samples between 6.5 to 9.5 ft BGS at MW-13B. Cadmium and copper exeedances were detected at MW-12 from one sample at a depth of 18 to 19.5 ft BGS. Arsenic exceedances also occurred at MW-13B at three samples depths between 6.5 to 13.5 ft BGS.

No visual signs of potential contamination were observed in the soil and no soil vapors were detected using the PID at any of the explorations except MW-13 and MW-13B. Slag material was observed at borings MW-13 from 10 ft to 14 ft BGS and at MW-13B from 9.5 ft. Odors were noted at soil borings MW-13 and MW-13B. At MW-13, the odors were slight, but not identified. At MW-13B, a hydrocarbon-like odor was observed in the sample collected from 6.5 to 8 ft BGS.

#### 8.1.5.3 South of the Former Slip 5 Area

Soil samples collected in the South of the Former Slip 5 Area include samples collected from 25 explorations in the following areas:

- Western Property Boundary: MW-7
- Southern Property Boundary: MW-5, MW-6
- Eastern Property Boundary: MW-4, HBE-1, HBE-2, HBE-3, HBE-SS1, EXT1, EXT2, EXT3, Bldg-14-11Exc1, Bldg-14-11Exc2, Bldg-14-11Exc3, Bldg-14-11Exc4, and Bldg-14-11Exc5, BLDG14-11-SURF, PIVExc2, TowpathExc13
- Northern Portion of Building 14-01: TRENCH2, TRENCH3, TRENCH4, TRENCH5, OuttakesExc-1, OuttakesExc-2, OuttakesExc-3, and OuttakesExc-4.

Arsenic concentrations detected in the above explorations during the RI are provided in Table 22 and all other detected concentrations for the soil samples collected in these explorations are provided in Table 23. A comparison of the detected concentrations to pCULs is provided in both tables. Based on the comparison, the constituents detected at concentrations exceeding the pCUL in one or more samples from the above explorations include TCE, cPAHs; PCBs; and metals (arsenic and copper). A discussion of the constituents detected and the concentrations exceeding the pCUL is provided below.

In addition to those explorations listed above, soil samples were collected from explorations located in specific areas of concern in the South of the Former Slip 5 Area. These include the Former Washdown/Aqueous Degreaser Area (SB-1, MW-1, MW-2, MW-3, and Bldg1401-Footing-Exc1, Bldg1401-FootingExc3, Bldg1401-Footing-Exc5, Bldg1401-FootingExc8, Bldg1401-FootingExc10, and Bldg1401-FootingExc15) and the Former Washdown System Collection Tanks/Loading Dock Area (MW-8 and TOWPATHEXC2 through TOWPATHEXC7). Analytical results for these specific AOCs are discussed in Section 8.2.

*Field Screening*

No visual signs of contamination were observed in the soil and no soil vapors were detected above 50 ppm using the PID at the explorations located in the South of the Former Slip 5 Area.

**VOCs, SVOCs, and TPH**

VOCs (primarily methylene chloride and acetone; TCE, PCE, and vinyl chloride close to southern property boundary); SVOCs; PCBs; and TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons) were detected in the soil in the South of the Former Slip 5 Area. Only TCE was detected at concentrations exceeding pCULs. As shown on Figure 63, the TCE exceedance occurred at soil boring MW-6, which is located on the southern property boundary, at depth intervals 8 to 9.5 ft and 14 to 15.5 ft.

*cPAHs*

As shown on Figure 55, cPAHs were detected in some soil samples collected from the South of the Former Slip 5 Area, primarily in soil above 9.5 ft BGS. No cPAHs were detected at depths greater than 11 ft BGS. Of the 39 soil samples collected and analyzed for cPAHs from the explorations located in the South of the Former Slip 5 Area, cPAHs concentrations (calculated cPAHs TEQ) exceeding the cPAHs TEQ pCUL (15 µg/kg) occurred in 14 soil samples. The exceedances occurred at soil borings MW-4, MW-5, MW-6, and MW-7; two excavations and one surface sample located in the former Building 14-11 area; the PIVEXC 2; and at three trench excavations located inside Building 14-01. The concentrations exceeding the pCUL range from 15.5 µg/kg to 537 µg/kg.

*PCBs*

As shown on Figure 56, PCBs were detected in eight of the 52 soil samples collected from the 27 soil explorations. All of the detected concentrations exceed pCULs. Two of the exceedances occurred in soil samples collected from the 8- to 9.5-ft depth interval at soil borings MW-5 and MW-6 (southern property boundary) and two exceedances occurred in the soil samples collected between 2 and 6.5 ft BGS at MW-7 (western property boundary). The remaining exceedances occurred in construction-related soil samples collected from two shallow excavations (TRENCH3 and TRENCH5), inside Building 14-01, and in two shallow samples collected in the former Building 14-11 area. The total PCBs concentrations range from 14 µg/kg to 660 µg/kg. The highest concentrations occurred in the shallow soil sample at MW-7.

Concentrations of PCBs exceeding the pCULs also occurred in the Former Washdown/Aqueous Degreaser Area and the Former Washdown System Collection Tanks/Loading Dock Area. These exceedances are discussed in Sections 8.2.9 and 8.2.10.

*Metals*

Arsenic and copper are the only metals detected at concentrations exceeding the pCULs in soil samples from the South of the Former Slip 5 Area. As shown on Figure 57, arsenic exceedances occurred at soil boring MW-7 (24.5 mg/kg) and MW-5 (8.1 mg/kg) in the soil samples collected from 5 to 6.5 ft BGS. Copper exceedances occurred only near the eastern property boundary at HBE-SS1, EXT2, EXT3, Bldg14-11EXC1, and BLDG14-11-SURF. A total of six samples from these locations exceeded the pCUL (36 mg/kg) with concentrations ranging from 41.1 to 61.4 mg/kg.

Concentrations of arsenic exceeding the pCULs also occurred in the vicinity of I-206(s). These exceedances are discussed in Section 8.2.7.

### 8.1.6 Storm Drain System Chemical Results

The storm drain investigation was conducted to fill the following data gaps:

- Data on the Site storm drain system solids that have accumulated since the last cleaning
- Characterization of stormwater discharged from Outfalls A and B for Site PCOCs
- Information on the source of PCOCs in storm drain system solids, if any
- Information on the full length of the 12-inch-diameter corrugated pipe located south of Building 14-01.

Stormwater and storm drain solid analytical results were reported to the MDL. Concentrations detected above the MDL, but below the RL, were qualified as estimates (J flagged) due to uncertainty in the concentration and are included in Table 24 (stormwater ) and Table 25 (storm drain solids). For non-detected constituents, only the RLs are presented in Tables 24 and 25. Analytical results for all constituents including the RLs and the MDLs are provided in tabular format in Appendix N.

#### 8.1.6.1 Stormwater

As previously discussed in Section 4.5.2, four stormwater samples were collected to evaluate the quality of stormwater discharging to the LDW via Outfalls A (MH32) and B (MH80). Sample locations are shown on Figure 25. The samples were analyzed for VOCs; SVOCs; metals (including mercury and chromium VI); petroleum hydrocarbons; PCBs; TDS; and total suspended solids (TSS). Only some VOCs, SVOCs, and metals were detected in the samples. A summary of the detected constituents and the concentrations is provided in Table 24. Although the stormwater samples were analyzed only for total metals and, except for mercury, the groundwater pCULs for metals apply only to the dissolved fraction, detected concentrations in the stormwater samples were compared to the groundwater pCULs. As shown in Table 24, during the March sampling event only BEHP, cadmium, and zinc, and during the April sampling event only zinc, were detected in stormwater samples collected at MH32 (Outfall A) at concentrations exceeding the pCULs.

During the March sampling event, only BEHP, and during the April sampling event no constituents, were detected in the stormwater samples collected at MH80 (Outfall B) at concentrations greater than the pCUL.

#### 8.1.6.2 Storm Drain Solids

As previously discussed in Section 4.5.1, 36 samples of the solids present in the storm drain structures were collected in September 2011 and submitted for laboratory analysis. The data were compared to SMS criteria or LDW PRGs to evaluate the potential for storm drain solids, if they were transported to the LDW, to impact sediment. LDW PRGs were used instead of SMS criteria for PCBs, arsenic, cPAHs TEQ, and dioxins/furans TEQ when applicable. The comparison indicates that some metals, PCBs, cPAHs, and some SVOCs (primarily phthalates and benzyl alcohol) were present in some solids at concentrations exceeding the LDW PRG or SMS criteria. As shown on Figures 66 and 67, metals (arsenic, cadmium, chromium, mercury, and zinc) and PCBs were detected at concentrations exceeding the SMS criteria or PRGs in samples from some CBs located around Building 14-01 (North, South, East, and West) Areas and in four other areas identified as Building 14-13 Area, Building 14-02/14-03 Area, Isaacson West Area, and Isaacson East Area. Results are summarized in Table 25 and discussed by area below.

***Building 14-01 South, East, and West Areas***

Results for 2011 storm drain solids sampling in these areas indicate that benzyl alcohol; BEHP; butylbenzylphthalate; dimethylphthalate; n-nitrosodiphenylamine (East Area only); phenol (East and West Areas only); PAHs; cadmium; zinc; and mercury (East Area only) were present in the storm drain solids at concentrations exceeding the SMS criteria. Additionally, cPAHs, PCBs, and arsenic concentrations exceeded the LDW PRGs in these three areas. Dioxins/furans were detected in one sample from the South Area, but the TEQ concentration did not exceed the LDW PRG. Data for the storm drain solids collected from Building 14-01 South, East, and West areas are presented in Tables 26, 27, and 28, respectively.

***Building 14-01 North Area***

Results from 2011 storm drain solids sampling in this area indicate that benzyl alcohol; butylbenzylphthalate; dimethylphthalate; BEHP; 4-methylphenol; PAHs; zinc; and mercury were present in the storm drain solids at concentrations exceeding the SMS criteria. Additionally, cPAHs, PCBs, and arsenic concentrations exceeded the LDW PRGs. Data for the storm drain solids collected from Building 14-01 North Area is presented in Table 29.

***Building 14-13 Area***

Results from 2011 storm drain solids sampling in this area indicate that benzyl alcohol, butylbenzylphthalate, di-n-butylphthalate, dimethylphthalate, BEHP, pentachlorophenol (PCP), phenol, PAHs, cadmium, and zinc were present in the storm drain solids at concentrations exceeding the SMS criteria. Additionally, cPAHs, PCBs, and arsenic concentrations exceeded the LDW PRGs. Data for the storm drain solids collected from Building 14-13 Area is presented in Table 30.

***Building 14-02/14-03 Area***

Results from 2011 storm drain solids sampling in this area indicate that benzoic acid, benzyl alcohol, butylbenzylphthalate, dimethylphthalate, BEHP, 4-methylphenol, phenol, PAHs, cadmium, total chromium, copper, lead, mercury, and zinc were present in the storm drain solids at concentrations exceeding the SMS criteria. Additionally, cPAHs, PCBs, and arsenic concentrations exceeded the LDW PRGs. Data are presented in Table 31.

***Isaacson East Area***

Results from 2011 storm drain solids sampling in this area indicate that benzoic acid, benzyl alcohol, butylbenzylphthalate, BEHP, 4-methylphenol, PAHs, chromium, and zinc were detected in the storm drain solids at concentrations exceeding the SMS criteria. Additionally, cPAHs, PCBs, and arsenic concentrations exceeded the LDW PRGs. Data are presented in Table 32.

***Isaacson West Area***

Results from 2011 storm drain solids sampling in this area indicate that benzoic acid, benzyl alcohol, butylbenzylphthalate, BEHP, cadmium, chromium, and zinc were detected in the storm drain solids at concentrations exceeding the SMS criteria. Additionally, cPAHs, PCBs, and arsenic concentrations exceeded the LDW PRGs. Dioxins/furans where detected in one sample, but the TEQ concentration did not exceed the LDW PRG. Data are presented in Table 33.

#### 8.1.6.3 Storm Drain System Contaminant Source Evaluation

As previously discussed in Section 4.5.3, the source evaluation was conducted in April 2012. Samples were collected of various media present at the Site that could be a potential source of contaminants to the storm drain system; sampled media included surface debris, paint chips, and CJM. At locations where these media were not present, storm drain solids were collected from the structures where contaminants were previously present in the solids at concentrations exceeding the SMS criteria. Source material data for samples collected in each of the areas (Building 14-01 South, Building 14-01 East, Building 14-01 West, Building 14-01 North, Building 4-13, Building 14-02/14-03, Isaacson East, and Isaacson West) are presented in Tables 26 through 33, respectively, along with the 2011 storm drain structure data in each area to allow for direct data comparison. Results are summarized by area below.

Source material sample results were reported to the MDL. Concentrations detected above the MDL, but below the RL, were qualified as estimates (J flagged) due to uncertainty in the concentration and are included in Tables 26 through 33. Concentrations that have been J flagged, but are above the pCUL, are included on figures as exceeding cleanup levels. For non-detected constituents, only the RLs are presented in Tables 26 through 33. Analytical results for all constituents are provided in tabular format in Appendix N.

***Building 14-01 South, East, and West Areas***

Due to the lack of potential sources of contaminants to the storm drain system in these areas, and the lack of surface debris present at the time of sampling, storm drain solids samples were collected and analyzed to evaluate the quality of the solids relative to the SMS criteria or LDW PRGs. Data for the Building 14-01 South, East, and West areas are presented in Tables 26, 27, and 28, respectively.

CBs sampled in April 2012 did not directly correspond to CBs sampled in September 2011 due to the solids available for sampling and the need to composite some samples to provide sufficient material for analysis. In the Building 14-01 South Area, both CG-72 and CG-74 were sampled during the September 2011 and April 2012 events. In the Building 14-01 East Area, samples were collected from CB-60/61, CB-63, CB-66/67, and CB-B/62/68 in September 2011, but only CB-66/67 was sampled (as a composite sample) in April 2012; sufficient solids were not available in the other CBs. In the Building 14-01 West Area, CB-C, CB-D, and CB-E/77/77B were sampled in September 2011, and composite samples CB-C/D and CB-E/77/77B were collected in April 2012.

In the Building 14-01 South and East Areas, the concentrations of BEHP and PAHs were higher in the April 2012 solids samples than in the solids samples collected in September 2011. In the Building 14-01 South Area, concentrations of PCBs in the April 2012 solids samples were similar to the September 2011 samples, while in the Building 14-01 East Area, the concentration in 2012 samples was higher than in the 2011 solids samples. Concentrations of metals (cadmium and zinc) detected in April 2012 in the Building 14-01 South Area were similar to, or lower than, the concentrations detected in September 2011; concentrations of metals (cadmium and zinc) in the Building 14-01 East Area were similar to or higher than the concentrations detected in September 2011. The concentrations of mercury in the April 2012 solids samples collected from the South and East Areas do not exceed in the SMS criteria.

In the Building 14-01 West Area, the only SVOC detected that exceeds the SMS criteria was 4-methylphenol. Concentrations of cPAHs in the West Area were higher in the September 2011 solid samples than in the April 2012 solid samples, and the concentrations of PCBs were slightly lower or about the same. Concentrations of cadmium and zinc were similar to or lower compared to the concentrations in solids samples collected in September 2011, and mercury was detected above the SMS criteria in one of the solids samples from this area.

In the galbestos siding samples collected in April 2012, PCBs (Aroclor 1254) were detected at a concentration of 1.3 mg/kg. TCLP metals results were 2.0 mg/L for barium and 7.0 mg/L for lead, and not detected for cadmium, chromium, and silver. Galbestos siding is not considered a potential source of contaminants to storm drain solids.

***Building 14-01 North Area***

Three surface debris samples were collected in the Building 14-01 North Area. Data are presented in Table 29. The analytical results indicate that surface debris in this area may be a source of PCBs, BEHP, cPAHs, arsenic, and zinc present in the storm drain solids; however, the zinc concentrations in the surface debris samples were significantly less than the zinc concentrations detected in the 2011 storm drain solids. Benzyl alcohol; butylbenzylphthalate; 2,4-dimethylphenol; and 4-methylphenol were detected at concentrations greater than SMS criteria in 2011 stormwater solids, but were not detected above the MDL or the RL in the surface debris solids.

***Building 14-13 Area***

One paint chip and one surface debris sample were collected from the Building 14-13 Area. Data are presented in Table 30. The paint chip sample (PAINT-06) was collected from peeling paint on the exterior of Building 14-13. The analytical results indicate that the paint may be a source of PCBs, cadmium, and zinc present in the storm drain solids. Analytical results for the surface debris indicate that the surface debris in this area may also be a contributing source of cPAHs, PCBs, arsenic, cadmium, and zinc, and may be a source of BEHP, PCP, and PAHs detected in the storm drain solids, although the PAHs concentrations in the surface debris sample are significantly less than the concentrations detected in the 2011 storm drain solids sample from OWS79, the only 2011 sample in which PAH concentrations exceed SMS criteria. Benzyl alcohol, butylbenzylphthalate, di-n-butylphthalate, dimethylphthalate, and phenol were detected at concentrations greater than SMS criteria in 2011 storm drain solids, but were not detected above the MDL or RL in the paint chip and surface debris samples.

***Building 14-02/14-03 Area***

Four surface debris samples and five paint chip samples were collected from the Building 14-02/14-03 Area. Data are presented in Table 31. Paint chip samples in this area were collected from a variety of structures with peeling or degrading paint including bollards (PAINT-01 and PAINT-02), a conex box located north of Building 14-02 with multiple layers of beige and red paint (PAINT-03), a conex box located west of Building 14-02 with multiple layers of beige and green paint (PAINT-04), and the exterior south wall of Building 14-02 (PAINT-05). The analytical results for these samples indicate that the paint on the bollards, conex boxes, and the exterior wall of Building 14-02 may be a contributing source of the PCBs, arsenic, cadmium, mercury, and zinc in the storm drain solids. The analytical results do not suggest that the paint is a significant source of SVOCs and PAHs, except potentially for BEHP. No SVOCs or PAHs were detected in the paint chip sample collected from the exterior building wall.

The analytical results for the surface debris samples indicate that surface debris present in this area may be a contributing source of PCBs, BEHP, and metals and a potential source of PAHs. Except for BEHP, SVOCs were not generally detected in the surface debris samples at concentrations above the MDL or RL.

***Isaacson East Area***

Four surface debris samples and one CJM sample were collected from the Isaacson East Area. Data for the Isaacson East Area are presented in Table 32. The analytical results for these samples indicate that CJM present at some locations in this area may be a source of PCBs, BEHP, and cPAHs present in the storm drain solids and that surface debris present in this area may be a contributing source of PCBs and BEHP, as well as a source of arsenic, chromium, and zinc. Benzoic acid, benzyl alcohol, butylbenzylphthalate, and 4-methylphenol were not detected above the MDL or the RL in the CJM and surface debris solids.

***Isaacson West Area***

Four surface debris samples and one CJM sample were collected from the Isaacson West Area. Data for the Isaacson West Area are presented in Table 33. The analytical results for these samples indicate that CJM present in this area may be a source of PCBs in the storm drain solids and that surface debris present at some locations in this area may be a contributing source of the PCBs, as well as a source of the BEHP, arsenic, cadmium, chromium, and zinc contamination. Benzoic acid, benzyl alcohol, and butylbenzylphthalate were not detected above the MDL or the RL in the CJM and surface debris solids.

### 8.1.7 STORM DRAIN SYSTEM PHYSICAL CONDITION

The physical condition of the storm drain pipelines associated with Outfalls A and B and the 12-inch metal corrugated pipe located south of Building 14-01 were evaluated using video cameras. Because exceedances of the pCULs for some constituents (BEHP, arsenic, and barium)] were present in the stormwater samples collected from Outfalls A and B, and because these constituents were also present in some samples of Site soil and/or groundwater, the pipelines associated with Outfalls A and B were inspected for cracks, fractures, or breaks in the storm drain line segments that could potentially allow intrusion or infiltration of soil or groundwater. A video survey of the 12-inch metal corrugated pipe was conducted to determine if there were any connections to the pipe and to evaluate the purpose of the pipe.

#### 8.1.7.1 12-Inch Metal Corrugated Pipe

A video survey of the 12-inch metal corrugated pipe located south of Building 14-01 was conducted on February 10, 2012. The video survey identified debris in the pipe (the three-pronged electrical plug, sand, and dead rodents). Perforations on the top of the pipe were visible in the survey, but no tap connections were identified. The survey extended 346 ft inside the pipe until sand present in the pipe prohibited further advancement of the camera; however, daylight could be seen beyond the sand. After further inspection from the exterior, it was determined that the eastern end of the pipe daylights approximately 361 ft east of the western end of the pipe. The eastern pipe opening was mostly buried under large rocks and dirt. After removing the rock and dirt, a wire mesh screen covering the pipe opening was visible. A compact disk containing the video survey of the corrugated metal pipe and photos of the eastern end of the pipe are provided in Appendix O.

#### 8.1.7.2 Storm Drain System Associated with Outfalls A and B

In late September and early October 2012 a video survey of the storm drain pipelines associated with Outfalls A and B was conducted. The Boeing-owned storm drain system and those segments that were video-inspected are shown on Figure 27. A compact disk containing the video survey of the storm drain pipelines is provided in Appendix P. Prior to the video survey, the storm drain lines and associated structures (CBs, manholes, oil/water separators, and the Vortechs vaults) were jet cleaned.

The video survey determined that the majority of the storm drain line segments are in good condition; however, some cracks, fractures, and other pipe defects, as well as soil inside the pipe line, were identified. The video survey also identified tap connections and attempted to verify the connections for CBs CB-G, CB-H, CB-I, CB-J, and CB-90B (shown on Figure 27). The results of the survey were documented in a technical memorandum prepared by Landau Associates for Boeing. This technical memorandum is provided in Appendix P. A summary of the upstream and downstream structures that identify each segment, the date the segment was video-inspected, and general notes and comments about the condition of the segment are provided in Table 1 of the technical memorandum. Photographs of storm drain lines in poor condition are included in the technical memorandum. Photographs of storm drain line segments in good condition are not included in this technical memorandum.

A summary of the tap connections identified during video inspection activities is provided in Table 2 of the technical memorandum. Tap connections identified in Table 2 as "not observed to be plugged or capped" were identified based on observations from the video inspection of the main storm drain pipe. This identification does not include an assessment of plugs or caps that may be present in other locations, but are not visible from inside the main storm drain pipe.

Storm drain video inspections did not verify connections for CB-G, CB-H, CB-I, CB-J, or CB-90B. At CB-G, a down-turned steel elbow was present on the sidewall of the structure, which prohibited access to the storm drain line that may be connected to this structure. At the remaining CBs, the following inspections were conducted:

- At CB-H, a storm drain line located on the west side of the CB was video-surveyed for approximately 8 ft until the survey was abandoned due to a fractured joint.
- At CB-I, a storm drain line located on the south side of the CB was video-surveyed for approximately 8 ft until the survey was abandoned due to blockage/obstruction. A storm drain line on the west side of the CB could not be video-surveyed due to the presence of a down-turned steel elbow.
- At CB-J, a storm drain line located on the north side of the CB was video-surveyed for approximately 18 ft until the survey was abandoned because the line connected to another structure.
- At CB-90B, a storm drain line located on the north side of the CB was video-surveyed for approximately 72 ft until the survey was abandoned due to a bend in the pipe.

Although the connections to the above-identified CBs were not verified, an overlay of these locations with the abandoned 48-inch storm drain line (abandoned and rerouted in 1990), as shown on Figure 27, indicates that these structures were likely associated with the old 48-inch storm drain line. Video surveys do not suggest that any of these locations are actively connected to the current Boeing storm drain system.

The video surveys identified existing connections that were not previously identified on the storm drain maps, including connections of the following structures:

- CB-A to MH-22
- CB-C to CB-D
- CB-D to CB-77
- CB-77 to CB-E
- CB-E to MH-75
- CB-B to MH-65.

The RI storm drain base maps have been updated to reflect the piping verifications identified during the storm drain video survey review.

## 8.2 DATA GAPS FOR SPECIFIC AREAS OF CONCERN

One of the data gaps identified in the RI/FS Work Plan was the lack of information in specific areas of concern at the Site. These areas include the Thompson property Wooden Bulkhead, the Former Paint Storage Area, the Former Diesel and Gasoline Tanks Area, the Area with Observed Tar-Like Substance, the Former Slip 5 Outfall Area, the Former Hydraulic Test Pad Area, Vicinity of Monitoring Wells I-205(s) and I-206(s), Monitoring Well I-104(s) Groundwater Arsenic Source Area, the Former Washdown/Aqueous Degreaser Area, and the Former Washdown System Collection Tanks/Loading Dock Area. Each of these areas is shown on either Figure 19 or Figure 23.

### 8.2.1 THOMPSON PROPERTY WOODEN BULKHEAD

Three soil samples were collected from outside of the bulkhead through gaps in the wooden bulkhead located at the southern portion of the Thompson property. The samples were collected from gaps in the bulkhead where soil was present. The sample locations are shown on Figure 19. Sampling results were compared to sediment pCULs (SMS SCO criteria and LDW PRGs) to evaluate the potential for LDW sediment contamination from soil eroding through the gaps in the bulkhead. A single arsenic exceedance occurred with a concentration (7.6 mg/kg) slightly above the LDW PRG of 7 mg/kg dw. The detected cPAHs concentrations are less than the SCO LDW PRG of 150 mg total cPAH TEQ/kg dw. The analytical results for constituents detected in the wooden bulkhead samples are summarized in Table 34.

### 8.2.2 FORMER PAINT STORAGE AREAS

Three soil borings were located in the Former Paint Storage Area: one in each of the paint storage areas (SB-9 and SB-10) and one located where the former paint sludge sumps were located (SB-11). One monitoring well, MW-15, was located downgradient of the Former Paint Storage Area, as shown on Figure 19. The analytical results for constituents in soil samples from this area are summarized in Table 35.

#### 8.2.2.1 Soil

Analytical results for 12 soil samples collected from soil borings SB-9, SB-10, and SB-11 indicate that VOCs (primarily TCE, methylene chloride, acetone, and carbon disulfide); SVOCs; cPAHs; TPH (diesel-range and oil-range petroleum hydrocarbons); PCBs; and metals are present in one or more of the soil samples, but only cPAHs, PCBs, arsenic, and copper are present at concentrations exceeding the pCULs. PCB and cPAH exceedances generally occurred in the upper 3.5 ft of soil, although cPAHs and PCB (Aroclor 1254) exceedances occurred in the sample collected from the 5- to 6.5-ft depth interval at SB-9. Total PCBs were not detected in shallower or deeper intervals at SB-9 and were not detected at soil borings SB-10 or SB-11. Arsenic and copper exceedances occurred as deep as 15 ft at SB-10 and 15.5 ft at SB-11. Analytical results for constituents detected in the soil samples collected from the Former Paint Storage Area are summarized in Table 35.

#### 8.2.2.2 Groundwater

Only arsenic was detected in the groundwater at concentrations exceeding the pCUL. Dissolved arsenic concentrations range from 20.0 µg/L to 76.8 µg/L. The analytical results for constituents detected in the groundwater at well MW-15 are summarized in Table 12.

### 8.2.3 FORMER DIESEL AND GASOLINE TANKS AREA

One test pit (TP-109) was excavated in the Former Diesel and Gasoline Tanks Area (Figure 19) to determine if the tanks are still present and to collect soil samples for laboratory analysis. No monitoring wells were installed in this area. The test pit was approximately 6.5 ft by 10.5 ft and extended to a depth of 10 ft BGS. No visual signs of potential contamination were observed in the soil and no soil vapors were detected using the PID. No USTs were encountered. Based on the analytical results for the soil sample collected near the base of the test pit, no constituents are present at concentrations exceeding a pCUL. Gasoline-range petroleum hydrocarbons (without associated benzene) were present at 17 mg/kg, well below the pCUL of 100 mg/kg. Diesel-range and motor oil-range petroleum hydrocarbons were not detected. The analytical results for constituents detected in the RI soil samples collected from the Former Diesel and Gasoline Tanks Area are summarized in Table 35.

### 8.2.4 AREA WITH OBSERVED TAR-LIKE SUBSTANCE

Two test pits (TP-107 and TP-108) were excavated north of the eastern Vortechs vault (Figure 19) to evaluate the extent of a tar-like substance previously discovered outside of the stabilized soil perimeter. The test pits were approximately 4 by 10 ft wide and extended 12 ft BGS. A dark brown-to-black, tar and asphalt-like material, as well as bricks, burnt wood debris, and a petroleum odor were encountered at the 1- to 2-ft depth interval on each sidewall of TP-108. Burnt wood and an oil-like odor were observed on the north and east sidewalls of TP-107 at the 1- to 2-ft depth interval. Soil samples were collected for laboratory analysis from this depth interval from each sidewall at test pits TP-107 and TP-108 and from the depth interval directly below it (2 to 3 ft BGS) from the north sidewall of each test pit. A soil sample was also collected from the base of each test pit.

Elevated concentrations of cPAHs (up to 6,593 µg/kg) were detected in the soil samples collected where the tar-like material and burnt wood debris were encountered. Diesel-range, oil-range, and gasoline-range petroleum hydrocarbons were also detected in the samples. The concentration of diesel-range petroleum hydrocarbons in one sample, oil-range petroleum hydrocarbons in one sample, and gasoline-range petroleum hydrocarbons in one sample collected from the 1- to 2-ft depth interval at TP-108 exceed the pCULs. The maximum gasoline-range petroleum hydrocarbon concentration detected was 36 mg/kg; benzene was detected in this sample at a concentration of 4.4 µg/kg so the gasoline-range petroleum concentration was compared to the pCUL of 30 mg/kg. Concentrations of arsenic and copper exceeding the pCULs are also present in soil samples collected from the depth intervals where the tar-like material and burnt wood debris were present. No constituents were detected at concentrations exceeding the pCUL in the soil samples collected from the 2- to 3-ft interval at either test pit. The analytical results for constituents detected in the soil samples collected from the Area with Observed Tar-Like Substance are summarized in Table 36.

### 8.2.5 Former Slip 5 Outfall Area

Soil samples were collected from four soil borings located in the Former Slip 5 Outfall Area (SB-6, SB-7, SB-8, and MW-14), as shown on Figure 19. One groundwater sample was collected from a temporary well point installed in soil boring SB-8 and four quarterly groundwater samples were collected from well MW-14 and from piezometer PZ-3, which are located in the Former Slip 5 Outfall Area. The samples were collected to evaluate if discharge from the Former Slip 5 Outfall Area may have impacted soil and groundwater in this area.

#### 8.2.5.1 Soil

No visual signs of potential contamination were observed in the soil and no soil vapors were detected using the PID at the explorations completed within the Former Slip 5 Outfall Area. Except for some crushed concrete at 2 ft BGS at soil boring SB-6 and some asphalt at 2.5 ft BGS at MW-14, no debris was encountered in the explorations.

VOCs; SVOCs; TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons); cPAHs; PCBs; and metals were detected in soil samples from this area. cPAHs and PCBs were detected in one or more soil samples at concentrations exceeding the pCULs. The cPAHs exceedances occurred at depths between 2 ft and 6.5 ft BGS except at MW-14 where cPAHs also exceed the pCULs in the 8- to 9.5-ft sample depth interval. PCB Aroclor 1260 was detected in the 2- to 3.5-ft sample depth interval at SB-6. The detected concentration (56 µg/kg) and the total PCBs concentration (56 µg/kg) exceed the PCBs pCULs of 5.4 µg/kg and 1.8 µg/kg, respectively. Arsenic, cadmium, and chromium were detected in soil samples to a depth of 6.5 ft BGS at SB-6 at concentrations exceeding pCULs. Arsenic and copper also exceeded the pCULs in samples from MW-14 and arsenic only at SB-7 and SB-8. The analytical results for constituents detected in the soil samples collected from the Former Slip 5 Outfall Area are summarized in Table 37.

#### 8.2.5.2 Groundwater

Metals were the primary constituents detected in groundwater in this area. Dissolved arsenic was only detected once (at PZ-3) at a concentration exceeding the pCUL. Dissolved cadmium was detected at concentrations exceeding the pCUL at well MW-14 and at soil boring SB-8. The only other pCUL exceedance in groundwater in this area was chrysene, which occurred once at MW-14. The analytical results for constituents detected in the groundwater samples collected at well MW-14, piezometer PZ-3, and soil boring SB-8 are summarized in Table 13.

### 8.2.6 Former Hydraulic Test Pad Area

One monitoring well (MW-11) was located in the Former Hydraulic Test Pad Area, as shown on Figure 19, to evaluate the presence of hydrocarbons previously present in groundwater in this area. Two test pits (TP-106 and TP-106B) and one monitoring well, MW-10, were located downgradient of the Former Hydraulic Test Pad Area to evaluate whether free product may have migrated prior to the remedial action in this area. A concrete block was encountered in TP-106 at 4.5 ft BGS preventing further excavation; therefore, TP-106B was excavated directly adjacent to the west of TP-106 to 12 ft BGS. The lateral extent of the combined test pits was approximately 8.5 ft by 10 ft.

#### 8.2.6.1 Soil

No visual signs of potential contamination were observed in the soil and no soil vapors were detected using the PID at the explorations completed within the Former Hydraulic Test Pad Area (MW-11) and downgradient of the Former Hydraulic Test Pad Area (TP-106, TP-106B, and MW-10). Except for the concrete block encountered at TP-106, no debris or underground structures were encountered at the explorations.

VOCs; SVOCs; TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons); cPAHs; PCBs; and metals were detected in soil in this area. Except for cPAHs, arsenic, and copper at MW-11, none of the detected concentrations exceed the pCULs at TP-106B and MW-11. The cPAHs exceedances at MW-11 occurred at depth (8 ft to 15 ft BGS). The arsenic and copper exceedances at MW-11 were detected in the sample from 8 to 9.5 ft BGS. PCBs, cPAHs, and arsenic exceed the pCULs at MW-10. All of the exceedances occurred at depth (13.5 to 15 ft BGS); although cPAHs exceedances also occurred in the 2- to 3.5-ft and 8- to 9.5-ft depth intervals. The analytical results for constituents detected in the soil samples collected from the Former Hydraulic Test Pad Area are summarized in Table 38.

#### 8.2.6.2 Groundwater

Metals were the primary constituents detected in groundwater at well MW-11. A single arsenic concentration (9.4 µg/L) was detected slightly above the pCUL of 8 µg/L. None of the concentrations of other detected constituents exceed the pCULs. Concentrations of cPAHs, PCBs, and dissolved arsenic were detected at concentrations exceeding the pCUL at well MW-10. The analytical results for constituents detected in the groundwater at wells MW-10 and MW-11 are summarized in Table 13.

### 8.2.7 Vicinity of Monitoring Wells I-205(s) and I-206(s)

Three test pits (TP-101, TP-102, and TP-103) were located in the upgradient groundwater flow direction (east) of I-206(s) and two test pits (TP-104 and TP-105B) were located in the upgradient groundwater flow direction (east) of well I-205(s), as shown on Figure 19. The purpose of the test pits was to identify a potential source for arsenic detected in groundwater at these wells.

The test pits were generally 4 ft x 10 ft and extended to depths ranging from 12 ft to 14 ft. Soil samples were collected from the base of test pits TP-101, TP-102, TP-104, and TP-105B. Sidewall samples were collected at TP-103; one of the sidewall samples was near the base of the excavation.

No visual signs of potential contamination were observed in the soil and no soil vapors were detected using the PID at the explorations completed in the vicinity of monitoring wells I-205(s) and I-206(s). No debris or buried structures were encountered in the explorations, except for a water pipe at test pit TP-104.

VOCs, SVOCs, cPAHs, and metals were detected in soil at each of the test pits. TPH (diesel-range and oil-range petroleum hydrocarbons) was detected in soil at TP-103 [near well I-206(s)]. Except cPAHs, arsenic, and copper at test pit TP-103, none of the detected concentrations exceed the pCULs. cPAH, arsenic, and copper exceedances occurred in the unsaturated zone between depths of 5 and 7 ft BGS at test pit TP-103. The analytical results for constituents detected in the soil samples collected from the vicinity of monitoring wells I-205(s) and I-206(s) are summarized in Table 39.

### 8.2.8 Monitoring Well I-104(S) Groundwater Arsenic Source

Three wells were installed upgradient (east) of well I-104(s) to evaluate potential sources for the elevated arsenic concentrations detected in groundwater at well I-104(s). Monitoring well MW-23 is located within an area of stabilized soil material directly upgradient of well I-104(s). Monitoring well MW-21 is located between the area of stabilized soil and well I-104(s), and well MW-18 is located west and south of the stabilized soil, near previous direct-push boring IDP-8 (an elevated concentration of arsenic was previously detected in groundwater at location IDP-8). The locations of wells MW-18, MW-21, and MW-23 are shown on Figure 23. Elevated concentrations of dissolved arsenic (significantly above the pCUL of 8 µg/L) were detected at all three monitoring wells during each of the RI groundwater monitoring events. Dissolved concentrations range from 2,980 µg/L to 6,650 µg/L at well MW-18; from 17,000 µg/L to 22,600 µg/L at well MW-21; and from 34,400 µg/L to 80,000 µg/L at well MW-23. Arsenic concentrations in groundwater at well I-104(s) range from 844 µg/L to 2,460 µg/L, less than the concentrations at wells MW-18, MW-21, and MW-23. At well MW-20, which was installed during the RI at a location immediately adjacent to well I-104(s), the dissolved arsenic concentrations are significantly less, ranging from 135 µg/L to 449 µg/L. The analytical results for constituents detected in the groundwater at wells I-104(s), MW-18, MW-21, and MW-23 are summarized in Table 12.

Soil samples were collected during installation of wells MW-18, MW-21, and MW-23, as well as at MW-20, which is adjacent to well I-104. Arsenic concentrations above the pCUL of 7 mg/kg were detected in soil at the borings for well MW-18 (maximum 35.5 mg/kg at the 5- to 6.5-ft BGS interval); well MW-21 (maximum 221 mg/kg at the 13.5 to 15-ft BGS interval); and well MW-23 (maximum 331 mg/kg at the 12.5- to 14-ft BGS interval, beneath the stabilized soil material and below the water table). Arsenic was also detected at the boring for well MW-20, located adjacent to well I-104(s). Arsenic concentrations in soil at MW-20 were 139 mg/kg at the 5.5- to 6-ft BGS interval; however, below the water table, at the 14.5- to 16-ft BGS interval, arsenic was detected at a concentration of 10.5 mg/kg, only slightly above the pCUL. The analytical results for arsenic detected in soil at wells MW-18, MW-20, MW-21, and MW-23 are summarized in Table 18. Arsenic mobility and possible sources of the elevated arsenic in groundwater at wells I-104, MW-18, MW-20, MW-21, and MW-23 are discussed below.

Arsenic mobility may be affected by arsenic concentration in soil, arsenic speciation, redox and pH conditions, as well as soil composition and permeability. Arsenic speciation was not performed on soil or groundwater samples as part of this RI. However, of four possible arsenic oxidation states, arsenic in soil typically occurs in the +3 and +5 states [As (III) and As(V)]. Under oxidized conditions, such as in shallow soil, arsenic primarily exists in the As(V) form. In reduced conditions, there may be a higher proportion of As(III), which is generally more mobile.

ORP in groundwater was measured at wells I-104, MW-18, MW-20, MW-21, and MW-23 during quarterly groundwater sample collection. ORP values at wells I-104, MW-18, MW-21, and MW-23 range from -316 mV to 14.6 mV, with a mean ORP at these four wells during all four quarters of -146 mV, suggesting reducing conditions within the aquifer in the area of these four wells, which is likely to increase the mobility of arsenic within the groundwater. ORP values at MW-20 are more positive than at the other wells and range from -12.7 mV to 143 mV. Soil above the water table likely has a higher redox potential; redox potential under oxidized conditions (e.g., shallow, not flooded soil) typically ranges from approximately +400 to +700 mV (Dempsey 1991, Peryea 1989).

Although pH was not analyzed in soil samples at these five well locations, pH in groundwater during quarterly groundwater monitoring ranged from 5.18 to 11.91. At well MW-23, groundwater conditions were alkaline, and pH ranged from 9.39 to 11.91. At well I-104 and well MW-20, pH was slightly acidic (5.42 to 6.67) during three quarters of sampling (first, second, and fourth quarters), but was slightly alkaline (9.01 and 9.42, respectively) during the third quarter sampling. Groundwater at wells MW-18 and MW-21 was slightly acidic to neutral during quarterly sampling (5.18 to 7.73).

Arsenic generally has low mobility in soil with pH within the acidic to neutral range and with a high redox potential (Tokunaga 2005). As pH increases, however, As(V) is increasingly mobile and less readily adsorbed. This effect is less apparent with the generally more mobile As(III), which is the species likely to exist in reducing conditions. Consequently, arsenic is expected to be more mobile at higher pH.

Arsenic concentrations at the five wells (I-104, MW-18, MW-20, MW-21, and MW-23) were compared to pH and ORP values over the four quarterly sampling events. Arsenic concentrations generally increase with increasing pH, and decrease with increasing ORP values. Scatter plots are presented on Figure T-2, in Appendix T.

One likely source of elevated arsenic in downgradient wells I-104 and MW-20 is the mobilization of arsenic from near, within, or beneath the stabilized soil material as a result of elevated pH conditions and low ORP. The area upgradient of well I-104 is paved, limiting the infiltration of stormwater and decreasing the mobility of arsenic in shallow soil above the groundwater table. The highest proximal arsenic concentrations in soil were located beneath the water table at wells MW-23 (331 mg/kg; beneath the stabilized soil material) and MW-21 (221 mg/kg; northwest of the stabilized soil material). The soil in this area was excavated and treated using a stabilization process in 1991 to reduce the leachability of arsenic within the soil (TCLP test results indicated leachate concentrations of arsenic in excess of 5 mg/L for untreated soil). After stabilization, the TCLP arsenic results for the treated soil were less than the characteristic waste limit of 5 mg/L. As described in Section 3.1.12, the depth of the excavated soil that was treated was limited by the depth of groundwater. Sampling and analysis of stabilized soil conducted in January 2008 by Landau Associates confirmed that TCLP arsenic concentrations in the stabilized soil were below the universal treatment standard of 5 mg/L (Landau Associates 2008a). However, correlation between arsenic concentrations and high pH in groundwater may indicate that increases in pH have mobilized arsenic in untreated soil.

### 8.2.9 Former Washdown/Aqueous Degreaser Area

One soil boring, SB-1, was advanced and three monitoring wells (MW-1 through MW-3) were installed inside Building 14-01 in the Former Washdown/Aqueous Degreaser Area, as shown on Figure 24. As shown on Figure 24, well MW-1 was located near the former aqueous cleaner (aqueous degreaser) and associated sump to address the data gap identified in the Building 14-01 Investigation Work Plan, which was the lack of soil and groundwater quality data near these two structures. Soil samples were collected from the soil borings associated with the monitoring wells and groundwater samples were collected from each well during the four RI monitoring events. Additionally, soil samples were collected from seven construction-related excavations identified as Bldg1401-FootingExc1, Bldg1401-FootingExc3, Bldg1401-FootingExc5, Bldg1401-FootingExc8, Bldg1401-FootingExc10, Bldg1401-FootingExc14, and Bldg1401-FootingExc15. The excavations were located just east of the Former Washdown/Aqueous Degreaser Area, as shown on Figure 24. The depth of the soil samples range from 1.5 to 6.0 ft BGS.

#### 8.2.9.1 Soil

VOCs; TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons); SVOCs; cPAHs; and metals were detected in soil in this area. The primary VOCs that were detected are methylene chloride and acetone; however, TCE and PCE were detected in two samples collected from the Bldg1401-FootingExc14 and Bldg1401-FootingExc15 excavations. The detected TCE concentration at Bldg1401-FootingExc14 (93 µg/kg) exceeded the pCUL (51 µg/kg). Excavation Bldg1401-FootingExc14was located along the southern wall of Building 14-01 and the sample was collected from 4.0 ft BGS.

Gasoline-range petroleum hydrocarbons, cPAHs, and PCBs were also detected in the soil at concentrations exceeding the pCULs. One exceedance of the gasoline-range petroleum hydrocarbon pCUL of 100 mg/kg occurred at Bldg1401-FootingExc5. Gasoline-range petroleum hydrocarbons were detected in one additional sample collected in this area, but the concentration was low (9.7 mg/kg). Concentrations of cPAHs exceeding the pCULs were detected in the soil samples collected at a depth of 4 ft BGS at Bldg1401-FootingExc3 and Bldg1401-FootingExc5, at a depth of 7.5 ft BGS at Bldg1401-FootingExc1, and at a depth interval of 8 to 9 ft at MW-2. Concentrations of PCB Aroclor 1254 (39 µg/kg), PCB Aroclor 1260 (36 µg/kg), and total PCBs (75 µg/kg) were detected at concentrations exceeding the pCULs (0.29 µg/kg, 5.4 µg/kg, and 1.8 µg/kg, respectively) at soil boring SB-1. The exceedances occurred in the soil sample collected from the 8- to 9-ft depth interval. A deeper sample was not analyzed for PCBs at this exploration. The analytical results for constituents detected in the soil samples collected from the Former Washdown/Aqueous Degreaser Area are summarized in Table 40.

#### 8.2.9.2 Groundwater

Arsenic, chromium VI, and vinyl chloride were detected in groundwater in this area at concentrations exceeding the pCULs. The arsenic exceedances occurred at well MW-1 during all four RI monitoring events. The chromium VI exceedances occurred once at well MW-1, twice at well MW-2, and once at well MW-3. Chromium VI concentrations exceeding the pCUL (0.00058 mg/L) range from 0.010 mg/L to 0.019 mg/L. A single vinyl chloride concentration (0.81 µg/L) was detected above the pCUL (0.53 µg/L) at MW-2 in June 2012. The analytical results for constituents detected in the groundwater at wells MW-1, MW-2, and MW-3 are summarized in Table 14.

### 8.2.10 Former Washdown System Collection Tanks/Loading Dock Area

One monitoring well (MW-8) and several construction-related excavations (TOWPATHEXC2 through TOWPATHEXC7) were located in the area where two 10,000-gallon ASTs that contained wastewater from the washdown system were formerly located and where a loading dock was also formerly located. The exploration locations are shown on Figure 19. Soil samples were collected from the soil boring associated with the monitoring well and groundwater samples were collected from the well during the four RI monitoring events. Soil samples were collected from the base of the construction-related excavations, which were 0.7 ft BGS.

#### 8.2.10.1 Soil

VOCs; TPH (diesel-range, oil-range, and gasoline-range petroleum hydrocarbons); SVOCs; cPAHs; PCBs; and metals were detected in soil in this area. The primary VOCs that were detected are methylene chloride and acetone; however, PCE was detected in three samples collected from the TOWPATHEXC3, TOWPATHEXC4, and TOWPATHEXC5 excavations. The detected PCE concentrations (5.6 µg/kg, 9.1 µg/kg, and 1.1 µg/kg, respectively) do not exceed the PCE pCUL (260 µg/kg).

cPAHs and PCBs were also detected in the soil at concentrations exceeding the pCULs. Concentrations of cPAHs exceeding the pCULs were detected in the soil samples collected at TOWPATHEXC3, TOWPATHEXC4, TOWPATHEXC5, and TOWPATHEXC6. Concentrations of PCB Aroclor 1254 and total PCBs were detected at concentrations exceeding the pCULs at TOWPATHEXC3, TOWPATHEXC4, and TOWPATHEXC6. The concentrations range from 28 µg/kg to 88 µg/kg compared to the pCULs of 0.29 µg/kg and 1.8 µg/kg for Aroclor 1254 and total PCBs, respectively. Metals were not detected at concentrations exceeding the pCULs in the soil in this area. The analytical results for constituents detected in the soil samples collected from the Former Washdown System Collection Tanks/Loading Dock Area are summarized in Table 41.

#### 8.2.10.2 Groundwater

No COCs were present at concentrations exceeding pCULs at MW-8. The analytical results for constituents detected in the groundwater at well MW-8 are summarized in Table 14.

## 8.3 SOIL VAPOR INVESTIGATION

As described in Section 4.4, five vapor samples (SV-1 through SV-5) were collected from beneath the Building 14-01 floor slab to determine the extent, if any, that VOCs are present in soil vapor below the building floor slab. The sample locations are shown on Figure 24. The vapor samples were analyzed for VOCs. A summary of the detected constituents and the concentrations are provided in Table 42. The results were compared to the screening levels for soil vapor and, as shown in Table 42, none of the detected concentrations exceed the soil vapor screening pCULs. Based on the results of the soil vapor samples, no indoor air samples were deemed necessary and no indoor air samples were collected.

## 8.4 SEDIMENT

Sediment samples were collected from 15 surface and subsurface locations to provide recent analytical data for the entire suite of SMS analytes. The physical and analytical results are described below.

### 8.4.1 PHYSICAL DESCRIPTION

Surficial sediments (top 0 to 10 cm) across the investigation area consisted of a thin layer of wet to very wet silts over sediments with slightly lower water content that varied from very soft to medium stiff sandy silts or clays (Appendix E-Qualitative Sample Characteristics Forms). An exception was found in the sediments collected at SD-502G. The thin surface layer of wet silt rapidly transitioned to a medium dense, silty, fine to medium sand with lower water content. TOC in the surface sediments (0 to 10 cm) ranges from 1.05 to 1.85 percent, with an average value of 1.57 percent.

At each location, the sediment units present in the cores varied with depth (Appendix E). The shallow surface units were primarily silts or sandy silts (with the exception of the predominantly sand unit that appeared immediately below the shallow silt layer at SD-502). The percentage of sand increased in the deeper sediment units (becoming the dominant constituent), while the silt and clay fraction decreased with depth. The overall thickness of the shallow silt units varied from less than 2 inches at SD-502 to greater than 12 ft (at SD-511) below mudline. The average thickness of the silt units in the inshore samples at the Site was approximately 2.5 ft (with a range from 2 inches or less to approximately 5.8 ft in thickness). The average thickness of the silt units in the cores located offshore near the navigation channel was approximately 7.6 ft (with a range from 6.1 ft to greater than 12 ft). At a majority of the sample locations, the deepest sediment units sampled consisted of either a poorly graded sand unit or a silty sand unit with interbedded layers.

TOC appeared to be correlated with the presence of silts in the core samples. The TOC in samples from sediment units that are predominantly silt ranges from 0.97 percent to 3.07 percent, with an average value of 1.97 percent. TOC in the deeper sand units ranges from 0.1 percent to 2.75 percent, with an average value of 0.95 percent.

### 8.4.2 LABORATORY ANALYTICAL RESULTS

All sediment samples collected and initially scheduled for analysis were analyzed for TOC, the SMS list of chemicals, and carbazole. Sediments from five surface grab locations were analyzed for dioxins and furans. Archived samples representing the 10- to 11-ft interval at three locations [SD-516 (field duplicate of station SD-505), SD-507, and SD-509] were analyzed for TOC and PCBs following a review of the initial results. The samples were analyzed to further investigate the maximum depth of sediments with elevated concentrations of PCBs at the sample locations. Sediments with elevated concentrations (characterized as detected concentrations above the SCO) for the other SMS chemicals were limited to the shallow subsurface sediments less than 4 ft below mudline.

The chemistry results (SMS list of chemicals plus carbazole) for the surface grab samples are presented in Table 43 and for the subsurface core samples in Table 44. The results of the dioxin and furan analyses for the surface grab samples are presented in Table 45.

The surface grab sample results were compared to the sediment pCULs (see Section 7.4; Table 8). The pCULs apply to the surface sediments (either the top 10 cm of sediment or the top 45 cm of sediment in clamming areas above -4 feet MLLW). The sediment pCULs do not apply to the deeper subsurface sediments; however, for screening purposes, the subsurface core sample results (starting at 2 ft below the sediment surface and continuing deeper) were compared to the SMS criteria where appropriate.

The results for the metals are expressed in units of mg/kg dw. The results for the SMS list of non-ionizable organic compounds are typically expressed as an organic-carbon-normalized value (in units of mg/kg OC); however, the dw values (expressed in units of μg/kg dw) are also presented. The results for the ionizable organic compounds are expressed in units of μg/kg dw. The results for total PCBs are expressed in units of μg/kg dw or in units of mg/kg OC. In the subsurface core samples where the TOC values were exceptionally low (less than 0.5 percent TOC), Ecology guidance recommends using the dw values rather than carbon-normalized values for the non-ionizable organic compounds.

The cPAHs include benzo(a)pyrene, benzo(b)fluoranthene, benzo(a)anthracene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene, and chrysene. The results for the cPAHs are expressed in units of µg TEQ/kg dw. The TEQ for the cPAHs was calculated using the Toxicity Equivalence Factors (TEFs) that were used in the LDW RI (Windward 2010). The TEQ was calculated using ½ the RL for non-detected cPAHs, consistent with the LDW RI.

The results for dioxins/furans are expressed in units of ng TEQ/kg dw. The TEQ for dioxins and furans was calculated using the World Health Organization 2005 (Van den Berg et al. 2006) TEFs, consistent with the LDW RI. The dioxins/furans TEQ values were calculated in two ways: using ½ the RL for non-detected congeners and using zero for the non-detected congeners (Table 45).

Table 46 presents a summary table of results by chemical. The minimum and maximum values for each chemical (detected or not detected), the minimum and maximum detected value (dw and OC-normalized, if appropriate) are provided. In addition, the number of surface samples (0 to 10 cm or 0 to 45 cm) that exceed the pCULs for human seafood consumption, human direct contact, and benthic organisms for each chemical (detected or not detected) is provided. The number of samples (surface and subsurface) that exceed either the SMS SCO or the CSL criteria (detected and not detected) are provided for all the surface and subsurface sediment samples analyzed.

# 9.0 NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination at the Site has been defined based on the results of chemical testing of soil, groundwater, soil vapor, storm drain solids, stormwater, and sediment and a comparison of the results to the pCULs and screening levels presented in Section 8.0. The discussion of the nature and extent of contamination below includes the Site upland area and LDW sediment area offshore of the Site.

## 9.1 UPLAND AREA

The extent of contamination in the Site uplands is discussed in the following sections by media (soil, groundwater, soil vapor, storm drain solids, and stormwater).

### 9.1.1 SOIL

The extent of soil contamination presented is based on the analytical results for soil samples collected during and prior to the RI that are representative of soil that remains at the Site following completion of the previously described interim actions. The locations for samples representing soil remaining are shown on Figure 68. Soil is considered to be contaminated if a constituent is present at a concentration exceeding the pCUL. A comparison of the pCULs to the analytical results for soil samples representing soil remaining at the Site is provided in tabular format in Appendix Q. Constituents present in soil at the Site at concentrations exceeding the pCULs include one SVOC (naphthalene); one VOC (TCE); cPAHs; PCBs; metals (arsenic, barium, cadmium, chromium VI, total chromium, copper, lead, mercury, nickel, thallium, and zinc); and diesel-range, oil-range, and gasoline-range petroleum hydrocarbons. The majority of total chromium exceedances occurred in historical soil samples collected from the Former Slip 5 Area; these samples were not tested for chromium VI. Two of the total chromium exceedances were detected in samples from 2011 at MW-13; these samples were tested for chromium VI and concentrations were below the chromium VI pCUL. As discussed in Section 7.2, the preliminary soil cleanup levels consider residential and industrial direct contact exposures and leaching of contaminants from soil to groundwater. Some of the constituents detected in soil at concentrations exceeding the soil pCULs are not detected in groundwater at concentrations exceeding the groundwater pCULs during the RI; these include naphthalene; barium; total chromium; and diesel-range, oil-range, and gasoline-range petroleum hydrocarbons. Further evaluation of the potential for these constituents to migrate to the LDW is provided in Section 10.1. A summary of those constituents found in soil and those found in groundwater at concentrations exceeding the pCULs is provided in Table 47.

The extent of soil contamination is discussed below by area: North of the Former Slip 5 Area, the Former Slip 5 Area, South of the Former Slip 5 Area, and the wooden bulkhead located in the southern portion of the Site.

#### 9.1.1.1 North of the Former Slip 5 Area

Constituents present in soil at some locations in the North of the Former Slip 5 Area at concentrations exceeding the pCULs include cPAHs; PCBs; metals (arsenic, cadmium, copper, lead, mercury, zinc); and diesel-range, oil-range, and gasoline-range petroleum hydrocarbons. Table 48 summarizes the number of samples analyzed, the percentage of the samples with concentrations exceeding the pCULs, and the maximum concentration detected for each of the above constituents. As shown in Table 48, the constituents that most frequently exceed the cleanup levels are cPAHs (41 percent of samples), arsenic (66 percent of samples), and copper (51 percent of samples). As shown on Figures 55, 57, and 60, exceedances occur throughout most of the North of the Former Slip 5 Area. The vertical extent of the exceedances is limited to the unsaturated zone (above 11 ft BGS) for cPAHs except at one location (MW-22), but arsenic and copper exceedances extend into the saturated soil zone (below the groundwater table) at several locations. As shown on Figure 57, most of the highest concentrations of arsenic occur at depths between 5 and 11 ft BGS at locations west and north of the stabilized soil area. Another area with elevated concentrations of arsenic at this depth is a small section of soil that was not stabilized adjacent to the Stabilized Soil Area. This is also the location of the former steam cleaning rack and sump associated with the former Isaacson property building (more information on these structures is provided in Section 3.1). The arsenic concentrations discussed in this small area are based on historical data except for one soil sample collected during the RI from 8 to 9.5 ft BGS at soil boring MW-25.

Concentrations of other metals (cadmium, lead, mercury, and zinc) exceed the pCULs less frequently. There was only one exceedance of mercury; it occurred in a sample of the stabilized soil material collected in 2008 (sample location IMR-11). Zinc exceedances occurred in two shallow samples located along the western property boundary (sample locations PBI-2 and MW-20). Only five exceedances of lead occurred in soil in the North of Former Slip 5 Area. Lead exceedances occurred in the two soil samples where zinc exceeded the pCUL and in two samples collected from south of the stabilized soil material in 2008 (sample location IMR-16 and IMR-14). Lead also exceeded the pCUL in one shallow soil sample (3 ft BGS) collected from west of the stabilized soil material in 2009 (sample location IDP-7). Diesel-range, oil-range, and gasoline-range petroleum hydrocarbons exceedances occurred in 3 percent or less of the soil samples, all from the Observed Tar-Like Substance Area. These exceedances, as well other exceedances in this area (cPAHs, arsenic, and copper), appear to be associated with the tar-like substance encountered at a depth interval between 1 to 2 ft BGS. No constituents were detected at concentrations exceeding the pCULs in samples collected below the tar-like substance (2 to 3 ft BGS). The tar-like substance did not appear to extend farther west than TP-107 since there was no observation of the substance on the west sidewall of TP-107. The extent of the tar-like substance was not defined in the other directions.

PCBs (Aroclors 1254 and 1260) were detected in less than 5 percent of the soil samples analyzed for PCBs in the North of the Former Slip 5 Area. All detected concentrations exceed the pCUL. The locations of the exceedances are widely separated. Two of the exceedances occurred in shallow soil (above 5 ft BGS). One of the shallow samples was collected during the RI at soil boring SB-6 (near the former Slip 5 Outfall) and the other sample was collected in 2006 from the northeast corner of the Site where a sump was previously located (see Section 3.1.20 for discussion of the sump). Two of the exceedances occurred between depths of 5 ft and 9.5 ft BGS. One of the samples was collected at soil boring SB-9 located in the Former Paint Storage Area and the other sample was collected at soil boring MW-18 located just south of the Stabilized Soil Area in the western portion of the Site.

In summary, concentrations of arsenic exceeding the pCUL are found in two-third of the soil samples and from locations throughout the North of the Former Slip 5 Area. Most samples with concentrations greater than the pCUL were collected from the unsaturated zone; however, several arsenic exceedances extend below the groundwater table. cPAHs and copper are detected at concentrations exceeding the pCULs in soil in 41 and 51 percent of the samples from this area. Copper exceedances extend below the groundwater table, but the cPAH exceedances generally do not.

The areas of specific concern in this area, as identified in the RI/FS Work Plan, are the Former Paint Storage Area, the Former Diesel and Gasoline Tanks Area, the Observed Tar-Like Substance Area, and the Former Slip 5 Outfall Area. The nature and extent of soil contamination in these areas are as follows:

- **Former Paint Storage Area.** Soil samples from the four locations in the Former Paint Storage Area contain cPAHs, PCBs, arsenic, and copper at concentrations exceeding the pCULs. Except for arsenic and copper, the exceedances only occurred in the unsaturated soil zone and generally occurred in the upper 3.5 ft of soil.
- **Former Diesel and Gasoline Tanks Area.** No constituents were detected at concentrations exceeding the pCULs in the Former Diesel and Gasoline Tanks Area.
- **Area of Observed Tar-Like Substance.** Soil contamination in the area of the Observed Tar-Like Substance consists of diesel-range, oil-range, and gasoline-range petroleum hydrocarbons, cPAHs, arsenic, and copper. The contamination appears to be associated with the tar-like substance and does not extend below a depth of 2 ft BGS.
- **Former Slip 5 Outfall Area.** Soil samples from the four locations in the Former Slip 5 Outfall Area contain cPAHs, PCBs, arsenic, cadmium, and copper at concentrations greater than the pCULs. Soil contamination in this area does not extend below the groundwater table.

#### 9.1.1.2 Former Slip 5 Area

Constituents present in soil within the Former Slip 5 Area at concentrations exceeding the pCULs include one SVOC (naphthalene); cPAHs; PCBs (Aroclors 1242, 1254, and 1260); metals (arsenic, barium, cadmium, chromium VI, total chromium, copper, lead, mercury, nickel, thallium, and zinc); and gasoline-range petroleum hydrocarbons. Table 49 summarizes the number of samples analyzed, the percentage of the samples with concentrations exceeding the pCULs, and the maximum concentration detected for each of the above constituents. As shown in Table 49, the constituents that most frequently exceed the cleanup levels are cPAHs (58 percent of samples), total PCBs (33 percent of samples), arsenic (55 percent of samples), copper (54 percent of samples), cadmium (28 percent of samples), and lead (22 percent of samples). As discussed in Section 2.2, filling of the slip was conducted in phases between 1936 and 1966. There were five documented fill episodes and, for simplicity, the material associated with each episode are referred to as Fill A, B, C, D, and E. A description of the fill material and the approximate areas where the fill was placed are provided on Figure 65.

The majority of the pCULs exceedances occurred in the fill materials identified as Fill C and Fill E. For example, all of the barium, chromium VI, and zinc exceedances; about 92 percent of cadmium exceedances; about 85 percent of the lead exceedances; and about 75 percent of the PCB, arsenic, and copper exceedances occurred in samples of the Fill C material. All of the remaining lead exceedances and 57 percent of the remaining copper exceedances occurred in Fill E. Arsenic and cPAH exceedances occurred in each of the five fill material types. A single mercury exceedance occurred in Fill E from a 1983 sample at B-20. The areal extent of the Fill C and E materials is greater than the extent of the other fill materials and most of the samples were collected from these fill materials. PCBs exceedances also occurred in fill materials B (1 percent), D (6 percent), and E (16 percent). Fifty-five percent of the Fill C material samples and 50 percent of the Fill D material samples containing PCB exceedances were collected over 25 years ago (in 1983 or 1988).

There are two locations in the Fill C material and three locations in the Fill E material where many of the pCUL exceedances occurred. In the Fill C material, 11 of the 24 PCBs exceedances occurred in soil samples collected at RI soil boring MW-17 and the 1988 soil boring associated with former well I-202(s). At these locations, PCBs exceedances occurred in each sample collected between 2 ft BGS and 17 ft BGS (MW-17) and between 2.5 ft BGS and 27.5 ft BGS [I-202(s)]. Arsenic, barium, cadmium, copper, lead, nickel, thallium, zinc, chromium VI, gasoline-range petroleum hydrocarbon, and cPAHs exceedances also occurred at soil boring MW-17. Except for PCBs, cPAHs, and a few metals, the exceedances at location MW-17 occurred below the groundwater table. As previously described in Section 8.1.5.2, slag was observed at 10 to 11 ft BGS at MW-17. Fragments of wood and sawdust were observed at MW-17 between 12.5 and 24.5 ft BGS. Arsenic, cadmium, total chromium, copper, lead, nickel, and zinc exceedances also occurred at I-202(s) at depths above and below the groundwater table. Metal scrap, wire, and white grain-sized material were observed at this soil boring. Soil samples collected from soil boring I-202(s) were only analyzed for PCBs and metals.

The three locations in the Fill E material where many of the pCULs occurred were soil borings MW-12, MW-13, and MW-13B. It should be noted that, as described previously in Section 4.2.2, monitoring well MW-13 was not installed in soil borings MW-13 or MW-13B. Both borings were located along the historic main river channel, as shown on Figure 68, but, due to obstructions in the subsurface that prohibited advancement of the borings to the desired depth for well installation, well MW-13 was installed at the location of soil boring SB-4. At soil borings MW-12 and MW-13B, PCBs, cPAHs, and gasoline-range petroleum hydrocarbon exceedances occurred. Cadmium and copper exceedances occurred at all three locations. Lead exceedances occurred at soil borings MW-13 and MW-13B. Nickel, total chromium, and cPAHs exceedances also occurred at MW-13. At MW-13B, the exceedances primarily occurred between depths of 6.5 and 13.5 ft BGS. At MW-13, the exceedances primarily occurred between depths of 12.5 to 16.5 ft BGS. At MW-12, the exceedances occurred much deeper, between 18.5 to 24.5 ft BGS. No visual signs of potential contamination were observed at MW-12, but slag material was observed at MW-13 and MW-13B at depths of 10 to 14 ft BGS and 9.5 to 11 ft BGS, respectively. A slight hydrocarbon odor was observed at MW-13B at a depth interval of 6.5 to 8 ft BGS, which is the depth interval that a gasoline-range petroleum hydrocarbon exceedance occurred.

cPAHs exceedances occurred in samples from all of the five different fill materials including samples from below the groundwater table in each. Except for cPAHs, copper, and arsenic, no other constituents were detected in the Fill A material at concentrations exceeding the pCULs. In addition to cPAHs, copper, and arsenic, the only other exceedances that occurred in the Fill B and Fill D materials were PCBs (one exceedance in Fill B and two exceedances in Fill D) and a single mercury exceedance in the Fill D material.

In summary, concentrations of cPAHs exceeding the pCULs are found in slightly over half of the soil samples and are from throughout the Former Slip 5 Area, including in samples from below the groundwater table. PCBs exceedances, detected in about one-third of the samples, are also found in several of the fill materials and extend below the groundwater table. Arsenic, copper, and a single mercury exceedance are the only metals that were detected over pCULs in Fill A or Fill D materials.

The areas of specific concern in the Former Slip 5 Area, as identified in the RI/FS Work Plan, are the Former Hydraulic Test Pad Area, the Hazardous Waste/Hazardous Materials Storage Sheds Area, and the Area in the Vicinity of I-205(s) Area. The nature and extent of soil contamination in these areas are as follows:

- **Former Hydraulic Test Pad Area.** Analytical results for soil samples collected within the Former Hydraulic Test Pad Area prior to the RI do not exceed the pCULs, except for arsenic at TDP31. Therefore, based on RI results as described in Section 8.2.6, cPAHs, arsenic, and copper exceedances occur in soil in the Former Hydraulic Test Pad Area. The exceedances occurred at MW-11 from 8 to 15 ft BGS.

- **Former Hazardous Waste/Hazardous Materials Storage Sheds Area.** No constituents were detected at concentrations exceeding the pCULs in soil samples collected at pre-RI soil borings (TDP-27 through TDP-30) located within the Former Hazardous Waste Storage Sheds Area. One soil sample was collected from this area during the RI, IT-TOWPATHEXC1-B(.8), that exceeded cleanup level for cPAHs and copper. Additionally, test pit TDP-105 was located just southwest of this area. No visual signs of contamination were observed in the test pit and no constituents were detected at concentrations exceeding the pCUL in the soil sample collected at the base of the excavation (11 ft BGS).

- **Area in Vicinity of I-205(s).** No constituents were detected at concentrations exceeding the pCULs in soil samples collected from two test pits located upgradient of well I-205(s). Arsenic and copper exceedances occurred at boring I-205s in the soil sample collected at depth (27.5 ft BGS) with concentrations of 393 mg/kg and 71 mg/kg, respectively. The I-205s sample collected at 12.5 ft BGS exceeded the cleanup level for arsenic with a concentration of 9 mg/kg, but the field duplicate at this location was below the pCUL at 3 mg/kg.

#### 9.1.1.3 South of the Former Slip 5 Area

Constituents present in soil in the South of the Former Slip 5 Area at concentrations exceeding the pCULs include cPAHs, PCBs, TCE, arsenic, copper, and gasoline-range petroleum hydrocarbons. Table 50 summarizes the number of samples analyzed, the percentage of the samples with concentrations exceeding the pCULs, and the maximum concentration detected for each of the above constituents. As shown in Table 50, the constituents that most frequently exceed the cleanup levels are cPAHs (24 percent of samples), PCBs (12 percent of samples), arsenic (10 percent of samples), and copper (13 percent of samples). The concentration of gasoline-range petroleum hydrocarbons exceeds the pCUL in about 1 percent of the samples. TCE exceeds the pCULs in 3 percent of the samples. All of the TCE exceedances occurred along the southern property boundary at locations MW-6 and TDP26 (at the construction-related excavation), and at Building 14-01 Footing Exc14 (located inside Building 14-01, adjacent to the southern wall of the building). Each of the TCE exceedances occurred at depth (near or below the groundwater table), except at the construction-related excavation where the exceedance occurred at 4 ft BGS.

PCBs and cPAHs exceedances occurred in soil along the southern property boundary at MW-5, MW-6, and MW-7; along the eastern property boundary at MW-4; in the Former Washdown System Collection Tanks/Loading Dock Area at the construction-related excavations TowpathExc3, TowpathExc4, TowpathExc5 (cPAHs only), and TowpathExc6; the shallow construction-related excavations in the former Building 14-11 area (Bldg-14-11Exc1, Bldg-14-11Exc2, IT-PIVExc2-B(5.0), and a surface sample collected just below where PCBs were detected in a sample of the CJM); and in samples collected from soil inside Building 14-01. Inside Building 14-01, PCBs and cPAHs exceedances occurred at two construction-related trenches (TRENCH3 and TRENCH5); cPAHs exceedances also occurred at TRENCH 4 and PCBs exceedances occurred at soil boring SB-1. cPAHs exceedances occurred in construction-related excavations Bldg1401-FootingExc 1, -3, and -5 and RI soil boring MW-2. All of the cPAHs and PCB exceedances occurred in soil within the unsaturated zone.

Very few metals exceed pCULs in soil in the South of the Former Slip 5 Area. The exceedances consist of arsenic in 20 samples and copper in 15 samples each. The highest arsenic concentrations were detected in samples from the western portion of the Site at locations MW-7, HP-3, and I-206(s). Concentrations exceeding the pCUL at these locations range from 9 to 43 mg/kg. Exceedances at I-206(s) and HP-3 were detected at the deepest sample depths, 27.5 and 20 ft BGS, respectively. The majority of copper exceedances were detected in the former washdown/aqueous degreaser area and near the eastern property boundary.

One gasoline-range petroleum hydrocarbon exceedance occurred in soil inside Building 14-01. The exceedance occurred in a construction-related excavation (Bldg1401-FootingExc 5).

In summary, concentrations of cPAHs and PCBs exceeding the pCULs are detected in about 24 percent and 12 percent of the samples, respectively. Concentrations of VOCs (TCE, PCE, and vinyl chloride) were detected in soil near the southern property boundary. TCE exceedances occurred in soil in both the saturated and unsaturated zones. Arsenic and copper are the only metals that exceed pCULs in the South of Former Slip 5 Area. PCBs, cPAHs, and gasoline-range petroleum hydrocarbons are detected at concentrations exceeding the pCULs in shallow soil at locations inside Building 14-01. Only the gasoline-range petroleum hydrocarbon exceedance occurred within the Former Washdown/Aqueous Degreaser Area. PCBs and cPAHs were detected in shallow soil in the area of former Building 14-11.

The areas of specific concern in the South of Former Slip 5 Area, as identified in the RI/FS Work Plan, are the area in the Vicinity of I-206(s), the Former Washdown/Aqueous Degreaser Area, and the Former Washdown System Collection Tanks/Loading Dock Area. The nature and extent of soil contamination in these areas are as follows:

- **Area in Vicinity of I-206(s).** Arsenic was detected at concentrations exceeding the pCUL in soil samples collected prior to the RI. The arsenic exceedances occurred in 9 of 68 soil samples analyzed for arsenic. Exceedances occurred at depths ranging from 3 to 27.5 ft BGS. The highest concentration was detected at 16 ft BGS at boring HP-3.
- **Former Washdown/Aqueous Degreaser Area.** Analytical results for soil samples collected within the Former Washdown/Aqueous Degreaser Area indicate cPAHs, PCBs, TCE, gasoline-range petroleum hydrocarbons, arsenic, and copper are present in soil at concentrations exceeding the pCULs, but the exceedances are very limited. PCBs

exceedances occurred in one soil sample collected from the unsaturated zone at SB-1; a TCE exceedance occurred in one shallow soil sample (4 ft BGS) at one construction-related excavation located along the southern interior wall; gasoline-range petroleum hydrocarbons exceedances occurred in one of the construction-related excavations located along the southern interior wall; cPAHs exceedances occurred in shallow soil samples collected from three construction-related excavations; and three copper and two arsenic exceedances occurred in soil samples collected from the unsaturated zone (7.5 to 9 ft BGS).

- **Former Washdown System Collection Tanks/Loading Dock Area.** As shown in Table 41, cPAHs and PCBs exceedances occurred in soil samples collected from 0.7 ft BGS in shallow construction-related excavations. cPAHs exceedances occurred in four samples and PCB exceedances occurred in three samples.

#### 9.1.1.4 Wooden Bulkhead

The extent of contamination in soil behind the wooden bulkhead on the Thompson property was evaluated based on samples collected through gaps in the bulkhead. Because soil erosion to the sediments is the pathway of concern, results were compared to the sediment pCULs. Arsenic was detected in one sample at a concentration slightly above the sediment pCUL. Arsenic concentrations in the other samples did not exceed the pCUL.

### 9.1.2 GROUNDWATER

The extent of groundwater contamination presented is based on the analytical results for groundwater samples collected during the RI. Groundwater is considered to be contaminated if a constituent is present at concentrations exceeding the pCULs. Tables 51, 52, and 53 provide statistics for groundwater constituents that exceed pCULs. The tables include number of samples analyzed, number of detections, the frequency of exceedances, and the maximum detected concentration for all groundwater constituents that had at least one exceedance.

#### 9.1.2.1 Site Wide

The constituents detected at concentrations exceeding the pCULs in groundwater at one or more of the locations during the RI include two SVOCs (benzoic acid and BEHP); cPAHs; PCBs; metals (arsenic, cadmium, chromium VI, copper, lead, nickel, mercury, selenium, thallium, and zinc); acrylonitrile, TCE; cis-1,2-DCE; 1,1-dichloroethene; and vinyl chloride. A summary of those constituents found in groundwater at concentrations exceeding the pCULs is provided in Table 47. PCBs exceedances occurred only in groundwater at wells located in the Former Slip 5 Area [I-203(s), MW-10, MW-12, MW-13, and MW-17] and in wells located in the North of the Former Slip 5 Area [I-104(s) and MW-25 and piezometer PZ-1]. PCB exceedances most frequently occurred during the June 2012 event.

Metals exceedances primarily occurred in groundwater in the North of the Former Slip 5 Area in wells located within the Stabilized Soil Area (MW-23, MW-24, and MW-25) and at piezometer PZ-1 located along the northern property boundary. Dissolved arsenic exceedances occurred in groundwater throughout the property. The most elevated arsenic concentrations occurred at the wells located within and immediately west (downgradient) of the Stabilized Soil Area and at piezometer PZ-6 located within the Former Slip 5 Area. Dissolved arsenic concentrations in groundwater below and immediately west of the Stabilized Soil Area range from 3,290 µg/L to 285,000 µg/L. Dissolved arsenic concentrations at PZ-6 range from 437 µg/L to 8,010 µg/L.

The majority of groundwater samples with VOCs detected above pCULs were in samples from MW-6, located along the southern property boundary; the remaining exceedances occurred in the South of Slip 5 Area and North of the Slip 5 Area. pCUL TCE exceedances only occurred at wells MW-7 (once) and MW-6 (all four monitoring events). Vinyl chloride exceedances occurred at well MW-6 and MW-2 along the southern property boundary and at MW-16, MW-18, MW-23, and MW-25 south of and in the stabilized soil area. Cis-1,2-DCE was also exceeded at MW-6 during all four monitoring events. Other volatiles that were detected above pCULs include acrylonitrile at MW-18 south of the stabilized soil area, and acrylonitrile and 1,1-DCE at MW-6 along the southern property boundary.

#### 9.1.2.2 Western Property Boundary

Except for the single seep location, the wells and piezometers located along the western property boundary are the groundwater monitoring locations nearest the LDW and provide the best information regarding what constituents may be discharging to the LDW surface water and sediment via groundwater. As shown on Figure 23, seven groundwater monitoring wells [MW-7, MW-9, MW-10, MW-19, MW-20, I-104(s), and I-205(s)] and two piezometers (PZ-7, PZ-8) are located near the western property boundary, nearest the LDW shoreline. The constituents detected at concentrations exceeding the pCULs in groundwater at one or more of the western-most well locations during the RI include cPAHs; PCBs; metals (arsenic, cadmium, and nickel); and TCE. The locations where these constituents exceed the pCULs along the western property boundary are identified on Figure 69. Mercury was detected at a concentration greater than the pCUL in the parent sample, but not the duplicate sample from well I-104 during one quarter; mercury concentrations did not exceed the pCUL in any other western property groundwater samples and mercury is not shown as an exceedance on Figure 69.

As shown on Figure 69, the cPAHs and PCBs exceedances occurred in groundwater in the center of the western property boundary [MW-10, PZ-7 (cPAHs only), and the seep]. cPAHs and PCB exceedances also occurred in groundwater in the northwest corner of the property [I-104(s)]. During the December 2011 monitoring event (the first RI groundwater monitoring event), PCBs exceedances did not occur in any of the western-most wells. PCBs exceedances occurred at the seep in March and June 2012, at well MW-10 in September 2012, and at I-104(s) in June 2012.

As shown on Figure 69, the arsenic exceedances primarily occurred in those wells and piezometers located north of MW-9 [I-205(s), MW-10, MW-19, MW-20, I-104(s)]. No arsenic exceedances occurred at well MW-9 or piezometer PZ-8 (located south of MW-9) during the RI. Arsenic exceedances only occurred during the March 2012 monitoring event at MW-7 (located in the southwest corner of the Site) and the magnitude of the exceedance was small (less than twice the pCUL). The only other pCUL exceedance at well MW-7 was TCE in December 2011 (the first RI groundwater monitoring event). This exceedance was less than twice the pCUL. TCE exceedances did not occur in groundwater at any other location during the RI. Dissolved cadmium and nickel exceed the pCULs in groundwater at well MW-9 in September 2012 (the fourth RI groundwater monitoring event). All of the exceedances were less than twice the pCUL.

The highest arsenic concentrations in the western-most wells occurred at wells MW-19, MW-20, and I-104(s), which are located downgradient of the Stabilized Soil Area. Dissolved arsenic concentrations range from 25.9 µg/L (well MW-19) to 2,460 µg/L [well I-104(s)]. Although wells I-104(s) and MW-20 are located immediately adjacent to each other, dissolved arsenic concentrations are typically an order of magnitude higher at I-104(s), indicating the variability of groundwater concentrations. As shown in Table 2, monitoring well I-104(s) is screened at a deeper depth (15 to 25 ft BGS) than well MW-20, which is screened at 8 to 18 ft BGS.

### 9.1.3 Soil Vapor

The RI included collection of five soil vapor samples collected from beneath the Building 14-01 floor slab. VOCs were detected in each of the five samples, but all of the concentrations were below the soil vapor screening levels. Based on the results of the soil vapor samples, no indoor air samples were deemed necessary and no indoor air samples were collected. Soil vapor and indoor air area not considered contaminated media at the Site.

### 9.1.4 Stormwater

As discussed in Section 8.1.6.1, a comparison of the analytical results for the stormwater samples collected from Outfalls A (MH32) and B (MH80) to groundwater pCULs indicates that BEHP, cadmium, and zinc were present in stormwater at Outfall A at concentrations exceeding the pCULs and BEHP was present in the stormwater at Outfall B at concentrations exceeding the pCULs.

### 9.1.5 Storm Drain System Solids

As discussed in Section 8.1.6.2, a comparison of the analytical results for the storm drain solids collected in September 2011 to SMS criteria and LDW PRGs indicates that metals, PCBs, cPAHs, and SVOCs (primarily phthalates and benzyl alcohol) were present in some solids at concentrations exceeding the SMS criteria or LDW PRGs. As shown on Figure 66, metals (cadmium, chromium, copper, lead, mercury, and zinc) were detected at concentrations exceeding the SMS criteria in samples from CBs located around Building 14-01 and in four other areas identified as Building 14-12 Area, Building 14-02/14-03 Area, Isaacson West Area, and Isaacson East Area. Additionally, arsenic was detected above the LDW PRG in most CBs that also had SMS metal exceedances. As shown on Figure 67, total PCBs were detected above the PRG throughout the Site.

## 9.2 Lower Duwamish Waterway Sediment

The RI sediment investigation included collection of surface samples (representing the surficial 0 to 10 cm) and subsurface core samples (compositing sediment in 1-ft depth intervals (beginning 2 ft below the sediment surface and continuing deeper). The sampling was used to evaluate the vertical and horizontal distribution of the SMS chemicals (and carbazole) within the sediment offshore of the Site. Selected surface samples were analyzed for dioxins/furans to further refine the distribution of historical dioxin/furan results. Duplicate surface sediment grab and core samples were collected at two of the locations.

Data collected within and immediately adjacent to the sediment offshore from the Site prior to this RI are discussed in Section 3.2. The following discussion focuses primarily on the RI data; however, the historical data are used in the geospatial analyses for selected contaminants that are described below.

Surface sediments from the RI investigations are compared to the sediment pCULs (Table 8). Four contaminants (arsenic, cPAHs, total PCBs, and dioxins/furans) have pCULs that are based on human health risk PRGs. Total PCBs and arsenic have additional pCULs based on benthic organism PRGs (SMS criteria). In addition, an ecological risk-based PRG was developed for total PCBs for the river otter. The remaining SMS contaminants have pCULs based on benthic organism PRGs (SMS criteria).

All of the surface sediment samples collected during the RI sediment investigation had detected concentrations of total PCBs and arsenic that were above the pCULs (based on human health risk PRGs). Surface sediments at four locations had cPAH results (expressed in units of μg TEQ/kg dw) that were above the pCULs (based on human health risk PRGs). The calculated TEQ for dioxin and furan congeners analyzed in five surface samples (expressed in units of ng/kg dw TEQ) were above the pCULs (based on human health risk PRGs).

In addition, the RI sediment investigation found detected exceedances of the pCULs based on benthic organism PRGs (SMS criteria) for two of the metals (arsenic and zinc); two of the LPAHs (acenapthene and phenanthrene); four of the HPAHs (fluoranthene, indeno(1,2,3-c,d)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene); three of the phthalate esters (diethyl phthalate, butyl benzyl phthalate and BEHP); two of the chlorinated benzenes (1,2-dichlorobenzene and 1,4-dichlorobenzene); two of the ionizable organic compounds (benzyl alcohol and phenol); and total PCBs (by Aroclor) (Table 46). The remaining SMS compounds were found at concentrations below the pCULs (SMS criteria) or were not detected (Table 46).

The RI sediment investigation found carbazole concentrations that ranged from 9.6 J to 320 µg/kg dw (Table 46). The mean of the surface (0 to 10 cm) carbazole concentration is 40.6 µg/kg dw and the mean of the subsurface concentration is 30.4 µg/kg dw.

In general, chemical concentrations demonstrate either a steady decrease with depth or the concentrations remain stable within a sediment unit (e.g., silt or sandy silt unit) before dropping to nondetected concentrations in deeper sediment units with lower percentages of silt and TOC (e.g., poorly sorted sands or silty sands).

The extraction and analytical methods chosen in the RI/FS Work Plan to achieve the Data Quality Objectives (DQOs) provide laboratory-developed RLs that are below the SCO for the SMS chemicals of concern under most conditions. RLs for hexachlorobenzene, benzyl alcohol, and benzoic acid are elevated in one or more samples due to matrix interference and result in non-detected exceedances of the SCO or the CSL. The SMS criteria for hexachlorbenzene are based on an OC-normalized value.

There are non-detected exceedances of hexachlorobenzene in an additional seven samples with TOC at the low end of the range of TOC concentrations where OC-normalization is appropriate (above 0.5 percent; see discussion in Section 8.4.2). The typical RL for hexachlorobenzene using EPA Method 8270D and SIM is between 4.6 and 4.9 µg/kg dw. Organic carbon normalization of the RL value in samples where the TOC is between 1.27 and 0.5 percent results in an OC-normalized value that exceeds the SCO. Hexachlorobenzene is not detected in any of the other surface or subsurface samples analyzed. Re-analysis of the samples with the non-detected exceedances of the SCO using an alternative method with a lower RL was not conducted.

Additional chemicals that had one or more exceedances of the pCULs are found in a review of the available historical sediment data (Landau Associates 2011a). Historical sediment samples collected upstream (south) of the sediment site had exceedances of the SMS criteria for cadmium, chromium, mercury, and lead, in addition to the arsenic and zinc found during the RI. Several additional organic chemicals (including the ionizable organic compound dibenzofuran and several additional LPAH and HPAH compounds) that exceeded the SMS criteria were found in historical samples within and adjacent to the Site; however, the elevated concentrations occurred in samples that contained concentrations of PCBs or arsenic that exceeded the pCULs or where the concentrations found in deeper samples also exceeded the SMS criteria.

A majority of the SMS chemicals are either not detected or are present at concentrations well below the SMS criteria in a majority of the samples (Table 46). Of the 47 chemicals on the SMS list, 16 have detected exceedances of the SMS criteria. Eleven detected chemicals have a single exceedance of the SMS criteria. Zinc and butyl benzyl phthalate have detected exceedances of the SMS criteria in two separate samples (Table 46).

Table 54 summarizes the sample locations and sample intervals with the chemicals exceeding the pCULs. The SMS chemicals detected at concentrations that exceed the SMS criteria in the greatest number of samples are total PCBs (in 30 samples), arsenic (in 7 samples), and benzyl alcohol (in five samples). Detected concentrations of PCBs are widespread in the sediment offshore of the Site and exceed the SMS criteria in approximately 39 percent (30 of the 76) of the samples analyzed. At a majority of the sample locations, total PCB concentrations that exceed the SMS criteria are found in deeper samples than other chemicals with exceedances of the SMS criteria; however, at four sample locations arsenic concentrations that exceed the SMS criteria are found in deeper sample intervals where total PCB concentrations are below the SMS criteria.

The vertical distribution of sediments with total PCB concentrations that exceed the SMS criteria consistently overlap the distribution of other compounds that exceed the SMS criteria, with the exception of the arsenic concentrations mentioned above. The distribution of samples with total PCB and arsenic concentrations that exceed the pCULS (including the SMS criteria) can be used to define the maximum horizontal and vertical extent of sediment contamination offshore of the Site. A discussion of the horizontal and vertical distribution of total PCB and arsenic concentrations across the sediment offshore of the Site is presented in greater detail below.

### 9.2.1 Polychlorinated Biphenyls (by Aroclor)

Concentrations of total PCBs exceed the pCUL (2 μg/kg dw –based on the human health risk PRG for seafood consumption) in all of the surface samples collected during the RI. In addition, total PCBs exceed the benthic organism PRG (SCO) in 30 of the 76 RI samples analyzed (17 surface sediment samples and 59 core samples) and exceed the SMS CSL in 3 samples (Table 46). The total PCB concentrations range from an estimated concentration (with a "J" qualifier) of 12 μg/kg dw to 2,070 μg/kg dw. The OC-normalized values range from not detected at 0.8 mg/kg OC to 111.9 mg/kg OC (Table 46). Aroclors 1248, 1254, and 1260 are the only Aroclors detected.

A geospatial interpolation was conducted using Spatial Analysis Decision Assistance (SADA) software (Version 5.0) developed by The University of Tennessee Research Corporation. Sediment data from the current RI investigation include the results from RI surface grab samples (0 to 10 cm) and the core samples. Core samples representing sediments from 2 to 3 ft, 4 to 5 ft, 6 to 7 ft, and 8 to 9 ft were used in the interpolation if there were available data. At three locations where the 8- to 9-ft sample have total PCB concentrations that exceed the SCO, an archived 10- to 11- ft sample was analyzed to further investigate the depth of PCB contamination at that location. At locations where the deepest sample collected and analyzed has total PCB concentrations that exceeded the SCO, additional sampling using different equipment may be required to fill this data gap.

The historical data available within and adjacent to the project boundaries were also used when the location fell within the geospatial analysis search ellipse. Historical data, including both surface grab samples (0 to 10 cm) and surface core segments (representing the 0- to 0.9-ft or 0- to 1-ft intervals) were used to supplement the RI sediment investigation surface data. At a single location, the chemical results from a historical core segment representing the 0- to 2-ft interval were used in the geospatial interpolation of surface samples. Additional historical core data were used when the available sample intervals overlapped the depth intervals used in the geospatial interpolation. For example, a historical core sample representing a 3.5- to 4.5-ft interval was used in the geospatial interpolation with the 4- to 5-ft core data collected during the RI.

The total PCB concentrations were OC-normalized where appropriate (TOC levels greater than or equal to 0.5 percent). OC-normalized PCBs values were used in the interpolation and contouring to allow a direct comparison of the interpolated values against the SMS criteria.

The inverse distance weighting (IDW) was conducted on a 10-ft by 10-ft grid with a search ellipse of 200 ft by 75 ft (major and minor axis radii, respectively). The search ellipse was oriented approximately parallel to the river flow (166°N). The minimum number of surrounding data points (neighbors) included in the IDW was 2 and the maximum was 8. The power for the IDW was set at 4.

Using a power of 4 minimized the number of stations where there was a significant difference between the interpolated value of surrounding grid cells and the sample results within a grid cell. This geospatial methodology was developed for Boeing Plant 2 jointly by EPA, Ecology, USACE, and Boeing.

The geospatial analysis was run using SADA as a series of 2-D layers. Data from each sample interval were interpolated independent of the other data intervals, resulting in a 2-D layered interpolation. The data set used in the interpolations used fill-down surrogate values for RI sediment investigation sample locations where sample intervals were not collected or where it was inappropriate to OC normalize the values. Fill-down surrogate values were not used for the historical data sets.

The use of fill-down surrogate values is a conservative approach to allow improved coverage in the deeper intervals where fewer samples were collected. At each sample location, the concentration found in the deepest available sample is used to represent the maximum concentration present in all the deeper sample intervals not analyzed. In general, COC concentrations show either a steady decrease with depth or the concentrations remain stable within a sediment unit. This approach is likely to bias the interpolated values surrounding the surrogate sample high, but is unlikely to bias the results low.

The vertical search ellipse axis for the interpolation was set to 1 ft. A vertical search ellipse of 1 ft or less excludes data from shallower or deeper intervals or layers from being used in the interpolation of a cell value.

Figure 70 presents the results of the geospatial interpolation of total PCBs concentration (in mg/kg OC) compared to the SMS criteria. Grid cells are coded to represent areas with interpolated concentrations within defined ranges. The measured concentration (in mg/kg OC) at each location and depth interval is presented. An asterisk next to the concentration (in mg/kg OC) identifies a surrogate value carried down from a shallower sample interval.

The surface sediments in the inshore area have total PCB concentrations above the SCO over wide areas (Figure 70). The offshore surface sediments have lower total PCB concentrations, below the SCO. This pattern in total PCB concentrations changes with depth. The distribution of sediments with elevated total PCB concentrations in the inshore areas decreases with depth. Total PCB concentrations are below the SCO in the 4- to 5-ft interval within the inshore sediment cores. In the offshore areas, the distribution of sediments with elevated total PCB concentrations extends deeper and at two of the RI sample locations, the maximum depth of sediment with total PCB concentrations above the SCO could not be determined. .

### 9.2.2 ARSENIC

Concentrations of arsenic exceed the pCUL (7 µg/kg dw –based on the human health risk PRG for direct contact) in all of the surface samples collected during the RI. In addition, arsenic exceeds the benthic organism PRG (SCO) and the SMS CSL in 7 of the 73 RI samples (Table 46). Arsenic concentrations range from 0.9 mg/kg dw to 684 mg/kg dw (Table 46). A geospatial interpolation of the available surface and subsurface data from the current RI and the available historical data was conducted using the same procedures, grid specifications, search ellipse, and power used for the PCB geospatial interpolation. Arsenic concentrations in mg/kg dw were used in the geospatial interpolation.

Figure 71 presents the results of the geospatial interpolation of arsenic concentrations (in mg/kg dw) at the Site. Grid cells are coded to represent areas with interpolated concentrations within defined ranges. The measured concentration (in mg/kg) at each location and depth interval is presented. An asterisk next to the concentration (in mg/kg) identifies a surrogate value carried down from a shallower sample interval. Sediments with arsenic concentrations above the SCO were limited to the inshore areas and were found in sediments shallower than 6 ft below the sediment surface. Sediments with arsenic concentrations above the SCO were not found in the offshore sediments or deeper than the 4- to 5-ft sample interval.

### 9.2.3 cPAHs

The calculated cPAHs TEQs exceed the pCUL [380 μg TEQ/kg dw site-wide and 150 μg TEQ/kg dw intertidal (based on the human health risk PRG for direct contact]) in four of the surface samples collected during the RI. The calculated cPAHs TEQs range from 12.7 μg TEQ/kg dw to 1,703 μg TEQ/kg dw (Table 46) in the 73 RI samples analyzed for the SMS HPAHs (includes the individual cPAHs; see Section 8.4.2). A geospatial interpolation of the available surface data from the current RI and the available historical data was conducted using the same procedures, grid specifications, search ellipse, and power used for the PCB and arsenic geospatial interpolation.

Figure 72 presents the results of the geospatial interpolation of the surface cPAHs TEQs (in μg TEQ/kg dw). Grid cells are coded to represent areas with interpolated concentrations within defined ranges.

### 9.2.4 Distribution of Sediments that Exceed the SCO

All of the surface sediment samples collected during the RI sediment investigation had detected concentrations of total PCBs and arsenic that are above the pCULs (based on human health risk PRGs). Sediments containing elevated total PCB concentrations (characterized as detected concentrations above the SCO) were widespread both horizontally and vertically offshore of the Site. For a majority of the samples that have one or more SMS chemicals with concentrations greater than the SCO, total PCB concentrations either exceed the SCO in the sample or the total PCB concentration in a deeper sample at the location exceeds the SCO. At locations where the total PCB concentration are below the SCO or drops below the SCO in the deeper samples and concentrations of other SMS chemicals remained above the SCO, arsenic can be used to define the maximum depth of sediments with SMS chemical concentrations above the SCO. Arsenic defines the maximum depth of sediments with concentrations of one or more SMS chemicals above the SCO at four locations (Table 54).

# 10.0 CONCEPTUAL SITE MODEL

The conceptual Site model (CSM) was developed based on historical land use, environmental data, and the contaminant fate and transport processes that control the migration of contaminants in the natural environment. A schematic representation of the Site CSM is presented on Figure 73, and the following sections discuss the factors affecting the CSM including contaminant migration pathways, contaminant receptors, exposure pathways, contaminants present at the Site and in sediment offshore of the Site, and potential sources for the contaminants.

## 10.1 CONTAMINANT MIGRATION PATHWAYS

Several pathways that may cause contaminants to migrate at the Site were evaluated. Those evaluated consisted of the following:

- Leaching of contaminants from soil to groundwater
- Transport of contaminants in groundwater to adjacent surface water and sediment
- Transport of contaminants in stormwater to adjacent surface water and sediment
- Transport of contaminants in soil to sediment via bank erosion
- Transport of contaminants in soil and groundwater to indoor air via volatilization.

Based on the evaluation, all of the above pathways are considered to be potential migration pathways except for the volatilization of contaminants in soil and groundwater to indoor air, as discussed below.

### 10.1.1 POTENTIAL CONTAMINANT MIGRATION PATHWAYS

This section discusses each of the pathways considered to be potential migration pathways at the Site.

#### 10.1.1.1 Leaching From Soil to Groundwater

Because groundwater is encountered at shallow depths (typically between 11 ft and 17 ft BGS), contaminants found in soil may leach to groundwater and, therefore, leaching of contaminants from soil to groundwater is considered a potential migration pathway. However, as described in Section 9.1.1, some of the constituents detected in soil at concentrations exceeding the soil pCULs were not detected in groundwater at concentrations exceeding the groundwater pCULs during the RI. These constituents include barium; mercury (Former Slip 5 Area only); and diesel-range, oil-range, and gasoline-range petroleum hydrocarbons. The lack of these constituents in groundwater at concentrations exceeding the pCULs indicates that these constituents are not leaching from soil to groundwater and existing concentrations in soil are adequately protective of groundwater.

#### 10.1.1.2 Transport of Contaminants in Groundwater to Adjacent Surface Water and Sediment

As discussed in Section 8.1.2, groundwater at the Site flows to the west toward the LDW and, based on previous studies conducted along the LDW including at Boeing Plant 2, the shallow groundwater in the vicinity of the Site discharges to the LDW above -5 ft MLLW. One groundwater seep is present at low tide in the intertidal zone at about 0.0 ft MLLW. Because groundwater at the Site discharges to the LDW, contaminants in groundwater may be transported to LDW surface water and sediment and, therefore, groundwater is a potential migration pathway for contaminants.

#### 10.1.1.3 Transport of Contaminants in Stormwater to Adjacent Surface Water and Sediment

As discussed in Section 2.1, stormwater from the Site is discharged to the LDW via two outfalls: Outfall A and Outfall B. Prior to discharge to the LDW, the stormwater is collected in CBs where the solids suspended in stormwater are settled out. The stormwater also passes through oil/water separators where additional solids and oil are separated from the stormwater prior to discharge to the LDW. Stormwater from the Isaacson property also passes through two treatment vaults (Vortechs) that treat stormwater by allowing suspended solids to settle out prior to discharge to the LDW. Although analytical results from the stormwater monitoring and the CB solids indicate that stormwater discharging to the LDW via Outfall A and Outfall B is currently not contributing to the offshore sediment contamination adjacent to the Site, historical stormwater discharge may have contributed to contaminants in the offshore sediment and, therefore, stormwater is a potential migration pathway for contaminants.

#### 10.1.1.4 Transport of Contaminants in Soil to Sediment via Bank Erosion

Soil erosion at most of the Site is prevented by paving and buildings. A majority of the shoreline at the Site is currently protected from significant bank erosion by wooden and metal bulkheads; however; because there are some gaps in the wooden bulkhead on the south portion of the Site, some soil from behind the bulkhead may erode through the gaps to the LDW; therefore, soil erosion is a potential migration pathway for contaminants.

### 10.1.2 Non-Potential Contaminant Migration Pathways

Because there is an approximately 11- to 15-ft zone of unsaturated soil at the Site, migration of contaminants from soil and groundwater to indoor air via volatilization was evaluated. As described in Section 4.4, five vapor samples were collected from beneath the Building 14-01 floor slab to determine the extent, if any, that VOCs are present in soil vapor below the building floor slab. The results for the soil vapor samples were compared to the soil vapor screening levels presented in Section 7.3, and, as discussed in Section 8.3, all of the detected VOC concentrations were below the screening pCULs.

Because the soil vapor concentrations were below the screening levels, volatilization of contaminants from soil and groundwater to indoor air is not considered a migration pathway for the Site.

## 10.2 CONTAMINANT RECEPTORS

Potential receptors of contaminants found at the Site and in the sediment offshore of the Site were evaluated based on the current and likely future uses of the Site (described in Section 2.1) and of the areas offshore of the Site. Those receptors identified as potential receptors and those receptors evaluated, but determined not to be potential receptors based on this evaluation, are identified below.

### 10.2.1 POTENTIAL RECEPTORS

Only humans have been identified as potential receptors for Site contaminants in soil. Humans are considered potential receptors because current and future land use includes people working at the Site (either as construction workers or for industrial operations). Although the current Site use is industrial, for this report unrestricted potential property uses are considered that may include residential or commercial uses. Prior to completing the FS, a demonstration may be made that Site use should be limited to industrial, consistent with current and likely future land use.

Humans; terrestrial ecological receptors (birds, mammals); and aquatic organisms (fish, shellfish, and benthic invertebrates) have been identified as potential receptors for sediment contaminants. Humans are considered to be potential receptors of sediment contaminants because people may be present in the area offshore of the Site either during tribal fishing or recreational activities, although, because there is no readily available public access to the LDW from the shoreline in the vicinity of the Site, recreational activities are not likely. Terrestrial ecological receptors (birds or mammals) and aquatic organisms may be present in the area offshore of the Site.

### 10.2.2 NON-POTENTIAL RECEPTORS

Receptors that were considered, but not identified as potential receptors for Site contaminants, are terrestrial ecological receptors (wildlife, soil biota, and plants). As described in Section 7.2, these are not currently considered to be potential receptors. Contaminated soil at the Site is and will continue to be covered by buildings and pavement, preventing plants or wildlife from being exposed to soil contamination. As described in Section 7.2, a terrestrial ecological evaluation was ended based on an exposure analysis.

No additional receptors beyond those discussed in Section 10.2.1 were evaluated for sediment contaminants.

## 10.3 EXPOSURE PATHWAYS

The exposure pathways for those potential receptors identified in Section 10.2.1 (humans, terrestrial ecological receptors; and aquatic organisms) also depend on the current and likely future uses for the Site and of the areas offshore of the Site.

### 10.3.1 POTENTIAL EXPOSURE PATHWAYS

The potential pathways for exposure to contaminants from the Site include the following:

- Human direct contact with contaminated soil by construction or industrial workers.
- Human direct contact with LDW surface waters and sediments by tribal and recreational users.
- Direct contact with surface water and sediment by terrestrial ecological receptors (i.e., birds or mammals).
- Uptake of surface water/sediment contaminants into aquatic species such as fish and shellfish (i.e., aquatic organism bioaccumulation), which then would be consumed as food by humans.
- Uptake of surface water/sediment contaminants into aquatic species, which then would be consumed as prey by higher trophic level receptors.

#### 10.3.1.1 Soil Direct Contact

Contaminants are present in shallow soil at the Site; however, nearly all of the Site is covered with buildings or pavement; only a narrow strip of undeveloped land along the western and southern portion of the Site is undeveloped. Direct human contact with soil would not occur under normal conditions, but may occur during excavation for construction or repair of Site buildings and utilities and, therefore, human direct contact with contaminated soil by construction or industrial workers is considered a potential exposure pathway.

#### 10.3.1.2 Sediment Direct Contact

Direct contact with intertidal sediments by humans, terrestrial ecological receptors (birds and mammals), and aquatic organisms may occur, but exposure to contaminated sediments is usually limited to the shallow surface sediments. Direct human contact with sediment is typically limited to surface and shallow subsurface sediments in the intertidal zone (approximately -4 ft MLLW elevation and above); however, the lack of available public access to the LDW from the shoreline in the vicinity of the Site would limit exposure. Activities such as beach play or clamming are generally limited to intertidal areas (approximately 1.85 acres with restricted upland access), but direct exposure to sediments may also occur during recreational boating or net fishing activities in deeper waters. During clamming activities, sediments to a depth of 45 cm may be excavated and human direct contact with the exposed sediments can occur. Direct contact with sediment by terrestrial ecological receptors (birds and mammals) may also occur, but exposure to contaminated sediments during foraging is usually limited to the shallow surface sediments (10 cm or less). Exposure to aquatic species (benthic infauna and higher trophic level receptors) is typically limited to shallow sediments. Humans, terrestrial ecological receptors, and aquatic organisms would seldom be exposed to deep sediments unless the sediments were physically exposed during disturbance events or by erosion. Activities such as swimming may also expose humans, birds, and mammals to waters containing suspended sediments.

#### 10.3.1.3 Surface Water Uptake

Aquatic species such as fish and shellfish may be exposed to sediment contaminants by uptake of surface water containing suspended sediment.

#### 10.3.1.4 Ingestion of Fish and Shellfish

Humans and aquatic species (birds and mammals) may be exposed to sediment contaminants by ingestion of fish and shellfish exposed to sediment contaminants. However, the sediment contaminants that humans would be exposed to by ingestion of fish and shellfish are limited to those that bioaccumulate (PCBs, dioxins/furans, cPAHs and arsenic).

### 10.3.2 NON-POTENTIAL EXPOSURE PATHWAYS

One exposure pathway that was evaluated, but not identified as a potential exposure pathway for Site contaminants, was human ingestion of groundwater. As described in Section 7.1, groundwater is not considered to be a current or reasonable future source of drinking water; therefore, human ingestion of drinking water is not included as an exposure pathway

No additional exposure pathways beyond those previously discussed were evaluated for sediment contaminants.

## 10.4 UPLAND AREA CONTAMINANTS

The contaminants present in soil, groundwater, or stormwater at more than one Site location at concentrations exceeding the pCULs include BEHP; cPAHs; PCBs; metals (arsenic, barium, cadmium, chromium VI, total chromium, copper, lead, mercury, nickel, selenium, thallium, and zinc); VOCs (TCE, cis-1,2-DCE, vinyl chloride, and acrylonitrile); and diesel-range, oil-range, and gasoline-range petroleum hydrocarbons.

### 10.4.1 POTENTIAL UPLAND CONTAMINANT SOURCES

Potential past or current sources for contaminants in Site soil and groundwater include historical operations, former tanks and sumps, contaminated soil, and offsite sources. Potential sources for contaminants in stormwater or storm drain solids include building materials, infiltrating soil or groundwater if cracks in the storm drain piping are present at locations where soil or groundwater constituents exceed pCULs, and offsite sources.

#### 10.4.1.1 Soil and Groundwater

Potential sources that may have in the past or may currently contribute to soil and groundwater contamination at the Site are identified in the RI/FS Work Plan including historical Site operations; ASTs, USTs, and sumps; contaminated soil and fill material; stabilized soil fill material; a tar-like substance observed in one location at the Site; offsite sources (e.g., the Jorgensen site located north of the Site, and the 8801 site located south of the Site); and the Former Slip 5 Outfall Area. The potential for the sources to contribute to soil and groundwater contamination is discussed by area below. Additionally, some RI explorations were conducted to evaluate potential sources for elevated arsenic concentrations in groundwater at wells I-104(s), I-205(s), and I-206(s). The potential sources identified, if any, are evaluated following the general discussion of potential groundwater and soil contaminant sources by area.

*North of the Former Slip 5 Area*

cPAHs; PCBs; metals (arsenic, cadmium, copper, lead, mercury, and zinc); and diesel-range, oil-range, and gasoline-range petroleum hydrocarbons were detected in the soil in the North of the Former Slip 5 Area at concentrations exceeding the pCULs. Except for diesel-range, oil-range, and gasoline-range petroleum hydrocarbons, these contaminants were also detected in groundwater in the North of the Former Slip 5 Area at concentrations exceeding groundwater pCULs. The lack of diesel-range, oil-range, and gasoline-range petroleum hydrocarbons exceedances in groundwater in the North of the Former Slip 5 Area indicates that these contaminants are not leaching from soil to groundwater. A summary of those contaminants found in soil and those found in groundwater in the North of the Former Slip 5 Area is provided in Table 47. The potential sources for the contaminants found in soil and groundwater in the North of the Former Slip 5 Area include historical operations, former USTs and sumps, the observed tar-like substance found in soil, material used to fill the former river meander, and stabilized soil material. These sources are evaluated below.

**Historical Operations**

As described in Sections 2.2 and 2.3, the Site was previously occupied by several sawmills; a wood treatment operation; a steel melting, forging, and fabricating facility; and a galvanizing plant. Boeing has not operated on the property in the North of the Former Slip 5 Area except to conduct cleanup activities and to utilize the area for equipment storage after the property was paved. Boeing operations on the property are not considered a likely source of contamination. Features and operations associated with the historical facilities that may have contributed to the release of contaminants at the Site are described below:

- **Former Sawmills.** Contaminants associated with sawmills are typically petroleum hydrocarbons from the use of hydraulic fluids and diesel or heavier petroleum fuel used to run heavy equipment. Although petroleum hydrocarbons were present in the soil at concentrations exceeding the pCULs in a few locations, they were not present in groundwater at concentrations exceeding the pCULs. Boiler tanks were used at both the Duwamish Lumber Company Sawmill and the Tyee Lumber Company Sawmill (Figure 6) and, because these sawmills operated in the early 1900's, it is possible that coal was used as fuel for the tanks. The combustion of coal may result in the release of cPAHs, cadmium, and other heavy metals, which were detected in the soil in the North of the Former Slip 5 Area at concentrations exceeding the pCULs.
- **Former Wood Preserving.** The Mineralized Cell Wood Preserving Company that operated on the northern side of the Slip 5 Area used a solution of arsenic and sulfate salts of copper and zinc to preserve wood. Storage tanks associated with this operation were reportedly cleaned twice per day and sludge and remaining chemicals in the tanks were reportedly drained directly to the ground surface. The operations associated with the wood preserving are likely the primary source of elevated levels of arsenic and copper detected in soil throughout the North of the Former Slip 5 Area.
- **Former Steel Forging and Galvanizing Plant.** Structures associated with the former Isaacson Iron Works Facility included a tractor repair shop, a welding shop, tractor sheds, a storage shed, a tractor parts warehouse, offices, a scrap iron yard, a galvanizing plant, a general warehouse, a paint shop and a paint storage area. Facilities and operations that may have been a potential source of contaminants in soil in the North of the Former Slip 5 Area include the galvanizing plant and the paint shop and storage facility. It is not clear if the former paint shop operations and storage sheds may have contributed to soil contamination. cPAHs, PCBs, arsenic, and copper were detected in soil in this area at concentrations exceeding the pCULs. Other than PCBs, these contaminants are not typically associated with paint; PCBs were used in paint in the past to enhance the structural integrity of the paint and reduce flammability.

**Former USTs and Sumps**

There are currently no USTs, ASTs, or sumps located in the North of the Former Slip 5 Area. Former USTs and sumps include the sump associated with the former Isaacson Iron Works steam cleaning rack; three sumps associated with the Former Paint Storage Area (identified as TS-09, TS-10, and TS-11 on Figure 4); a sump located in the northeast corner of the Site; four diesel and gasoline tanks (identified as TS-05 through TS-08 on Figure 4); and two boiler fuel tanks (identified as TS-12 on Figure 4). A comparison of the RI and/or pr-RI analytical results for soil samples collected in the areas of the four former diesel and gasoline tanks and the two boiler fuel tanks to pCULs indicates that the tanks were not sources of current contamination in the North of the Former Slip 5 Area. The sumps and their potential as contaminant sources are described below:

- The steam cleaning rack and associated sump were located in the northern portion of the Isaacson property as shown on Figure 4. As described in Section 3.1.1, the steam cleaning rack was used by Isaacson to clean equipment. Water, waste sludge, and solvents from the cleaning filtered into a 5-ft deep sand and gravel unlined sump. In about 1979 or 1980, a catch pan was placed above the sand and gravel in the sump to facilitate collection and disposal of waste sludge and solvent, but the sump was never connected to the sewer (Dames & Moore 1983). The sump and associated soil were later removed. Soil samples collected from this area and analyzed prior to the RI and one soil sample collected from MW-25 during the RI, indicate elevated concentrations of arsenic in soil where the steam cleaning rack and sump were previously located. Petroleum hydrocarbons and VOCs were not detected in soil in this area at concentrations exceeding the pCULs.

- As previously mentioned, it is not clear whether the painting operations may have contributed to soil contamination based on the types of contaminants detected in media in this area and, therefore, it is not clear if the associated sumps were a potential contaminant source.
- As discussed in Section 3.1.20, a sump was previously located in the northeastern corner of the Site (Figure 4) and removed by Boeing in 2006; this sump may have been a source of PCBs detected in soil at concentrations exceeding the pCULs. The sump was a below-grade, open-to-the-surface 55-gallon drum that was discovered under a steel plate. The sump reportedly had an inlet pipe and an outlet pipe (Landau Associates 2007). The purpose or use of the sump is unknown.

**Observed Tar-Like Substance**

Based on the RI results, the vein of tar-like substance discovered outside of the stabilized soil perimeter on the northern side of the excavation for the eastern Vortechs vault (shown on Figure 19), is a likely source for the diesel-range, oil-range, and gasoline-range petroleum hydrocarbons and cPAHs detected in soil in this area at concentrations exceeding the pCULs.

**Fill Material**

Fill material used to fill the former river meander, which was likely material hydraulically dredged from the LDW during channel modification, may be a source of contaminants in soil and groundwater in the North of the Former Slip 5 Area.

**Stabilized Soil Material**

Soil above the groundwater table containing elevated concentrations of arsenic that was excavated, stabilized, and used as excavation backfill may be a potential contaminant source to groundwater, although TCLP results indicate little impact to groundwater by this material. Alternatively, soil below the groundwater table that was not stabilized may be a source of elevated arsenic concentrations found in groundwater in the North of the Former Slip 5 Area. Elevated pH levels in groundwater under the stabilized soil may increase the water solubility of some metals including arsenic, lead, and zinc.

### *Former Slip 5 Outfall*

cPAHs, PCBs, arsenic, cadmium, and copper were detected in soil in the vicinity of the Former Slip 5 Outfall Area. Because these contaminants were detected in nearby soil in the Former Slip 5 Area, it is unclear whether the outfall was a source of these contaminants.

### *Former Slip 5 Area*

One SVOC (naphthalene); cPAHs; PCBs; metals (arsenic, barium, cadmium, chromium VI, total chromium, copper, lead, mercury, nickel, thallium, and zinc); and gasoline-range petroleum hydrocarbons were detected in the soil within the Former Slip 5 Area at concentrations exceeding the pCULs. cPAHs; PCBs; and metals (arsenic, cadmium, and nickel) were also detected in groundwater in the Former Slip 5 Area at concentrations exceeding the pCULs. The lack of naphthalene, barium, chromium VI, total chromium, copper, lead, mercury, thallium, zinc, and gasoline-range petroleum hydrocarbons exceedances in groundwater indicates that these contaminants are not leaching from soil to groundwater. A summary of those contaminants found in soil and those found in groundwater within the Former Slip 5 Area is provided in Table 47. The potential sources for those contaminants in soil and groundwater within the Former Slip 5 Area are historical operations, debris and contaminants present in material used to fill the slip, as described below.

#### Historical Operations

Historical operations that may have contributed to contaminants present in the soil and groundwater within the Former Slip 5 Area include those associated with the sawmills; the wood treatment facility; the steel melting, forging, and fabricating facility and galvanizing plant. Historical operations by Boeing are also evaluated as a potential source of contaminants.

- **Former Sawmills**. In addition to potential coal combustion to heat the boilers used at the sawmills, a waste burner that was operated by the former Duwamish Lumber Company Sawmill in the western portion of the property (Figure 6), may have resulted in a release of contaminants to the environment. The soil boring associated with RI well MW-17 and the soil boring associated with former well I-202(s) are located in the area of the waste burner. As described in Section 8.1.5.2, many of the pCUL exceedances in soil within the Former Slip 5 Area occurred at these two soil borings, including PCBs, cPAHs, gasoline-range petroleum hydrocarbons, chromium VI, and several other metals.
- **Former Wood Preserving Plant**. As discussed above in Section 8.1.3.1, the Mineralized Cell Wood Preserving Company operations, which extended into the Former Slip 5 Area, may have been a contributing source of arsenic contamination in soil within the Former Slip 5 Area.
- **Former Steel Forging and Galvanizing Plant.** Slag associated with the former Isaacson Iron Works facility was observed at four locations within the Former Slip 5 Area during the RI (soil borings MW-13, MW-13B, MW-17, and SB-3) and in several locations during earlier investigations. As previously discussed in Sections 3.1.1 and 3.1.2, samples of slag were collected in 1983 and analyzed. Analytical results for the slag material indicate that it may be

a source of barium, chromium, copper, and lead in soil. However, based on EP Toxicity tests performed on the slag samples, which did not detect any metals, the slag may not be a direct source of contaminants in groundwater.

- **Former Boeing Operations.** Boeing formerly operated two facilities that were located in the Former Slip 5 Area that had the potential for releasing contaminants to the Site: the Former Hazardous Waste/Hazardous Materials Sheds and the Former Hydraulic Test Pad Area. Based on results primarily from pre-RI soil investigations, the storage of hazardous waste/hazardous materials in the sheds did not result in a release of contaminants to the Site. In the 1990s, Boeing used the area east of Building 14-03 for hydraulic testing. In 1992, a release of hydraulic oil occurred from a holding tank associated with an oil/water separator located in this area (identified as TS-04 and TS-92 on Figure 4). The oil/water separator (TS-92), holding tank (TS-04), and associated piping were removed in 1995. The area that was impacted is shown on Figure 4. Approximately 900 tons of petroleum-contaminated soil was excavated from the area surrounding the oil/water separator and holding tank. Based on pre-RI and RI analytical results, the only residual contamination in soil in this area that may be related to the release is cPAHs. RI investigations conducted downgradient of the Former Hydraulic Test Pad Area indicate the presence of cPAHs and PCBs in groundwater; however, it is unlikely that the source of PCBs is the 1992 release of hydraulic oil because PCBs were never detected in soil and groundwater in that area.

**Former and Existing USTs and Sumps**

Two storage tanks currently exist within the Former Slip 5 Area. These are associated with current and/or past Boeing operations and include a 20,000-gallon boiler fuel UST (TS-01), which was decommissioned in-place in 2003, and a 500-gallon diesel AST (TS-57). Both are located on the west side of Building 14-02. A 1,000-gallon gasoline UST and a diesel 500-gallon UST were also located west of Building 14-01, but have been removed. Petroleum hydrocarbons were not detected in soil or groundwater in explorations conducted in the area of these USTs during the RI or during previous investigations indicating that these USTs are not a source of contamination. PCBs, cPAHs, and arsenic were detected in soil and groundwater at concentrations exceeding the pCULs during the RI; however, the former and existing USTs are not likely to be a source of these constituents.

*South of the Former Slip 5 Area*

cPAHs; PCBs; TCE; metals (arsenic and copper); and gasoline-range petroleum hydrocarbons were detected in soil and acrylonitrile, TCE, cis-1,2-DCE, 1,1-DCE, vinyl chloride, cPAHs, dissolved arsenic, chromium VI, and dissolved nickel were detected in groundwater in the South of the Former Slip 5 Area at concentrations exceeding the pCULs. The lack of PCBs, copper, and gasoline-range petroleum hydrocarbons in groundwater indicates that these contaminants are not leaching from soil to groundwater. A summary of those contaminants found in soil and those found in groundwater in the South of the Former Slip 5 Area is provided in Table 47. The potential sources for those contaminants in soil and groundwater in the South of the Former Slip 5 Area, including offsite sources (i.e., the 8801 site), are evaluated below.

**Off-Site Sources**

The most likely source for the VOCs (TCE, cis-1,2 –DCE, 1,1-DCE, and vinyl chloride) detected in soil and/or groundwater at concentrations exceeding the pCULs near the southern property boundary is located on the adjacent former PACCAR property (8801 site). As presented in a draft focused FS (DFFS) performed by AMEC for PACCAR Inc. (AMEC 2012), PCE, TCE, and vinyl chloride are present in soil in two areas of concern that are adjacent to the Thompson property, identified as the Northwest Corner and the Northern Boundary areas of concern. On the 8801 site, there are 10 locations along the property boundary with TCE concentrations greater than 100 µg/kg and only one location on the Thompson property. The maximum TCE concentration in unsaturated soil along the property boundary on the 8801 site is 78,200 µg/kg; the maximum concentration in unsaturated soil along the property boundary on the Thompson Property is 270 µg/kg.

Based on the most recent groundwater data collected at the 8801 site that is available to Boeing (collected in September and October 2011), the highest TCE concentration in groundwater at the 8801 site is 280 µg/L. This concentration is almost four times greater than the highest concentration detected at the Thompson Property (71 µg/L) in December 2011. The groundwater concentrations found at the 8801 site are more indicative of a nearby release than the concentrations detected in groundwater at the Thompson property. Furthermore, the DFFS states that a potential VOC source area is located in the vicinity of monitoring well MW-28A located on the 8801 site and, based on the data collected at the Site, there is not an identifiable source of VOCs on the Thompson property.

**Concrete Joint Material**

PCBs were detected in two CJM samples collected from the former Building 14-11 Area and in three CJM samples collected from the Former Loading Dock Area. PCBs were also detected in soil samples collected from shallow construction-related excavations in these areas; the soil detections may be due to PCBs in the CJM.

**Fill Material**

The source of the cPAHs and copper in soil in the South of the Former Slip 5 Area, as well as the source of the PCBs in shallow soil near the southern property boundary, are unknown, but may be related to fill material.

#### 10.4.1.2 Storm Drain Solids

Constituents have been detected in the storm drain solids at the Site at concentrations that exceed the sediment pCULs. As previously discussed in Section 4.5.3, samples of various media present at the Site that could be a potential source of the contaminants present in the storm drain solids were collected for laboratory analysis. The media sampled included surface debris, paint chips, and CJM. Surface debris, paint chips, and storm drain structure solids were analyzed for SVOCs, PAHs, PCBs, and metals. CJM was analyzed for SVOCs, PAHs, and PCBs. A discussion of the source material data for samples collected in eight areas (Building 14-01 South, Building 14-01 East, Building 14-01 North, Building 14-01 West, Building 14-13, Building 14-02/14-03, Isaacson East, and Isaacson West) is provided in Appendix R and summarized in tabular format in Appendix R along with the 2011 storm drain structure data in each area to allow for direct data comparison. Based on the results of the source material sampling, peeling paint, CJM on the Isaacson property and surface debris may be a source of contaminants found in the storm drain solids. In areas where soil is contaminated and cracks or holes are present in storm drain piping, soil infiltration may be a source of contaminants in storm drain solids. Storm drain lines where this may occur include the segment west of Building 14-01 between CB-82 and CB-81, the segment north of Building 14-02/14-03 between CB-30 and CB-29, and the segment north of Building 14-14 between CB-F and MH-18; however, no metals detected in these storm drain structures at concentrations greater than the sediment pCULs were detected in nearby soil at concentrations greater than the sediment pCULs.

Air deposition is also likely to be a source of contaminants in storm drain solids. An evaluation of air deposition at Boeing Plant 2 identified moderate to high impacts from copper and zinc in dry deposition particulate samples (Golder 2010). Other studies have identified air deposition as a source of PAHs, PCBs, metals, and phthalates (Brandenberger et al 2012a; Brandenberger et al 2012b; Sediment Phthalates Work Group 2007).

#### 10.4.1.3 Stormwater

Constituents have been detected in the storm drain solids at the Site at concentrations that exceed the sediment pCULs. Analytical results for the stormwater samples indicate that constituents detected in storm drain solids at concentrations above the sediment pCULs are not present in the stormwater at concentrations that result in stormwater concentrations above the pCULs for groundwater, except BEHP (Outfalls A and B) and cadmium and zinc (Outfall A only). Because these two constituents were detected in the storm drain solids, although BEHP was only detected sporadically, particulates entrained in the stormwater samples may be the source of the constituents in the stormwater. Soil infiltration into the storm drain system is not likely to be a source of these contaminants because BEHP was only sporadically detected in soil at concentrations less than the pCUL and cadmium and zinc were not detected at concentrations greater than the pCULs in areas where cracks or holes in the storm drain piping that might allow soil intrusion were present.

In areas where the storm drain piping is below the groundwater table and contaminants are present in groundwater at concentrations exceeding the groundwater pCULs, groundwater infiltration is a potential source of stormwater contaminants, especially at times when stormwater flow is low. However, BEHP is only detected sporadically in groundwater at concentrations exceeding the pCULs and concentrations of cadmium and zinc in groundwater do not exceed the pCULs in areas where cracks were observed in the stormdrain piping and the piping is likely to be submerged at some times of the year; therefore, groundwater infiltration is unlikely to be a source for these contaminants.

Air deposition is also likely to be a source of contaminants in stormwater. An evaluation of air deposition at Boeing Plant 2 identified moderate to high impacts from copper and zinc in dry deposition particulate samples (Golder 2010). Other studies have identified air deposition as a source of PAHs, PCBs, metals, and phthalates.

### 10.4.2 Potential Sediment Contaminant Sources

Potential past or current sources for contaminants in sediments offshore of the Site include discharge of Site groundwater and stormwater, erosion of bank soil, and offsite sources.

#### 10.4.2.1 Contaminants in Groundwater

Contaminants present at concentrations exceeding the pCULs in groundwater in the western-most portion of the Site that are also present in sediment at concentrations exceeding the sediment pCULs include arsenic, cPAHs, and PCBs. Because groundwater discharges to the LDW, shallow groundwater may be a potential source of contaminants found in sediment in shallow areas of the waterway adjacent to the shoreline. However, except for arsenic, the concentrations of PCBs and cPAHs detected in groundwater along the western-most property boundary are low and exceed the pCULs only because the pCULs are very low. Because of the low concentrations of PCBs and cPAHs in groundwater, the contribution of these contaminants to sediment via groundwater is likely very low.

#### 10.4.2.2 Contaminants in Stormwater

Chemical results from the stormwater monitoring and the CB solids indicate that Boeing Outfall B located at the south end of the Site and Boeing Outfall A located near the middle of the Site are currently not contributing to the sediment contamination within the Site. However, historical releases may have resulted in past contamination. Available information regarding the King County Outfall (King County International Airport Storm Drain #2) indicates stormwater from KCIA may be a past and continuing source. The drainage basin served by the outfall is about 235 acres and includes the central portion of the airport property. Contaminant concentrations detected in storm drain solids in 2009 at concentrations greater than the SCO and CSL include arsenic (90 mg/kg dw), PCBs (3,400 ug/kg dw), cPAH TEQ (38,000 ug/kg dw), and HPAHs (284,000 ug/kg dw) (SAIC and Newfields 2011, *Lower Duwamish Waterway Source Tracing Data Evaluation: Stormwater Pathway*, December 2011).

#### 10.4.2.3 Contaminants in Erodible Bank Soil

As previously discussed, a majority of the shoreline at the Site is currently protected from significant bank erosion by wooden and metal bulkheads. Gaps in the wooden bulkhead at the southern portion of the Thompson property may allow some soil to erode and migrate to the LDW. Gaps in the wooden bulkhead at the Port property between the northern portion of the Site and the LDW may also allow soil to erode and migrate to the LDW. Except for arsenic in one soil sample at a concentration slightly above the sediment pCULs, soil samples collected through holes in the wooden bulkhead at the Thompson property did not contain metals or PCBs at concentrations exceeding the sediment pCULs, and, therefore, erosion from this area is not likely to be a source of these contaminants in sediment. Concentrations in soil behind the Port bulkhead have not been determined. The placement of fill material within the footprint of the Former Slip 5 Area (a relic portion of a lower Duwamish River meander) may also have contributed to the elevated concentrations of some contaminants (e.g., arsenic) near the central portion of the offshore sediments prior to placement of the bulkheads.

#### 10.4.2.4 Contaminant Releases from Offsite Sources

Historical accounts of releases of contaminants into the LDW are well documented. Releases have occurred from investigated sites located upriver and downriver of the Site. Tidal current flow may be responsible for upriver or downriver movement of sediment-associated contaminants from released offsite sources. Downstream river flows may result in migration of contaminants from upstream sources to sediments offshore of the Site.

The distribution of contaminants within the sediments offshore of the Site is determined primarily by the source of the contamination (onsite versus offsite sources) and by the timing of the release (short-term or long-term). Short-term releases may result in contamination that has limited horizontal distribution due to reduced sediment movement and subsequent burial by cleaner sediments. Accumulation of cleaner sediments in a net depositional environment may also limit the vertical distribution of a contaminant restricting the contaminated sediments to a thin sediment horizon. Longer term releases of potential contaminants may result in a wider distribution and a greater vertical distribution of contamination within a sediment unit, particularly under more dynamic sediment conditions.

An evaluation of available bathymetric surveys, which were conducted by the USACE and other parties in the LDW, was performed by Windward (Windward 2003) for the LDW Superfund project under a CERCLA Order with EPA. This review suggested that intertidal benches along the LDW appeared to be relatively stable over time with some net deposition. Along the navigation channel slopes adjacent to the intertidal benches, elevations were generally more variable for the time period that was evaluated.  Windward (Windward 2003) concluded that changes in elevations outside the authorized navigation channel (between the navigation channel and the intertidal benches) may have been attributable to "*…maintenance dredging adjacent to the navigation channel, other dredging activities conducted to improve ship access to berthing areas or marinas, or other erosive events.*"

The low rates of net deposition on the shallow inshore benches may explain the elevated concentrations of some contaminants in the nearshore.  The sediments offshore and closer to the navigation channel may show lower surface concentrations because the surface sediments are more dynamic (undergoing periodic erosion and re-deposition) or have higher sediment accumulation rates. The maximum depth of contamination in sediments near the navigation channel may also be the result of the dynamic nature of the sediments in the deeper water adjacent to the navigation channel.  Periodic dredging activities to maintain navigational working depths or for improving vessel access to near-shore areas may have temporarily deepened selected areas along the channel.  The accumulation of mobile (and potentially contaminated) sediments within these dredged areas may provide an explanation of the greater depth of contamination near the channel edge.  This long-term accumulation and periodic re-suspension of sediments in a dynamic environment may result in a mixing and averaging of chemical concentrations within thicker sediment units.

# 11.0 AREAS FOR CONSIDERATION IN THE FS

The soil and groundwater pCULs used in this RI were determined, as described in Section 7.0, based on TMCLs developed for the Boeing Plant 2 site, MTCA Method B, and pCULs at nearby sites. Soil pCULs are based on residential and industrial land uses and protection of groundwater. Groundwater pCULs are based on discharge to the fresh and marine waters of the LDW and protection of LDW sediment. PCULs have not yet been adjusted to be no lower than PQLs as provided for in MTCA. Groundwater pCULs are used to evaluate stormwater quality for the RI.

Constituents present in soil, groundwater, and stormwater at concentrations exceeding the pCULs are described in Section 9.0. Based on the evaluation of data presented in this RI compared to the pCULs, areas, contaminants, and source areas have been identified for further consideration in the FS. These are described below by general area and/or media:

- North of the Former Slip 5 Area. Contaminants in soil samples that represent soil remaining at the Site at concentrations greater than the pCULs include metals, cPAHs, PCBs, and total petroleum hydrocarbons. The COCs in soil for this area are arsenic, cadmium, copper, and cPAHs, because these exceedances are the most numerous and widespread. Contaminants in groundwater samples at concentrations greater than the pCULs include metals, cPAHs, PCBs, vinyl chloride, acrylonitrile, and two SVOCs. Detected SVOCs and acrylonitrile exceeded pCULs in a single sample each. COCs in groundwater for this area are metals, cPAHs, PCBs, and vinyl chloride, because these exceedances are the most numerous and widespread. Under and downgradient of the stabilized soil, the groundwater pH is elevated, which may affect the solubility of some metals. A specific source area to be considered in the FS is the area with the observed tar-like substance.

- Former Slip 5 Area. Contaminants in soil samples that represent soil remaining at the Site at concentrations greater than the pCULs include metals, cPAHs, PCBs, gasoline-range petroleum hydrocarbons, and naphthalene. The COCs in soil for this area are arsenic, cadmium, chromium, copper, lead, nickel, zinc, cPAHs, and PCBs, because these exceedances are the most numerous and widespread. Contaminants in groundwater samples at concentrations greater than the pCULs include metals, cPAHs, PCBs, and BEHP. COCs in groundwater for this area are arsenic, cadmium, cPAHs, and PCBs, because these exceedances are the most numerous and widespread. No specific source area was identified for consideration in the FS.

- South of Former Slip 5 Area. Contaminants present in soil samples that represent soil remaining at the Site at concentrations greater than the pCULs include cPAHs, PCBs, metals, trichloroethene, and gasoline-range petroleum hydrocarbons. The COCs in soil for this area are cPAHs, PCBs, arsenic, and copper, because these exceedances are the most numerous and widespread. Contaminants in groundwater samples at concentrations greater than the pCULs include TCE and its breakdown products cis-1,2-DCE, 1,1-DCE, and vinyl chloride; metals; cPAHs; and, in a single sample, acrylonitrile. Of these, acyrylonitrile; cis-1,2-DCE; and vinyl chloride were found only near the southern property boundary. The source for TCE and its breakdown products is likely to be on the 8801 site and they are therefore not considered COCs for the Site. The COCs in groundwater for this area are arsenic and chromium VI, because these exceedances are the most numerous and widespread.

- Stormwater. Contaminants detected in stormwater at concentrations greater than the pCULs for groundwater are BEHP and, only at Outfall A at the northwestern portion of the Thompson property, cadmium and zinc. Stormwater samples were analyzed for total metals; however, pCULs for cadmium and zinc apply to the dissolved fraction. BEHP is detected sporadically in groundwater, stormwater, storm drain solids, and source material samples at the Site.
- Storm Drain Solids. Contaminants present in storm drain solids at concentrations greater than the sediment pCULs include metals, PCBs, cPAHs, and SVOCs. Peeling paint, CJM on the Isaacson property, and surface debris may be a source of these contaminants in storm drain solids.

Based on the data collected during the RI, contaminants are present in sediment located offshore of the Site at concentrations exceeding the pCULs. The need for cleanup and cleanup options will be evaluated and implemented, as necessary, as part of the LDW process and any sediment cleanup necessary offshore of the Isaacson-Thompson property will be conducted under the EPA Record of Decision for the LDW.

The pCULs used in this RI are the same as the PRGs that were established in the EPA's Proposed Plan for the LDW Superfund site (EPA 2013). It was recognized in EPA's Proposed Plan for the LDW that it would not be practical to interpret exceedances of the PRGs based on natural background as identifying sediments requiring active remediation (e.g., dredging, capping, ENR, or a combination thereof). Given the urban, industrial nature of the LDW, sediments virtually everywhere within the LDW have concentrations of those contaminants that exceed natural background concentrations.

In lieu of using exceedances of the PRGs to identify areas requiring active remediation, EPA's Proposed Plan (EPA 2013) established remedial action levels (RALs) for each sediment contaminant (Table 55). The RALs were set by EPA at concentrations such that the PRGs are expected to be met either immediately after construction or in the long- term after natural recovery, to the extent practicable considering some uncertainties. In some cases, the RALs are equal to the PRGs; this is true for all of the PRGs set at the SCO of the Washington State SMS, with the exception of the PRGs for total PCBs and arsenic, which are based on human health protection, as described above. Some of the RALs for human health contaminants are greater than the PRGs, in recognition of the impossibility of achieving natural background concentrations in an urban environment through active sediment remediation alone. Some of the RALs are also above the PRGs because some degree of reduction in contaminant concentrations is expected to occur through natural recovery, thus, obviating the need for active remediation. Use of the RALs to identify sediment areas requiring active remediation in EPA's Proposed Plan (EPA 2013) is a complex issue because not only did the RALs vary depending upon the receptor intended to be protected (i.e., humans, benthic invertebrates, river otters) and the exposure pathway (i.e., seafood consumption, direct contact during netfishing, clamming, or beach play), but the RALs were considered differently depending on whether an area was intertidal or subtidal, as well as whether it had more or less potential for disturbance via natural erosion or vessel scour (see footnote to Table 55 regarding the recovery categories identified in EPA's Proposed Plan). The degree of exceedances of the RALs also factors into the type of active remediation (i.e., dredging, capping, ENR) that may ultimately be selected. Boeing expects that any sediment remediation that may be required at the Site will be conducted in accordance with EPA's ROD for the LDW Superfund site, and the ROD is not expected to be completed until mid-2014. Although the PRGs, RALs, and flowcharts describing their use in deciding on appropriate remedial actions were described in detail in EPA's Proposed Plan for the LDW (EPA 2013), it is not yet known whether EPA will modify any of those in the ROD. Hence, it is likely premature to attempt to identify those sediments offshore of the Site that will require active remediation. Once EPA's ROD is completed, Boeing expects that the final PRGs, RALs, and flowcharts therein will provide the basis for the selection of appropriate sediment cleanup levels and for the identification of applicable remedial alternatives for sediments at the Site.

Prior to preparation of the FS, proposed cleanup levels and points of compliance will be developed and submitted to Ecology for review and approval, incorporating adjustments for PQLs, cross-media protection, and current and likely receptors, migration pathways, and exposure pathways, as appropriate. To the extent the proposed cleanup levels are higher than the pCULs, the contaminants and areas to be considered in the FS may change.

## 12.0 USE OF THIS REPORT

This RI report has been prepared for the exclusive use of The Boeing Company and applicable regulatory agencies for specific application to the Isaacson-Thompson Site located in Tukwila, Washington. The use of this report by others or for another project is at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

This report has been prepared under the supervision and direction of the undersigned. If you have any questions or comments regarding this report, please contact us at (425) 778-0907.

LANDAU ASSOCIATES, INC.

Kristy J. Hendrickson, P.E.
Principal

Stacy J. Lane, L.G.
Senior Geologist

Evelyn H. Ives
Senior Staff Engineer

AMEC Environment & Infrastructure, Inc.

Cliff Whitmus
Principal Scientist

Robert Gilmour
Senior Scientist

KJH/SJL/EHI/tam

# 13.0 REFERENCES


AECOM. 2012. *Final Feasibility Study, Lower Duwamish Waterway, Seattle, Washington.* Prepared for The Lower Duwamish Waterway Group by AECOM, for submittal to the U.S. Environmental Protection Agency, Region 10, Seattle, Washington and the Washington State Department of Ecology, Northwest Regional Office, Bellevue, Washington. October 31.

AECOM. 2010. *Lower Duwamish Waterway Group; Draft Final Feasibility Study Report*. Prepared for The Lower Duwamish Waterway Group by AECOM, Seattle, Washington.

Alpha Engineers. 1989. *Final Report, Thompson-Isaacson Seawall, Boeing Advanced Systems, Tukwila,Washington*. December 29.

AMEC. 2012. *Ecology Review Draft Focused Feasibility Study, 8801 East Marginal Way South, Tukwila, Washington*. Agreed Order No. 6069. AMEC Environment & Infrastructure, Inc. February 2.

AMEC. 2011. *Final Remedial Investigation Report, 8801 East Marginal Way South, Tukwila, Washington, Agreed Order Number 6069*. AMEC Earth & Environmental, Inc. March 18.

AMEC. 2008. *DSOA Additional Characterization Water Sample Collection, Boeing Plant 2 Duwamish Sediment Other Area, Tukwila, Washington*. AMEC Geomatrix, Inc. Prepared for The Boeing Company. December.

AMEC and Floyd-Snider. 2011. Duwamish Sediment Other Area and Southwest Bank Corrective Measure Alternatives Study, Boeing Plant 2, Seattle/Tukwila, Washington. Volume 1. Prepared for The Boeing Company. March.

Anchor QEA. 2011. *Final Engineering Evaluation/Cost Analysis, Jorgensen Forge Facility, 8531 East Marginal Way South, Seattle, Washington*. Prepared for the U.S. Environmental Protection Agency, Region 10 on behalf of Earle M. Jorgensen Company and Jorgensen Forge Corporation. Anchor QEA, LLC. March.

Anchor QEA. 2009. *Draft Source Control Evaluation Addendum Report Jorgensen Forge Facility*. Prepared for the Washington State Department of Ecology. Anchor QEA, LLC and Farallon Consulting, LLC. December.

Barrick, R.C., D.S. Becker, L.B. Brown,H. Beller, and R. Pastorok. 1988. *Sediment quality values refinement: 1988 update and evaluation of Puget Sound AET*. Volume 1. Final Report. Prepared for Tetra Tech, Inc., Bellevue, WA, and the U.S. Environmental Protection Agency, Seattle, WA. PTI Environmental Services, Bellevue, WA.

Bergam, Mark. 2012. Personal Communication (telephone conversation with Steve Shaw, Landau Associates, re: *Dewatering activities at the King County Airport during June of 2011*). Mark Bergam, Washington State Department of Transportation, Airport Division (subdivision Airport Engineering). December 11.

Boeing. 2011a. Email to Ronald W. Timm, Washington State Department of Ecology, re: *Isaacson-Thompson Construction Support Sampling – Bldg 14-01 Footings Excavation*. From Kathryn L. Moxley, The Boeing Company. June 9.

Boeing. 2011b. Email to Ronald W. Timm, Washington State Department of Ecology, re: *I-T Tow Path Construction Sampling and Analysis Plan.* From Kathryn L. Moxley, The Boeing Company. June 29.

Boeing. 2011c. *Boeing Plant 2 Seattle, WA Target Media Cleanup Levels Technical Memorandum Final*. Prepared for the U.S. Environmental Protection Agency. The Boeing Company; based on an approval with modifications from EPA dated September 28th, 2010. May 26.

Booth, D. and L. Herman. 1998. *Duwamish Industrial Area Hydrogeologic Pathways Project, Duwamish Basin Groundwater Pathways Conceptual Model Report*. Derek Booth, Ph.D., University of Washington, and Lori Herman, CGWP, Hart Crowser, Inc. Prepared for City of Seattle Office of Economic Development and King County Office of Budget and Strategic Planning. Produced by Hart Crowser, Inc. April.

Brandenberger, J.M., P. Louchouarn, L-J Kuo, E.A. Crecelius, V. Cullinan, G.A. Gill, C. Garland, J. Williamson, and R. Dhammapala. 2012a. *Control of Toxic Chemicals in Puget Sound, Phase 3: Study of Atmospheric Deposition of Air Toxics to the Surface of Puget Sound.* Washington State Department of Ecology, Air Quality Program, Publication no.10-02-012. October.

Brandenberger, J.M., P. Louchouarn, L-J Kuo, E.A. Crecelius, V. Cullinan, G.A. Gill, C. Garland, J. Williamson, and R. Dhammapala. 2012b. *Study of Atmospheric Deposition of Air Toxics to the Surface of Puget Sound, PCB Atmospheric Deposition Rates and Loads*. Washington State Department of Ecology, Air Quality Program, Publication No. 10-02-012 Appendix G

Dames & Moore. 1983. *The Report of the Evaluation of Site Contamination, Isaacson Steel Property For the Boeing Aerospace Company*. October 4.

Dempsey, J.E. 1991. *Fate of Arsenic and Cadmium in Forest Soils Downwind from the Tacoma Copper Smelter*. Master of Science Thesis, University of Washington. September.

Ecology. 2013. Letter re: *Ecology Review of Draft Remedial Investigation Report, Boeing Isaacson-Thompson Site, Tukwila, WA, Agreed Order #DE 7088*. From Ronald W. Timm, L.Hg., M.S., Toxics Cleanup Program, Washington State Department of Ecology, Bellevue, Washington, to James Bet, The Boeing Company, Seattle, Washington. June 17.

Ecology Website. 2013a. 8801 East Marginal Way South Site. https://test-fortress.wa.gov/ecy/testpublications/SummaryPages/0809066.html. Washington State Department of Ecology Publication Number: 08-09-066. October.

Ecology Website. 2013b. *Jorgensen Forge Corporation*; Facility ID #2382. https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=3689. Washington State Department of Ecology.

Ecology. 2012a. Email to James N. Bet, The Boeing Company, re: I-T Revsied Transducer Locations. Ronald Timm, Washington State Department of Ecology. March 1.

Ecology. 2012b. Email to James N. Bet, The Boeing Company, re: I-T Stormwater Sampling. Ronald Timm, Washington State Department of Ecology. January 25.

Ecology. 2011a. Email to Kathryn L. Moxley, The Boeing Company, re: *Final RI/FS Work Plan – Boeing Isaacson Thompson – AO #7088*. From Ronald W. Timm, Washington State Department of Ecology. September 21.

Ecology. 2011b. Email to Kathryn L. Moxley, The Boeing Company, re: *Boeing-Isaacson-Thompson (Order No. DE 7088) – RI Work Plan for Building 14-01*. From Ronald W. Timm, Washington State Department of Ecology. March 24.

Ecology. 2011c. Email to Kathryn L. Moxley, The Boeing Company, re: *Boeing I-T Bldg 14-01 Trenching SAP*. From Ronald W. Timm, Washington State Department of Ecology. April 22.

Ecology. 2011d. Email to Kathryn L. Moxley, The Boeing Company, re: *Isaacson-Thompson Construction Support Sampling – Bldg 14-01 Footings Excavation*. From Ronald W. Timm, Washington State Department of Ecology. June 21.

Ecology. 2011e. Email to Kathryn L. Moxley, The Boeing Company, re: *Boeing Isaacson-Thompson – REVISED Tow Path Construction Sampling and Analysis Plan*. From Ronald W. Timm, Washington State Department of Ecology. July 11.

Ecology. 2010. Agreed Order No. DE 7088; In the Matter of Remedial Action by: The Boeing Company. Washington State Department of Ecology. April 23.

Ecology. 2009. Review Draft. *Guidance for Evaluating Soil Vapor Intrusion in WashingtonState: Investigation and Remedial Action*. Washington State Department of Ecology, Toxics Cleanup Program. Publication no. 09-09-047. October.

Ecology. 1988. Letter to Mr. J.T. Johnstone, P.E., Facilities Manager Environmental Affairs, Boeing Advanced Systems, Seattle, WA, re: *Issacson Bldg. 1405*. Richard Koch, Acting Metro District Supervisor, Northwest Regional Office, Washington State Department of Ecology. May 10.

Ecology 1985. Letter to Mr. Dan Heglund, Isaacson Corporation, re: *Cleanup of Arsenic Contaminated Soil*. From Joan K. Thomas, Regional Manager, Washington State Department of Ecology, Northwest Regional. February 13.

EPA. 2013. *Proposed Plan, Lower Duwamish Waterway Superfund Site*. United States Environmental Protection Agency, Region 10. February 28.

EPA. 2012. *EPA's Vapor Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings.* Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency. Publication No. EPA 530-R-10-002. March.

EPA. 2007. Working Draft. *Framework for Selecting and Using Tribal Fish and Shellfish Consumption Rates for Risk-Based Decision Making at CERCLA and RCRA Cleanup Sites in Puget Sound and the Strait of Georgia*. Revision 0.0. To be applied in consultation with Tribal Governments on a site-specific basis. United States Department of Environmental Quality, Office of Environmental Cleanup, Office of Air, Waste and Toxics, Office of Environmental Assessment.

EPA. 1989. *Risk Assessment Guidance for Superfund Volume 1 Human Health Evaluation Manual (Part A)*, Interim Final. Office of Emergency and Remedial Response, U.S. Environmental Protection Agency Washington, D.C. 20450. EPA/540/1-89/002. December.

ERM. 2002. Report: *Comprehensive Data Summary Report, Boeing Isaacson Site, VCP ID # NW0453*. Environmental Management Resources. August.

ERM and Exponent. 2000. *Request for Groundwater NFA Determination, Hydrogeologic Investigation and Site-Specific Action Level for Arsenic in Groundwater, Boeing Isaacson Site*, VCP ID# NW0453. Environmental Resources Management and Exponent. November.

Ferris, J.G. 1951. *Cyclic fluctuations of water levels as a basis for determining aquifer transmissibility*. International Union of Geodesy and Geophysics, Association of Science Hydrology, Pub. 33, 148-155.

GeoEngineers. 1997. *Evaluation of Ground Water Compliance Monitoring Program, Boeing Thompson-Isaacson Site, Seattle, Washington*. Prepared for The Boeing Company. May 27.

GeoEngineers. 1994. Report: *Report of Geotechnical Services, Subsurface Investigation, Oil/Water Separator Area, Building 14-03, Thompson-Isaacson Facility, Seattle, Washington.* March 13.

Golder. 2010. *Boeing Atmospheric Deposition Assessment Project Data Report, Boeing Plant 2 Stormwater Management Program*. Golder Associates, Inc. September.

KCDNRP. 2005. *King County Surface Water Design Manual*. King County Department of Natural Resources and Parks. January 24.

King County. 2013. *Stream and River Water Quality Monitoring*. http://green.kingcounty.gov/WLR/Waterres/StreamsData/WaterShedInfo.aspx?Locator=0311. King County. Accessed December.

Landau Associates. 2012a. *Work Plan, Port of Seattle Property Investigation, Tukwila, Washington. Prepared for The Boeing Company*. April 27.

Landau Associates. 2012b. *October 2012 Progress Report, Boeing Isaacson-Thompson Site, Agreed Order No. DE 7088.* Submitted on behalf of The Boeing Company to Ron Timm, Washington State Department of Ecology. November 15.

Landau Associates. 2011a. *Final Work Plan, Remedial Investigation/Feasibility Study, Boeing Isaacson-Thompson Site, Tukwila, Washington*. Prepared for The Boeing Company. Landau Associates. September 16.

Landau Associates. 2011b. *Final Work Plan, Building 14-01 Investigation, Boeing Isaacson-Thompson Site, Tukwila, Washington.* Prepared for The Boeing Company. March 29.

Landau Associates. 2011c. Email to Kathryn L. Moxley, The Boeing Company, re: *Boeing I-`T Bldg 14-01 Trenching SAP*. From Stacy Lane, Landau Associates. April 20, 2011.

Landau Associates. 2009a. *Data Summary Report, Thompson-Isaacson Property, Tukwila, Washington*. Prepared for The Boeing Company. September 2.

Landau Associates. 2009b *Phase II Environmental Site Assessment, Boeing Thompson Property, 8625 East Marginal Way South, Tukwila, Washington*. April 2.

Landau Associates. 2009c. *Phase II Environmental Site Assessment, Boeing Isaacson Property, 8625 East Marginal Way South, Tukwila, Washington*. April 2.

Landau Associates. 2009d. *Report, Property Boundary Investigation, Thompson-Isaacson Property, Tukwila, Washington.* Prepared for The Boeing Company. September 9.

Landau Associates. 2008a. Report: *Environment, Health, and Safety Assessment/Phase I Environmental Site Assessment, Boeing Isaacson Property, Tukwila, Washington*. September 15.

Landau Associates. 2008b. Report: *Environment, Health, and Safety Assessment/Phase I Environmental Site Assessment, Boeing Thompson Property, Tukwila, Washington*. August 11.

Landau Associates. 2008c. Report, *Redevelopment Activities: Stabilized Soil Mound Removal and Stormwater System Upgrades, Boeing Isaacson Property, Tukwila, Washington*. March 24.

Landau Associates. 2008d. Technical Memorandum: *Focused Disposal Characterization Sampling, Asphalt-Capped, Treated Soil Mound, Boeing Isaacson Property, Seattle, Washington*. From Tim Syverson, L.G., David M. Nelson, L.G, and Kathryn F. Hartley. March 7.

Landau Associates. 2007. Technical Memorandum: *Sump Removal and Soil Excavation, Boeing Isaacson Property, Seattle, Washington*. From Tim Syverson, L.G., and Ken Reid, L.G., to Paul Johansen, The Boeing Company. February

Landau Associates. 2004. Technical Memorandum: *Tank Closure Confirmation and Sampling, Former 2000 Gallon Heating Oil Tank, Thompson Site*. From William Enkeboll, P.E., and David Nelson, to Paul Johansen, P.E., and Wayne Schlappi, P.E, The Boeing Company. April 21.

Landau Associates 1989a. *Thompson-Isaacson Site Soil Excavation Work Plan Final Report. March 21*

Landau Associates. 1989b. *Draft Thompson-Isaacson Site Soil Excavation Summary Report.* October 11.

Landau Associates. 1988. *Data Report, Building 14-09, Thompson-Isaacson Site Investigation*. Prepared for The Boeing Company. May 4.

Landau Associates. 1986. *First Annual Report, Groundwater Monitoring Program, Boeing Isaacson Property, 8541 East Marginal Way South, Seattle, Washington.* June.

Landau Associates. 1985. *Draft Groundwater Monitoring Plan, Boeing Isaacson Property, Seattle, Washington*. Prepared for The Boeing Company. October 8.

Peryea, F.J. 1989. *Leaching of Lead and Arsenic in Soils Contaminated with Lead and Arsenic Pesticide Residues*. Report submitted to the State of Washington Water Research Center and U.S. Department of Interior. Report A-158-WASH. May.

Risk Science International. 1985. *Environmental Risk Assessment of the Boeing Field Division, Boeing Commercial Airplane Company, The Boeing Company, in Seattle, Washington*. Final Report. July 26.

SAIC and NewFields. 2011. *Lower Duwamish Waterway Source Tracing Data Evaluation: Stormwater Pathway*. Volume 1: Text and Tables. Prepared for the Washington State Department of Ecology, Toxics Cleanup Program, Northwest Regional Office, Bellevue, Washington. Science Applications International Corporation, Bothell, Washington and NewFields, Edmonds, Washington. December.

SAIC. 2004. *Draft, Source Control Action Plan, Slip 4, Lower Duwamish Waterway, Task 2.3 Soil and Groundwater Screening Criteria*.

Sediment Phthalates Work Group. 2007. *Summary of Findings and Recommendations*. Prepared by: City of Tacoma, City of Seattle, King County, Washington State Department of Ecology, U.S. Environmental Protection Agency, with assistance from Floyd Snider. September.

Sweet Edwards. 1984. Letter to Pat Wicks, Redmond, WA, re: *Isaacson Steel – Monitoring Wells*. Craig E. Wells, Geologist, Sweet, Edwards & Associates, Inc., Kelso, WA. December 7.

Technical Dryer. 1991. *Thompson-Isaacson Site Storm Drain Line and Soil Core Sampling Summary Report.* March 6.

Tokunaga, S. 2005. *Interaction of Anionic Pollutants with Soils – Sorption of As(III), As(V), Sb(III), Sb(V), Se(IV) Ions by Six Soils*. Proceedings of the 9th International Conference on Environmental Science and Technology. Rhodes Island, Greece. September.

USGS. 1983. *7.5-Minute Topographic Map, Seattle, Washington Quadrangle*. U.S. Geological Survey.

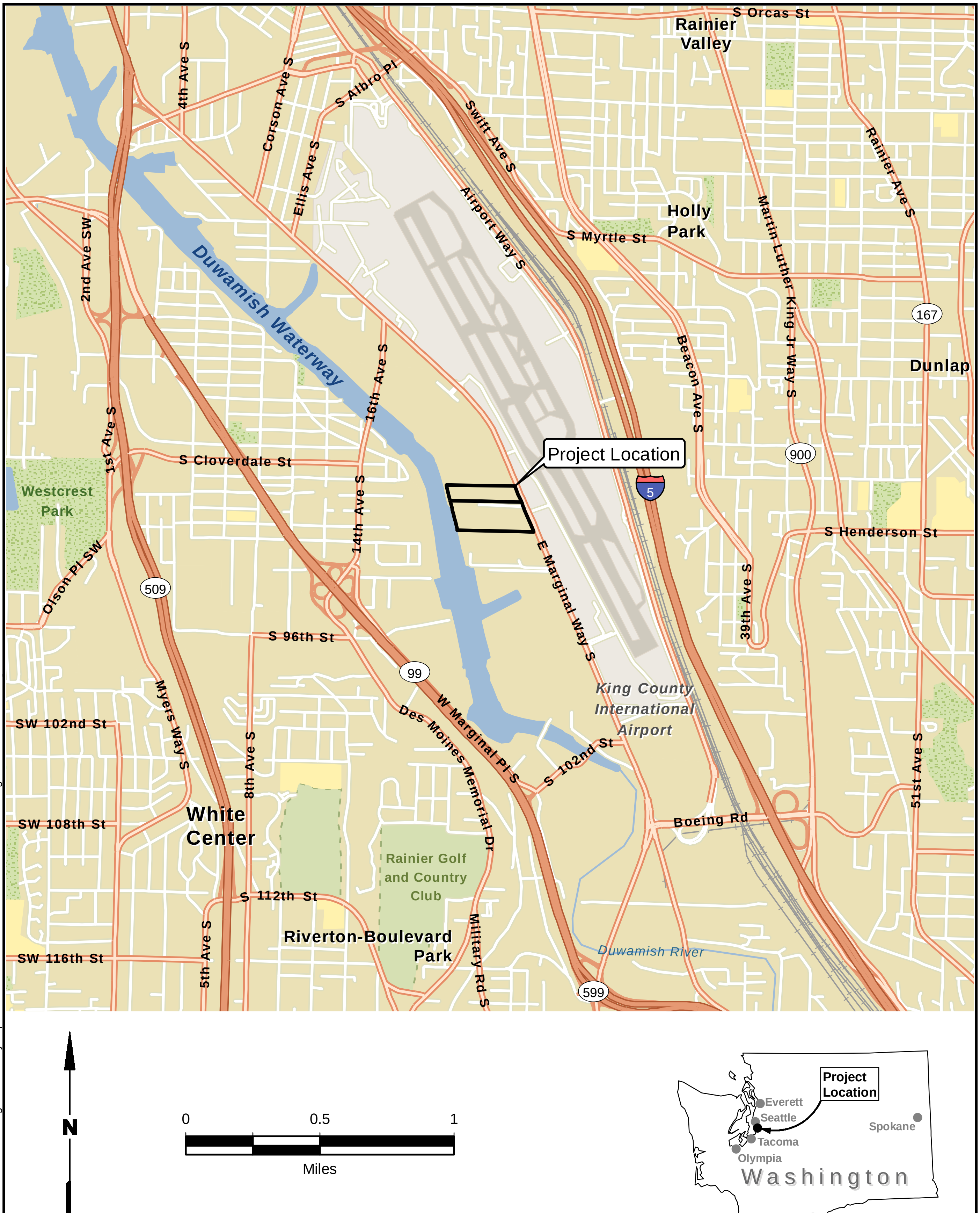
Wicks. 1984a. *Project Description for Remedial Work*. June.

Wicks. 1984b. *Report on Remedial Project and Recommendation for Project Completion at Isaacson Corporation Property, 8541 East Marginal Way South, Seattle, Washington.* October.

Windward. 2010. *Lower Duwamish Waterway Remedial Investigation, Remedial Investigation Report, Final*. For submittal to the U.S. Environmental Protection Agency, Region 10, Seattle, Washington and the Washington State Department of Ecology, Northwest Field Office, Bellevue, Washington. Prepared for the Lower Duwamish Waterway Group by Windward Environmental LLC. July 9.

Windward. 2003. *Phase I Remedial Investigation Report, Final*. Prepared for The Lower Duwamish Waterway Group by Windward Environmental, LLC, Seattle, Washington.

Van den Berg, M., Birnbaum, L.S., Denison, M., De Vito, M., Farland, W., Feeley, M., Fiedler, H., Hakansson, H., Hanberg, A., Haws, L., Rose, M., Safe, S., Schrenk, D., Tohyama, C., Tritscher, A., Toumisto, J., Tysklind, M., Walker, N., and Peterson, R.E. 2006. *The 2005 World Health Organization Reevaluation of Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds*: Toxicological Sciences, v. 93(2), p. 223-241.



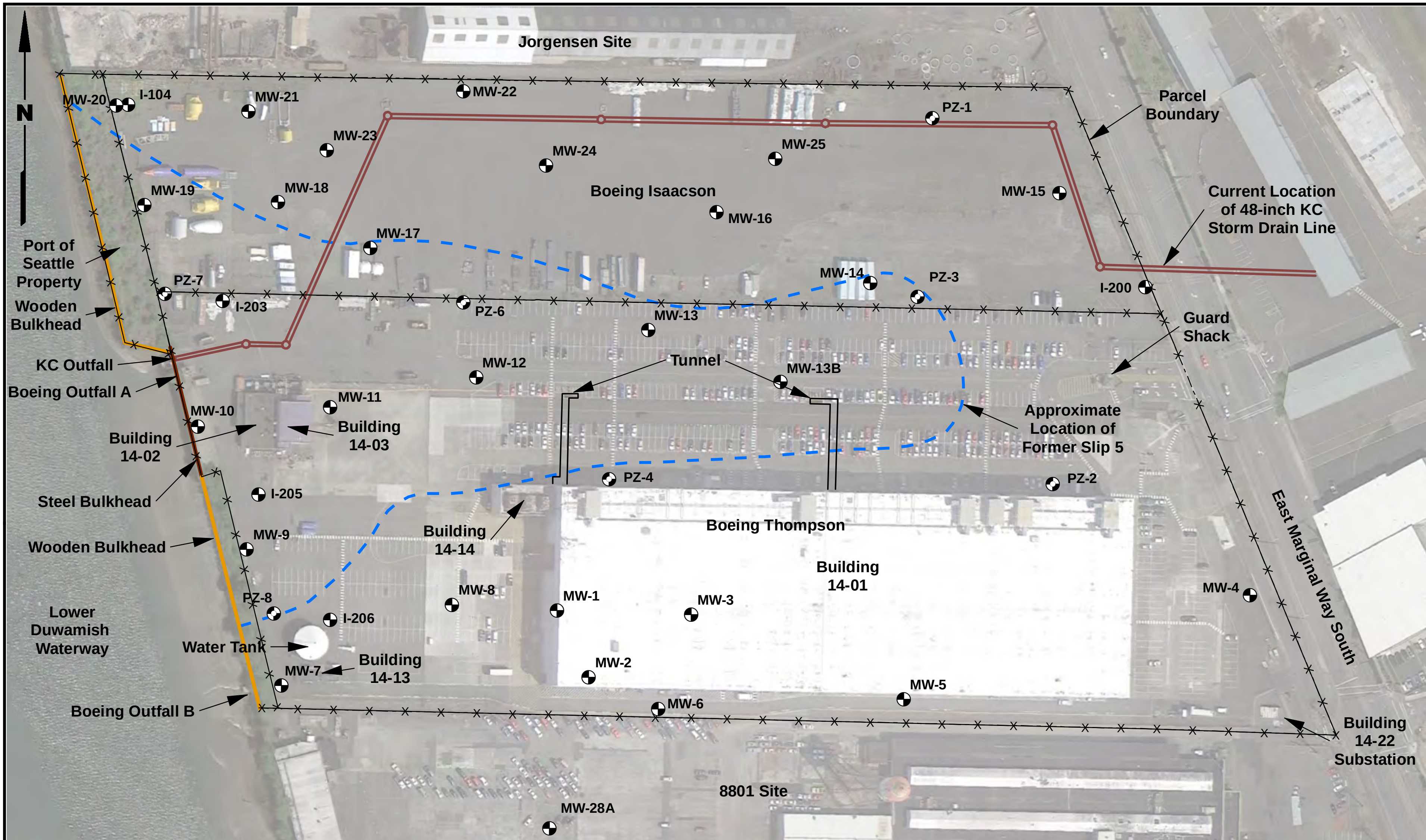

Data Source: Esri 2012

G:\Projects\025\190\213\013\RI\Figure01VicinityMap.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

LANDAU ASSOCIATES

| | | |
|---|---|---|
| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Vicinity Map** | Figure<br>1 |

G:\Projects\025\190\213\013\RI\Figure02CurrentSiteFeatures.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet




Legend

- Monitoring Well
- Piezometer
- Fence

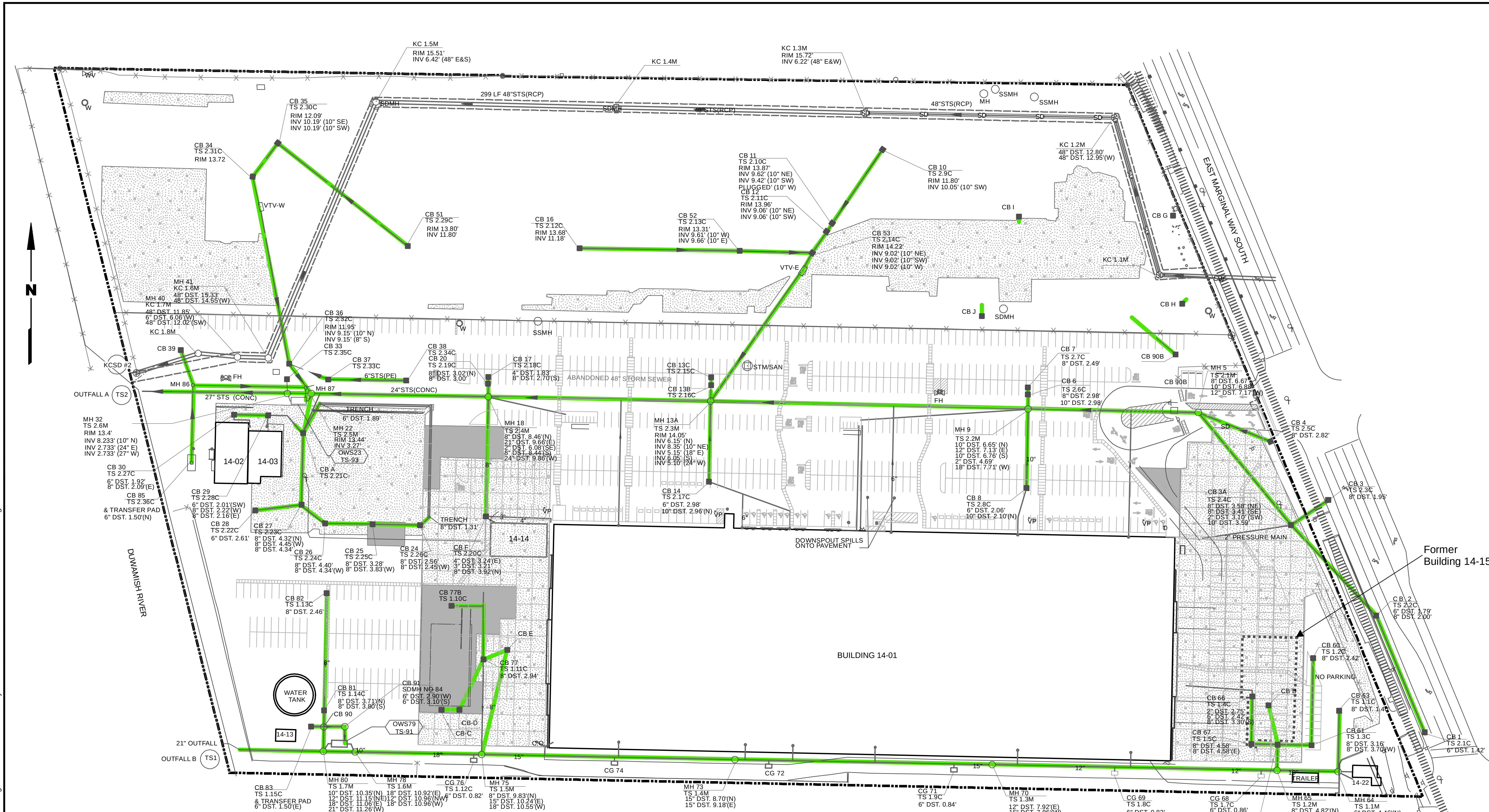
0 200 400

Scale in Feet

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

LANDAU ASSOCIATES

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




## Legend

- Existing Catch Basin
- Existing Storm Drain Line
- Boeing Property Boundary
- New Concrete (Replaced 2011)
- Concrete Area
- Former Building

## Notes

1. See Figure 2 for fence locations.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

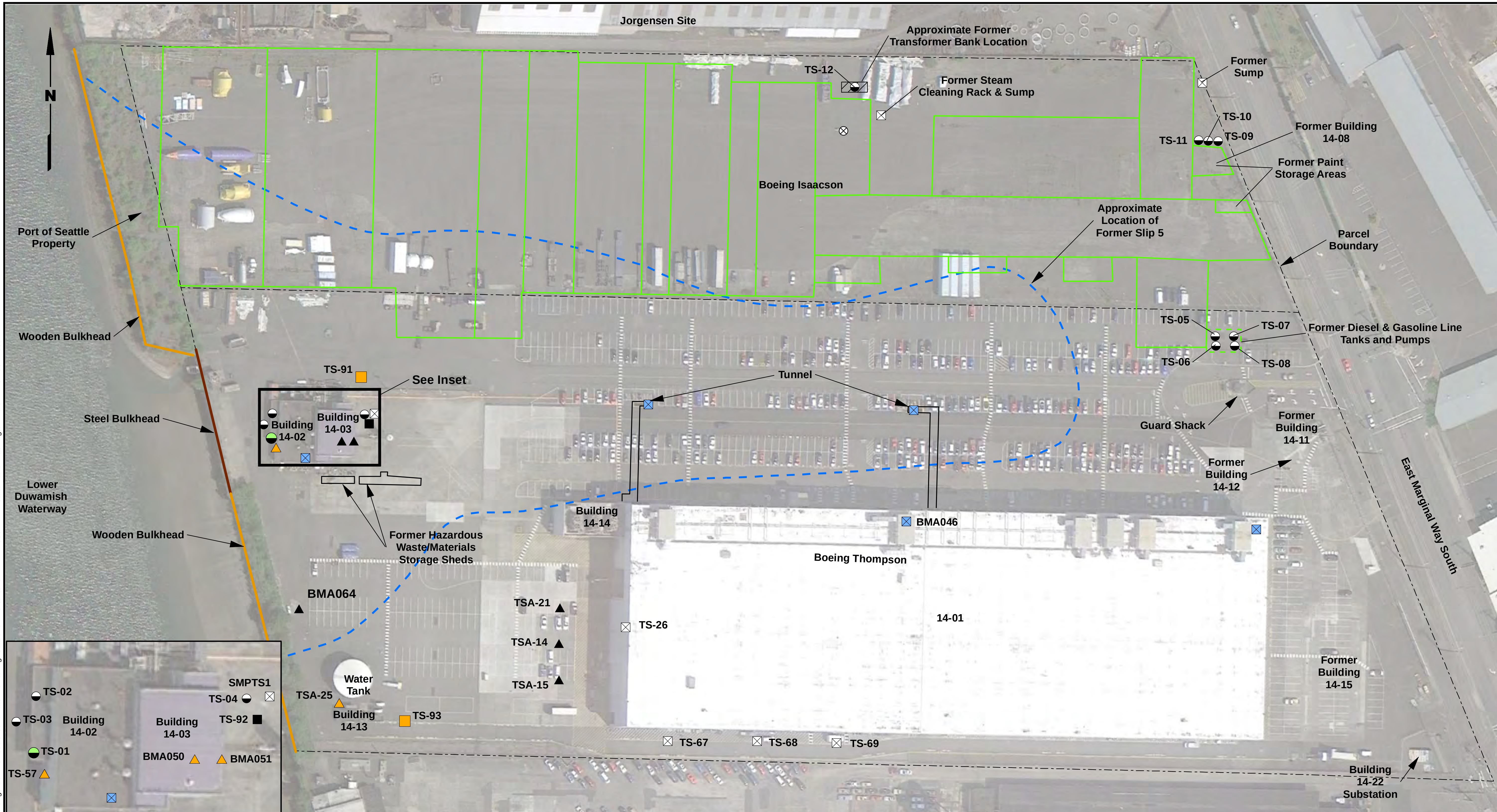
Source: Boeing 2012

0 120 240
Scale in Feet

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Current Storm Drain System** | Figure<br>3 |
|---|---|---|

LANDAU ASSOCIATES

G:\Projects\025\190\021\3013\RI\Figure03CurrentStormDrainSystem.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




G:\Projects\025\190\213\013\RI\Figure04PreviousGroundwaterMonitoringLocations.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

Legend

- ▲ Former Aboveground Storage Tank (AST) Location
- △ Existing AST That is Used
- ■ Former Oil/Water (OWS) Separator
- Existing OWS that is Used
- Former Sump Location
- Existing Sump Location
- Former Underground Storage Tank (UST) Location
- Existing UST That is Not Used
- Former Boiler Tank Location
- Former Isaacson Building/ Building 14-05

0 120 240

Scale in Feet

Note

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

Data Source: Google Earth Pro, 2012; King County Parcel Data

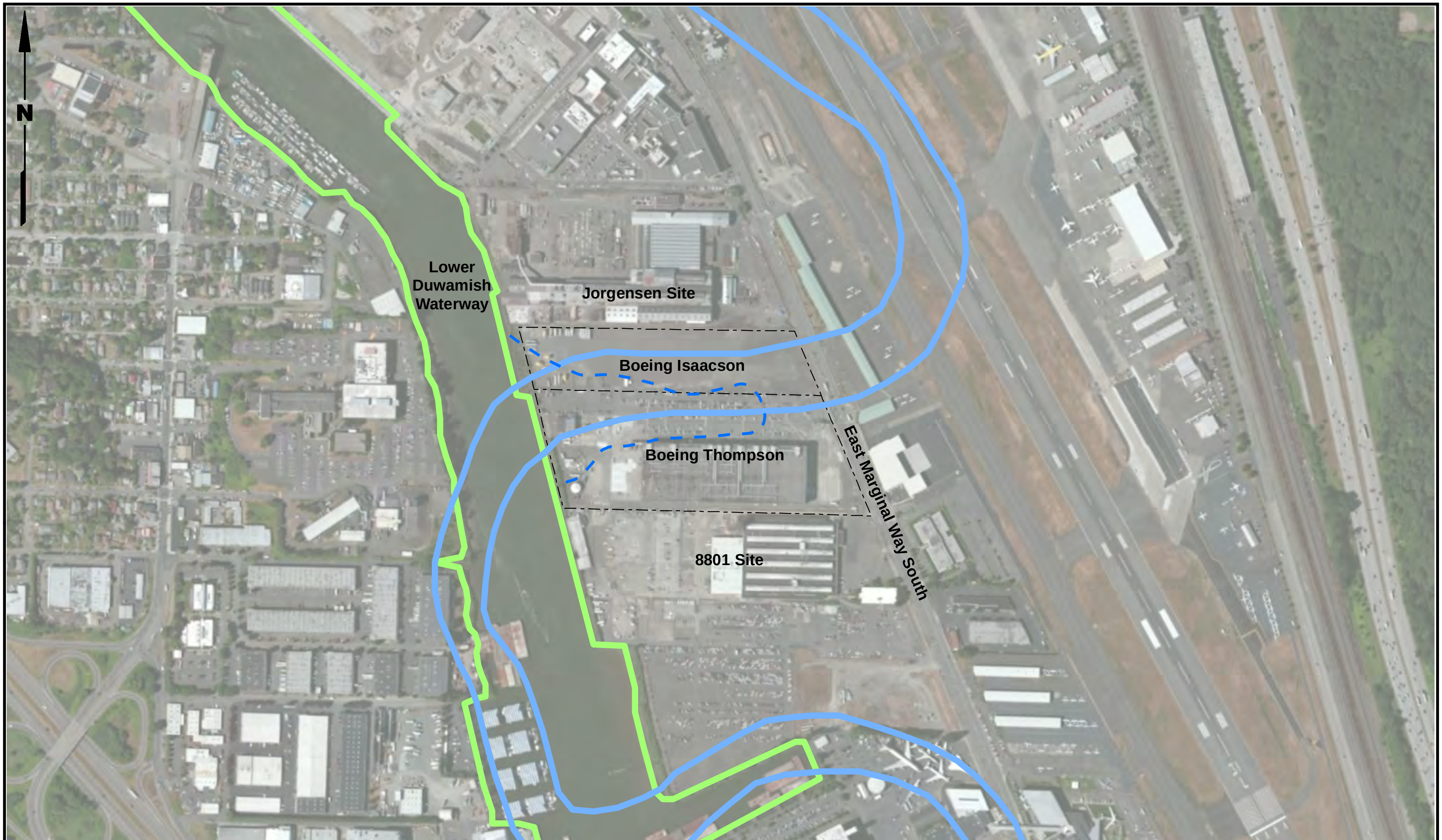
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Approximate Former and Existing UST, AST, OWS and Sump Locations**

Figure
4

G:\Projects\025\190\213\013\RI\Figure05HistoricRiverShoreline.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet




Legend

- Current Duwamish Waterway Shoreline
- Pre-1900 Duwamish River Shoreline
- Boeing Property Boundary
- Approximate Location of Former Slip 5

0 700 1,400

Scale in Feet

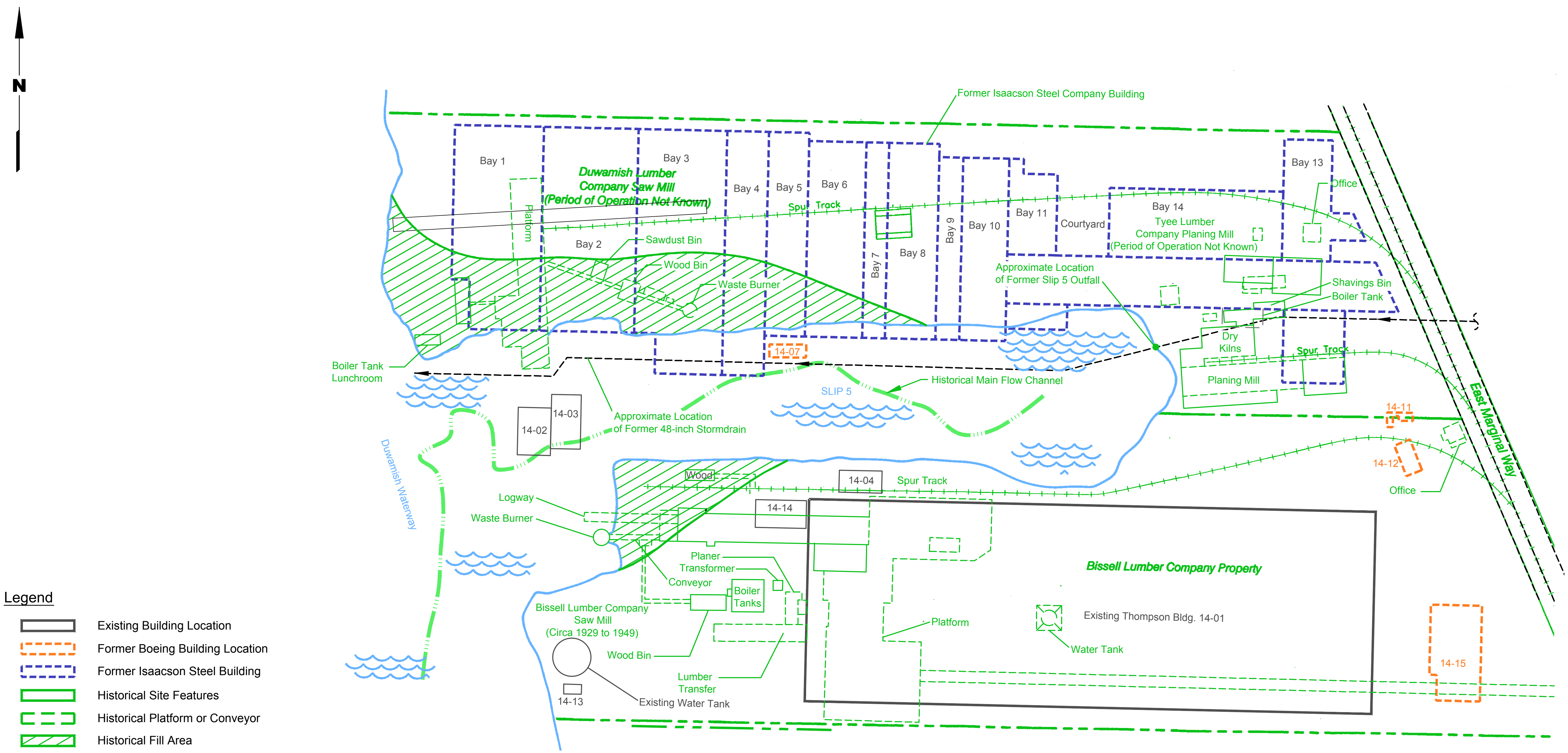
Data Sources: Esri World Imagery; King County Parcel Data

Note

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

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Historical Duwamish River Shoreline** | Figure<br>5 |
|---|---|---|




Legend

- Existing Building Location
- Former Boeing Building Location
- Former Isaacson Steel Building
- Historical Site Features
- Historical Platform or Conveyor
- Historical Fill Area
- Original Slip 5 Shoreline Based on 1936 Aerial Photo
- Historical Main Flow Stream Channel
- Historical Storm Drain Alignment
- Property Boundary

Note

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

Source: 1929 and 1949 Sanborn® Maps

0 150 300
Scale in Feet



LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | **Historical Site Features** | Figure 6 |
| --- | --- | --- |

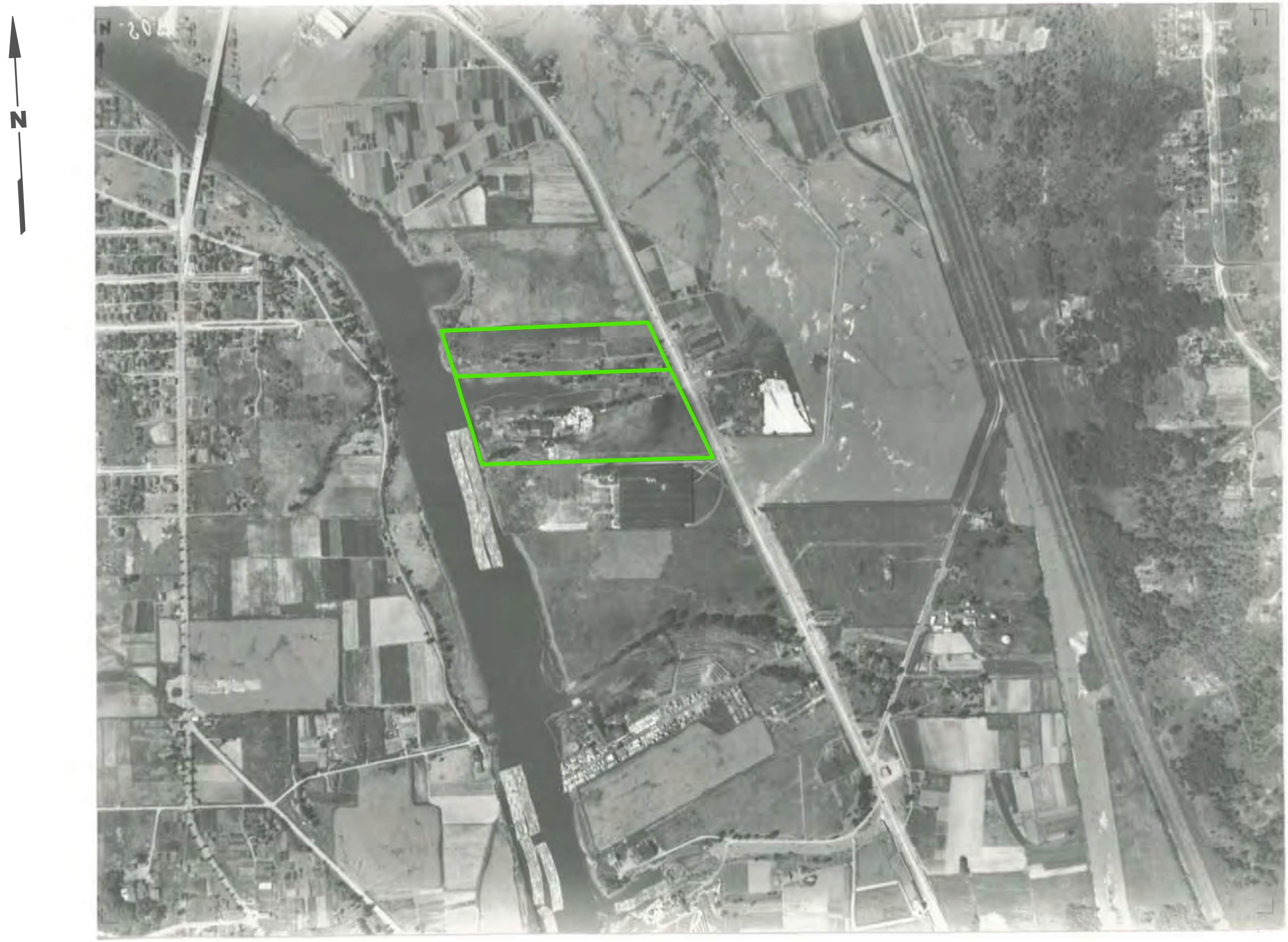

Source: ERM Report Figure 16, 2002





| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Slip 5 Fill History** | Figure<br>7 |
|---|---|---|

G:\Projects\025\190\213\013\RI\Figure08_1936AerialPhoto.mxd 3/19/2014 Unknown

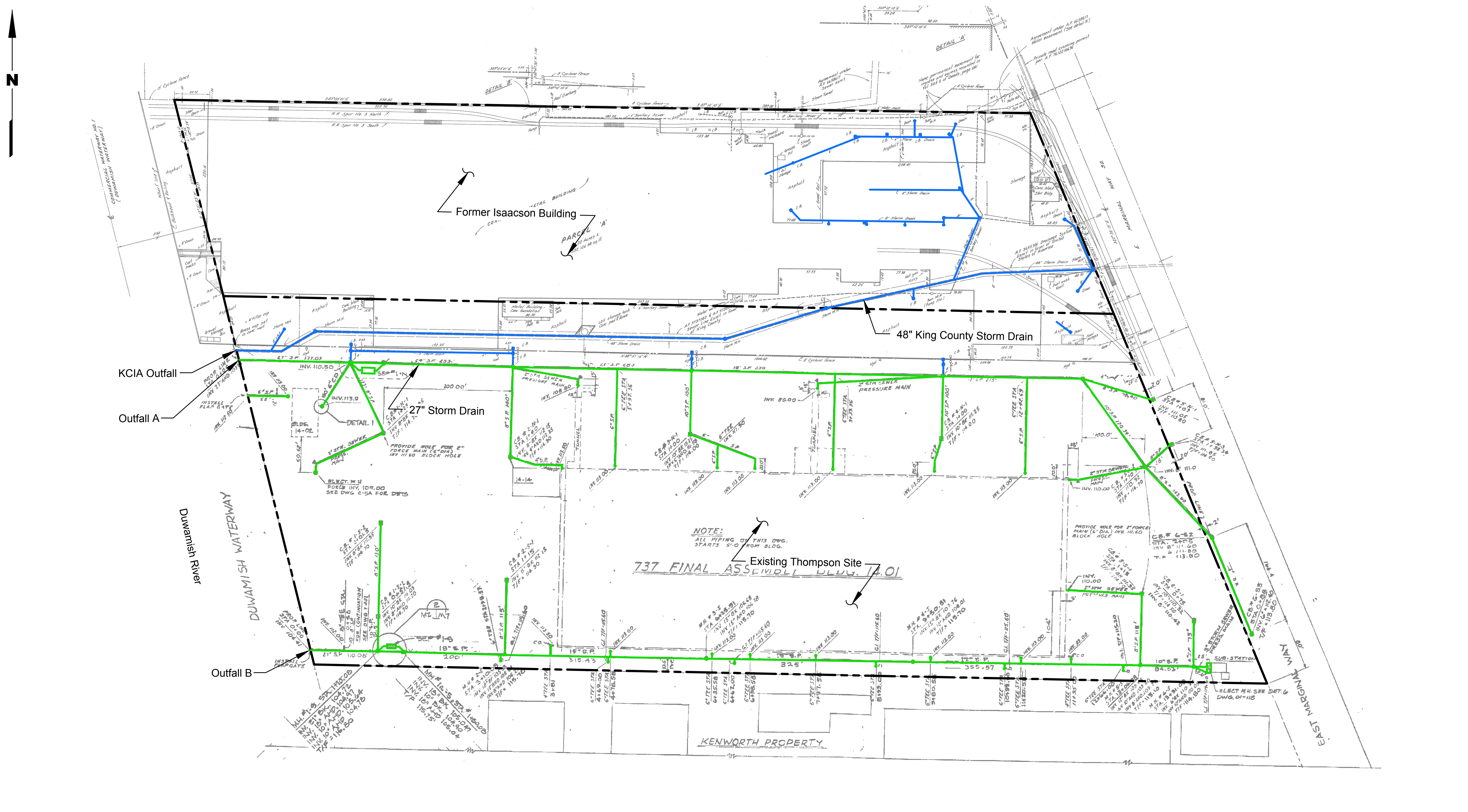



Legend

Approximate Site Boundary

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **1936 Aerial Photograph** | Figure<br>8 |
|---|---|---|




## Legend

Historical Storm Drain Location
Austin Associates 1966 (Revised 1999)

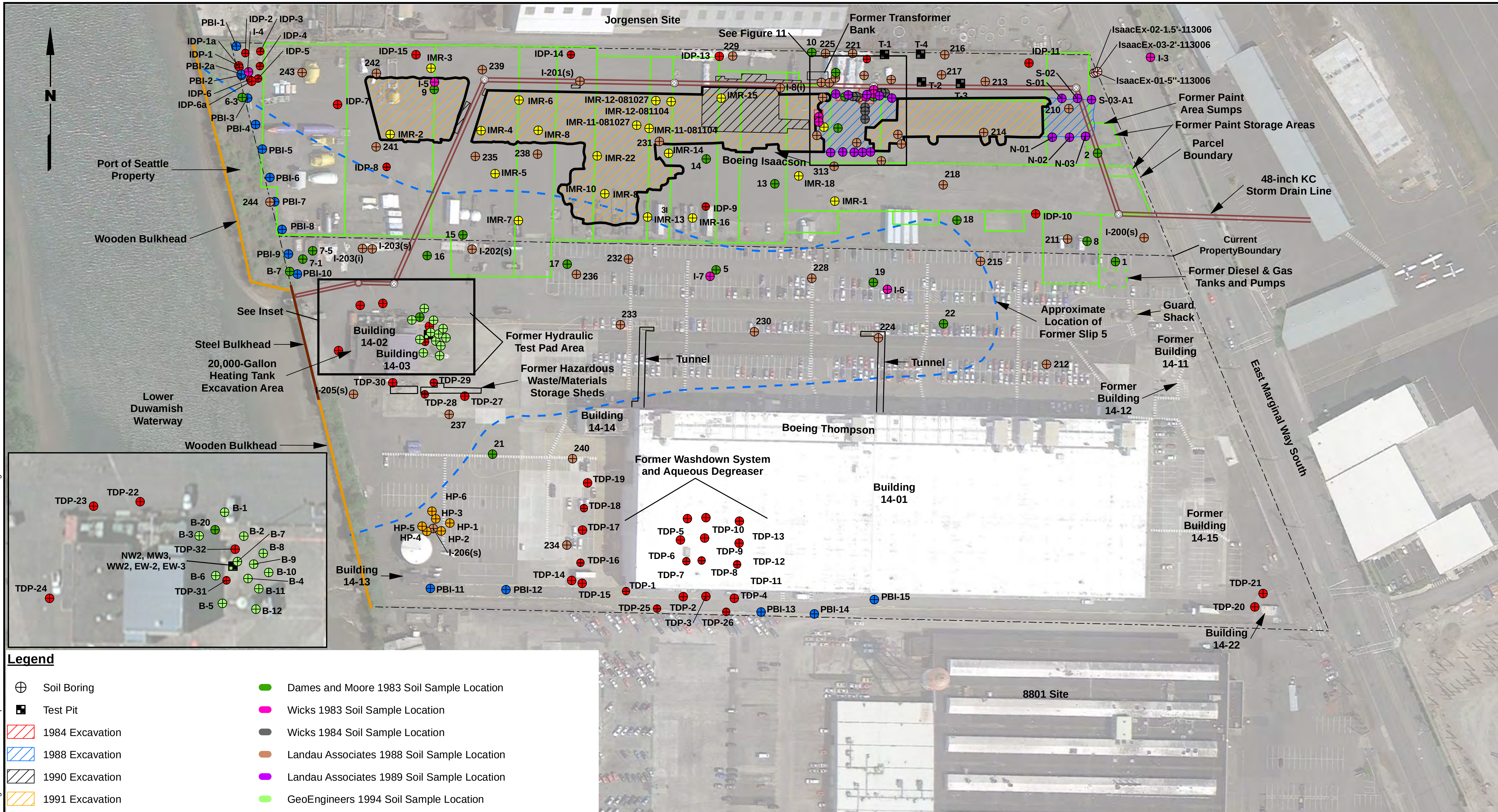
Historical Storm Drain Location
Horton Dennis & Associates, Inc 1983

0 150 300
Scale in Feet

Source: Austin Associates 1966 (Revised 1999), Horton Dennis & Associates, Inc 1983

| | | |
|---|---|---|
| Boeing<br>Isaacson - Thompson Site<br>Tukwila, Washington | **Historical Storm Drain Configuration** | Figure<br>9 |

LANDAU ASSOCIATES





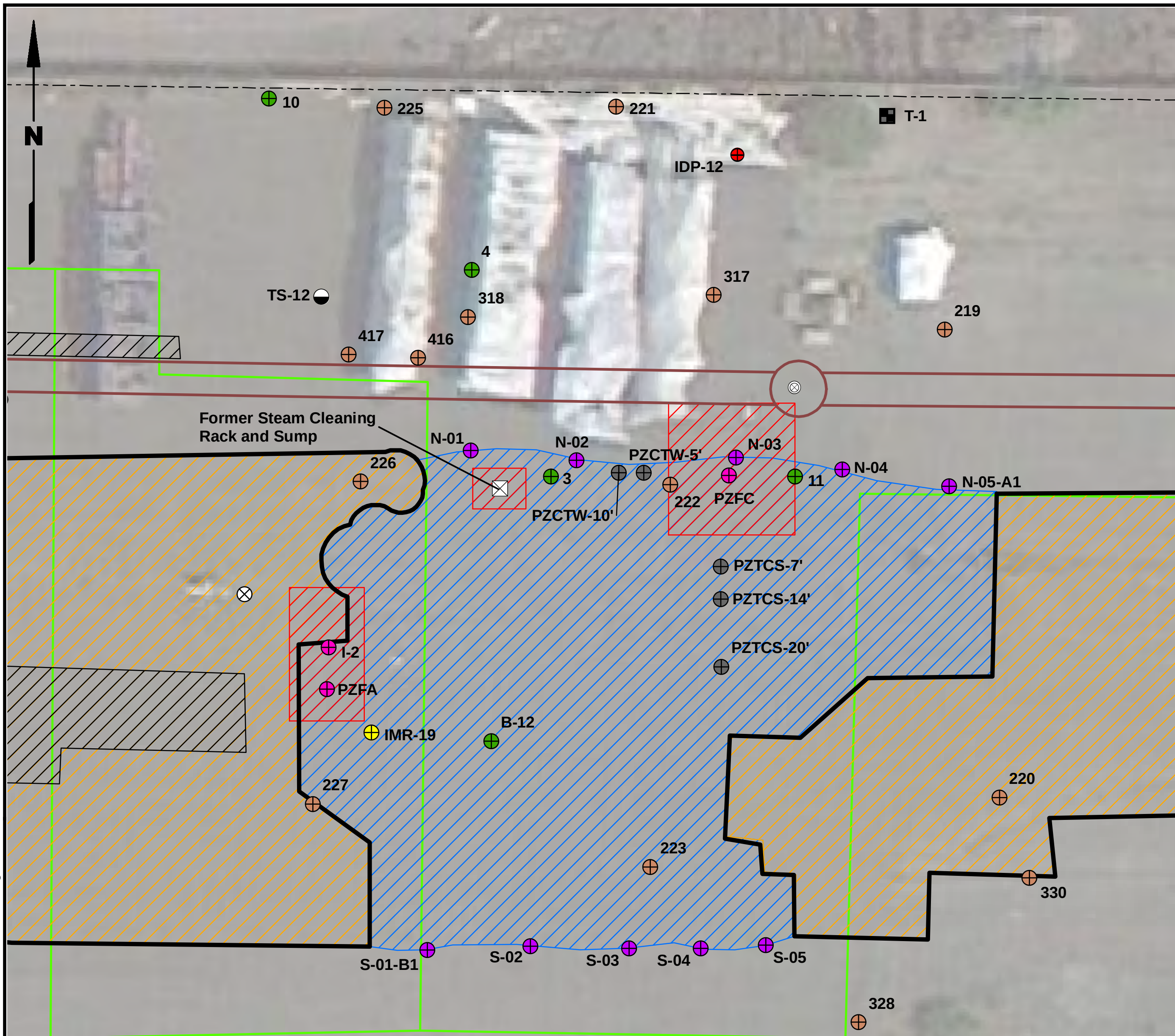

Data Sources: Google Earth Pro, 2012; King County Parcel Data

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

G:\Projects\025\190\213\013\RI\Figure10PreviousSoilSampleLocations.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | Previous Soil Sampling Locations | Figure 10 |
|---|---|---|




## Legend

- Former Sump Location
- Former Underground Storage Tank (UST) Location
- Former Boiler Tank Location
- Test Pit
- Soil Boring
- Dames and Moore 1983 Soil Sample Location
- Wicks 1983 Soil Sampling Location
- Wicks 1984 Soil Sampling Location
- Landau Associates 1988 Soil Sampling Location
- Landau Associates 1989 Soil Sample Location
- Landau Associates 2009 Post-Excavation Soil Sampling Location
- Landau Associates 2008/2009 Phase II ESA Soil Sampling Location
- 1984 Excavation
- 1988 Excavation
- 1990 Excavation
- 1991 Excavation
- Current Extent of Stabilized Soil Material

## Note

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

0 30 60

Scale in Feet

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

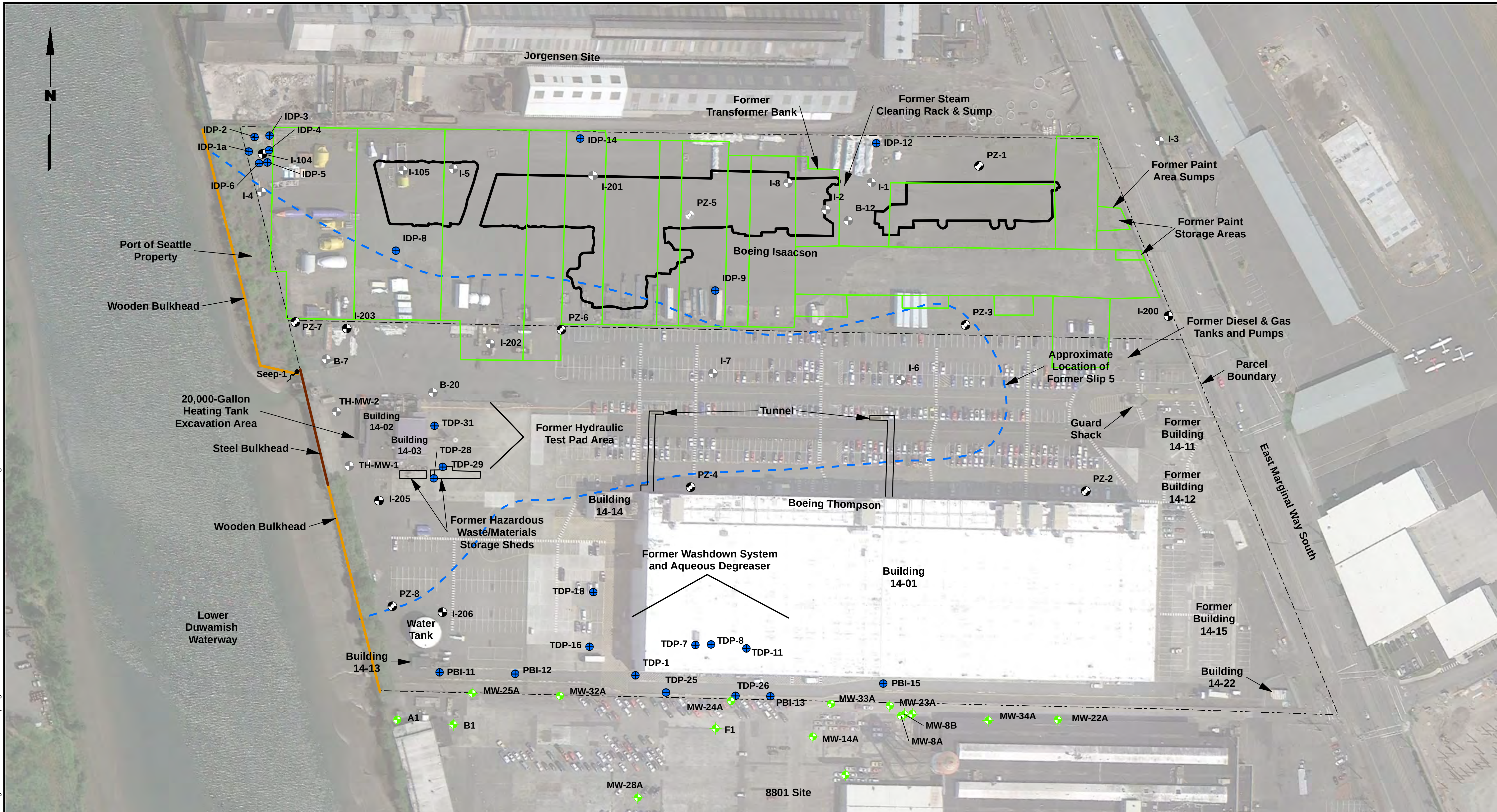
G:\Projects\025\190\213\013\RI\Figure11PreviousSoilSamplesInset.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Previous Soil Sampling Locations Detail**

Figure 11




## Legend

- Direct-Push Groundwater Sample Location
- Existing Monitoring Well Location
- Existing Piezometer Location
- Decommissioned or Destroyed Monitoring Well
- 8801 Site Groundwater Sampling Locations
- Seep
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material
- Former Isaacson Building/Building 14-05

0 140 280

Scale in Feet

Note

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

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

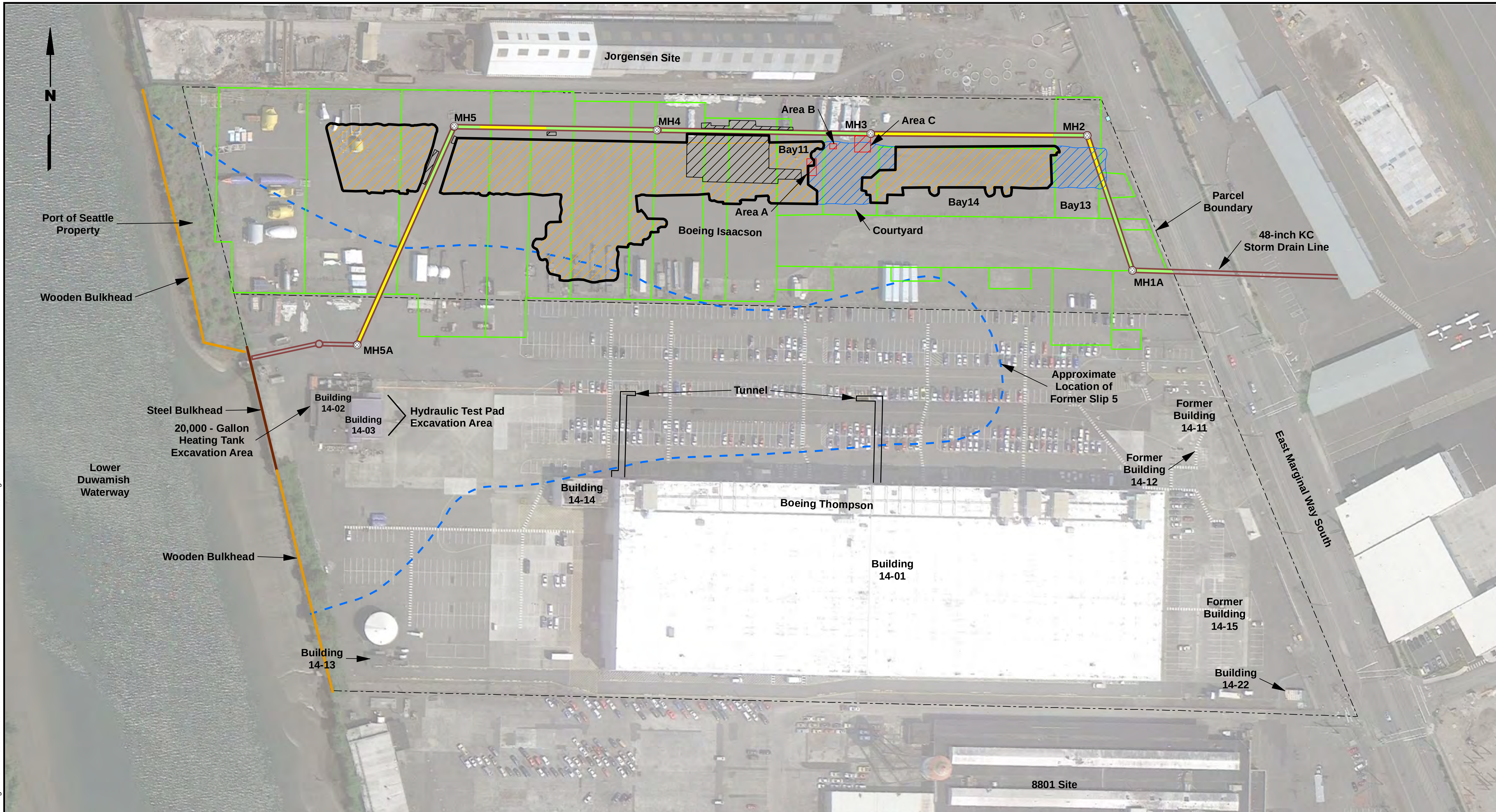
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Previous Groundwater Monitoring Locations**

Figure 12

G:\Projects\025\190\213\013\RI\Figure12PreviousGWSamplingLocations.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet




G:\Projects\025\190\213\013\RI\Figure13PreviousRemediationAreas.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

**Legend**

- 1984 Excavation
- 1988 Excavation
- 1990 Excavation
- 1991 Excavation
- Approximate Location of Former Slip 5
- Former Isaacson Building/ Building 14-05
- Backfilled With Imported Soil
- Backfilled With Native Soil < 200 ppm Arsenic
- Current Extent of Stabilized Soil Material

0 130 260

Scale in Feet

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

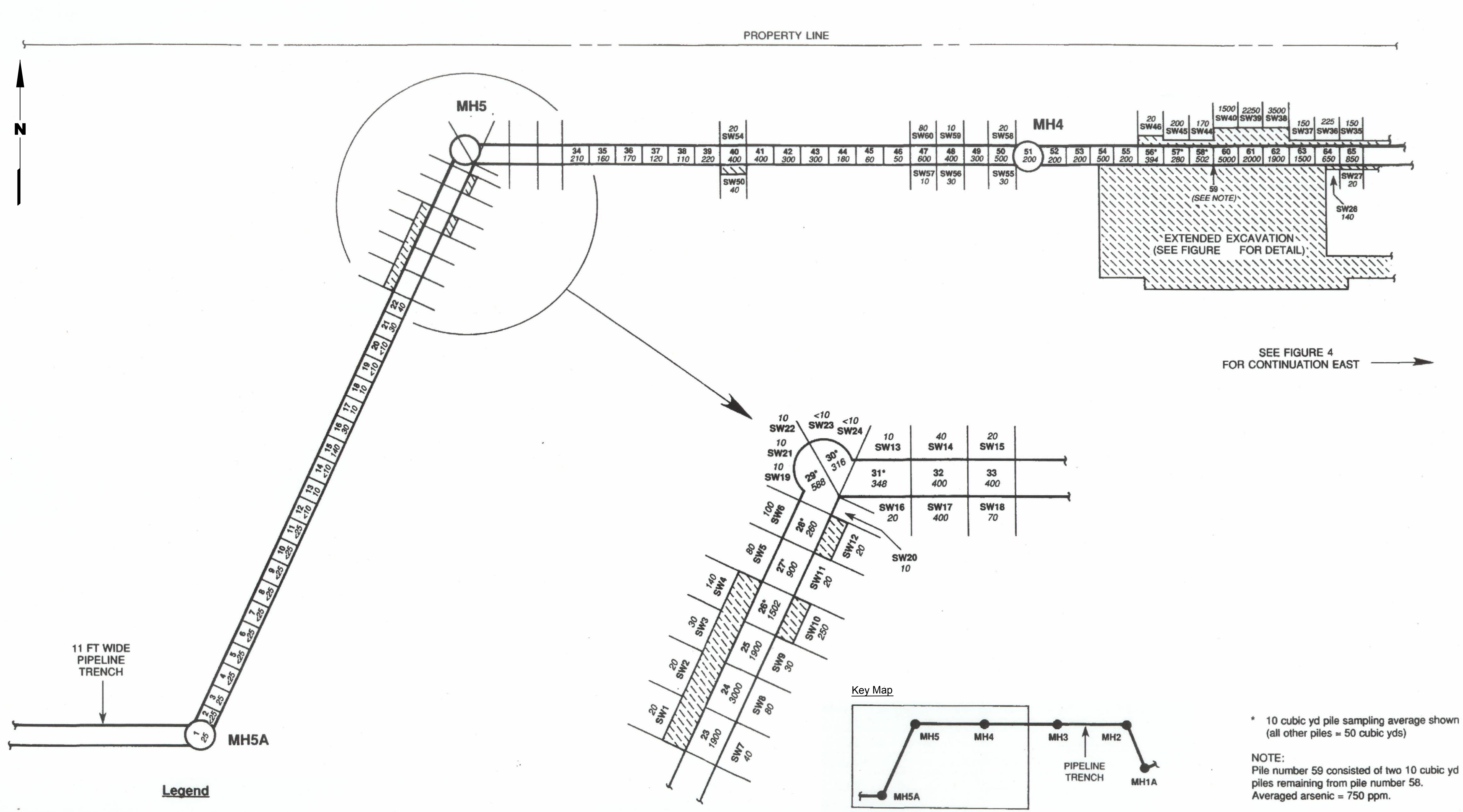
Data Sources: Google Earth Pro, 2012; King County Parcel Data

LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Previous Remediation Areas**

Figure
13




## Legend

| | | | |
|---|---|---|---|
| 126 | Trench Sample Number and Location | *2250* | Arsenic Value (ppm) Screen Test Values |
| SW60 | Sidewall Sample Number and Location | | Excavated area |

0 50 100
Scale in Feet

Source: Technical Dryer Inc. 1991

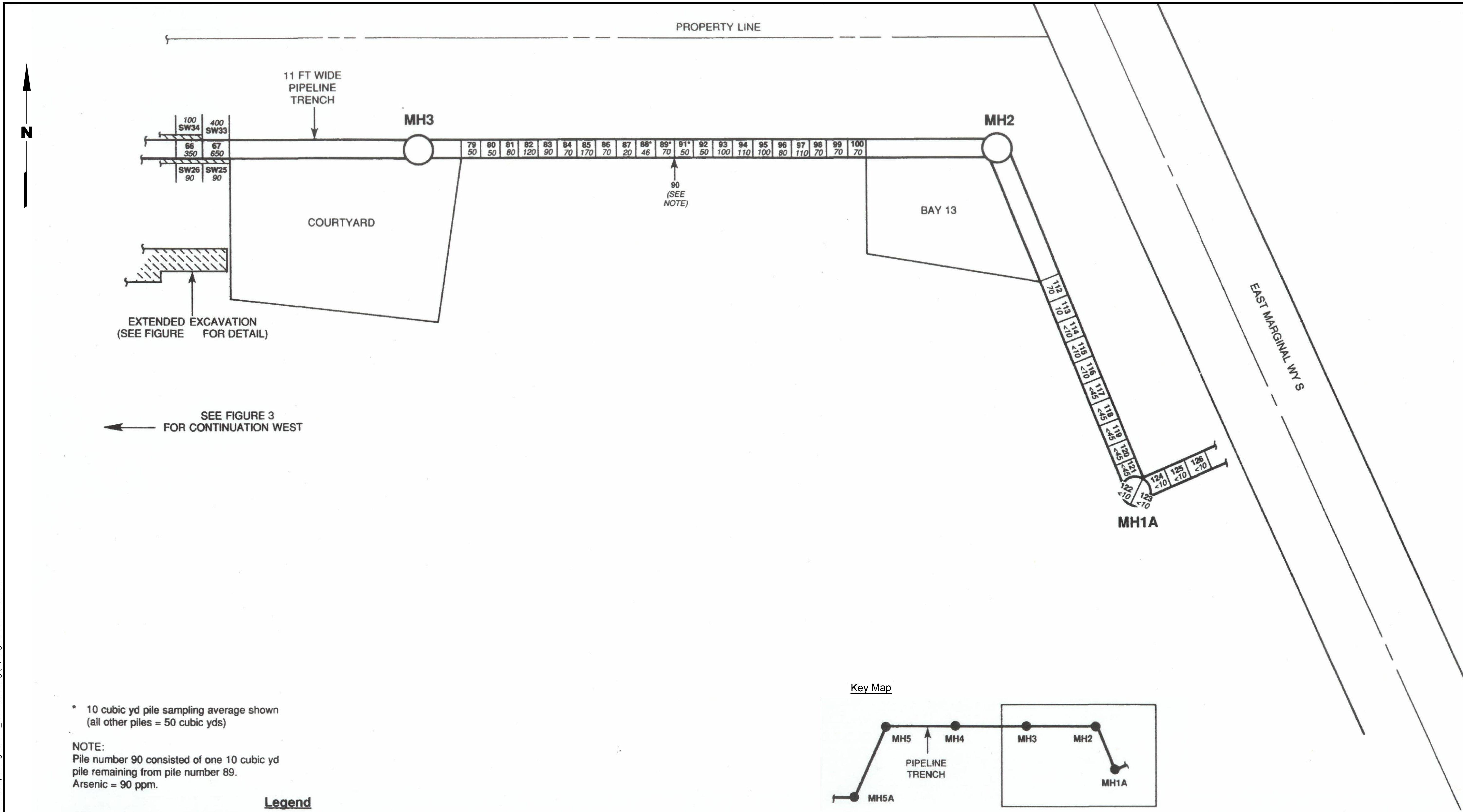
I:\025\190\212.012\RI Report\Figure 14A_14B 1989.dwg (A) "Figure 14A" 1/15/2013

LANDAU ASSOCIATES

Boeing
Isaacson - Thompson Site
Tukwila, Washington

**1989/1990 Storm Drain Line Excavation Sample Locations and Results - West**

Figure
14A




* 10 cubic yd pile sampling average shown (all other piles = 50 cubic yds)

NOTE:
Pile number 90 consisted of one 10 cubic yd pile remaining from pile number 89.
Arsenic = 90 ppm.

**Legend**

| | | | |
|---|---|---|---|
| 26 | Trench Sample Number and Location | 2250 | Arsenic Value (ppm) Screen Test Values |
| SW33 | Sidewall Sample Number and Location | | Excavated area |

0 50 100
Scale in Feet

Source: Technical Dryer Inc. 1991

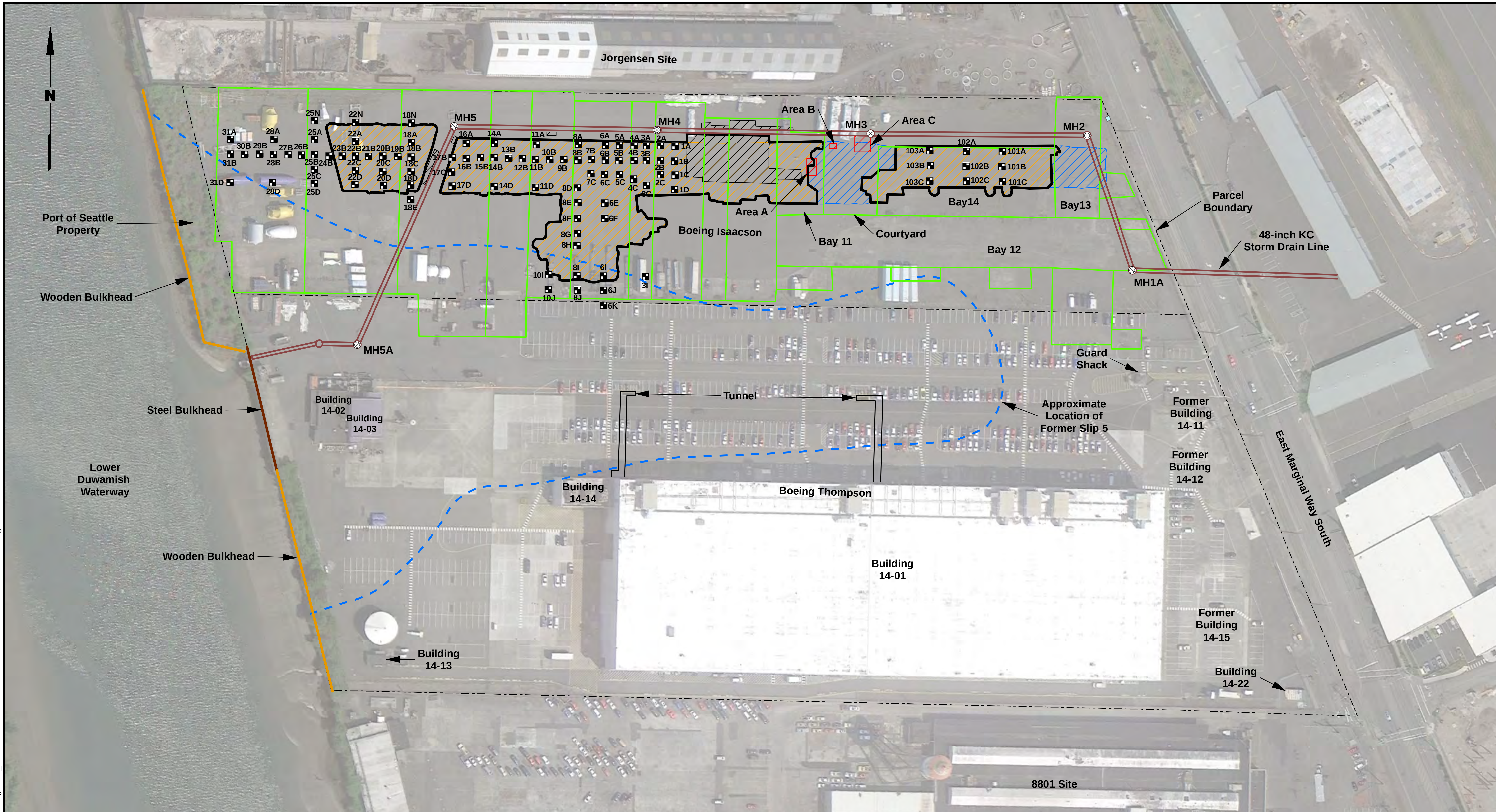
Landau Associates

Boeing
Isaacson - Thompson Site
Tukwila, Washington

**1989/1990 Storm Drain Line Excavation Sample Locations and Results - East**

Figure 14B

V:\025\190\212.012\RI Report\Figure 14A_14B 1989.dwg (A) "Figure 14B" 1/15/2013




G:\Projects\025\190\213\013\RI\Figure15_1989TestPits.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

**Legend**

- 1984 Excavation
- 1988 Excavation
- 1990 Excavation
- 1991 Excavation
- Approximate Location of Former Slip 5
- Former Isaacson Building/ Building 14-05
- 1989 Test Pit
- Current Extent of Stabilized Soil Material

Note

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

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

0 140 280

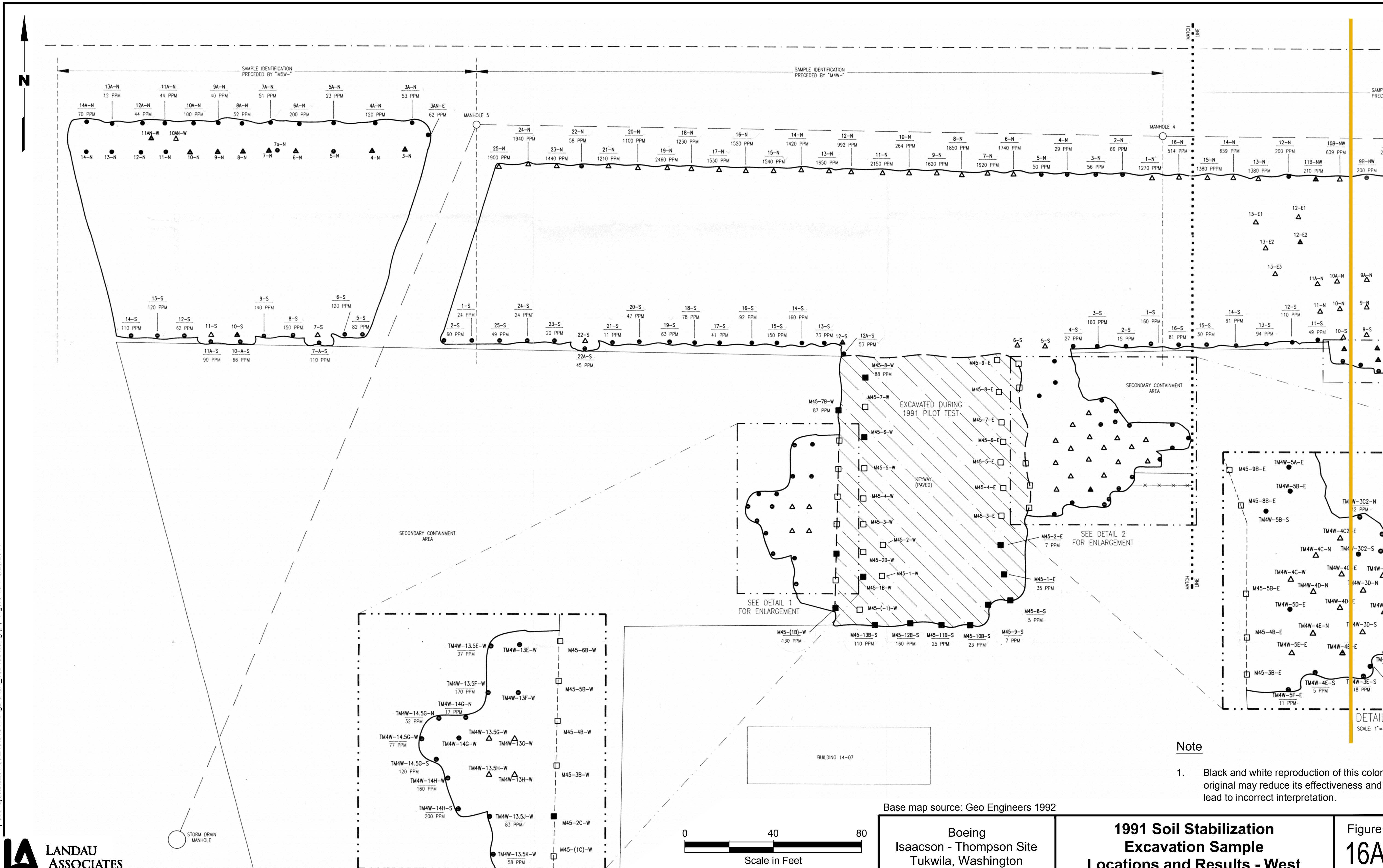
Scale in Feet

Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**1989/1990 Test Pit Locations**

Figure
15




## Note

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

Base map source: Geo Engineers 1992

0 40 80
Scale in Feet

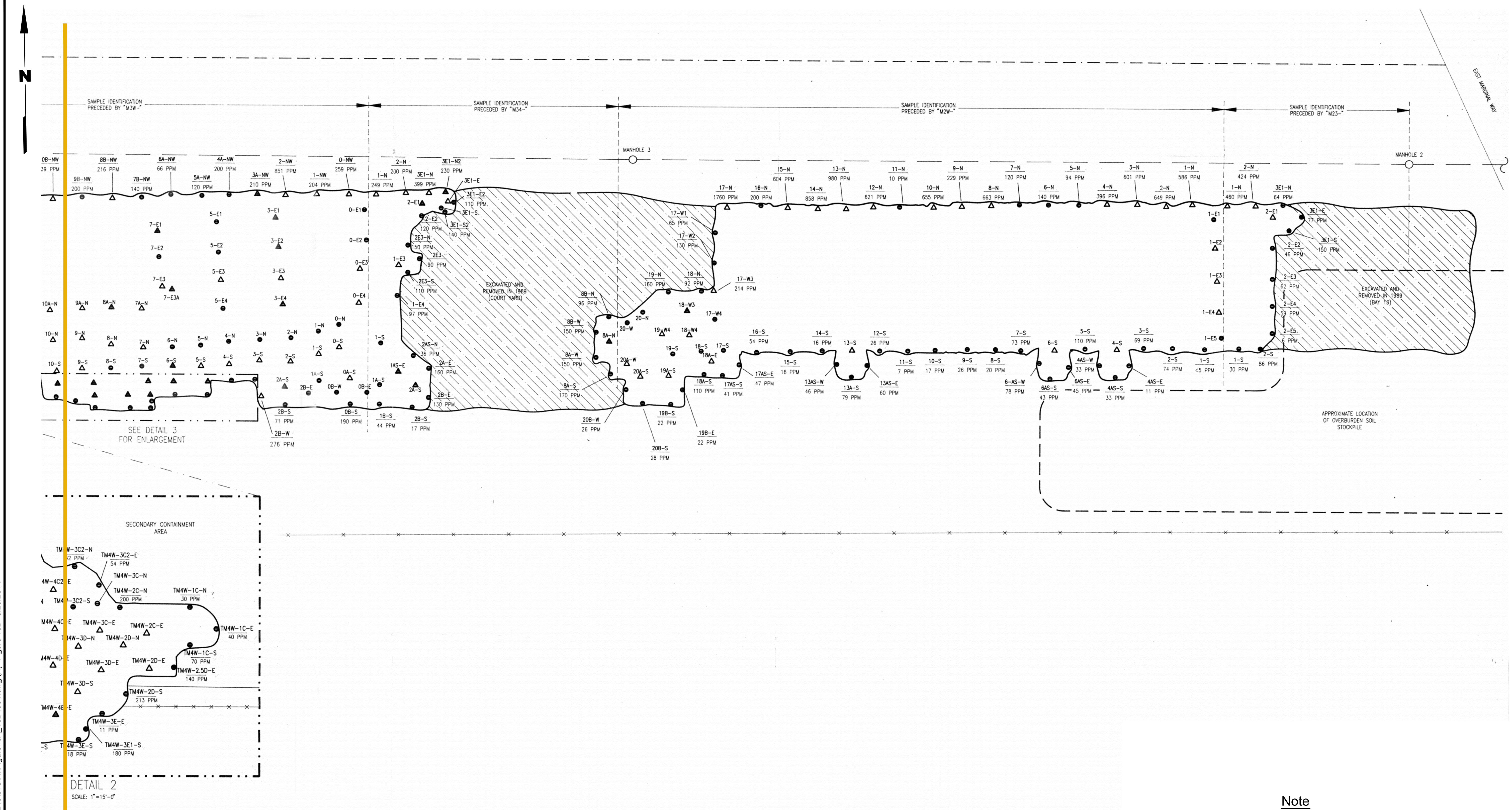
LANDAU ASSOCIATES

Boeing
Isaacson - Thompson Site
Tukwila, Washington

**1991 Soil Stabilization Excavation Sample Locations and Results - West**

Figure
16A

G:\Projects\025\190\213\013\RI\Figure16A_16B1991.dwg (A) "Figure 16A" 3/20/2014




## Note

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

Base map source: Geo Engineers 1992

0 40 80
Scale in Feet

Boeing
Isaacson - Thompson Site
Tukwila, Washington

**1991 Soil Stabilization Excavation Sample Locations and Results - East**

Figure 16B

LANDAU ASSOCIATES

G:\Projects\025\190\213\013\RI\Figure16A_16B1991.dwg (A) "Figure 16B" 3/20/2014


Surface Stations (by analysis group)

- Dioxins/Furans
- Only PCB Aroclors
- SMS List of COCs
- Subsurface Stations
- Navigation Channel

N

0 100 200 Feet

**Previous Sediment Sample Locations**

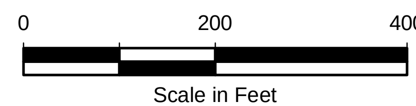
Boeing Isaacson-Thompson Site
Tukwila, Washington

| By: rhg | Date: 11/20/2013 | Project No. LY12160140 |
| --- | --- | --- |
| amec | | Figure **17** |

File path: P:\Boeing IT\LY11160060 Isaacson-Thompson 2011\Data\Historic and new sample locations\Sample Locations.mxd

G:\Projects\025\190\213\013\RI\Figure18CorrugatedPipeInvestigation.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet


Note
1. The 12-inch corrugated pipe is a footing drain for the retaining wall.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



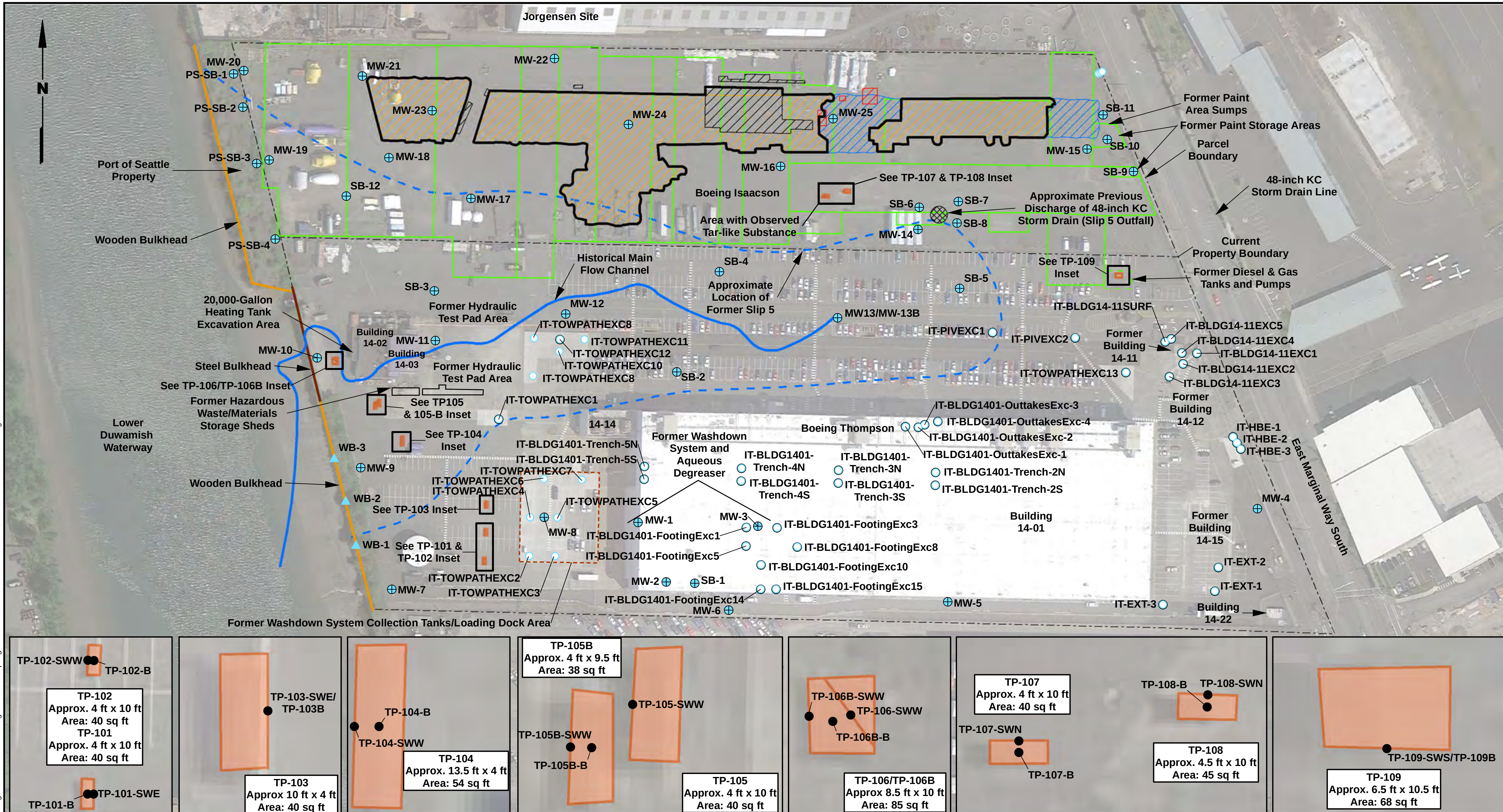

Data Source: Google Earth Pro, 2012; King County Parcel Data.

LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Corrugated Pipe Location**

Figure
18




**Legend**

- RI Soil Boring Sample Location
- RI Test Pit Soil Sampling Location
- RI Construction-Related Soil Sample Location
- RI Wooden Bulkhead Sample Location
- 1984 Excavation
- 1989 Excavation
- 1990 Excavation
- 1991 Excavation
- Former Isaacson Building/ Building 14-05
- Current Extent of Stabilized Soil Material
- Approximate Location of Former Slip 5

0 150 300
Scale in Feet

**Notes**

1. MW-13/MW-13B borings were advanced, but no wells were installed at these locations because of an obstruction. The actual monitoring well MW-13 was installed near boring location SB-4.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

LANDAU ASSOCIATES

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

| Boeing Isaacson-Thompson Site Tukwila, Washington | RI Soil Sampling Locations | Figure 19 |
|---|---|---|

G:\Projects\025\190\213\013\RI\Figure19RemedialInvestigationSoilSamplingLocations.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Thompson Wooden Bulkhead**
**Soil Sample Location - WB-1**
**March 3, 2012**

Figure
20

LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Thompson Wooden Bulkhead**
**Soil Sample Location - WB-2**
**March 3, 2012**

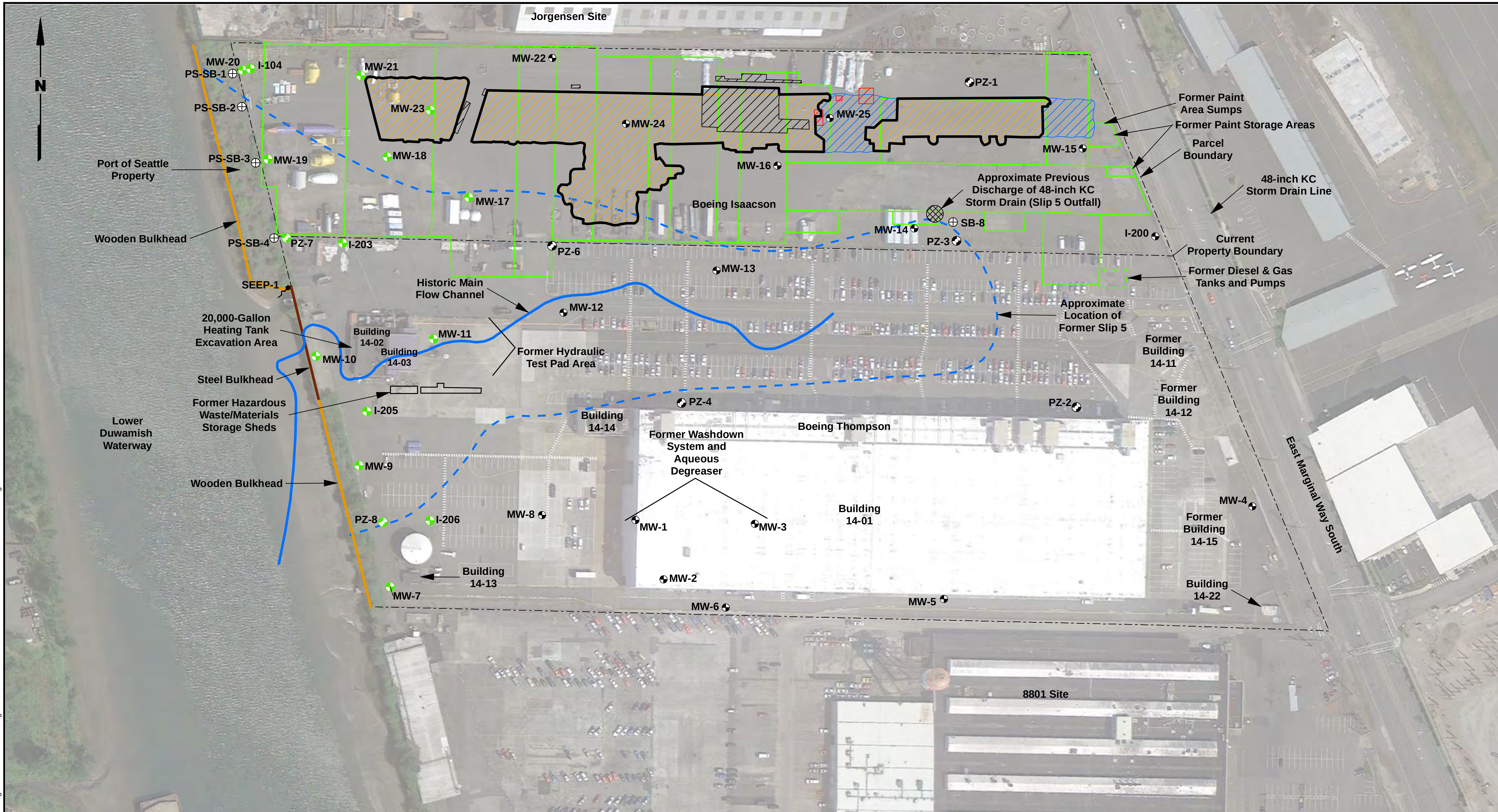
Figure
21

Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Thompson Wooden Bulkhead**
**Soil Sample Location - WB-3**
**March 3, 2012**

Figure
22




G:\Projects\025\190\213\013\RI\Figure23RIGWMonitoringLocations.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

**Legend**

- MW-22 Monitoring Well Location
- MW-10 Monitoring Well Location Where Groundwater Sampling Occured 1 Hour Before Low Tide and 1 Hour After a 0.0 Tide
- PZ-1 Piezometer Location
- PZ-7 Piezometer Location Where Groundwater Sampling Occured 1 Hour Before Low Tide and 1 Hour After a 0.0 Tide
- SB-8 Direct-Push Boring Groundwater Sample Location
- SEEP-1 Seep
- 1984 Excavation
- 1988 Excavation
- 1990 Excavation
- 1991 Excavation
- Current Extent of Stabilized Soil Material
- Former Isaacson Building (Building 14-05)
- Approximate Location of Former Slip 5

0 150 300

Scale in Feet

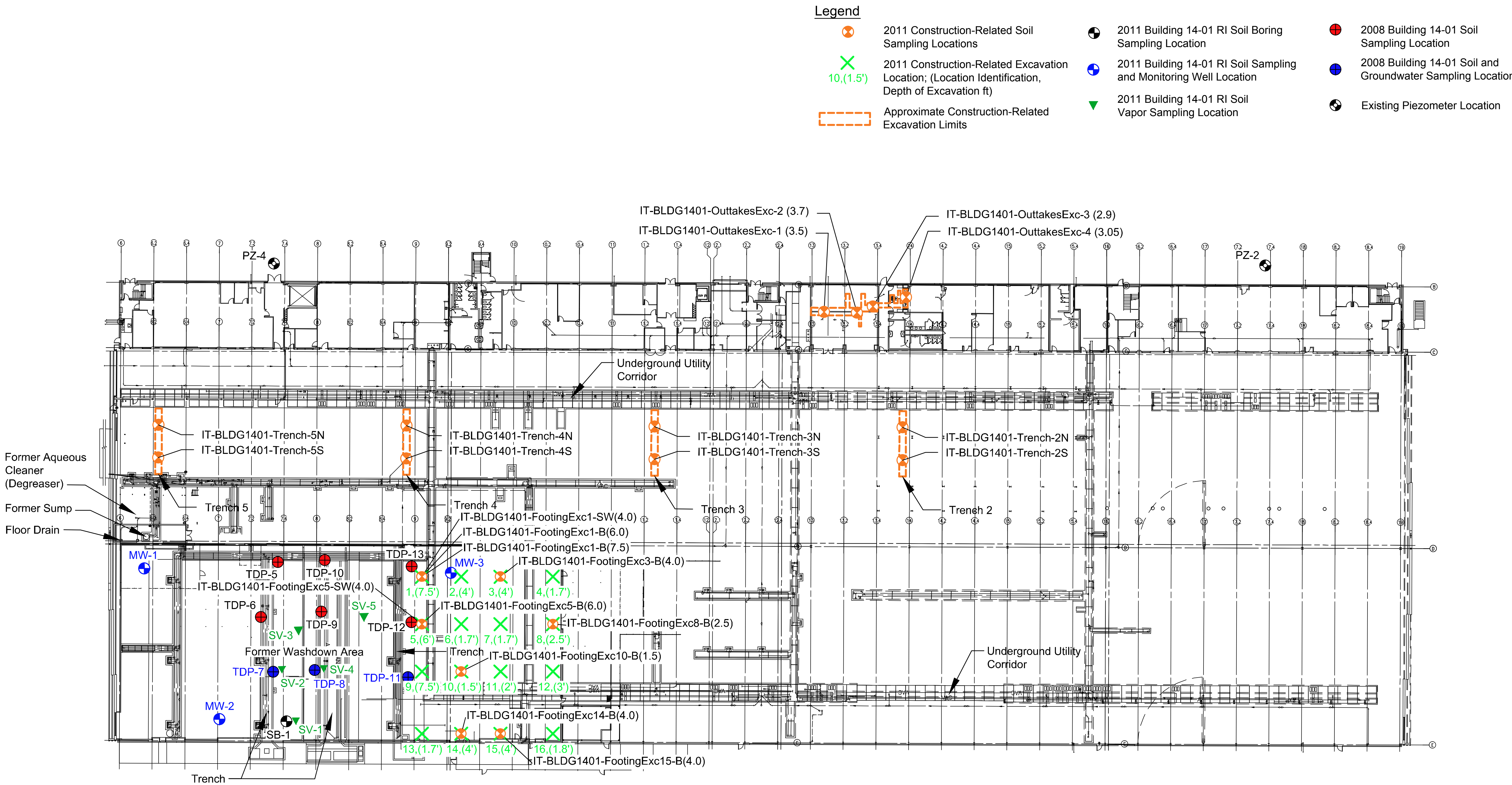
Data Sources: Google Earth Pro, 2012; King County Parcel Data

**Note**

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

LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | **RI Groundwater Monitoring Locations** | Figure 23 |
|---|---|---|




LANDAU ASSOCIATES, INC. | G:\Projects\025\190\213\013\RI\Figure24 Vapor.dwg (A) "Figure 24" 3/19/2014

Note

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

0 60 120

Scale in Feet

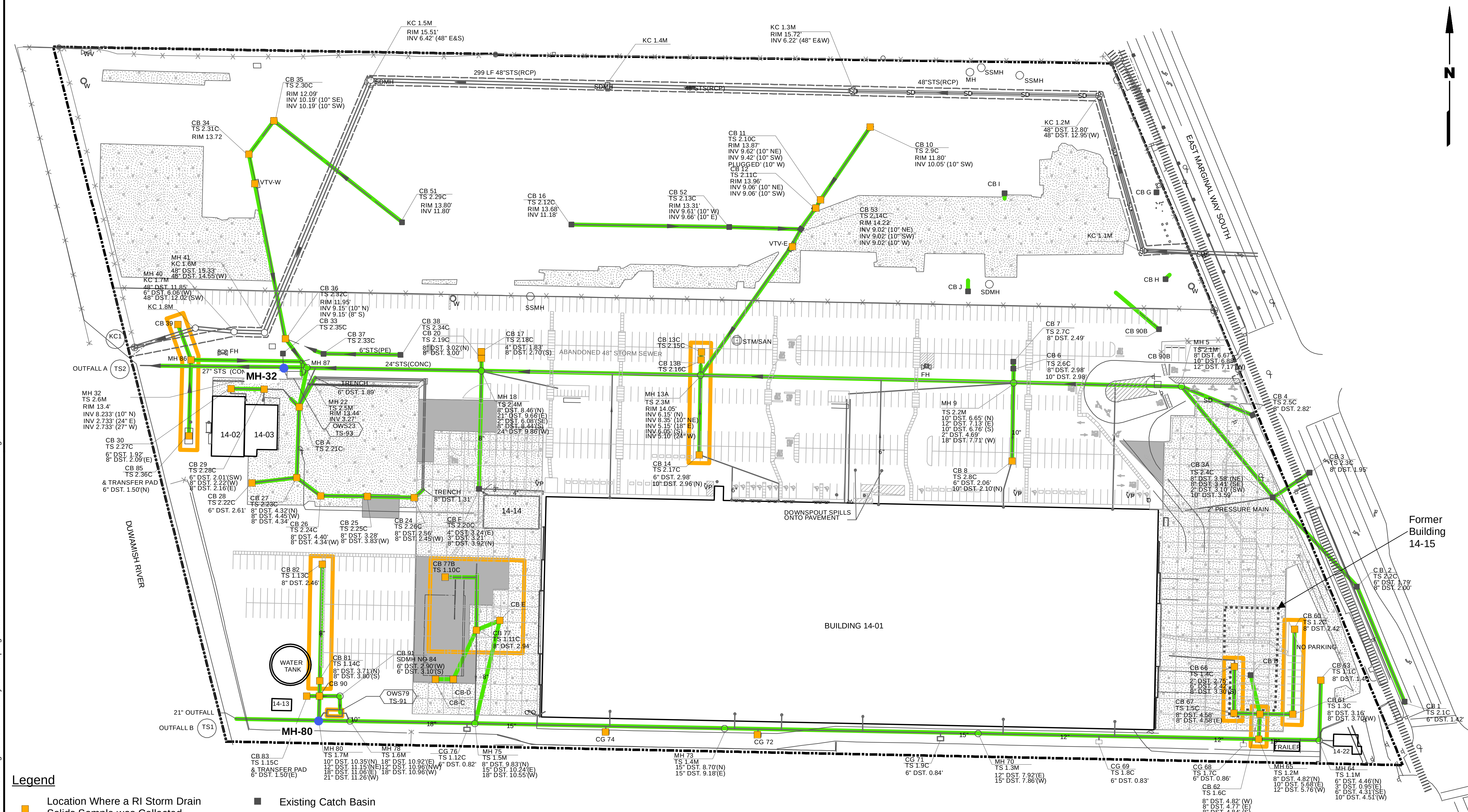
Base map source: Boeing Building 14-01 Mechanical Master (July 25, 1994)

LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Soil Vapor and Other Sampling Locations Inside Building 14-01**

Figure 24




## Legend

- Location Where a RI Storm Drain Solids Sample was Collected
- Location Where a RI Storm Drain Solids Composite Sample was Collected
- RI Stormwater Sampling Location
- Existing Catch Basin
- Existing Storm Drain Line
- New Concrete (Replaced 2011)
- Concrete Area
- Former Building

**Note**

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

0 120 240

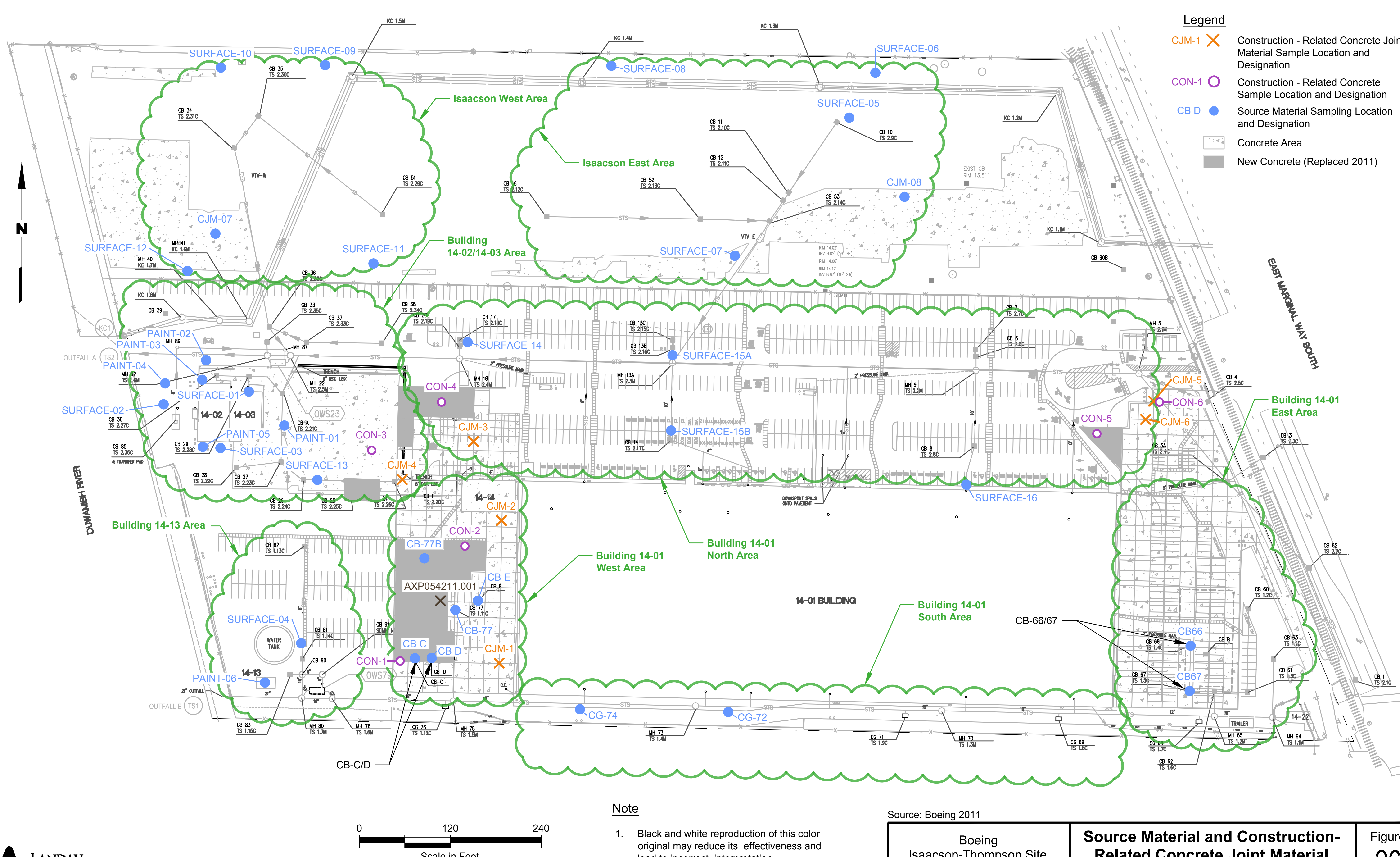
Scale in Feet

Source: Boeing 2012

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **RI Storm Drain System Sampling Locations** | Figure<br>25 |
|---|---|---|

G:\Projects\025\190\213\013\RI\Figure25StormDrainSystemSamplingLocations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Note

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

Source: Boeing 2011

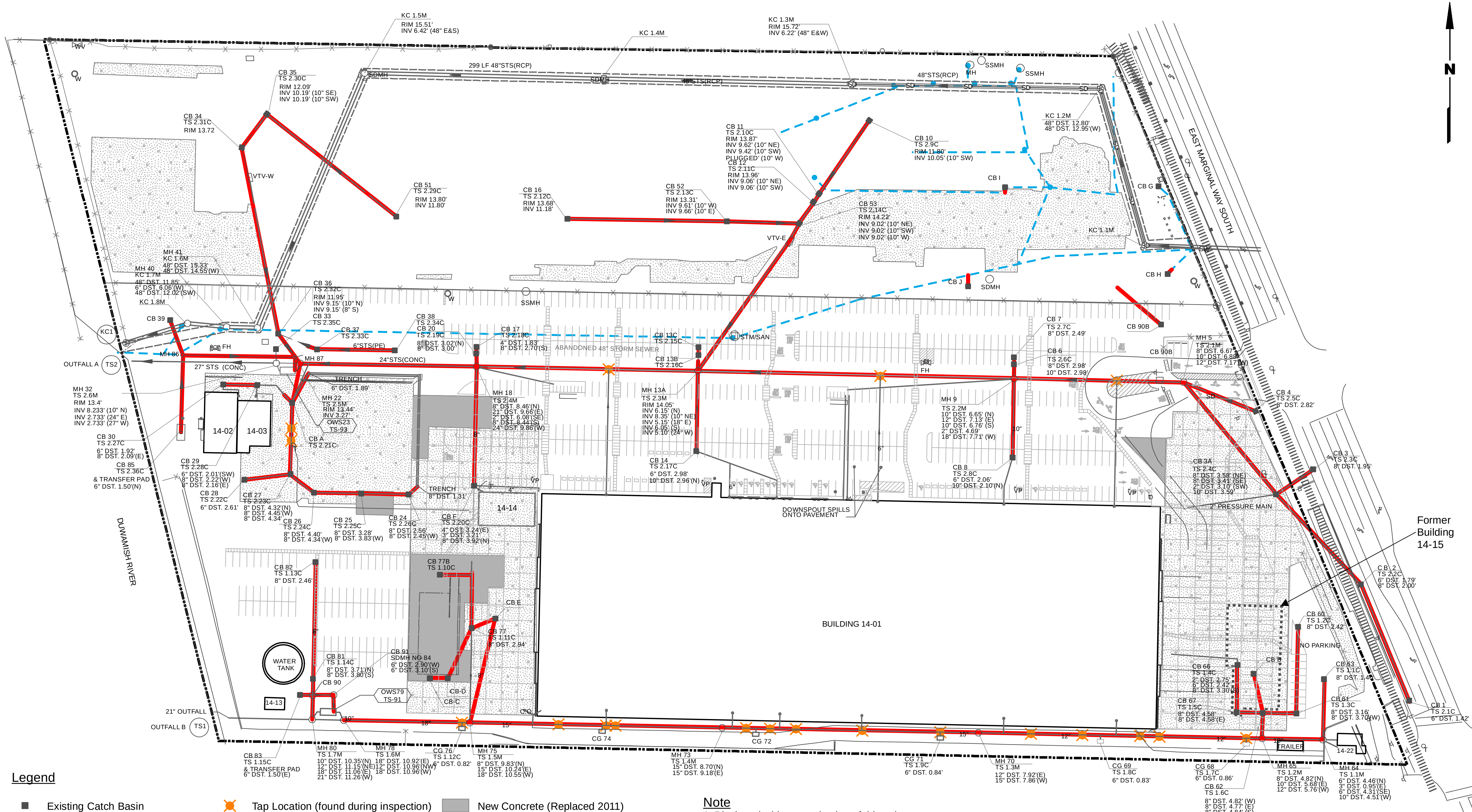
Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Source Material and Construction-Related Concrete Joint Material Sampling Locations**

Figure 26

LANDAU ASSOCIATES

LANDAU ASSOCIATES, INC. | G:\Projects\025\190\213\013\R\Figure26 CJM Sampling.dwg (A) "Figure 26" 3/19/2014




G:\Projects\025\190\213\013\RI\Figure27StormDrainVideoInspectionActivities.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

## Legend

- ■ Existing Catch Basin
- ● Former Storm Drain Structure
- - - 48-inch Storm Drain Line Abandoned and Rerouted in 1990
- ✱ Tap Location (found during inspection)
- ━ Storm Drain Inspection (Sept 2012)
- New Concrete (Replaced 2011)
- Concrete Area
- Former Building

## Note

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

Source: Boeing 2012

0 120 240

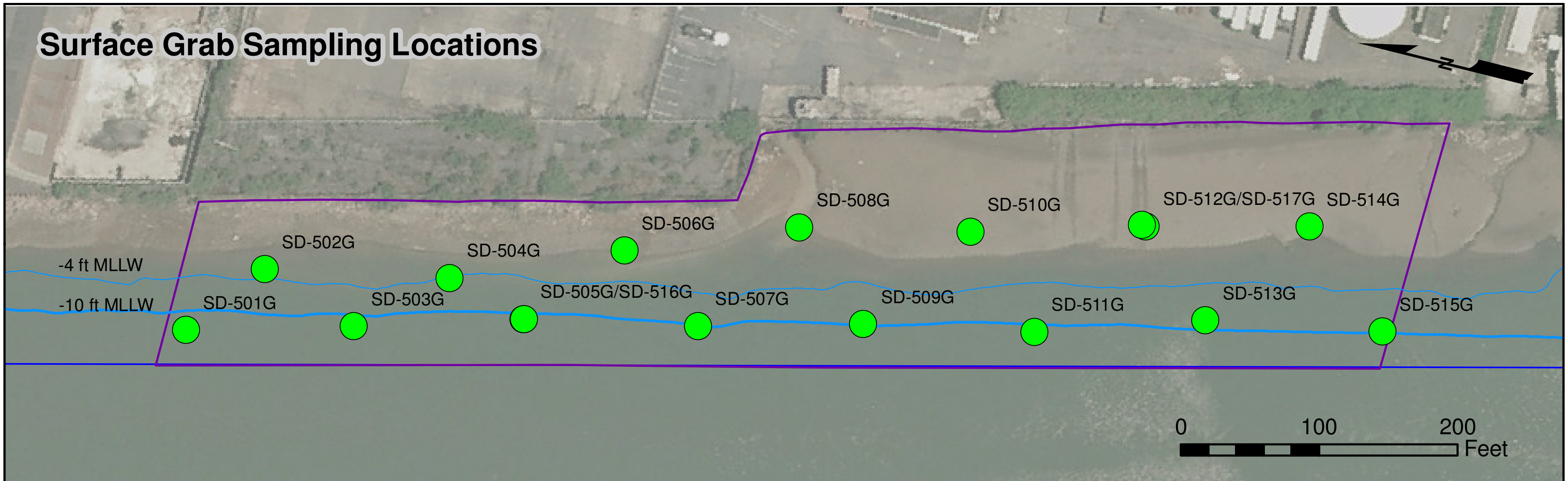
Scale in Feet

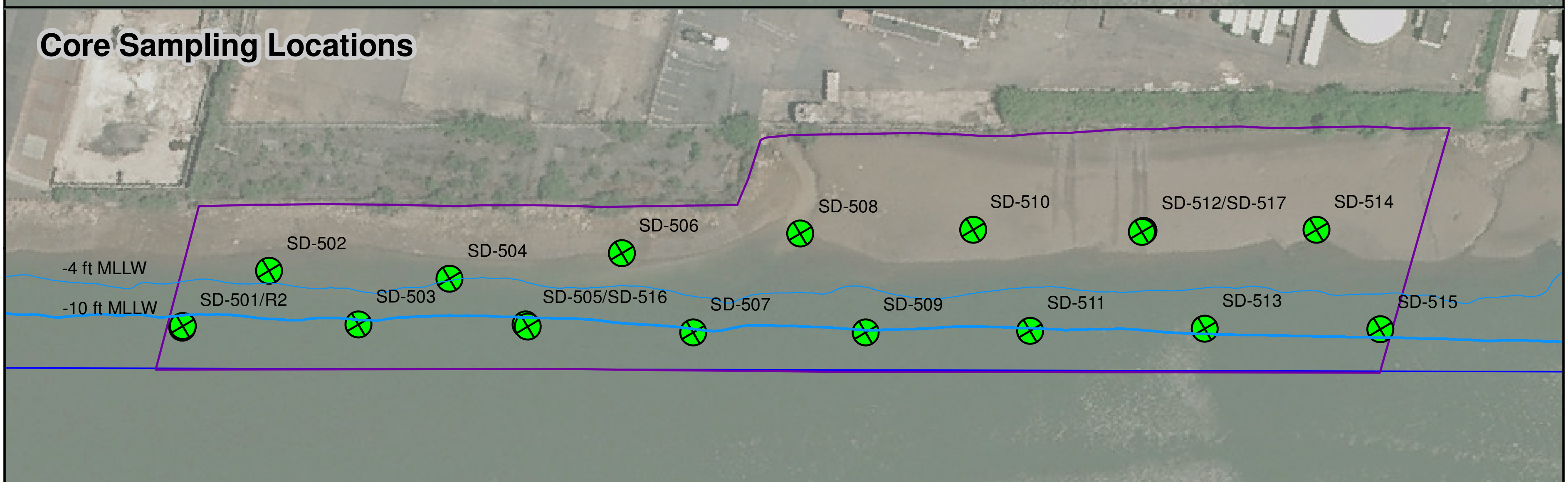
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Storm Drain Line**
**Video Inspection Activities**

Figure
27




**Legend**

- Surface (0-10 cm) Grab Sampling Locations
- Core Sampling Locations
- Edge of Navigation Channel

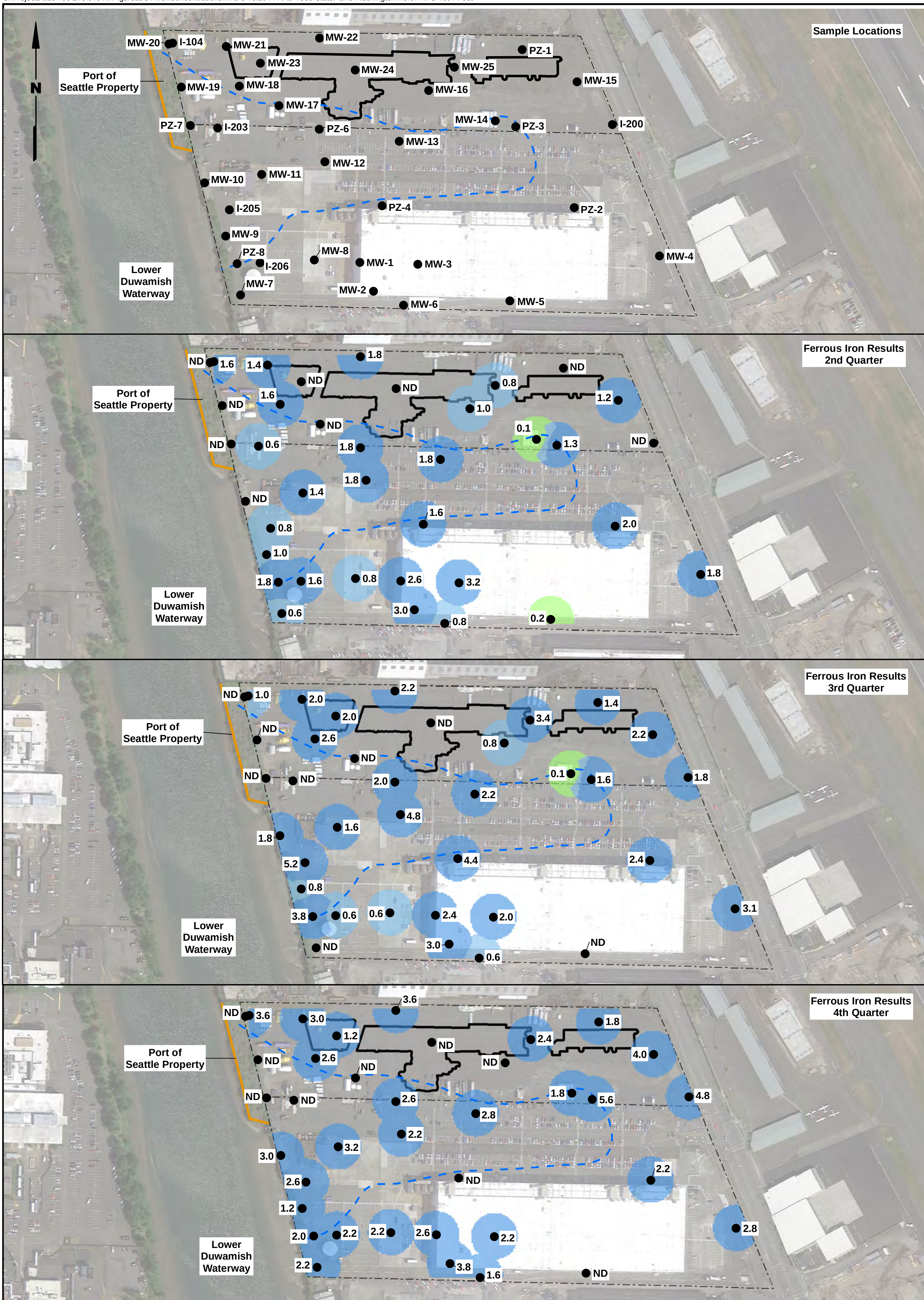
Note:
Bathymetric contour at -4 feet Mean Lower Low Water (MLLW) represents lower extent of intertidal zone, -10 feet MLLW lower extent of shallow subtidal zone.

**RI SEDIMENT SURFACE GRAB AND CORE SAMPLING LOCATIONS**

Boeing Isaacson-Thompson Site
Tukwila, Washington

| By: RHG | Date:2/7/2013 | Project No. LY12160140 |
|---|---|---|
| amec | | Figure 28 |

File path: P:\Boeing IT\LY12160140 Isaacson-Thompson 2012\BACKGROUND\Sampling Stations.mxd




**Legend**

- Groundwater Sampling Location
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

**Detected Concentrations (mg/L)**

- ≤0.3
- 0.3 - 1.0
- >1.0

**Notes**

1. All results shown are in mg/L.
2. Ferrous Iron was not measured during the 1st quarter monitoring event.
3. The MCL for iron in groundwater is 0.3 mg/L.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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

0 300 600

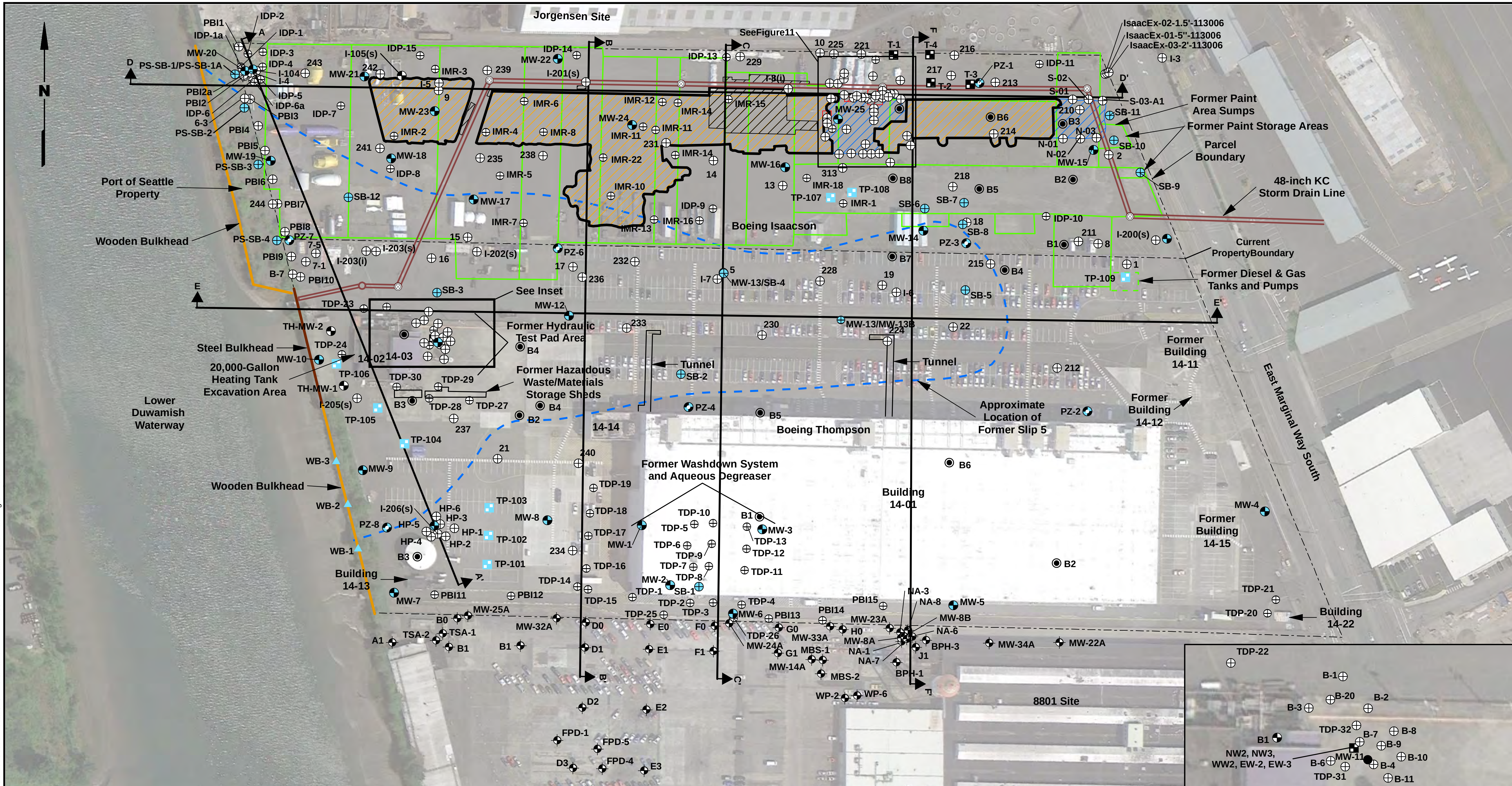
Scale in Feet

LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Ferrous Iron Concentrations in Groundwater**

Figure 29




## Legend

- RI Soil Boring Location
- RI Test Pit Location
- RI Wooden Bulkhead Sample Location
- Existing Piezometer Location
- Existing Monitoring Well Location
- Previous Monitoring Well
- Previous Geotechnical Boring
- Previous Soil Boring
- Previous Test Pit
- 8801 Site Soil Boring Locations
- 1984 Excavation
- 1988 Excavation
- 1990 Excavation
- 1991 Excavation
- Existing 48" King County Storm Drain Line
- Approximate Location of Former Slip 5
- Former Isaacson Building (Building 14-05)
- Current Extent of Stabilized Soil Material
- Cross Section Location

Scale in Feet: 0, 150, 300

## Notes

1. MW-13/MW-13B borings were advanced, but no wells were installed at these locations because of an obstruction. The actual monitoring well MW-13 was installed near boring location SB-4.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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

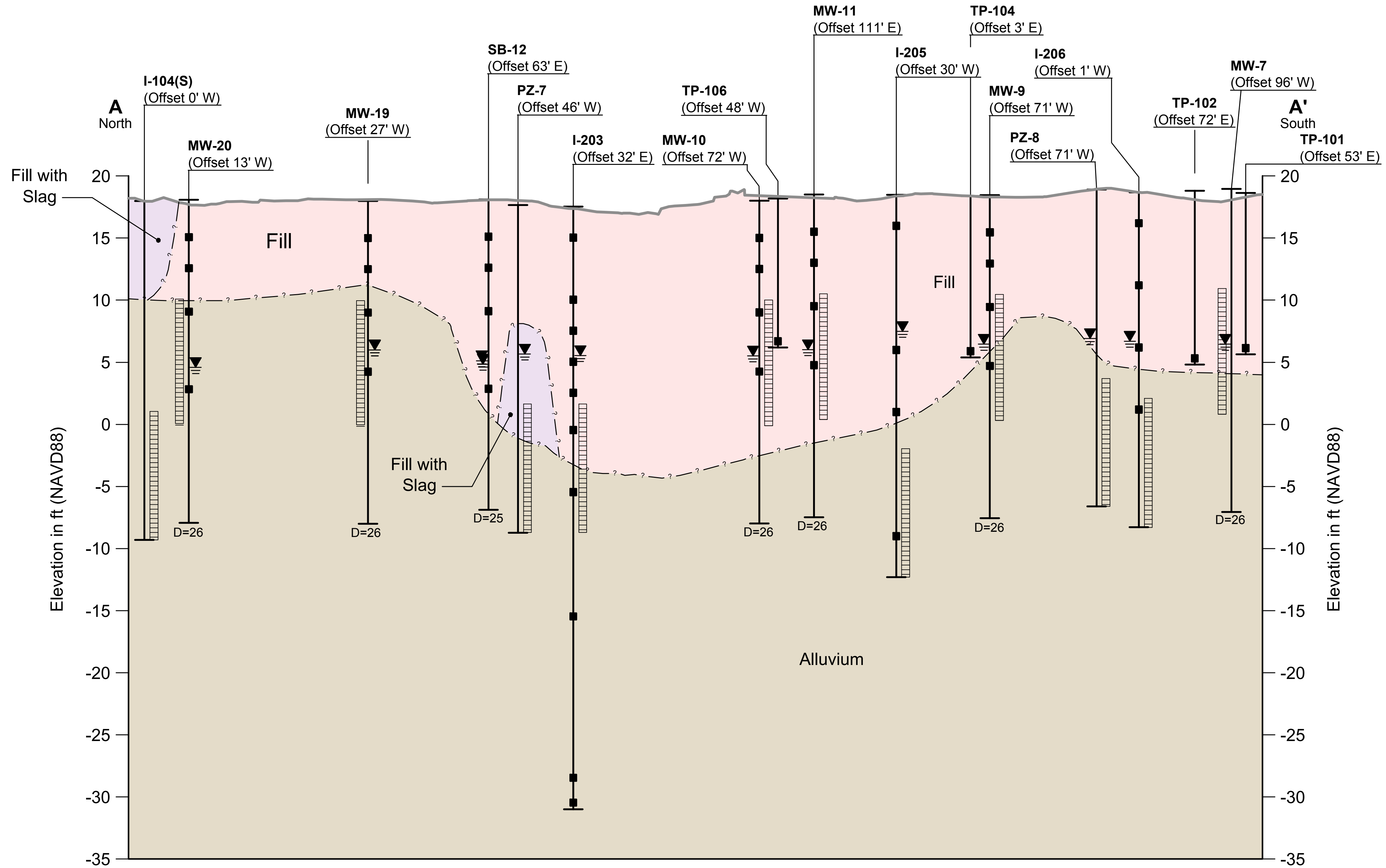
G:\Projects\025\190\213\013\RI\Figure30CrossSectionLocations.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Cross-Section Locations**

Figure 30




## Legend

| | |
|---|---|
| XX | Project Exploration Designation |
| (Offset 16' W) | Offset Distance in Feet and Direction |
| | Top of Exploration |
| | Soil Sample Location |
| | Groundwater Level (at time of drilling) |
| | Inferred Geologic Contact |
| | Well Screen Interval (if installed) |
| | Bottom of Exploration |

Fill: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris (brick, concrete, glass, crushed rock)

Fill with Slag: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris with slag, brick, and wood debris

Alluvium: Brown to dark gray silty fine to medium sand, sandy silt, with occasional gravel and organic material

## Notes

1. Soil descriptions are generalized, based on interpretation of field and laboratory data. Stratigraphic contacts are interpolated between borings and based on topographic features; actual conditions may vary.
2. For cross-section profile location, see Figure 30 .
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 100 200

Horizontal Scale: 1" = 100'
Vertical Scale: 1" = 10'

Source: Pacific Geomatic Services, Inc. 2008, Puget Sound Lidar Consortium 2005,

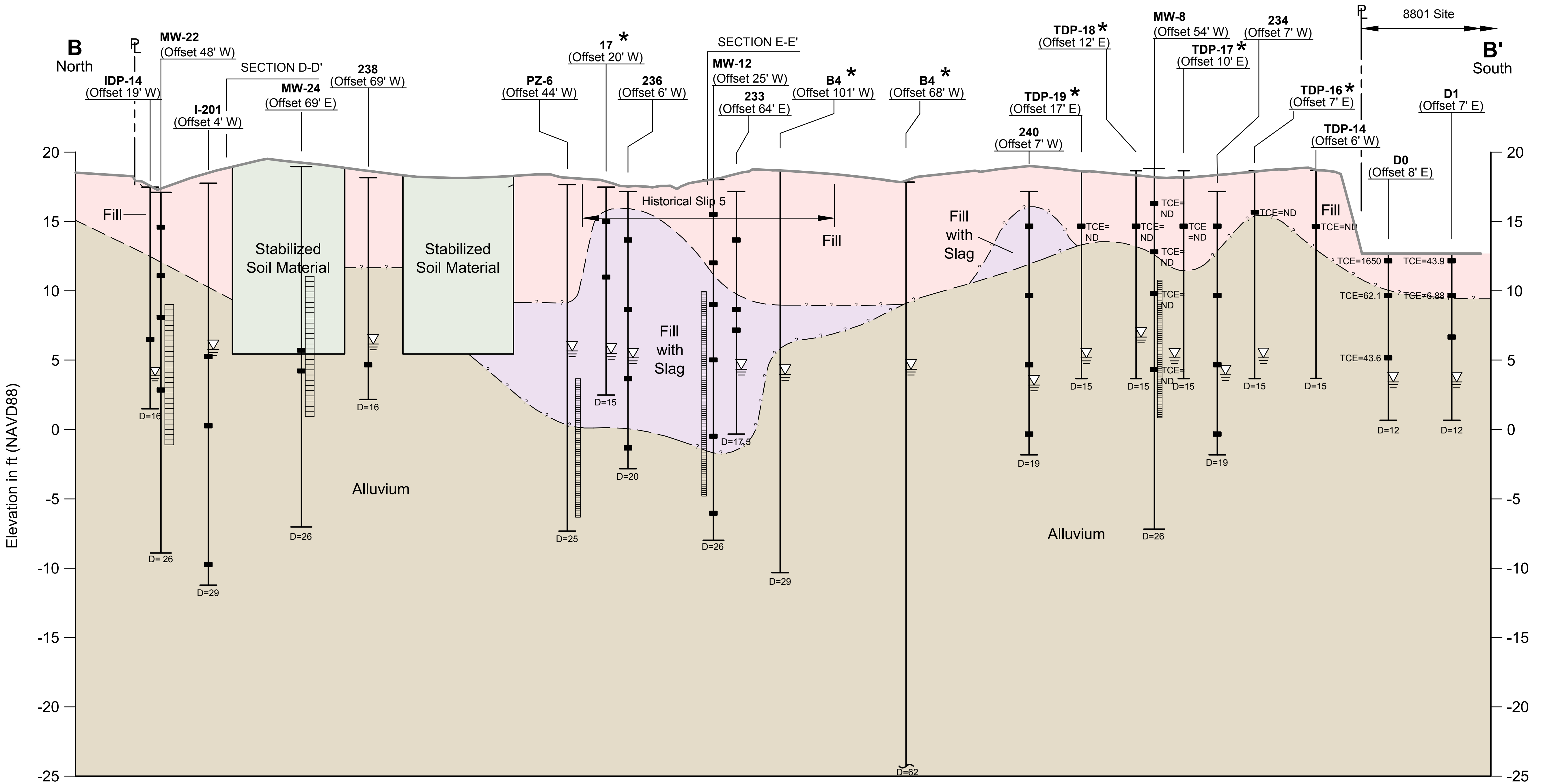
LANDAU ASSOCIATES, INC. | G:\Projects\025\190\213\013\RI\Figure31-35 Sections A-E.dwg (A) "Figure 31" 3/19/2014

LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Cross-Section A-A'**

Figure 31




## Legend

- **XX** — Project Exploration Designation
- (Offset 16' W) — Offset Distance in Feet and Direction
- Top of Exploration
- Soil Sample Location
- TCE=301 — Trichloroethene Result (µg/kg); ND= Not Detected
- Groundwater Level (at time of drilling)
- Inferred Geologic Contact
- Well Screen Interval (if installed)
- Bottom of Exploration
- D=14 — Depth of Exploration (BGS)

- Fill: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris (brick, concrete, glass, crushed rock)
- Fill with Slag: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris with slag, brick, and wood debris
- Stabilized Soil Material: Soil mixed with cementitious material
- Alluvium: Brown to dark gray silty fine to medium sand, sandy silt, with occasional gravel and organic material

## Notes

1. Soil descriptions are generalized, based on interpretation of field and laboratory data. Stratigraphic contacts are interpolated between borings and based on topographic features; actual conditions may vary.
2. For cross-section profile location, see Figure 30 .
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

* 2010 ground surface elevation used as top of boring locations where elevation was missing or could not be resolved.

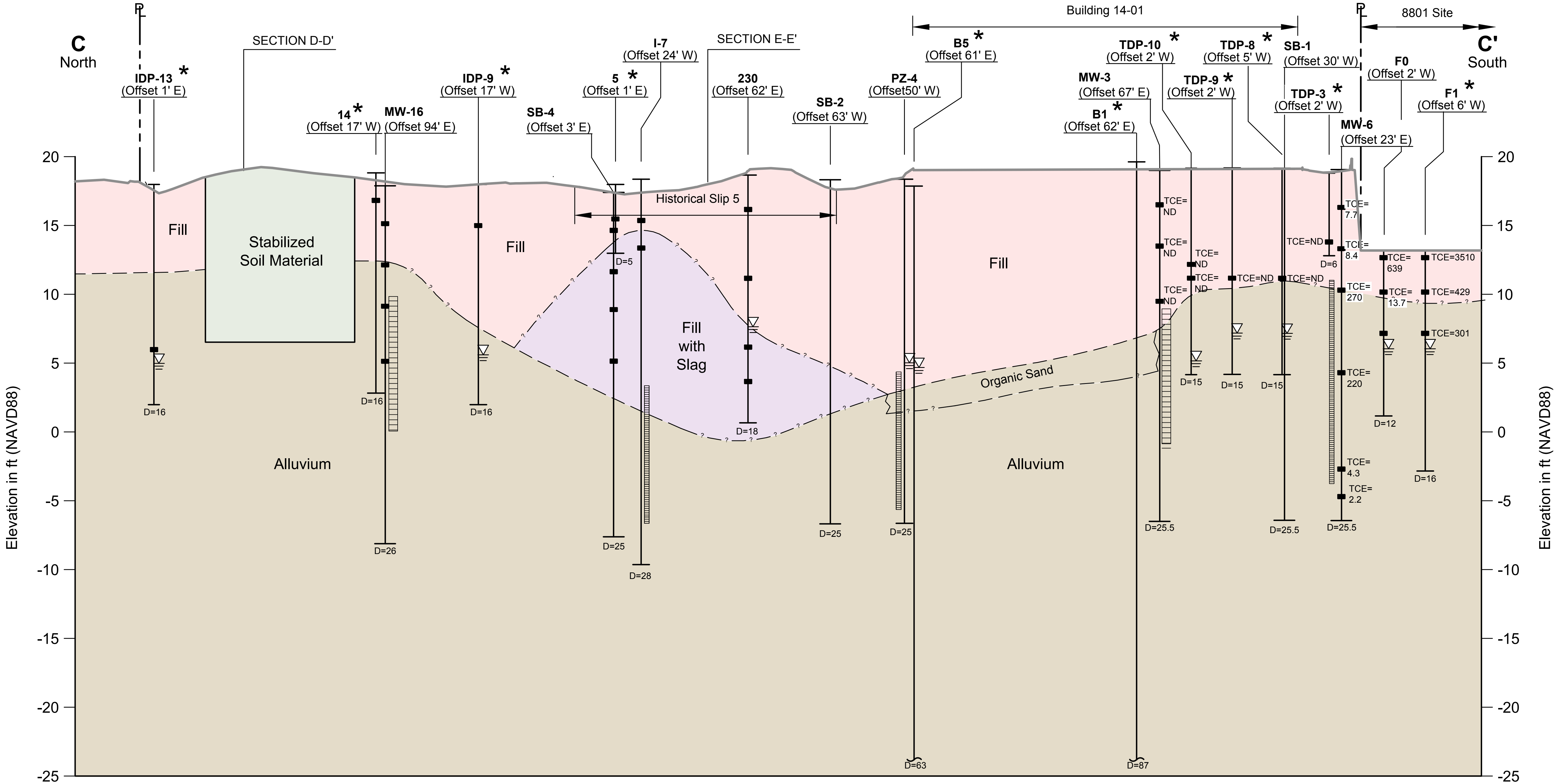
0 80 160

Horizontal Scale: 1" = 80'
Vertical Scale: 1" = 8'

Source: Pacific Geomatic Services, Inc. 2008, Puget Sound Lidar Consortium 2005,

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Cross Section B-B'** | Figure<br>32 |
|---|---|---|




LANDAU ASSOCIATES, INC. | G:\Projects\025\190\213\013\RI\Figure31-35 Sections A-E.dwg (A) "Figure 33" 3/19/2014

## Legend

- XX — Project Exploration Designation
- (Offset 16' W) — Offset Distance in Feet and Direction
- Top of Exploration
- TCE=301 — Soil Sample Location
- Trichloroethene Result (µg/kg)
  ND= Not Detected
- Groundwater Level (at time of drilling)
- Inferred Geologic Contact
- Well Screen Interval (if installed)
- Bottom of Exploration
- D=14 — Depth of Exploration (BGS)

- Fill: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris (brick, concrete, glass, crushed rock)
- Fill with Slag: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris with slag, brick, and wood debris
- Stabilized Soil Material: Soil mixed with cementitious material
- Alluvium: Brown to dark gray silty fine to medium sand, sandy silt, with occasional gravel and organic material

## Notes

1. Soil descriptions are generalized, based on interpretation of field and laboratory data. Stratigraphic contacts are interpolated between borings and based on topographic features; actual conditions may vary.
2. For cross-section profile location, see Figure 30 .
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

* 2010 ground surface elevation used as top of boring locations where elevation was missing or could not be resolved.

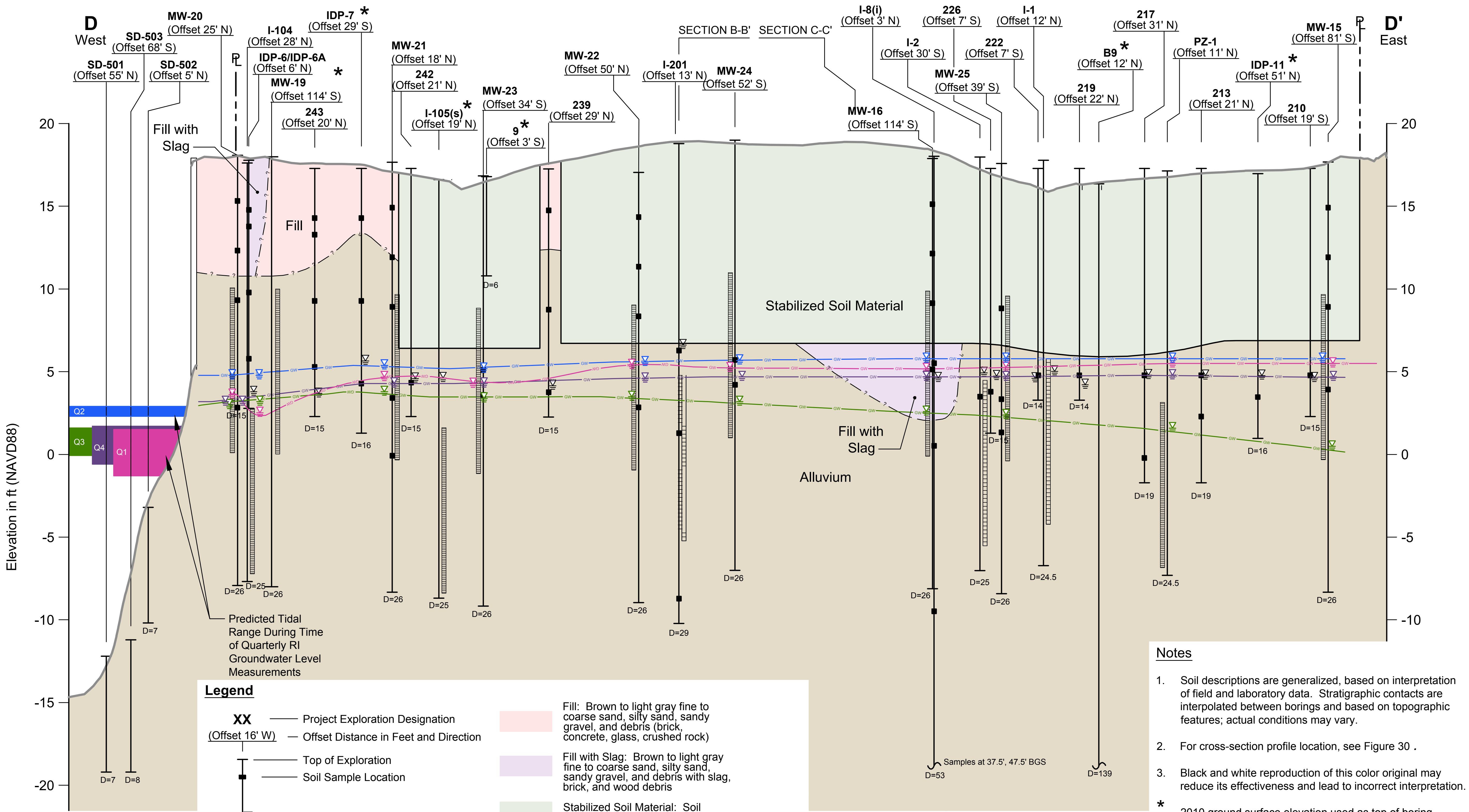
0 80 160

Horizontal Scale: 1" = 80'
Vertical Scale: 1" = 8'

Source: Pacific Geomatic Services, Inc. 2008, Puget Sound Lidar Consortium 2005,

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | Cross Section C-C' | Figure<br>33 |
|---|---|---|




## Legend

| | |
|---|---|
| XX | Project Exploration Designation |
| (Offset 16' W) | Offset Distance in Feet and Direction |
| | Top of Exploration |
| | Soil Sample Location |
| | Groundwater Level (at time of drilling) |
| | Inferred Geologic Contact |
| | Well Screen Interval (if installed) |
| | Bottom of Exploration |
| D=14 | Depth of Exploration (BGS) |

Fill: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris (brick, concrete, glass, crushed rock)

Fill with Slag: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris with slag, brick, and wood debris

Stabilized Soil Material: Soil mixed with cementitious material

Alluvium: Brown to dark gray silty fine to medium sand, sandy silt, with occasional gravel and organic material

Groundwater Elevation (12/05/12; Q1)

Groundwater Elevation (03/06/12; Q2)

Groundwater Elevation (06/13/12; Q3)

Groundwater Elevation (09/10/12; Q4)

0 120 240

Horizontal Scale: 1" = 120'
Vertical Scale: 1" = 6'

## Notes

1. Soil descriptions are generalized, based on interpretation of field and laboratory data. Stratigraphic contacts are interpolated between borings and based on topographic features; actual conditions may vary.
2. For cross-section profile location, see Figure 30 .
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

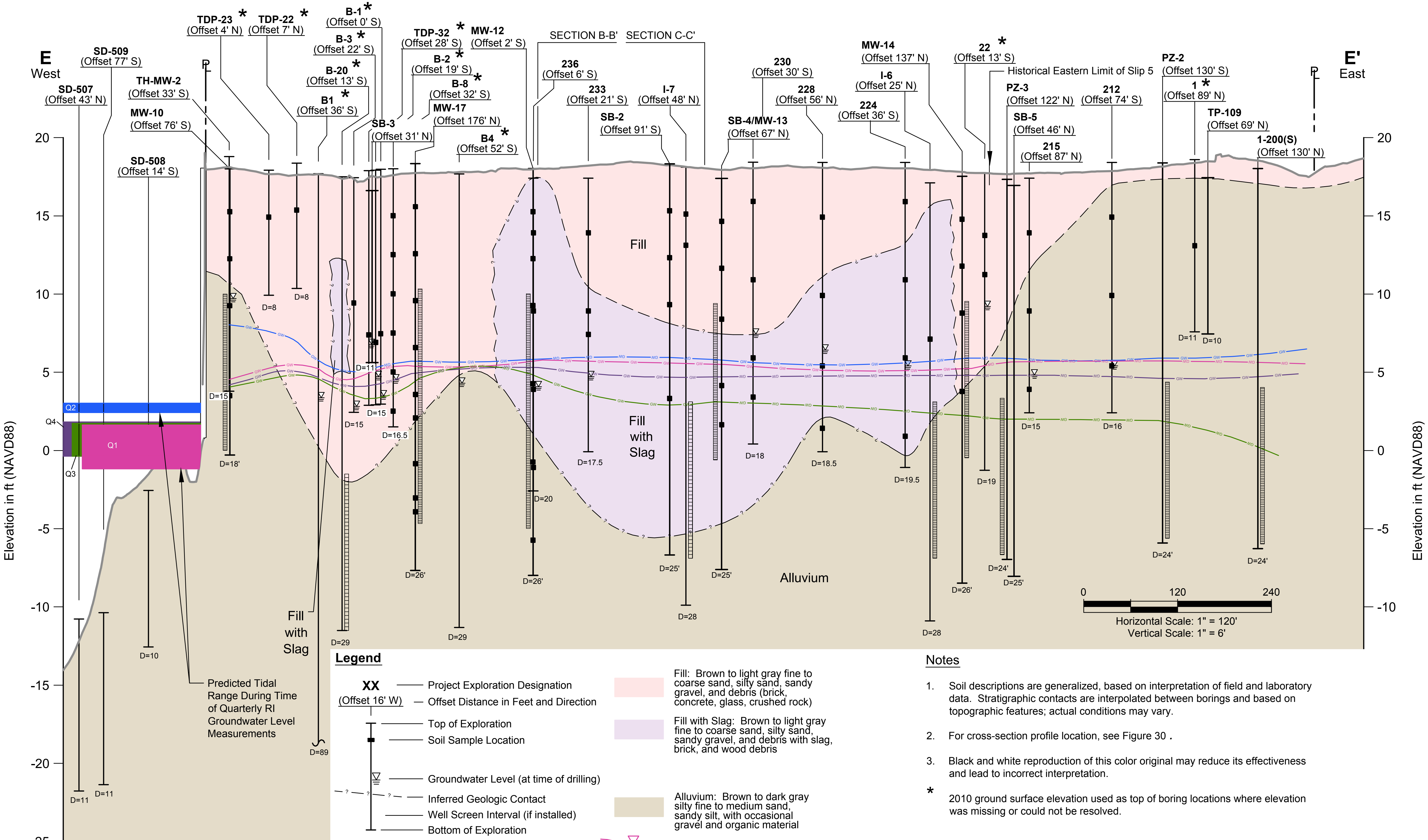
* 2010 ground surface elevation used as top of boring locations where elevation was missing or could not be resolved.

Source: Pacific Geomatic Services, Inc. 2008, Puget Sound Lidar Consortium 2005,



LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Cross Section D-D'** | Figure<br>34 |
|---|---|---|




## Legend

XX — Project Exploration Designation
(Offset 16' W) — Offset Distance in Feet and Direction

- Top of Exploration
- Soil Sample Location
- Groundwater Level (at time of drilling)
- Inferred Geologic Contact
- Well Screen Interval (if installed)
- Bottom of Exploration
- D=14 — Depth of Exploration (BGS)

Fill: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris (brick, concrete, glass, crushed rock)

Fill with Slag: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris with slag, brick, and wood debris

Alluvium: Brown to dark gray silty fine to medium sand, sandy silt, with occasional gravel and organic material

- Groundwater Elevation (12/05/12; Q1)
- Groundwater Elevation (03/06/12; Q2)
- Groundwater Elevation (06/13/12; Q3)
- Groundwater Elevation (09/10/12; Q4)

## Notes

1. Soil descriptions are generalized, based on interpretation of field and laboratory data. Stratigraphic contacts are interpolated between borings and based on topographic features; actual conditions may vary.
2. For cross-section profile location, see Figure 30 .
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

* 2010 ground surface elevation used as top of boring locations where elevation was missing or could not be resolved.

Source: Pacific Geomatic Services, Inc. 2008, Puget Sound Lidar Consortium 2005,

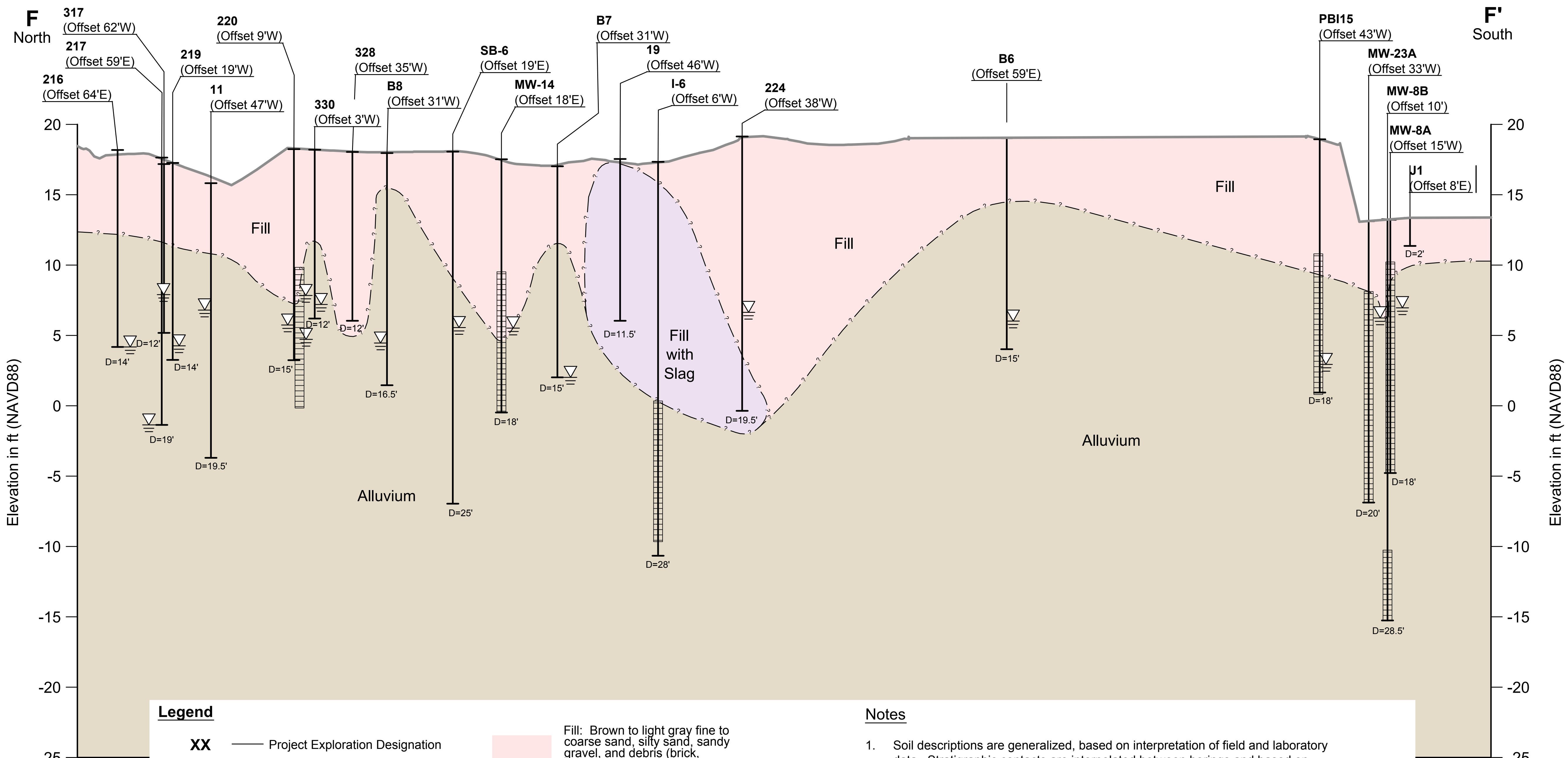


LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Cross Section E-E'**

Figure 35




## Legend

| | |
|---|---|
| XX | Project Exploration Designation |
| (Offset 16' W) | Offset Distance in Feet and Direction |
| | Top of Exploration |
| TCE=301 | Soil Sample Location |
| | Trichloroethene Result (µg/kg) ND= Not Detected |
| | Groundwater Level (at time of drilling) |
| — ? — ? — ? — | Inferred Geologic Contact |
| | Well Screen Interval (if installed) |
| | Bottom of Exploration |
| D=14 | Depth of Exploration (BGS) |

- Fill: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris (brick, concrete, glass, crushed rock)
- Fill with Slag: Brown to light gray fine to coarse sand, silty sand, sandy gravel, and debris with slag, brick, and wood debris
- Stabilized Soil Material: Soil mixed with cementitious material
- Alluvium: Brown to dark gray silty fine to medium sand, sandy silt, with occasional gravel and organic material

## Notes

1. Soil descriptions are generalized, based on interpretation of field and laboratory data. Stratigraphic contacts are interpolated between borings and based on topographic features; actual conditions may vary.
2. For cross-section profile location, see Figure 30 .
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

* 2010 ground surface elevation used as top of boring locations where elevation was missing or could not be resolved.

0 80 160

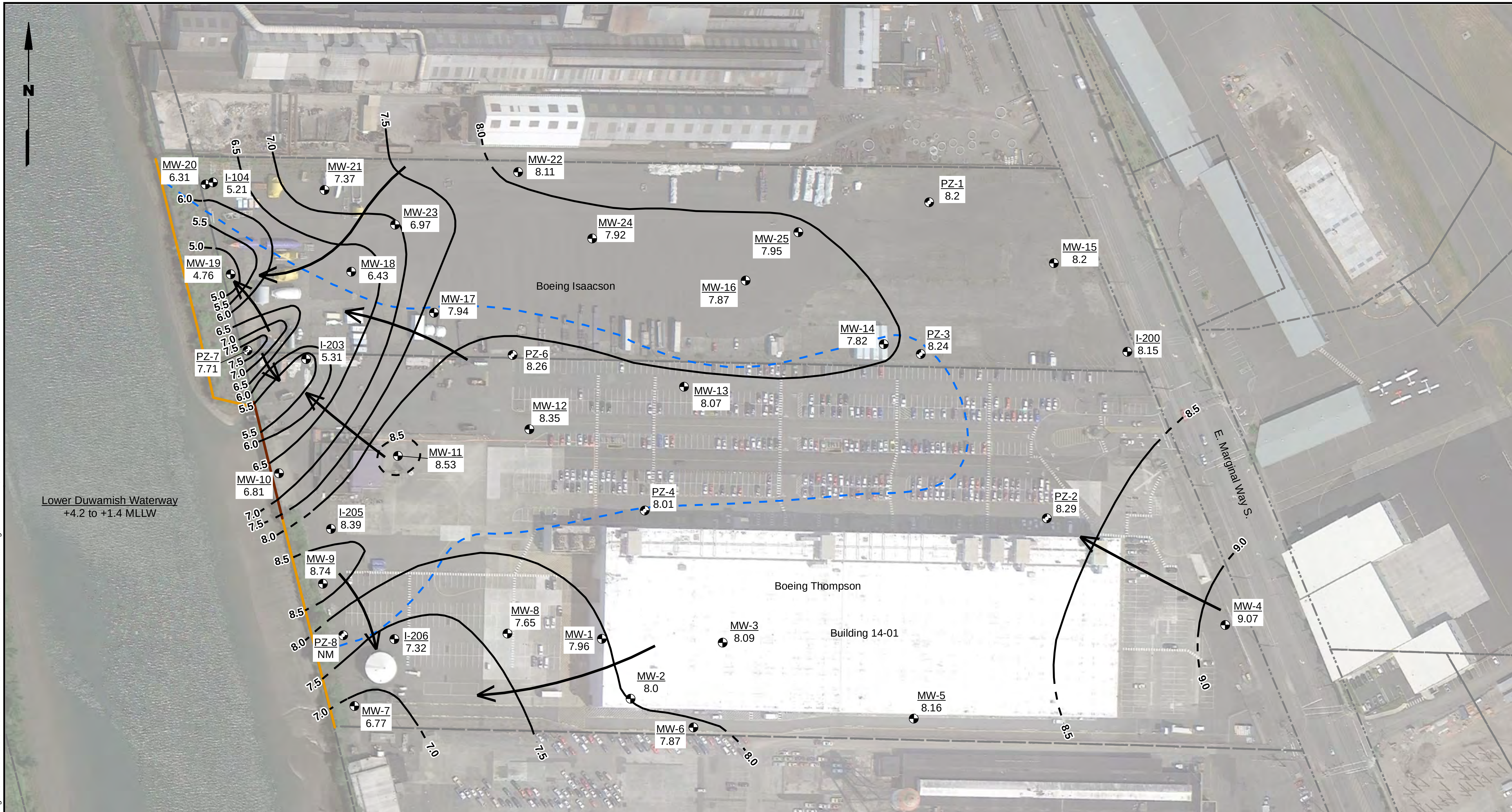
Horizontal Scale: 1" = 80'
Vertical Scale: 1" = 8'

Source: Pacific Geomatic Services, Inc. 2008, Puget Sound Lidar Consortium 2005,

LANDAU ASSOCIATES, INC. | G:\Projects\025\190\213\013\RI\Figure36 Section F.dwg (A) "Figure 36" 3/19/2014

Landau Associates

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Cross Section F-F'** | Figure<br>36 |
|---|---|---|




## Legend

| | |
|---|---|
| MW-10 6.81 | Monitoring Well Location and Groundwater Elevation (ft, MLLW) |
| PZ-1 8.2 | Piezometer Location and Groundwater Elevation (ft, MLLW) |

- Groundwater Contours (FT, MLLW)
- Estimated Direction of Groundwater Flow
- King County Parcels
- Approximate Location of Former Slip 5
- Wooden Bulkhead
- Steel Bulkhead

## Notes

1. Groundwater levels were measured on 12/5/11 between 17:25 and 19:20. Estimated surface water levels ranged from +4.2 to +1.4 ft, MLLW between 17:25 and 19:20 on 12/5/11.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 150 300

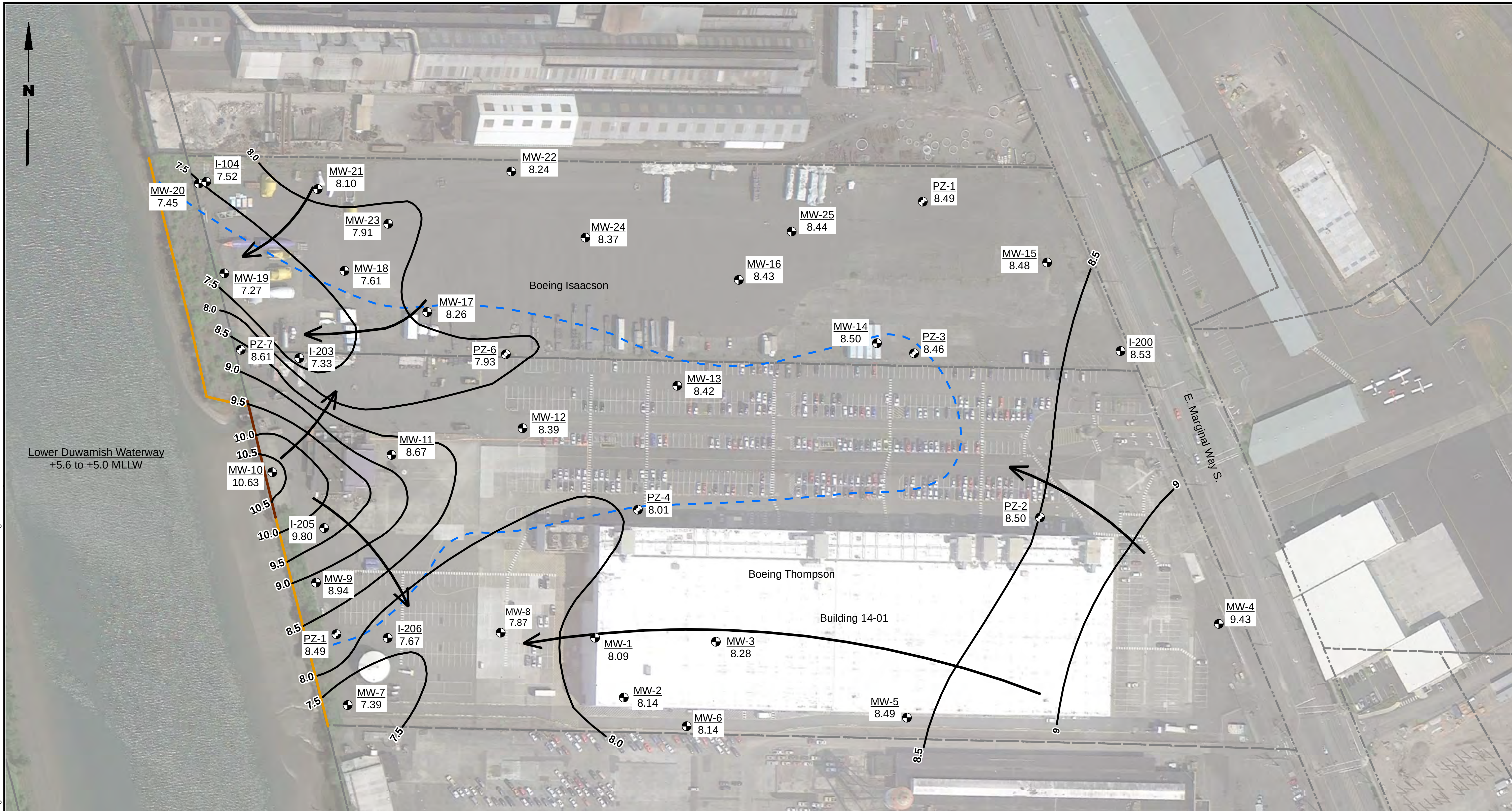
Scale in Feet

Data Sources: Boeing, 2012; King County GIS, 2010; Google Earth Pro, 2012.

G:\Projects\025\190\213\013\RI\Figure37GWContoursDec2011.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

Landau Associates

| | | |
|---|---|---|
| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Groundwater Elevation Contours**<br>**December 5, 2011** | Figure<br>37 |




G:\Projects\025\190\213\013\RI\Figure38GWContoursMarch2012.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

## Legend

- MW-10 10.63 — Monitoring Well Location and Groundwater Elevation (ft, MLLW)
- PZ-1 8.49 — Piezometer Location and Groundwater Elevation (ft, MLLW)
- Groundwater Contours (FT, MLLW)
- Estimated Direction of Groundwater Flow
- King County Parcels
- Approximate Location of Former Slip 5
- Wooden Bulkhead
- Steel Bulkhead

## Notes

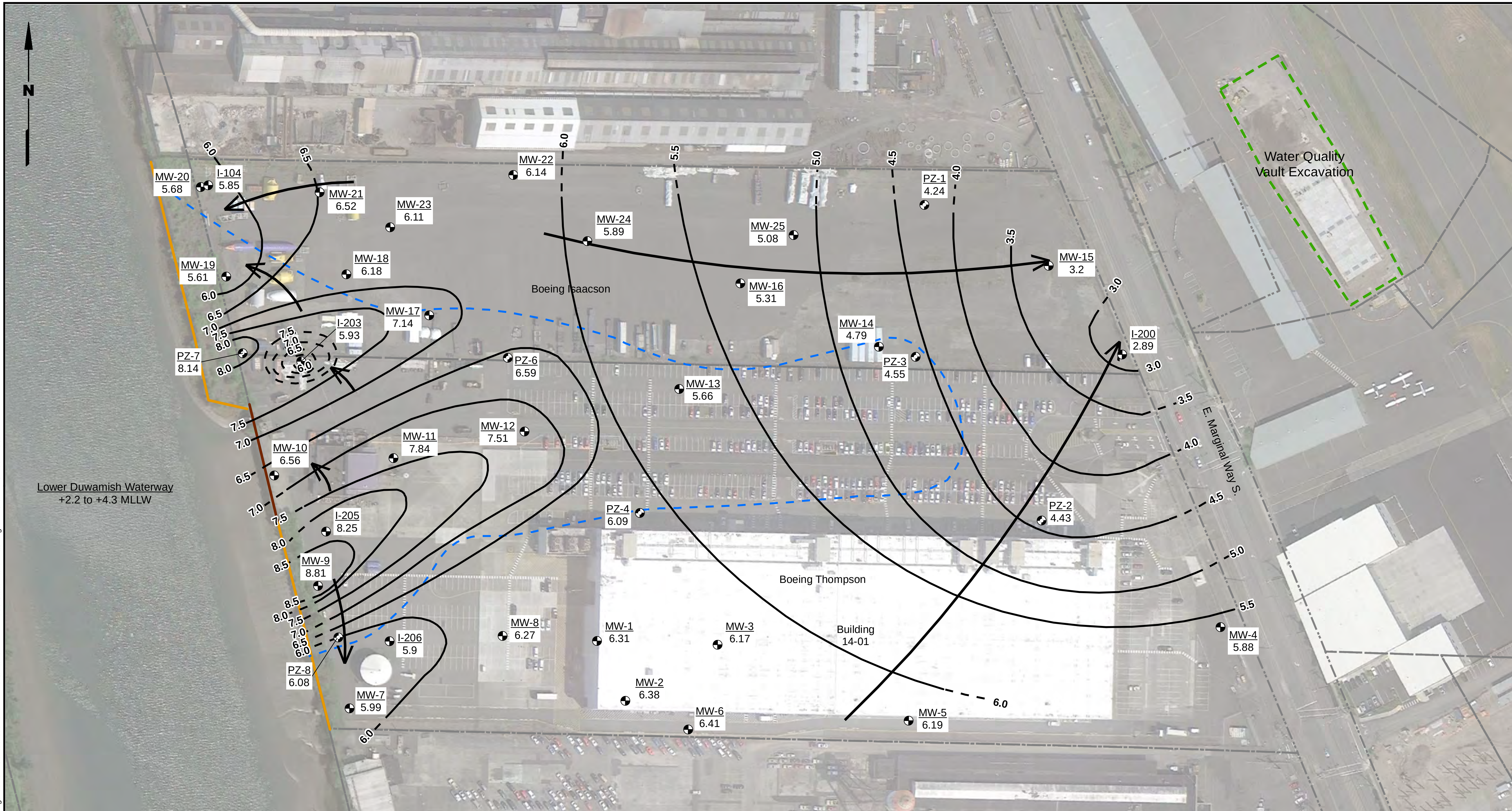
1. Groundwater levels were measured on 3/6/12 between 8:26 and 10:25. Estimated surface water levels ranged from +5.6 to +5.0 ft, MLLW between 8:30 and 10:30 on 3/6/12.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 150 300
Scale in Feet

Data Sources: Boeing, 2012; King County GIS, 2010; Google Earth Pro, 2012.

LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | **Groundwater Elevation Contours March 6, 2012** | Figure 38 |
|---|---|---|




G:\Projects\025\190\213\013\RI\Figure39GWContoursJune2012.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

**Legend**

- MW-10 6.56 — Monitoring Well Location and Groundwater Elevation (ft, MLLW)
- PZ-1 4.24 — Piezometer Location and Groundwater Elevation (ft, MLLW)
- Groundwater Contours (FT, MLLW)
- Estimated Direction of Groundwater Flow
- King County Parcels
- Water Quality Vault Excavation Where Dewatering Occured From April 20, 2012 to June 30, 2012
- Wooden Bulkhead
- Steel Bulkhead
- Approximate Location of Former Slip 5

**Notes**

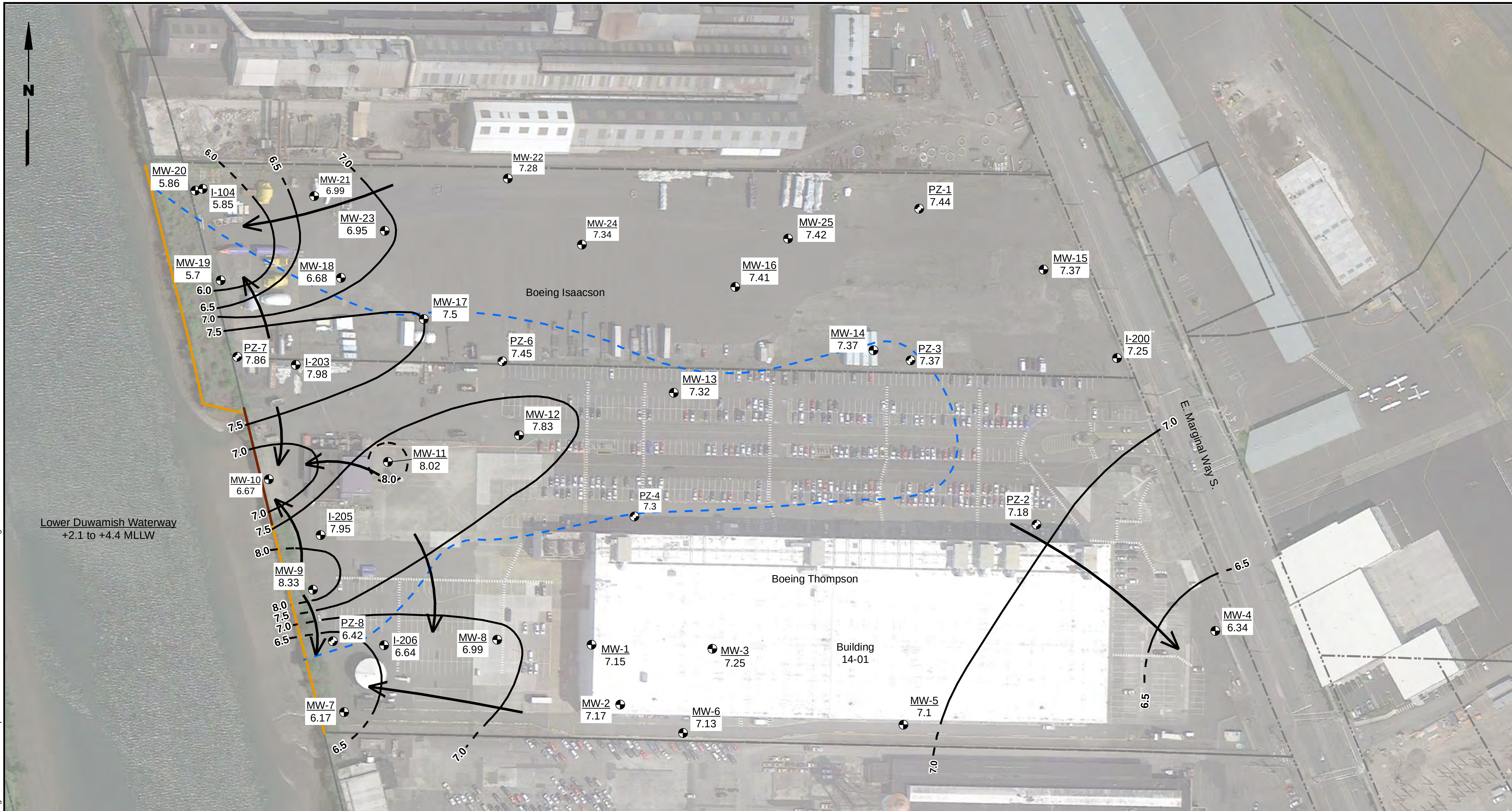
1. Groundwater levels were measured on 6/13/2012 between 09:25 and 11:00. Estimated surface water levels ranged from +2.2 to +4.3 ft, MLLW between 09:25 and 11:00 on 6/13/2012.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 150 300
Scale in Feet

Data Sources: Boeing, 2012; King County GIS, 2010; Google Earth Pro, 2012.

LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | **Groundwater Elevation Contours June 13, 2012** | Figure 39 |
|---|---|---|




G:\Projects\025\190\213\013\RI\Figure40GWContoursSept2012.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

## Legend

- MW-10 6.67 — Monitoring Well Location and Groundwater Elevation (ft, MLLW)
- PZ-1 7.44 — Piezometer Location and Groundwater Elevation (ft, MLLW)
- Groundwater Contours (FT, MLLW)
- Estimated Direction of Groundwater Flow
- King County Parcels
- Approximate Location of Former Slip 5
- Wooden Bulkhead
- Steel Bulkhead

## Notes

1. Groundwater levels were measured on 9/10/12 between 08:31 and 10:12. Estimated surface water levels ranged from +2.1 to +4.4 ft, MLLW between 08:31 and 10:12 on 9/10/12.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

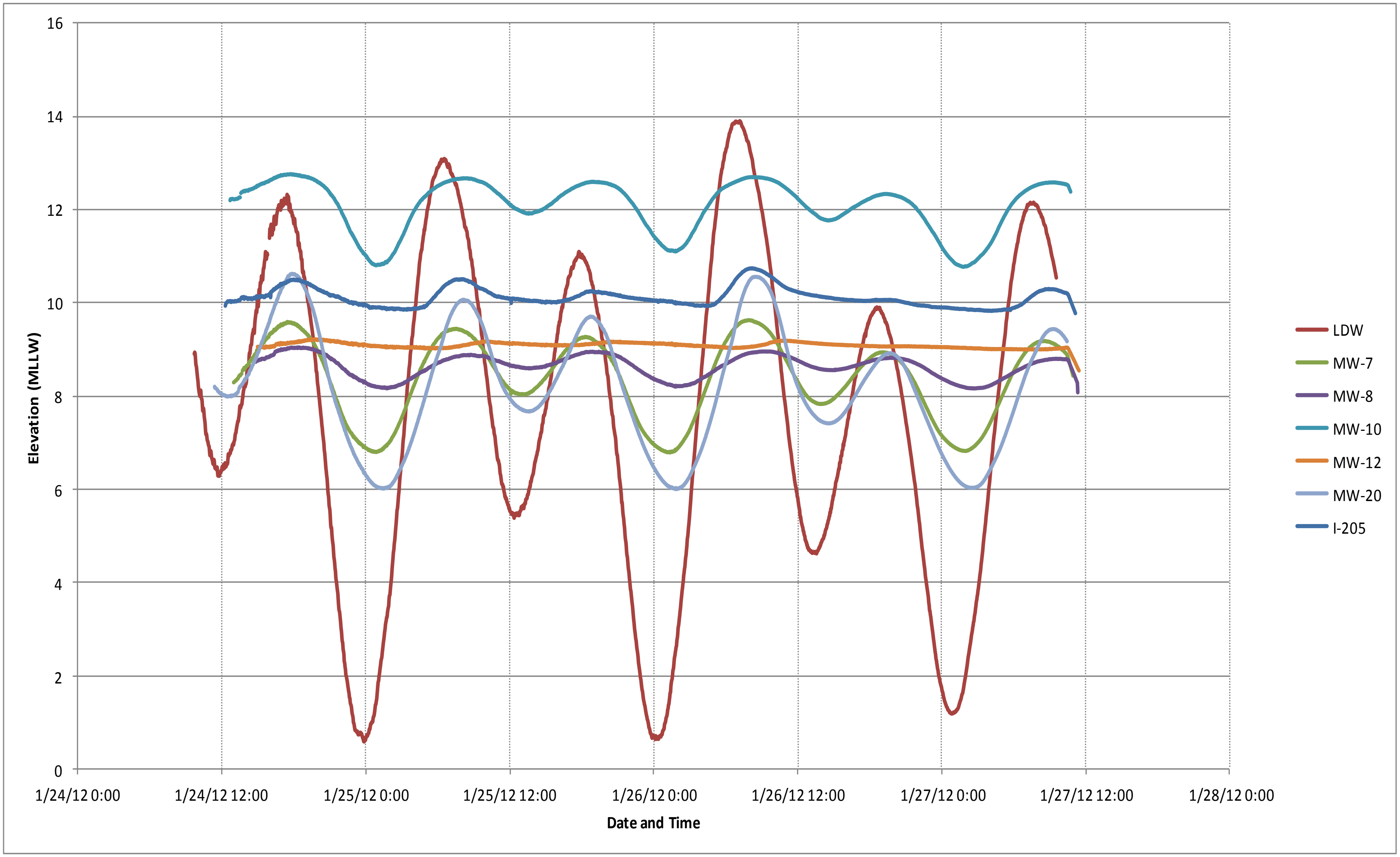
0 150 300
Scale in Feet

Data Sources: Boeing, 2012; King County GIS, 2010; Google Earth Pro, 2012.

Landau Associates

| Boeing Isaacson-Thompson Site Tukwila, Washington | Groundwater Elevation Contours September 10, 2012 | Figure 40 |
|---|---|---|

Source: \\edmdata01\projects\025\190\002\WIP\R\2012 Tidal Study\ALL_edited 121112DHF.xlsx



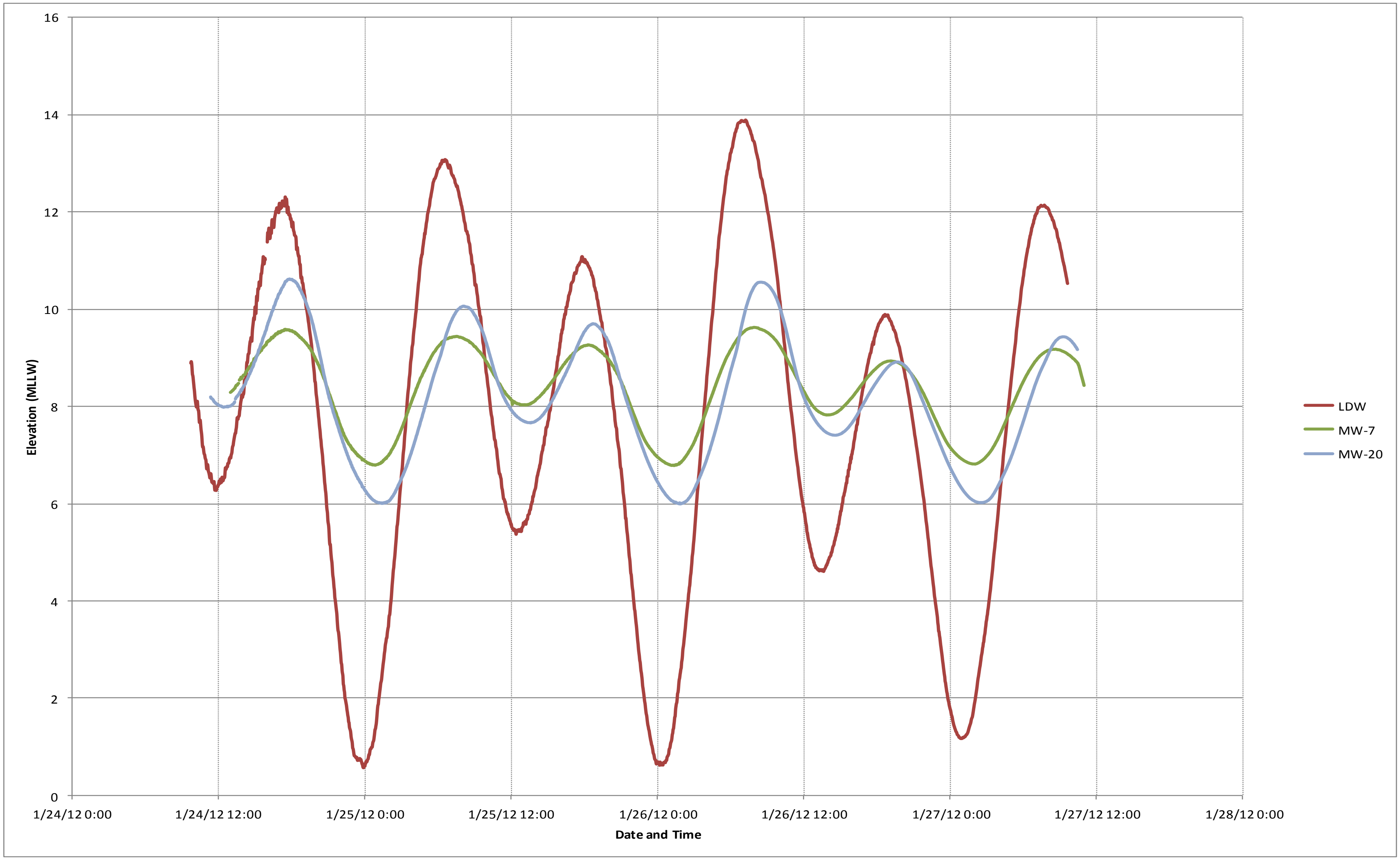

LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Tidal Fluctuations in Lower Duwamish Waterway vs All Measured Wells**

Figure 41

Source: \\edmdata01\projects\025\190\002\WIP\R\2012 Tidal Study\ALL_edited 121112DHF.xlsx

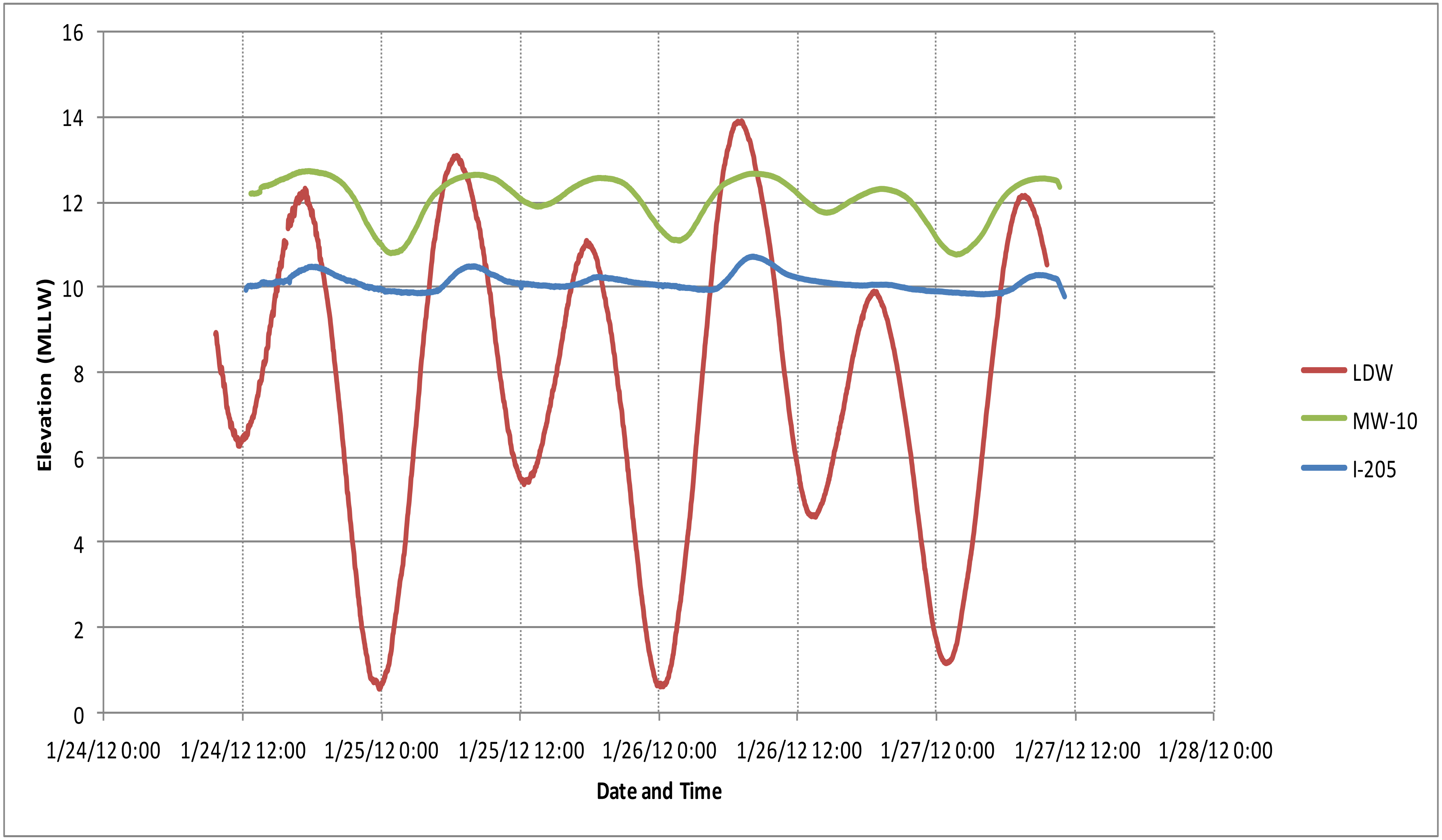



Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

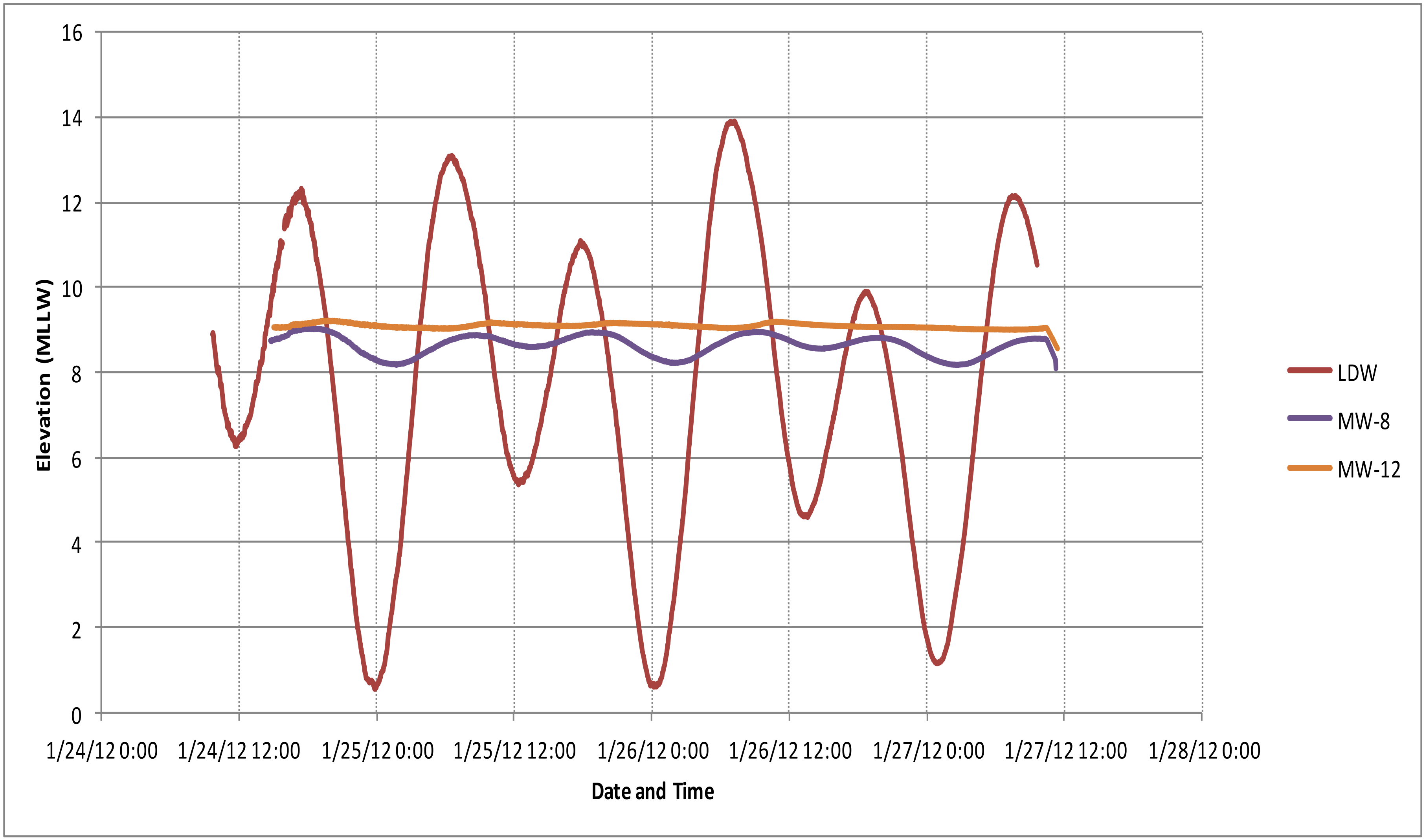
**Tidal Fluctuations in Lower Duwamish Waterway vs MW-7 and MW-20**

Figure 42




LANDAU ASSOCIATES

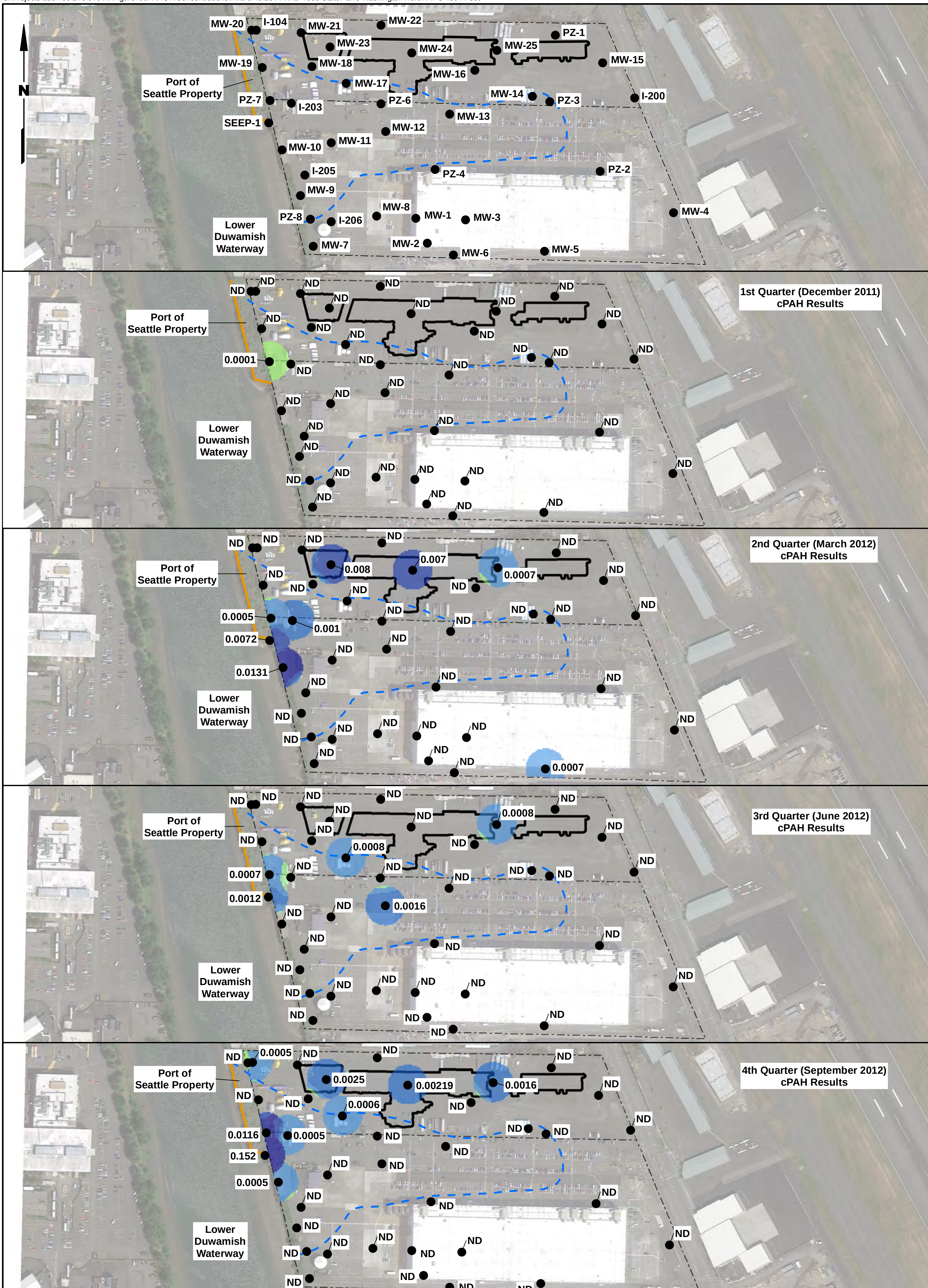
| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Tidal Fluctuations in Lower Duwamish Waterway vs MW-10 and I-205** | Figure<br>43 |
|---|---|---|




LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Tidal Fluctuations in Lower Duwamish Waterway vs MW-8 and MW-12** | Figure<br>44 |
|---|---|---|

G:\Projects\025\190\213\013\RI\Figure45cPAHGWConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- ● Sample Locations
- Approximate Location of Former Slip 5 (dashed blue line)
- Current Extent of Stabilized Soil Material (solid black line)

**Detected Concentrations (µg/L)**

- ≤0.0002
- 0.0002-0.001
- 0.001-0.003
- 0.003-0.01
- 0.01+

## Notes

1. All results shown are reported in µg/L.
2. The preliminary cleanup level for total cPAH TEQ is 0.0002 µg/L.
3. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 350 700

Scale in Feet

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

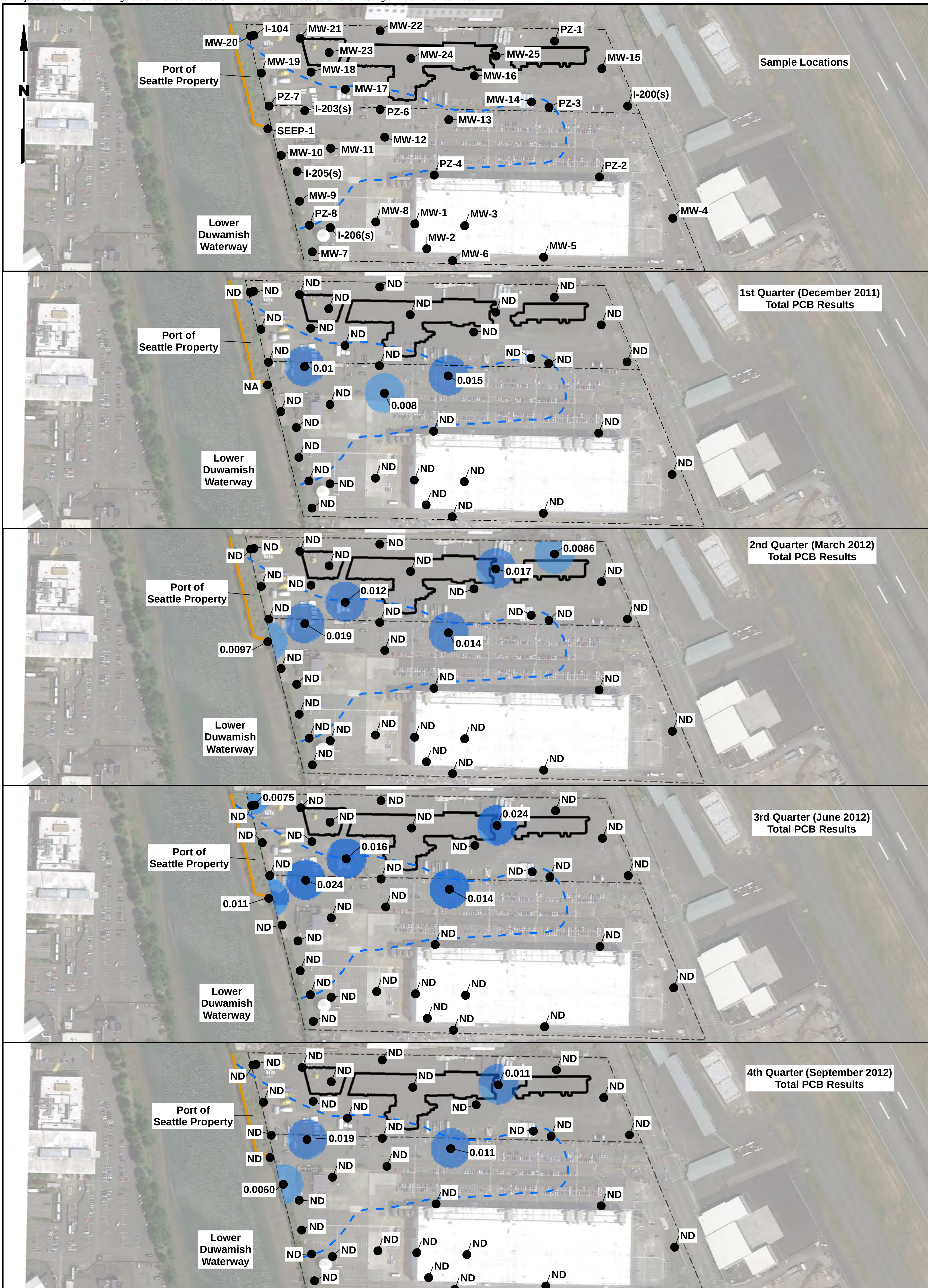
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Total cPAH TEQ Concentrations in Groundwater**

Figure 45

G:\Projects\025\190\213\013\RI\Figure46GWPCBConcentrations.mxd 4/2/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




Legend

- Groundwater Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

Detected Concentrations (µg/L)

- ≤0.00002
- 0.00002 - 0.01
- 0.01+

Notes

1. All results shown are reported in µg/L.
2. The preliminary cleanup level for total PCBs in groundwater is 0.00002 µg/L.
3. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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

0 350 700

Scale in Feet

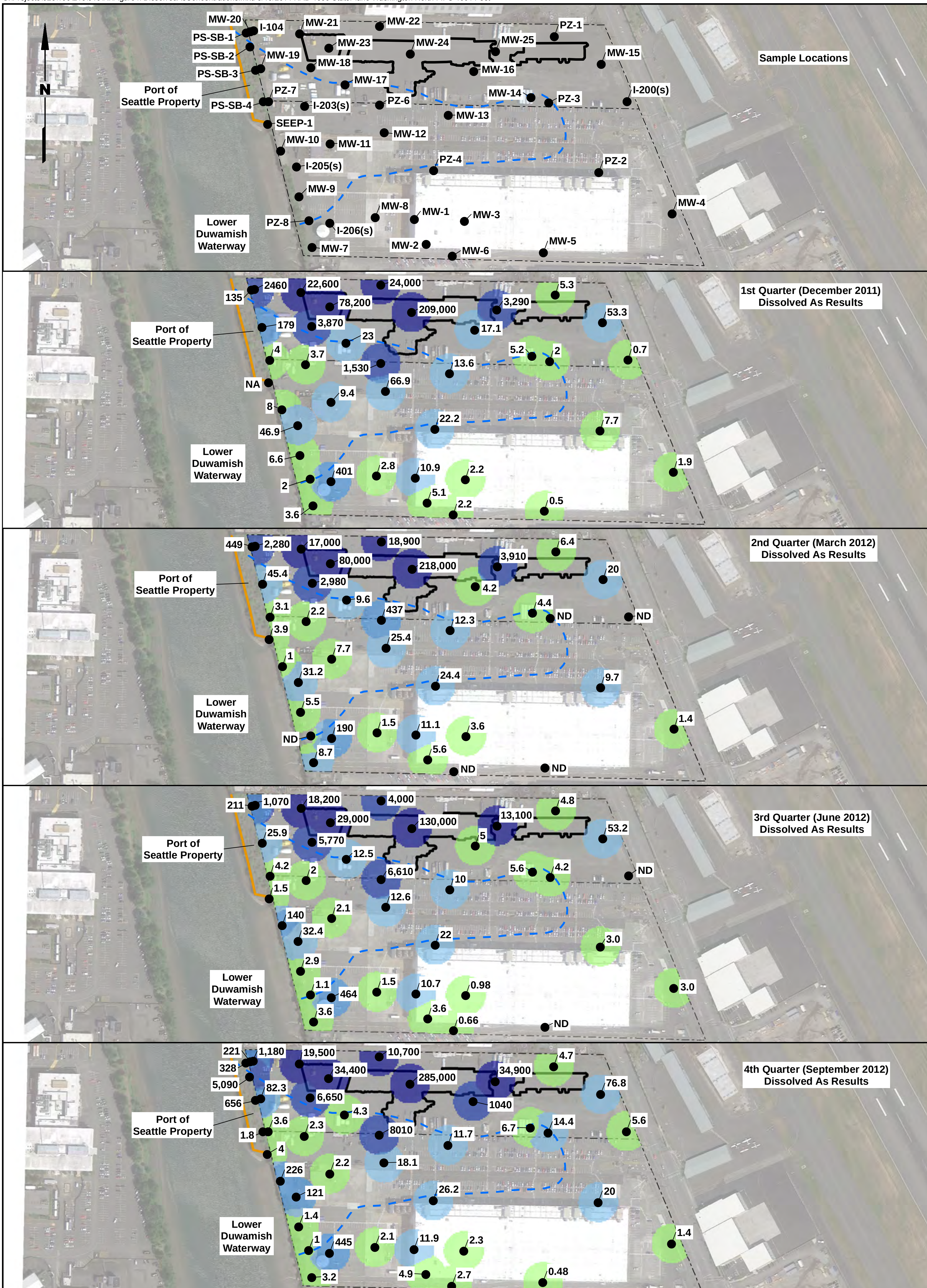
Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Total PCB Concentrations in Groundwater**

Figure 46

G:\Projects\025\190\213\013\RI\Figure47DissolvedAsConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- Groundwater Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

**Detected Concentrations (µg/L)**

- ≤8 µg/L
- 8-100 µg/L
- 100-500 µg/L
- 500-1,000 µg/L
- 1000-10,000 µg/L
- 10,000+ µg/L

## Notes

1. All results shown are reported in µg/L.
2. The preliminary cleanup level for arsenic in groundwater is 8 µg/L.
3. Groundwater samples from direct push borings were collected on the Port Property on 8/27/2013.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 350 700

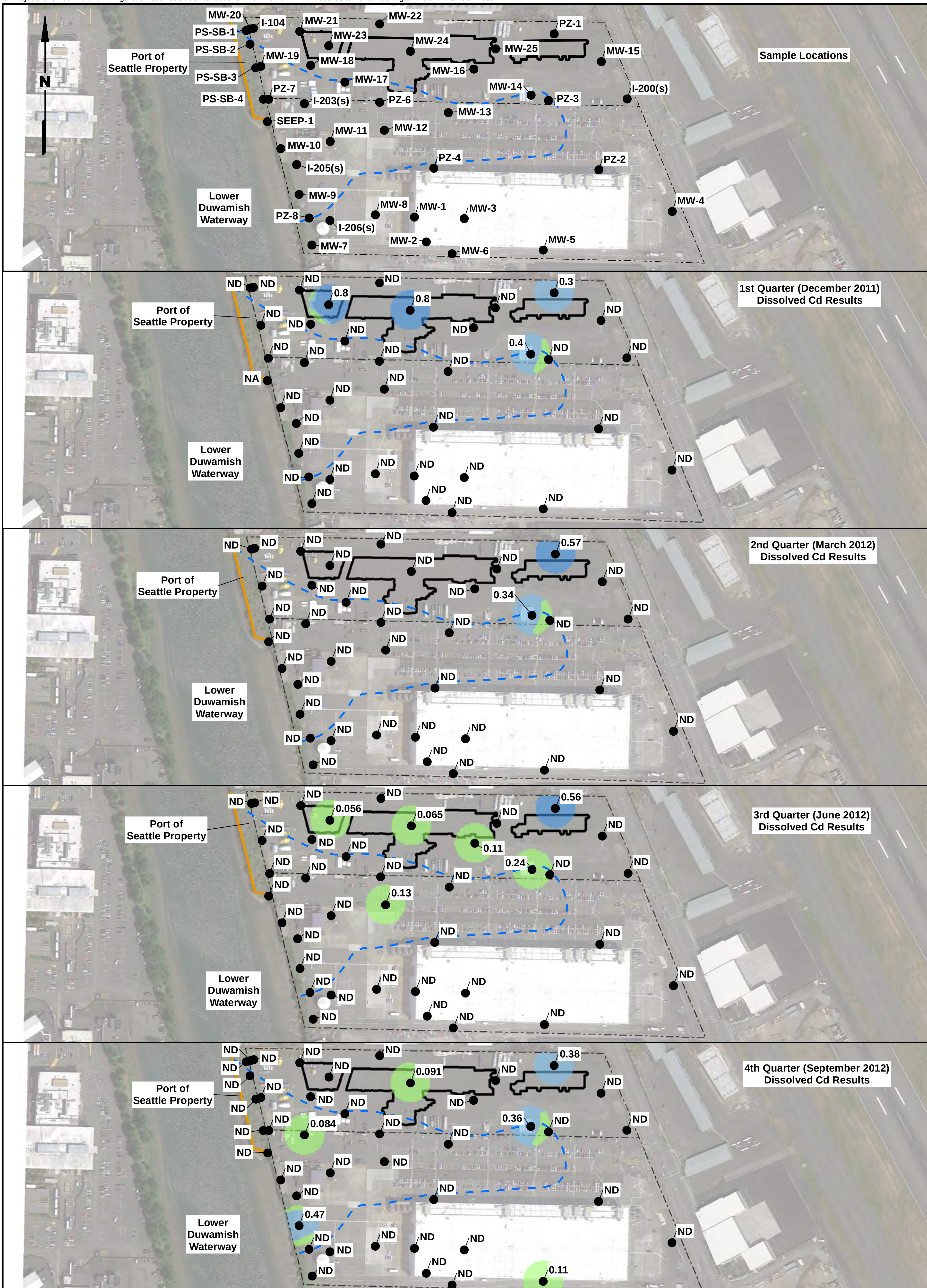
Scale in Feet

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

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Dissolved Arsenic Concentrations in Groundwater** | Figure<br>47 |
|---|---|---|

G:\Projects\025\190\213\013\RI\Figure48DissolvedCdConcentrations.mxd 4/10/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- Groundwater Sample Locations
- Approximate Location of Former Slip 5

**Detected Concentrations (µg/L)**

- ≤0.25
- 0.25-0.5
- 0.5-1

## Notes

1. All results shown are reported in µg/L.
2. The preliminary cleanup level for cadmium in groundwater is 0.25 µg/L.
3. Groundwater samples from direct push borings were collected on the Port Property on 8/27/2013.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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

LANDAU ASSOCIATES

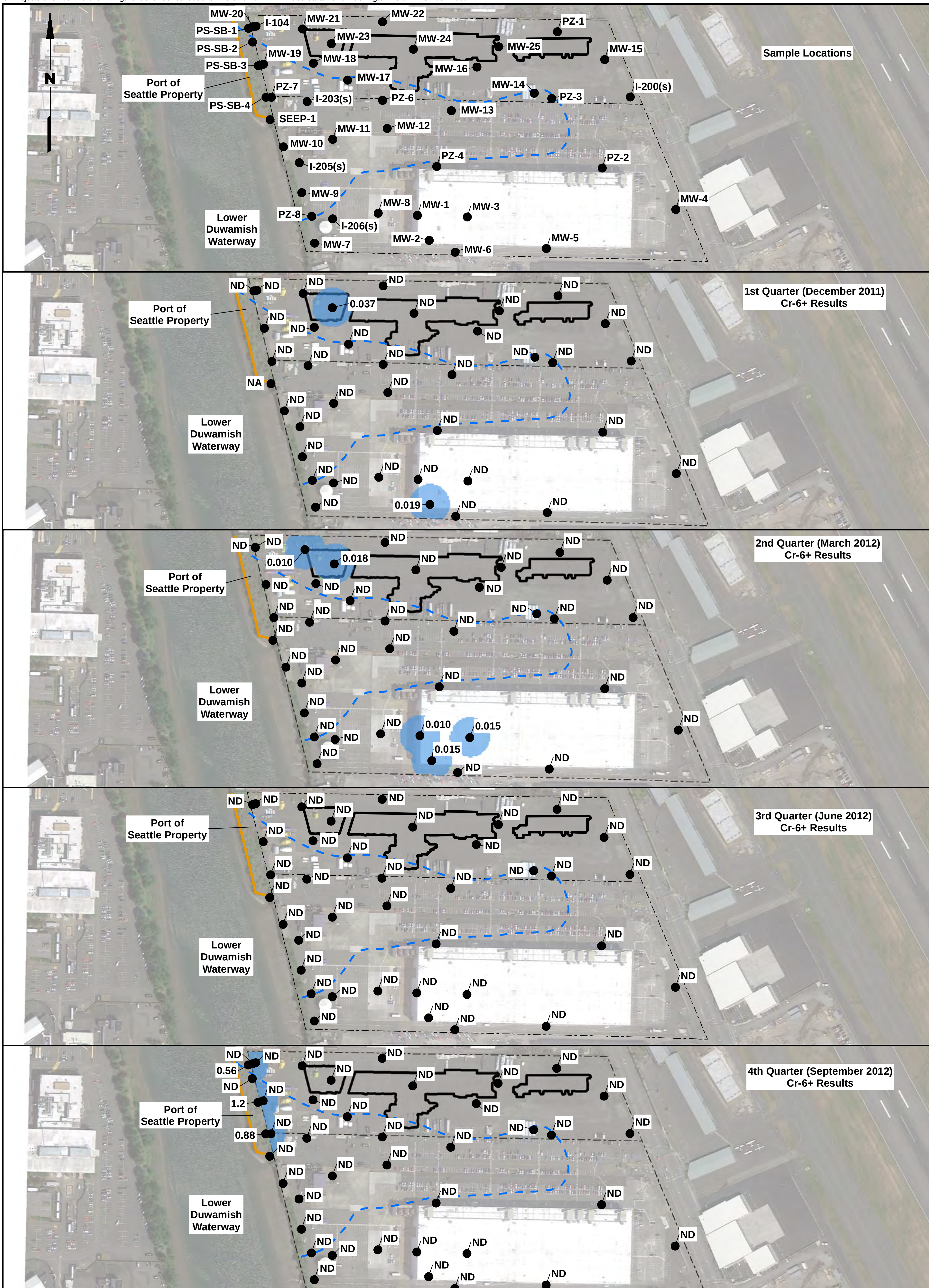
0 350 700
Scale in Feet

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Dissolved Cadmium Concentrations in Groundwater**

Figure 48

G:\Projects\025\190\213\013\RI\Figure49Cr6+Concentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- ● Groundwater Sampling Locations
- - - Approximate Location of Former Slip 5
- ▬ Current Extent of Stabilized Soil Material

**Detected Concentrations (mg/L)**

- ≤0.00058
- 0.00058+

## Notes

1. All results shown are reported in mg/L.
2. The preliminary cleanup level for chromium IV in groundwater is 0.00058 mg/L.
3. Groundwater samples from direct push borings were collected on the Port Property on 8/27/2013.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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

0 350 700
Scale in Feet

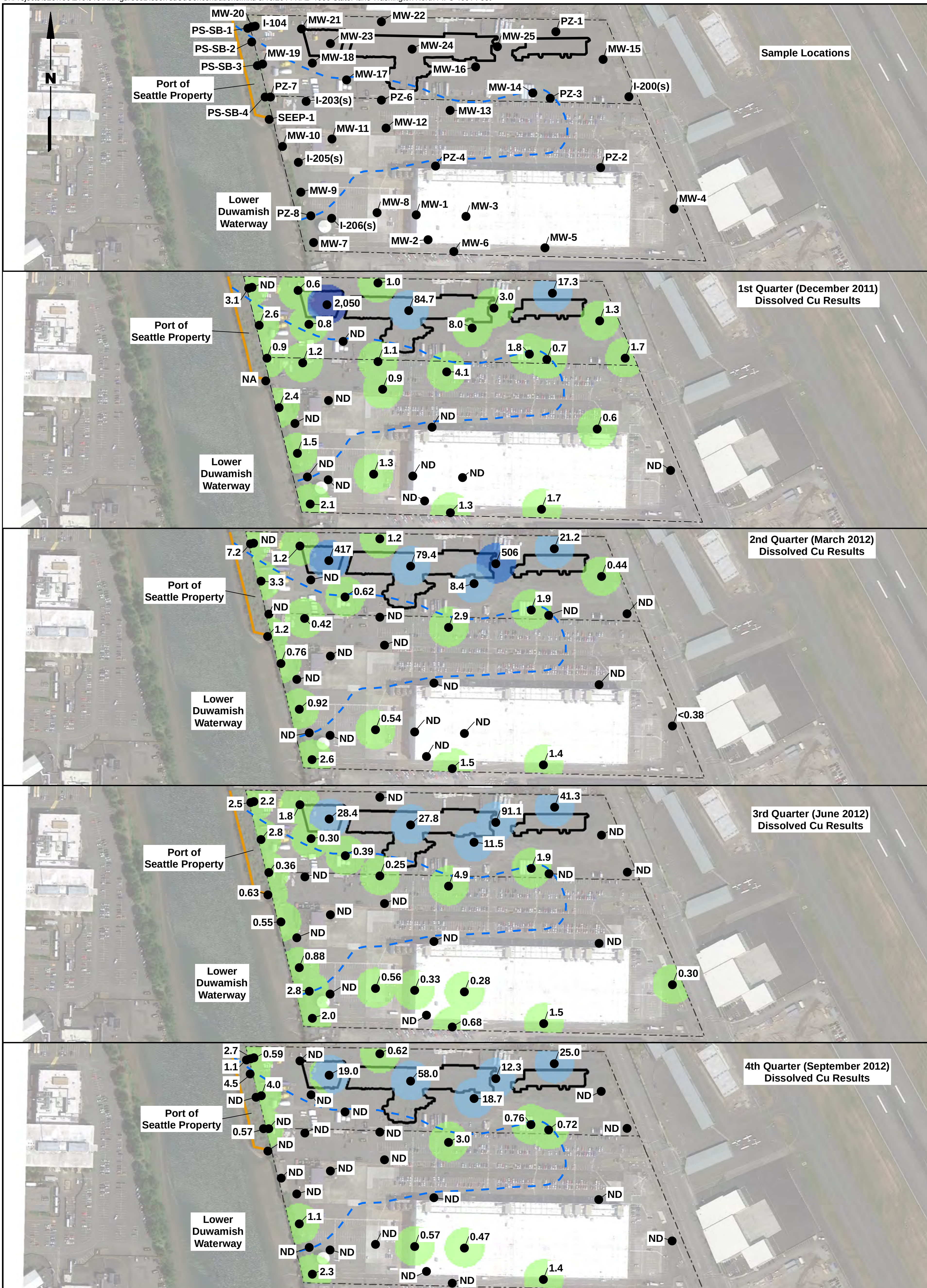
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Chromium VI Concentrations in Groundwater**

Figure 49

G:\Projects\025\190\213\013\RI\Figure50DissolvedCuConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




**Legend**

- ● Groundwater Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

**Detected Concentrations (µg/L)**

- ≤8
- 8-100
- 100-500
- 500-1,000
- 1,000+

**Notes**

1. All results shown are reported in µg/L.
2. The preliminary cleanup level for copper in groundwater is 8 µg/L.
3. Groundwater samples from direct push borings were collected on the Port Property on 8/27/2013.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 350 700

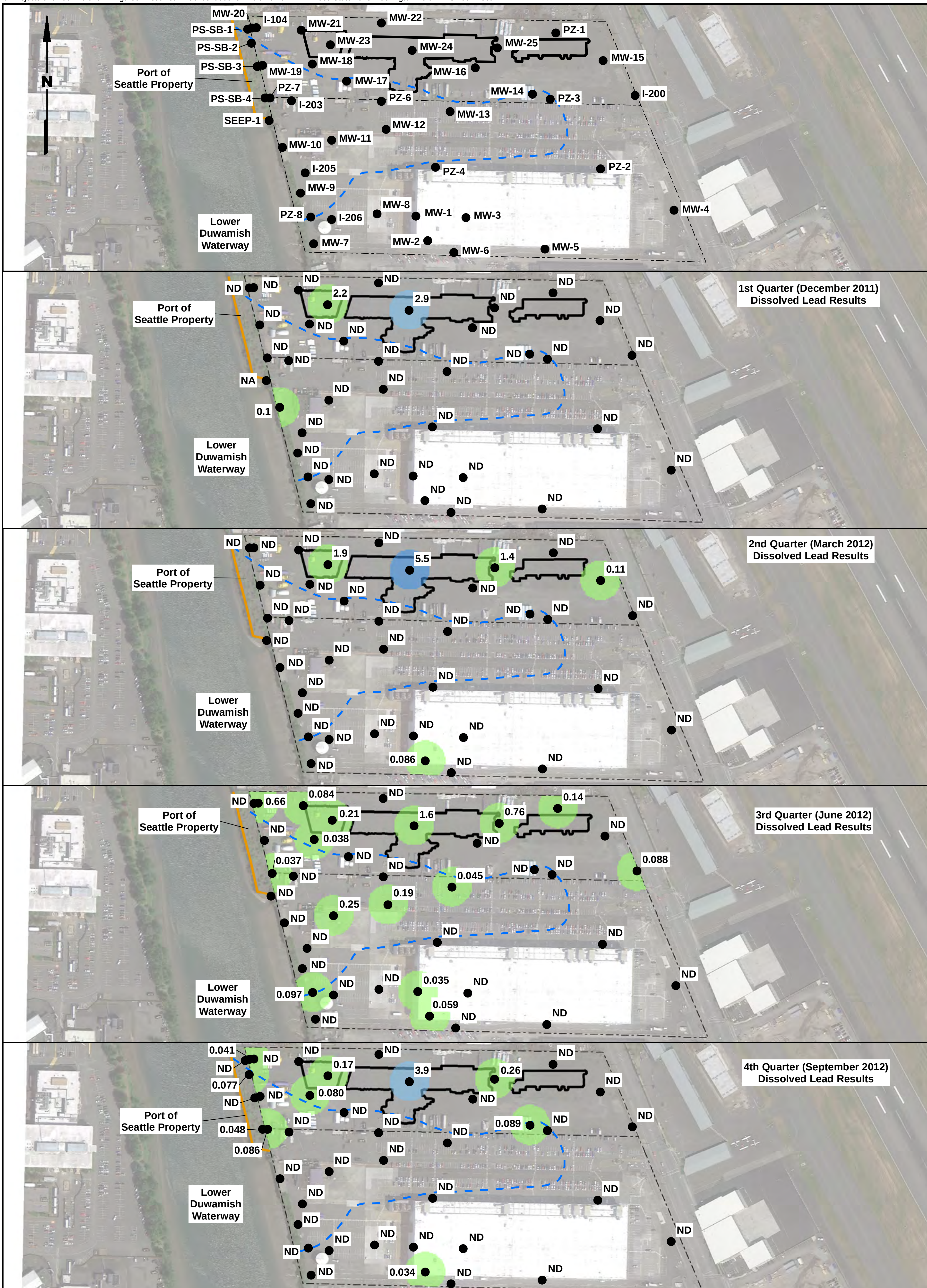
Scale in Feet

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

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Dissolved Copper Concentrations in Groundwater** | Figure<br>50 |
|---|---|---|

G:\Projects\025\190\213\013\RI\Figure51DissolvedPBConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- Groundwater Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

**Detected Concentrations (µg/L)**

- ≤2.5
- 2.5-4.5
- 4.5-10

## Notes

1. All results shown are reported in µg/L.
2. The preliminary cleanup level for lead in groundwater is 2.5 µg/L.
3. Groundwater samples from direct push borings were collected on the Port Property on 8/27/2013.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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

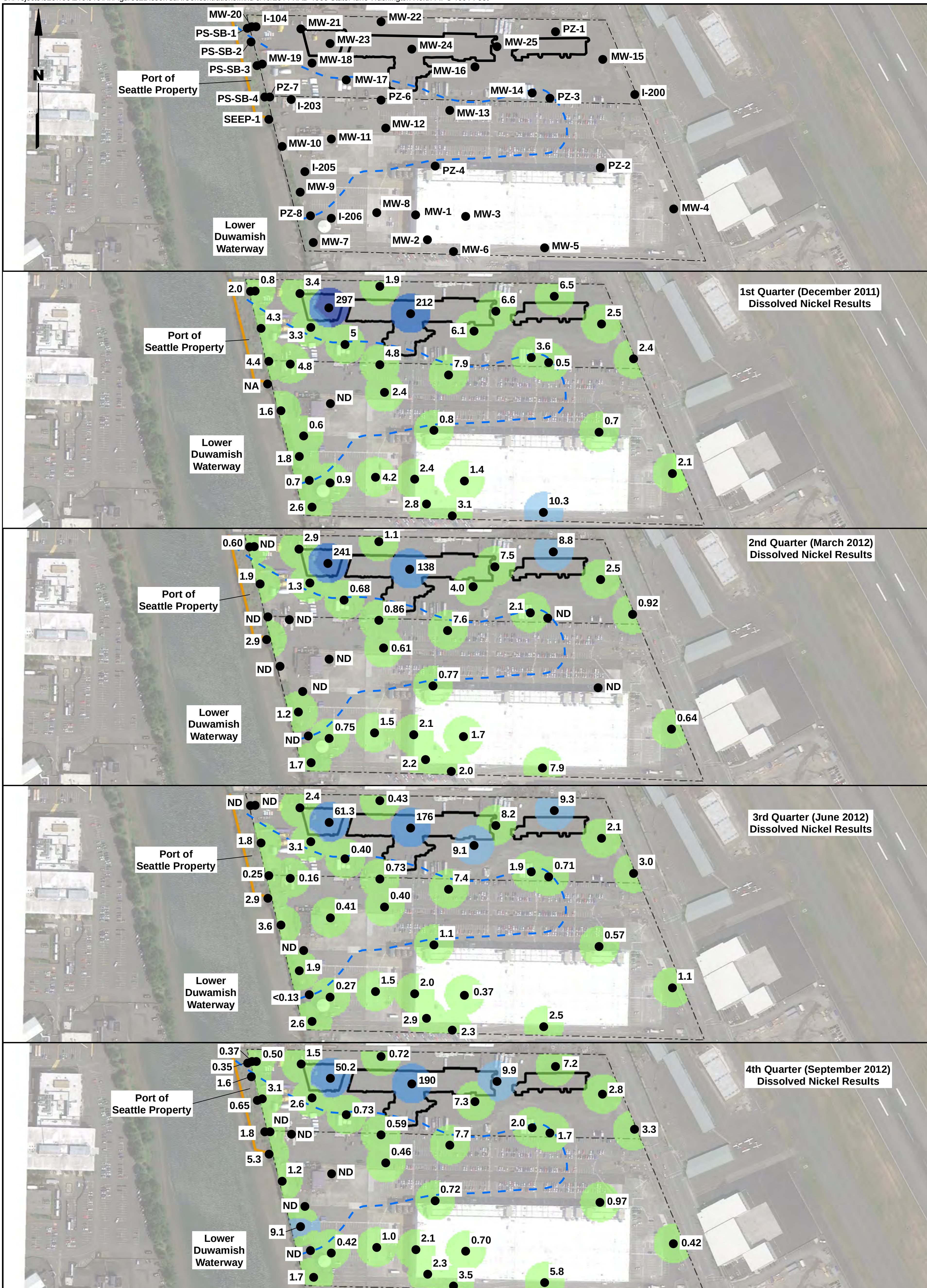
0 350 700
Scale in Feet

Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Dissolved Lead Concentrations in Groundwater**

Figure 51




## Legend

- ● Groundwater Sampling Locations
- - - Approximate Location of Former Slip 5
- — Current Extent of Stabilized Soil Material

**Detected Concentrations (µg/L)**

- ≤8.2
- 8.2-15
- 15-200
- 200-275
- 275+

## Notes

1. All results shown are reported in µg/L.
2. The preliminary cleanup level for nickel in groundwater is 8.2 µg/L.
3. Groundwater samples from direct push borings were collected on the Port Property on 8/27/2013.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 350 700

Scale in Feet

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

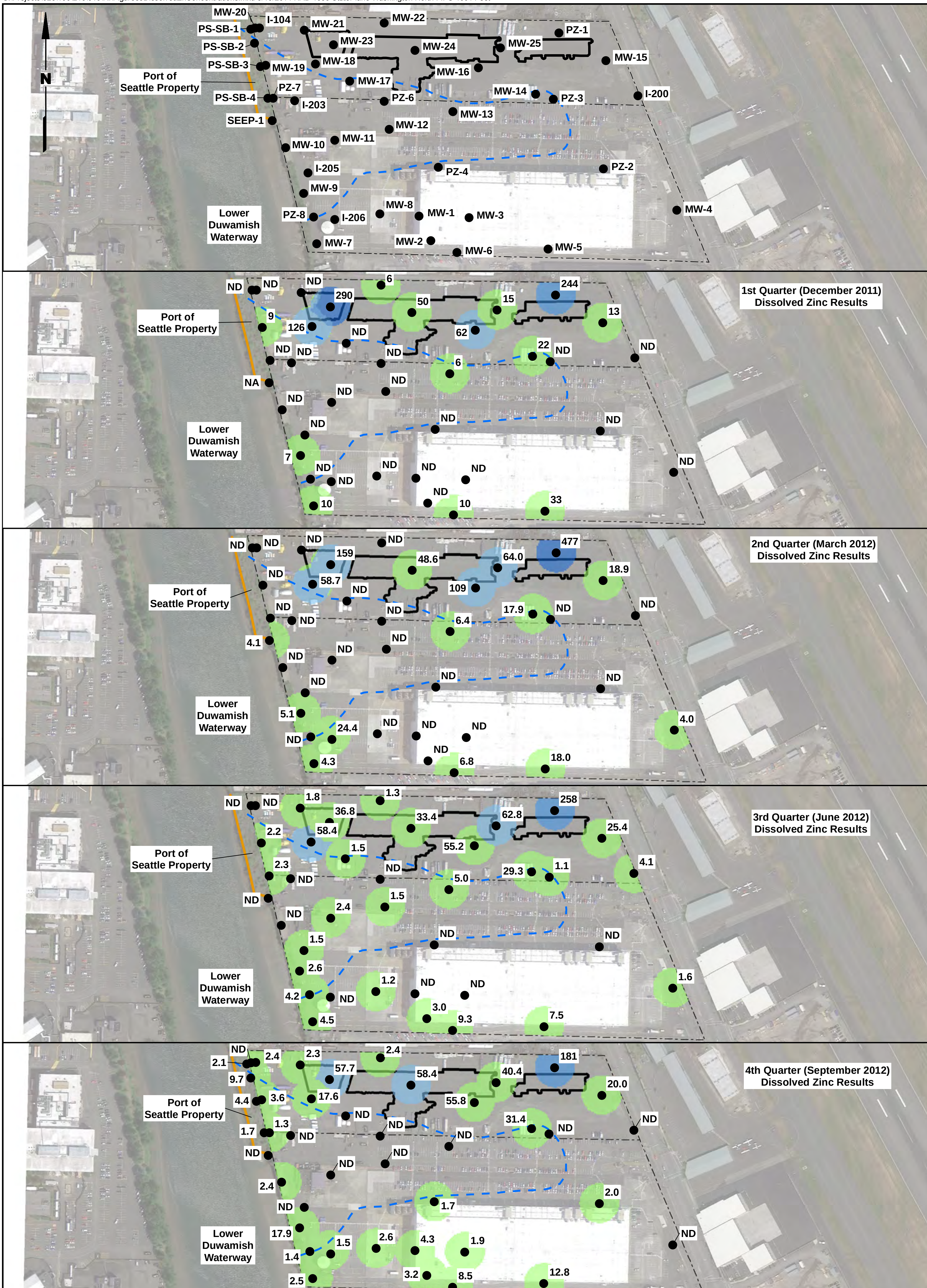
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Dissolved Nickel Concentrations in Groundwater**

Figure
52

G:\Projects\025\190\213\013\RI\Figure53DissolvedZnConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- ● Groundwater Sampling Locations
- - - Approximate Location of Former Slip 5
- — Current Extent of Stabilized Soil Material

**Detected Concentrations (µg/L)**

- ≤56
- 56-165
- 165-265
- 265-365
- 365+

## Notes

1. All results shown are reported in µg/L.
2. The preliminary cleanup level for zinc in groundwater is 56 µg/L.
3. Groundwater samples from direct push borings were collected on the Port Property on 8/27/2013.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 350 700

Scale in Feet

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

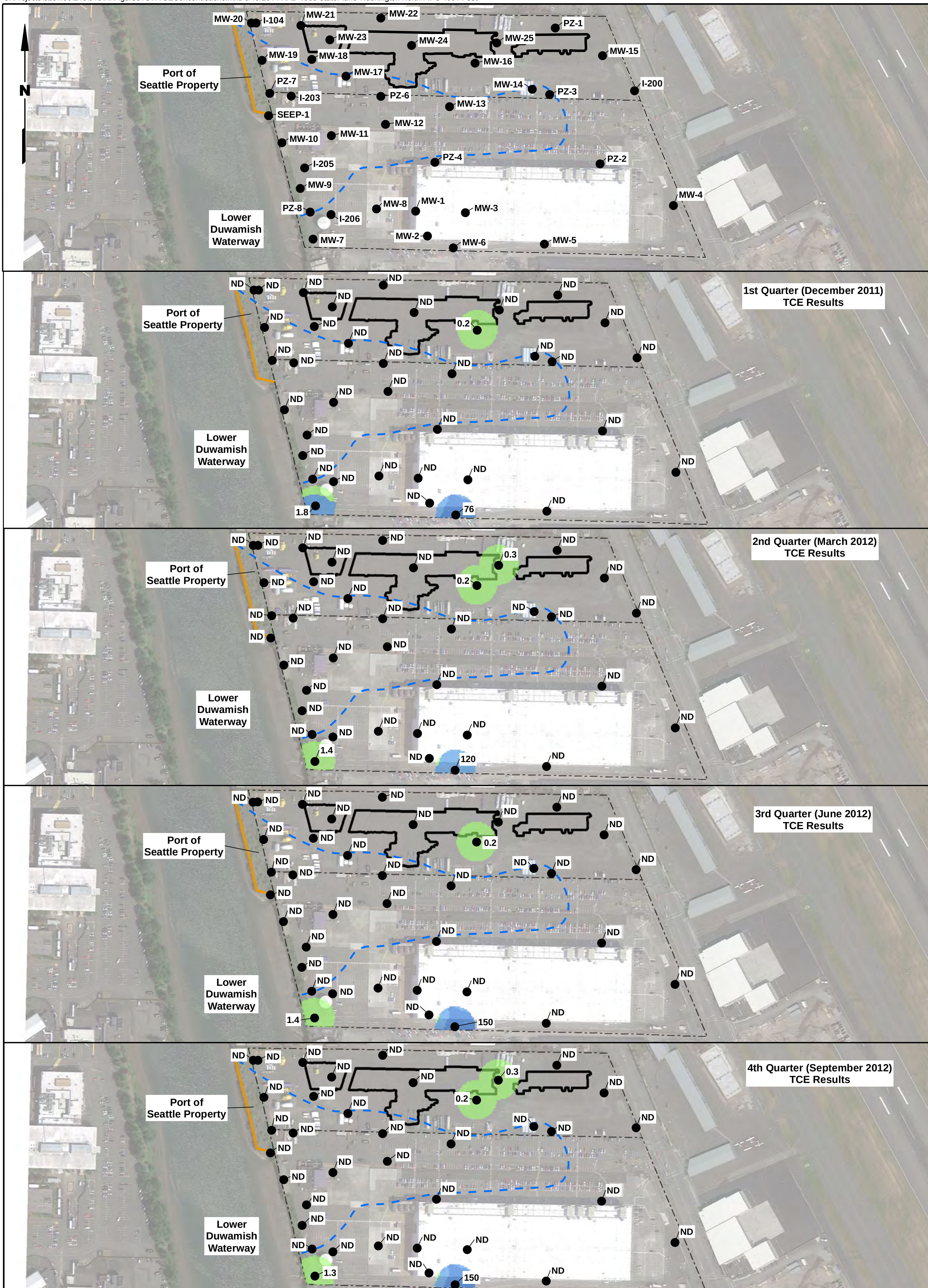
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Dissolved Zinc Concentrations in Groundwater**

Figure 53

G:\Projects\025\190\213\013\RI\Figure54GWTCEConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- ● Groundwater Sampling Location
- - - Approximate Location of Former Slip 5
- ▬ Current Extent of Stabilized Soil Material

**Detected Concentrations (µg/L)**

- ≤1.4
- 1.4-50
- 50-100
- 100+

## Notes

1. All results shown are reported in µg/L.
2. The preliminary cleanup level for TCE in groundwater is 1.4 µg/L.
3. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

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

0 350 700

Scale in Feet

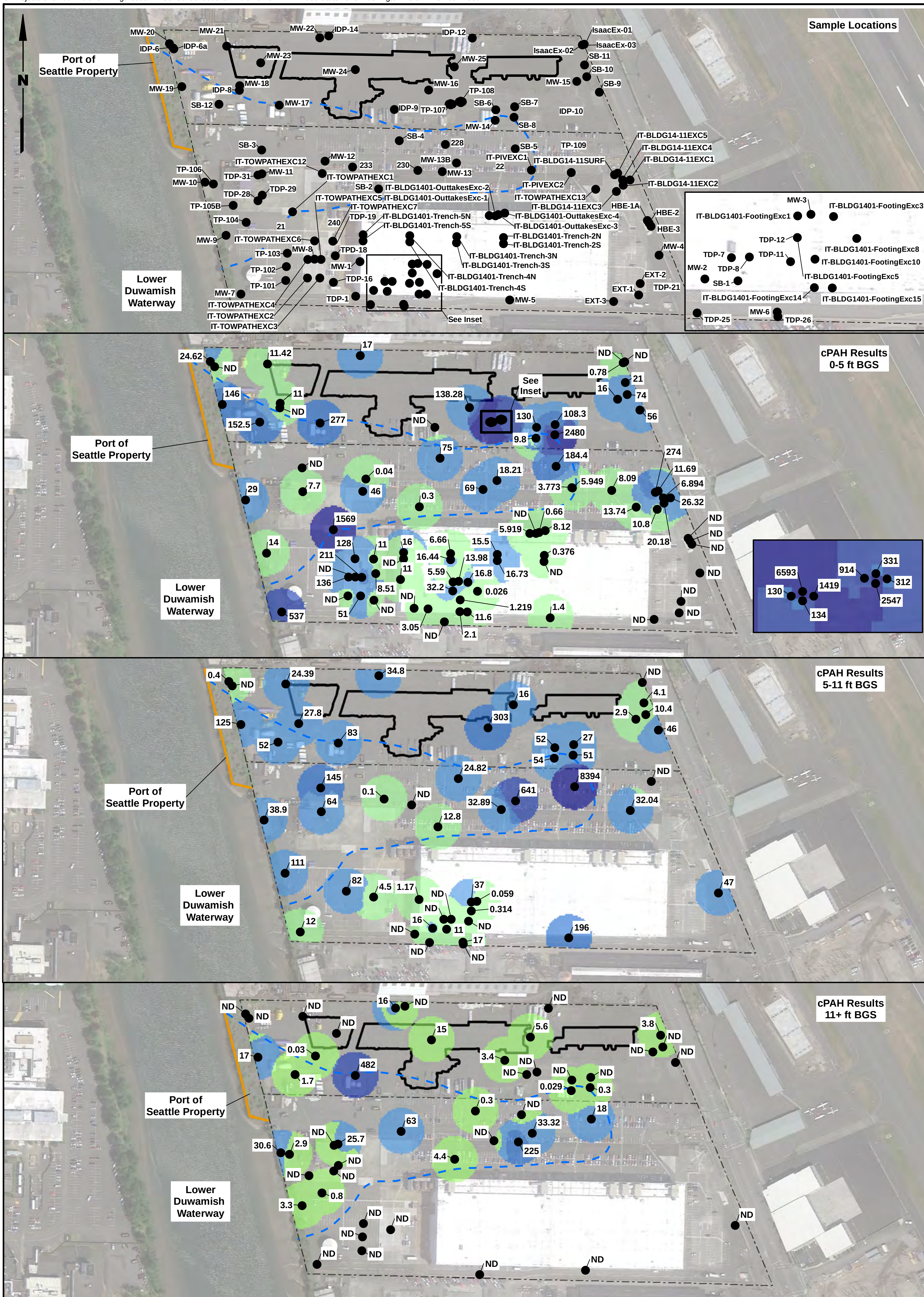
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**TCE Concentrations in Groundwater**

Figure
54

G:\Projects\025\190\213\013\RI\Figure55cPAHSoilConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- Soil Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

**Detected Concentration (µg/kg)**

- ≤15
- 15-140
- 140-390
- 390-1,400
- 1,400+

## Notes

1. All results shown are reported in µg/kg.
2. The preliminary cleanup level for total cPAHs in soil is 15 µg/kg.
3. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 300 600

Scale in Feet

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

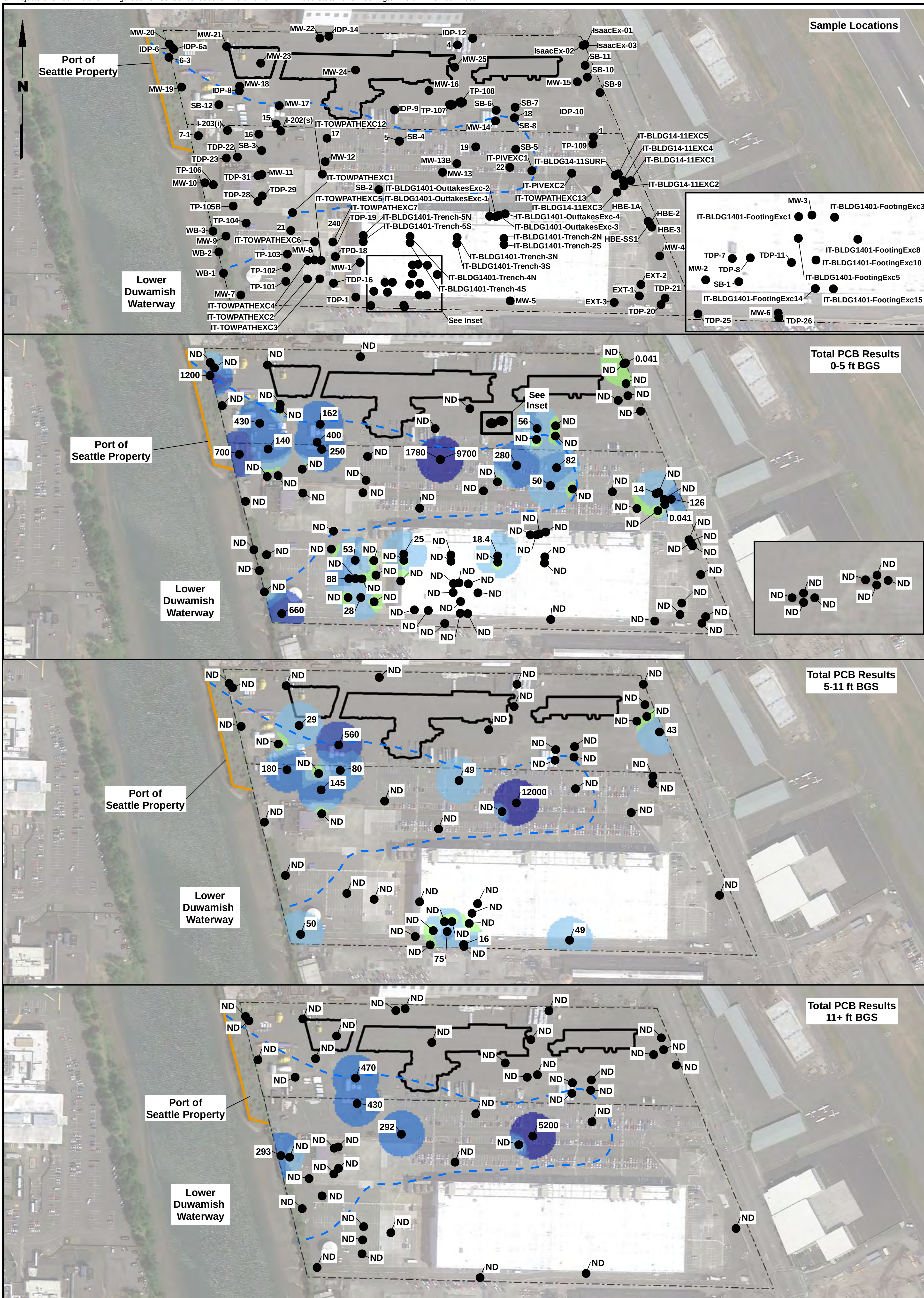
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Total cPAH Concentrations in Soil**

Figure
55

G:\Projects\025\190\213\013\RI\Figure56PCBSoilConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




**Legend**

- ● Soil Sampling Locations
- Approximate Location of Former Slip 5 (dashed blue line)
- Current Extent of Stabilized Soil Material (solid black line)

**Detected Concentrations (µg/kg)**

- ≤1.8
- 1.8-50
- 50-100
- 100-500
- 500-1,000
- 1,000+

**Notes**

1. All results shown are reported in µg/kg.
2. The preliminary cleanup level for PCBs in soil is 1.8 µg/kg.
3. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 300 600

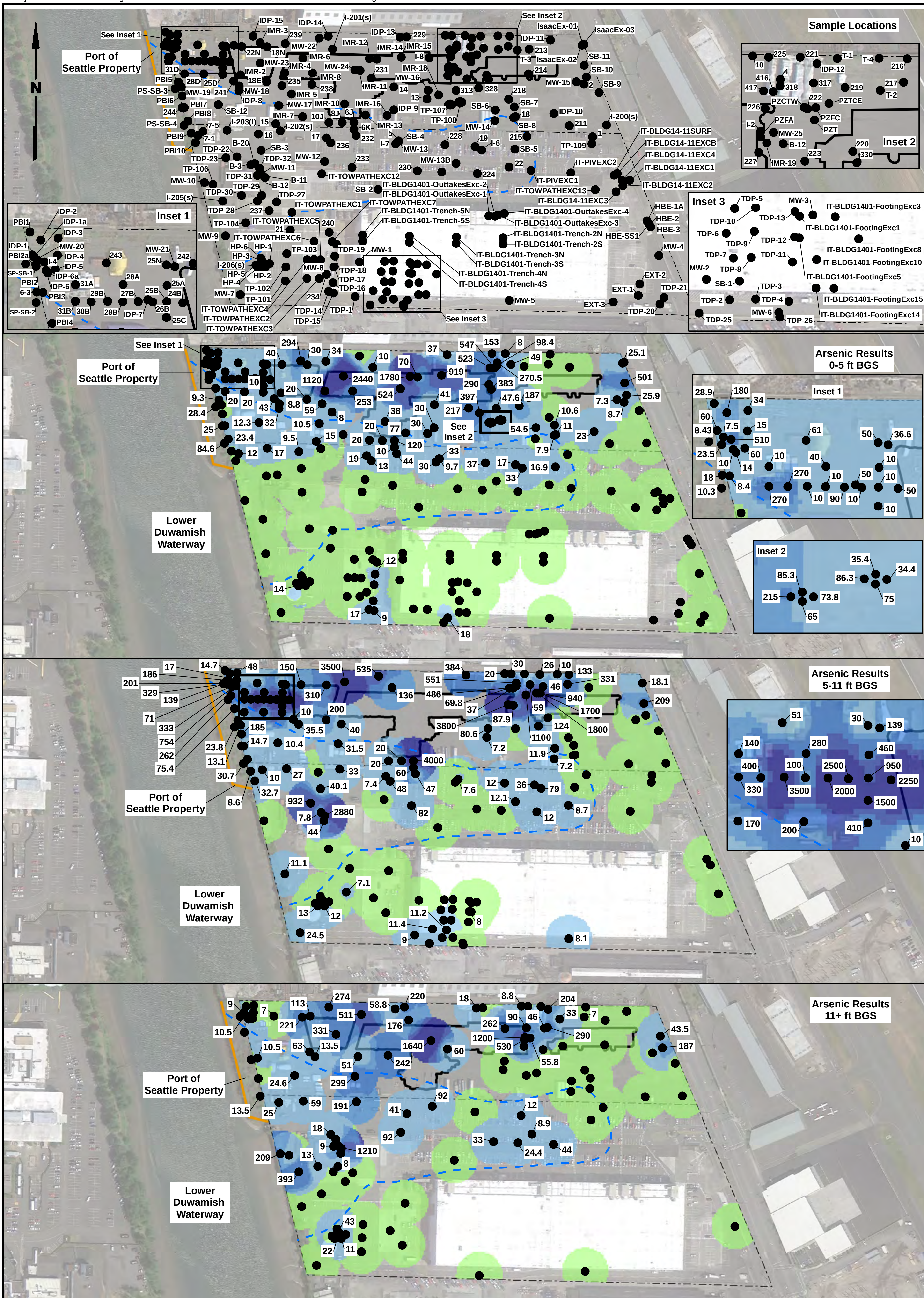
Scale in Feet

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

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | Total PCB Concentrations in Soil | Figure<br>56 |
|---|---|---|

G:\Projects\025\190\213\013\RI\Figure57AsSoilConcentrations.mxd 4/2/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- ● Soil Sampling Locations
- Approximate Location of Former Slip 5 (blue dashed line)
- Current Extent of Stabilized Soil Material (black line)

**Detected Concentrations (mg/kg)**

- ≤7
- 7-100
- 100-200
- 200-500
- 500-1,000
- 1,000+

## Notes

1. All results shown are reported in mg/kg.
2. Concentration values less than or equal to the preliminary cleanup level (7 mg/kg) are not presented.
3. The preliminary cleanup level for arsenic in soil is 7 mg/kg.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 300 600

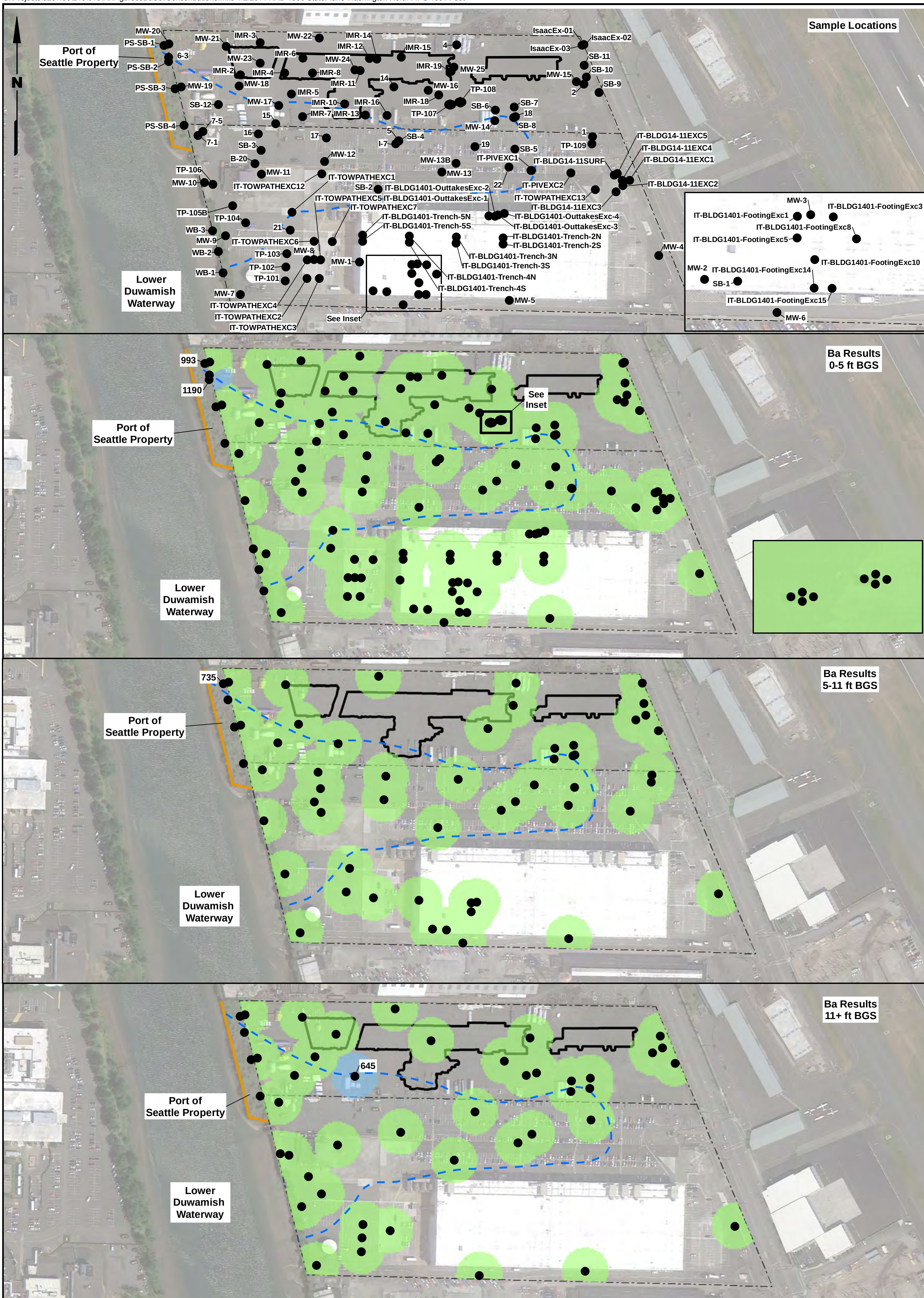
Scale in Feet

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

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Arsenic Concentrations in Soil** | Figure<br>57 |
|---|---|---|

G:\Projects\025\190\213\013\RI\Figure58BaSoilConcentrations.mxd 4/2/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




**Legend**

- Soil Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

**Detected Concentrations (mg/kg)**

- ≤640
- 640+

**Notes**

1. All results shown are reported in mg/kg.
2. Concentration values less than or eqaul to the preliminary screening level (640 mg/kg) are not presented.
3. The preliminary cleanup level for barium in soil is 640 mg/kg.
4. Inverse Distance Weighting calculated using the following inputs: Power = 4, Search Radius = Variable, Number of Points = 8, Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 300 600

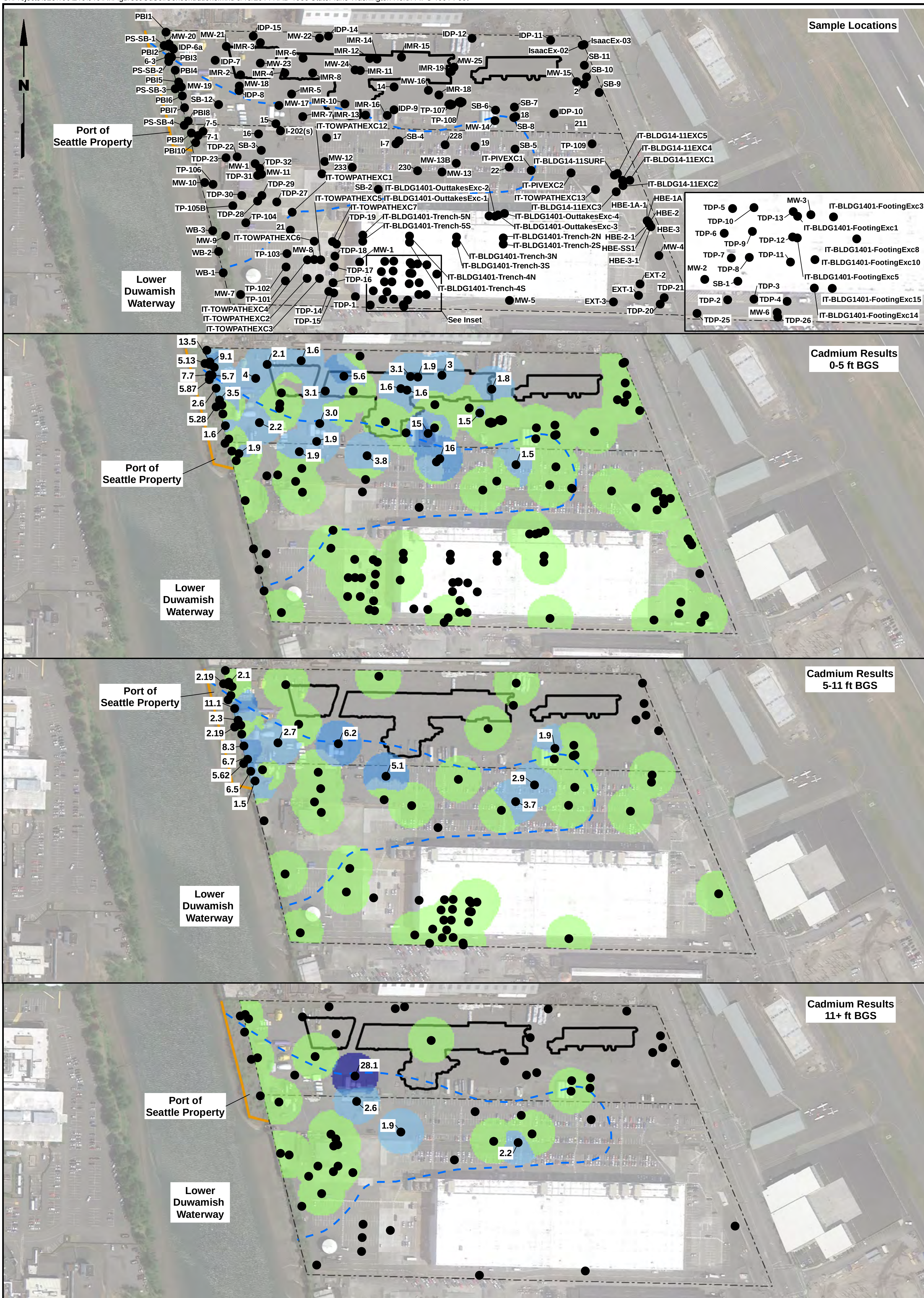
Scale in Feet

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

LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | Barium Concentrations in Soil | Figure 58 |
|---|---|---|

G:\Projects\025\190\213\013\RI\Figure59CdSoilConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




**Legend**

- Soil Sampling Locations
- Approximate Location of Former Slip 5

**Detected Concentrations (mg/kg)**

- ≤1.3
- 1.3-5
- 5-10
- 10-15
- 15-20
- 20+

**Notes**

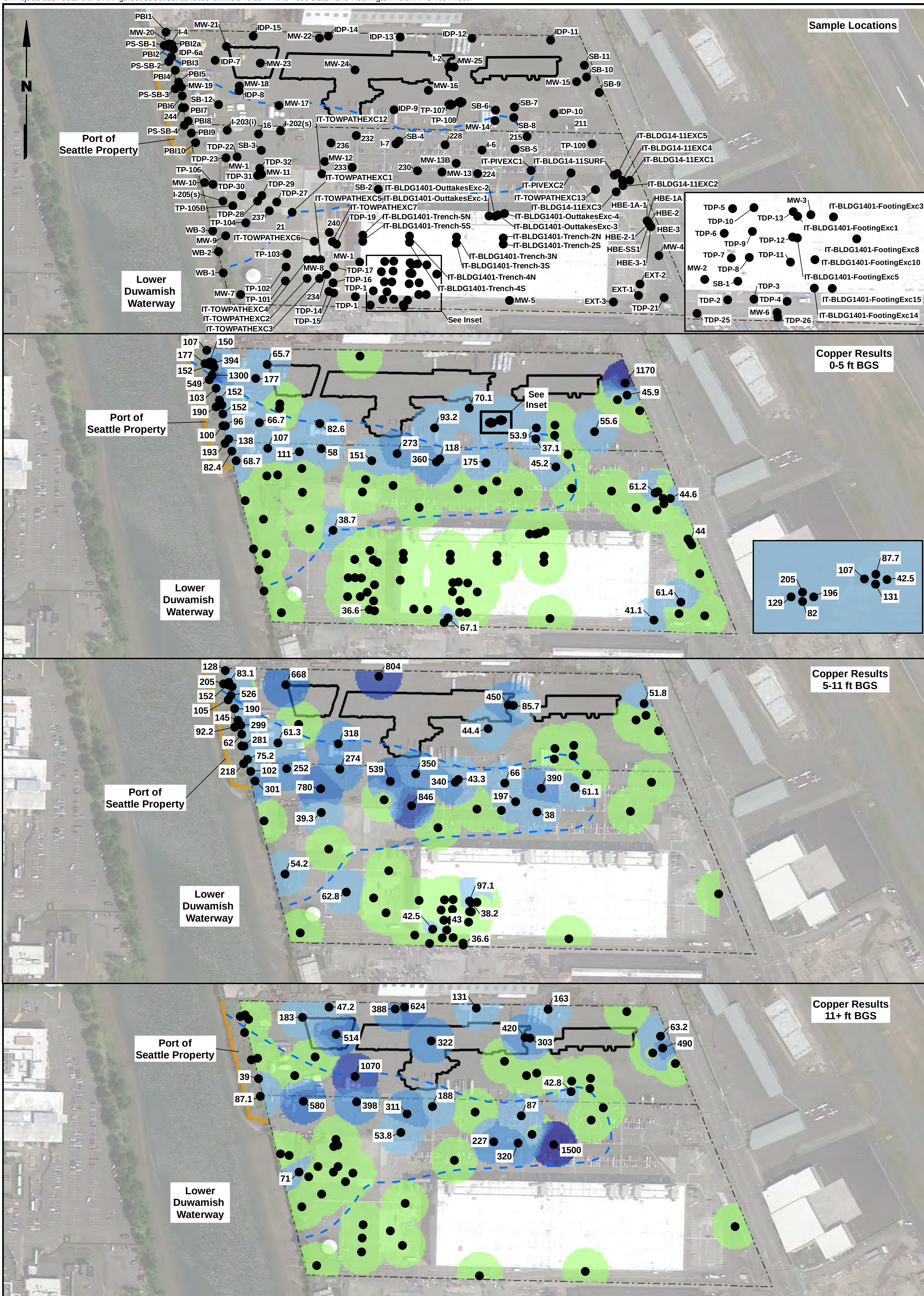
1. All results shown are reported in mg/kg.
2. Concentration values less than or equal to the preliminary cleanup level (1.3 mg/kg) are not presented.
3. The preliminary cleanup level for cadmium in soil is 1.3 mg/kg.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 300 600
Scale in Feet

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

LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | Cadmium Concentrations in Soil | Figure 59 |
| --- | --- | --- |




**Legend**

- ● Soil Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

**Detected Concentrations (mg/kg)**

- ≤36
- 36-200
- 200-500
- 500-800
- 800-1,100
- 1,100+

**Notes**

1. All results shown are reported in mg/kg.
2. Concentration values less than or equal to the preliminary cleanup level (36 mg/kg) are not presented.
3. The preliminary cleanup level for copper in soil is 36 mg/kg.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 300 600

Scale in Feet

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

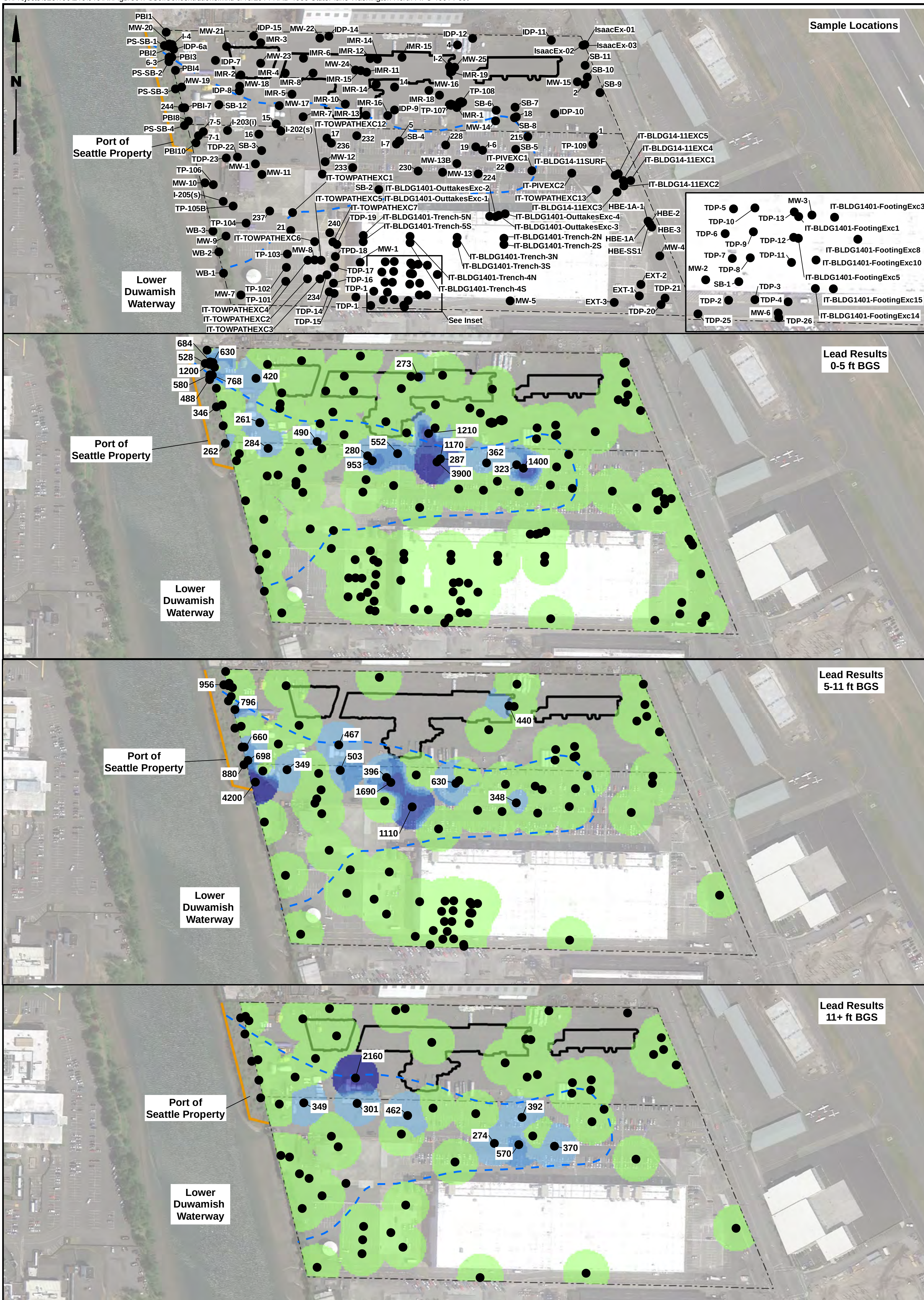
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Copper Concentrations in Soil**

Figure 60

G:\Projects\025\190\213\013\RI\Figure61PbSoilConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- Soil Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

**Detected Concentrations (mg/kg)**

- ≤250
- 250-500
- 500-750
- 750-1,000
- 1,000-2,000
- 2,000+

## Notes

1. All results shown are reported in mg/kg.
2. Concentration values less than or equal to the preliminary cleanup level (250 mg/kg) are not presented.
3. The preliminary cleanup level for lead in soil is 250 mg/kg.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Groundwater samples from direct push borings were collected on the Port Property on 8/27/2013.

0 300 600

Scale in Feet

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

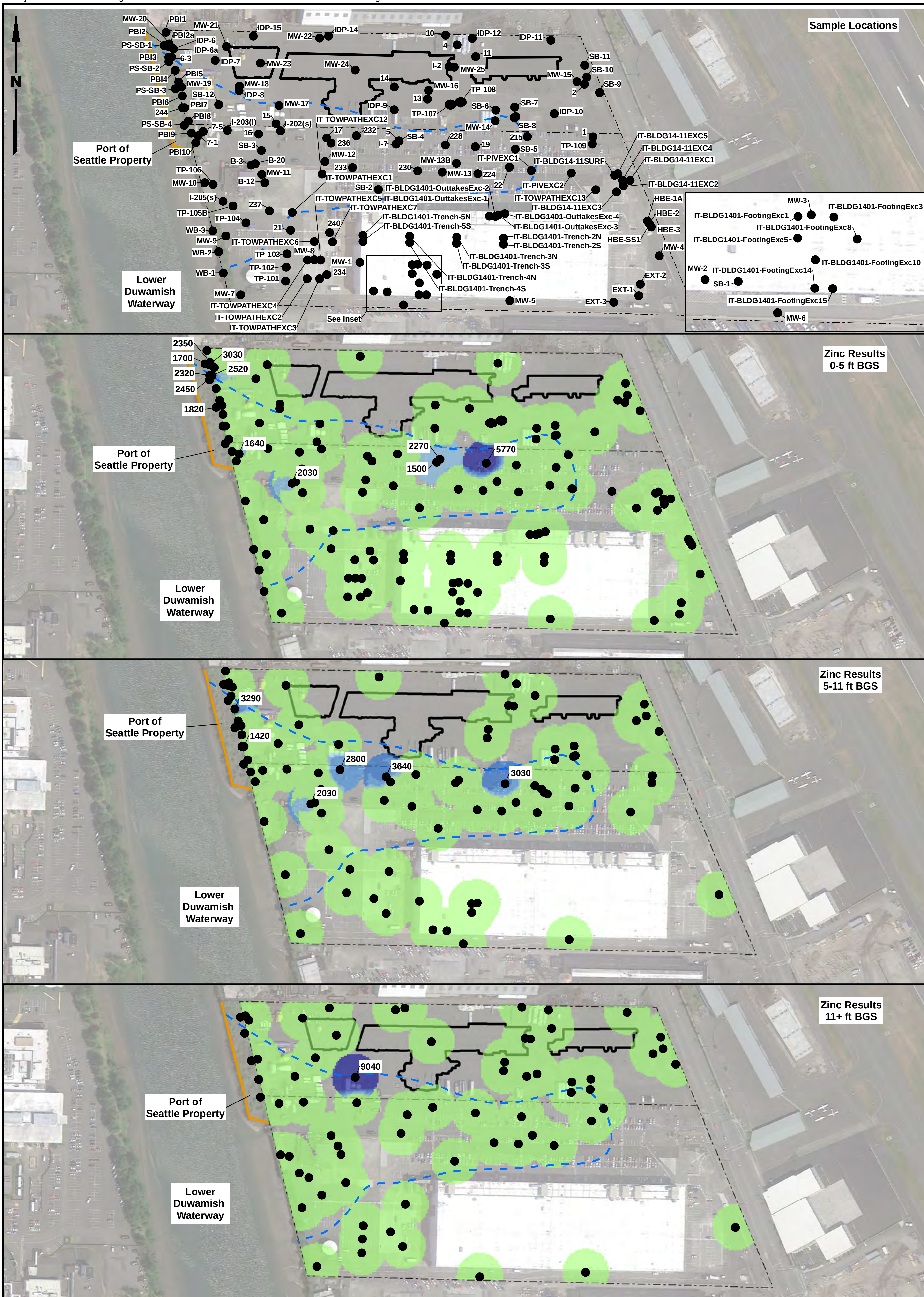
Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Lead Concentrations in Soil**

Figure
61

G:\Projects\025\190\213\013\RI\Figure62ZnSoilConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- Soil Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

**Detected Concentrations (mg/kg)**

- ≤1400
- 1400-2000
- 2000-3000
- 3000-4000
- 4000-5000
- 5000+

## Notes

1. All results shown are reported in mg/kg.
2. Concentration values less than or equal to the preliminary cleanup level (1,400 mg/kg) are not presented.
3. The preliminary cleanup level for zinc in soil is 1,400 mg/kg.
4. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 300 600

Scale in Feet

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

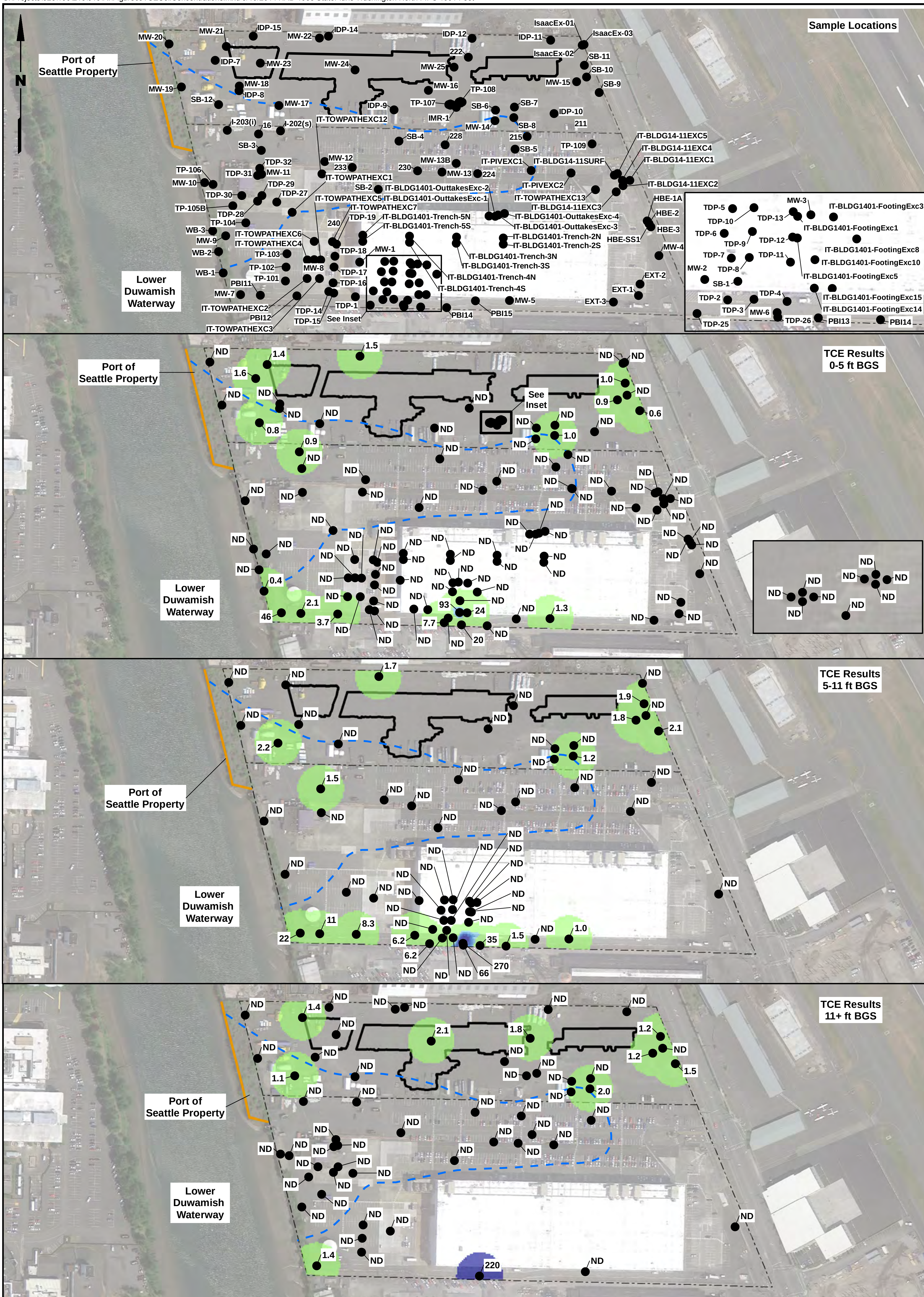
LANDAU ASSOCIATES

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Zinc Concentrations in Soil**

Figure
62

G:\Projects\025\190\213\013\RI\Figure63TCESoilConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




## Legend

- ● Soil Sampling Locations
- Approximate Location of Former Slip 5 (dashed blue line)
- Current Extent of Stabilized Soil Material (black line)

**Detected Concentrations (µg/kg)**

- ≤51
- 51-80
- 80-110
- 110-140
- 140-170
- 170+

## Notes

1. All results shown are reported in µg/kg.
2. The preliminary cleanup level for TCE in soil is 51 µg/kg.
3. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 300 600
Scale in Feet

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

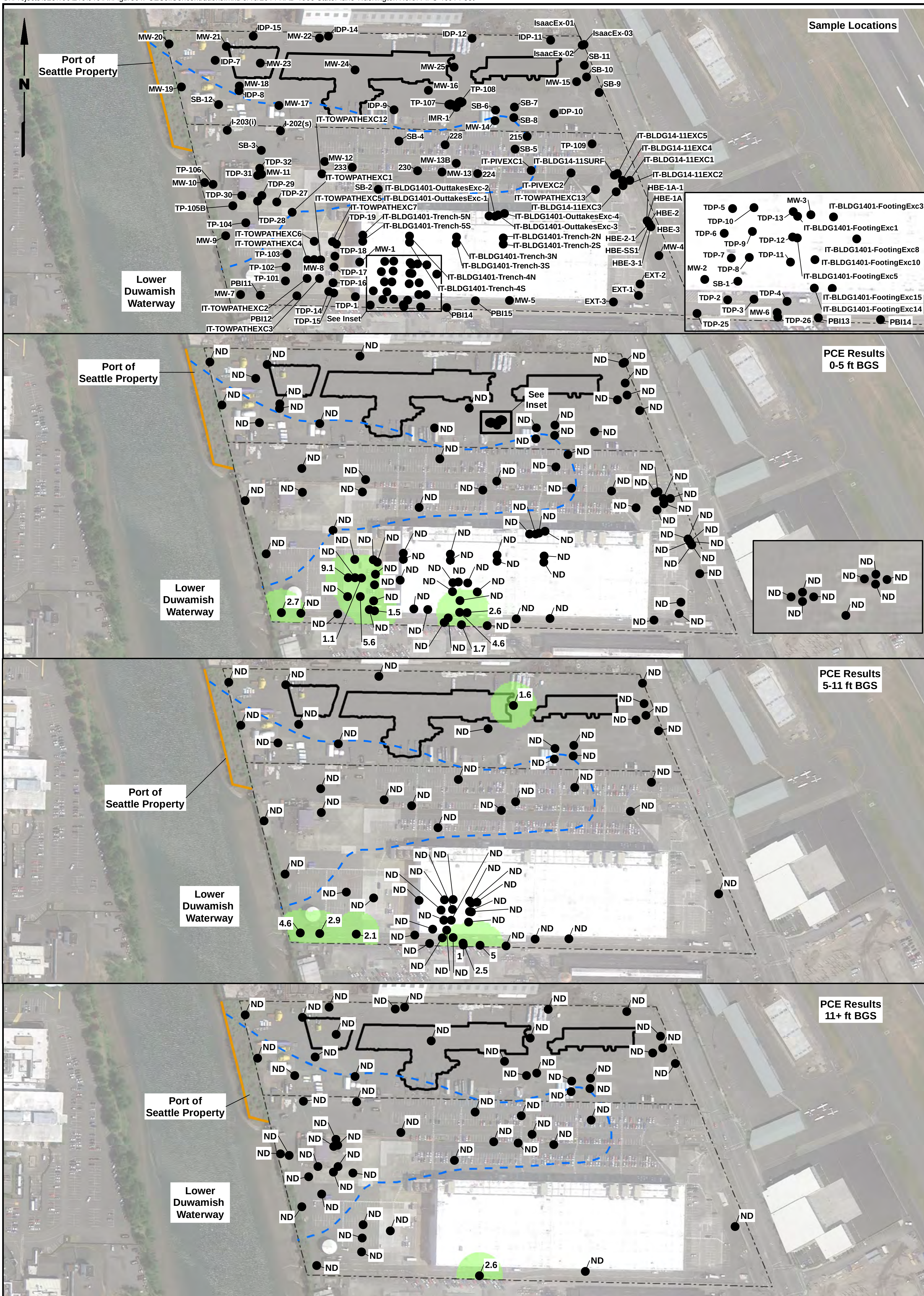
Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**TCE Concentrations in Soil**

Figure 63

G:\Projects\025\190\213\013\RI\Figure64PCESoilConcentrations.mxd 3/19/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet




Legend

- Soil Sampling Locations
- Approximate Location of Former Slip 5
- Current Extent of Stabilized Soil Material

Detected Concentrations (µg/kg)

- ≤260
- 260+

Notes

1. All results shown are reported in µg/kg.
2. The preliminary cleanup level for PCE in soil is 260 µg/kg.
3. Inverse Distance Weighting calculated using the following inputs:
   Power = 4
   Search Radius = Variable
   Number of Points = 8
   Maximum Distance = 75
4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 300 600

Scale in Feet

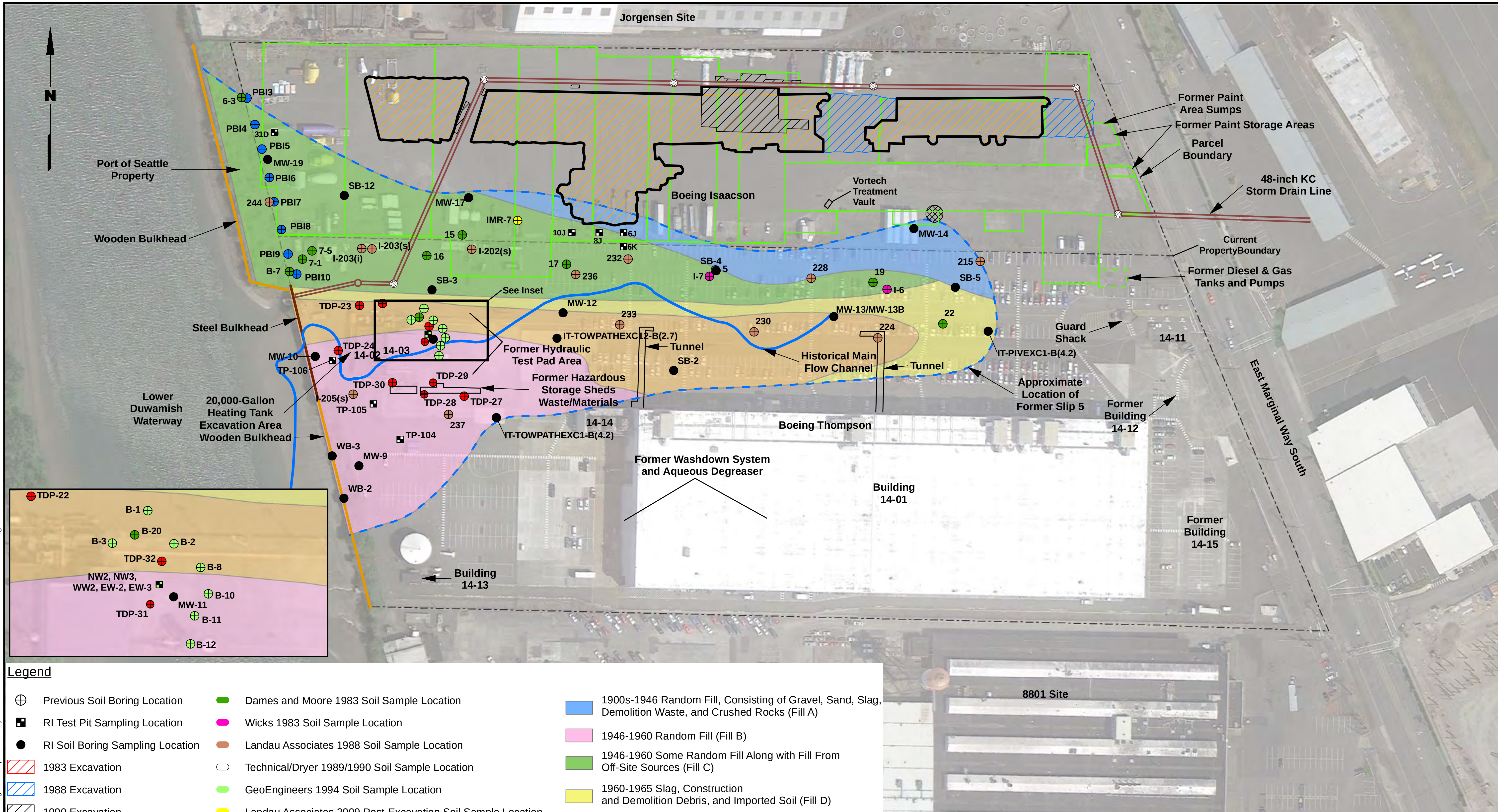
Data Sources: Google Earth Pro, 2012; King County Parcel Data

Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**PCE Concentrations in Soil**

Figure 64




G:\Projects\025190\213013\RI\Figure65Slip5FillHistory.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

**Legend**

- Previous Soil Boring Location
- RI Test Pit Sampling Location
- RI Soil Boring Sampling Location
- 1983 Excavation
- 1988 Excavation
- 1990 Excavation
- 1991 Excavation
- Approximate Location of Former Slip 5
- Dames and Moore 1983 Soil Sample Location
- Wicks 1983 Soil Sample Location
- Landau Associates 1988 Soil Sample Location
- Technical/Dryer 1989/1990 Soil Sample Location
- GeoEngineers 1994 Soil Sample Location
- Landau Associates 2009 Post-Excavation Soil Sample Location
- Landau Associates 2008/2009 Phase II ESA Soil Sample Location
- Landau Associates 2009 Property Boundary Soil Sample Location
- 1900s-1946 Random Fill, Consisting of Gravel, Sand, Slag, Demolition Waste, and Crushed Rocks (Fill A)
- 1946-1960 Random Fill (Fill B)
- 1946-1960 Some Random Fill Along with Fill From Off-Site Sources (Fill C)
- 1960-1965 Slag, Construction and Demolition Debris, and Imported Soil (Fill D)
- 1965-1966 Imported Construction - Quality Sand Fill Material (Fill E)
- Existing 48" King County Storm Drain Line
- Former Isaacson Building (Building 14-05)
- Current Extent of Stabilized Soil Material

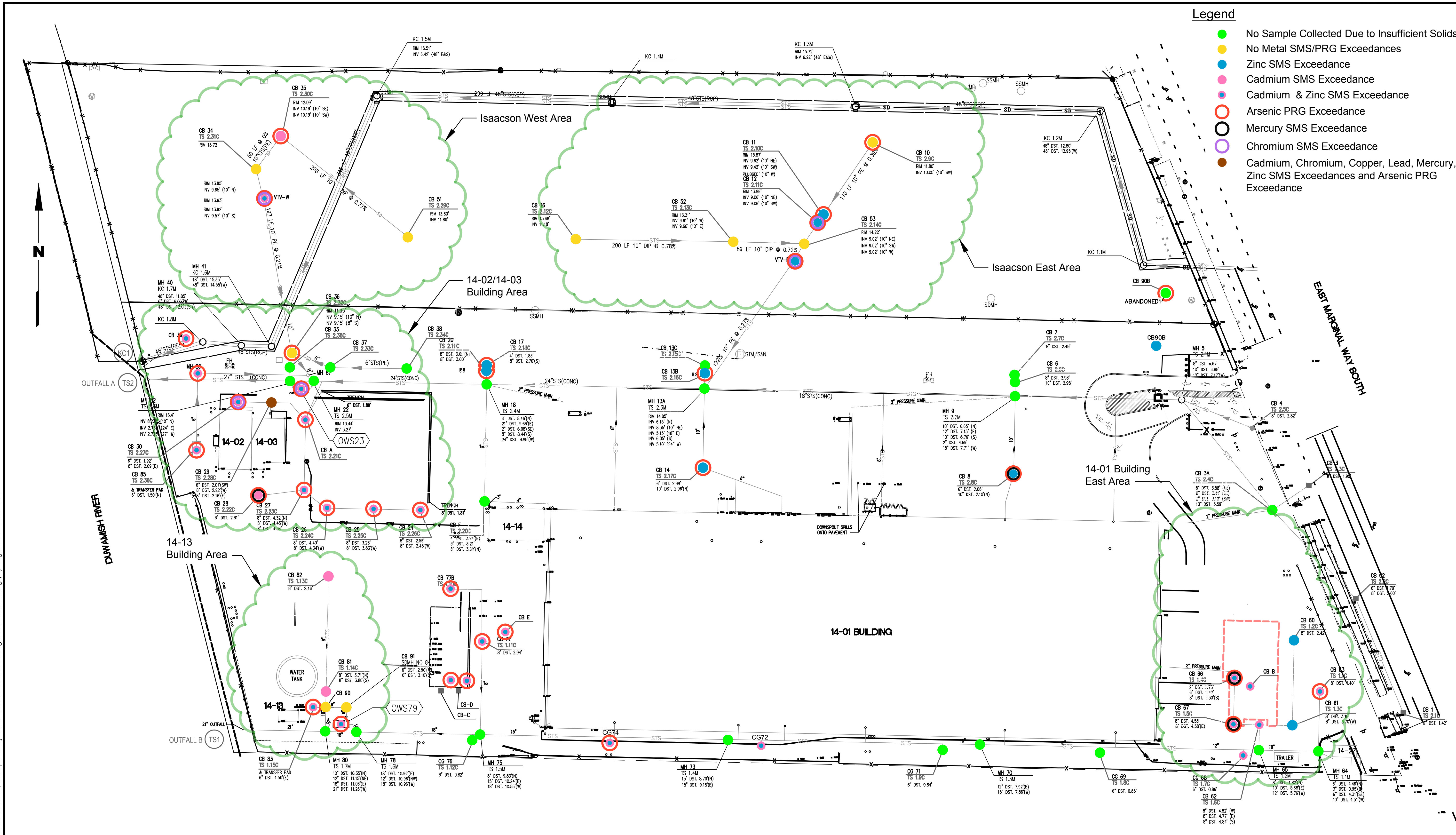
0 150 300
Scale in Feet

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

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

LANDAU ASSOCIATES

| Boeing Isaacson-Thompson Site Tukwila, Washington | **Former Slip 5 Area Soil Sampling Locations Relative to Fill Material Placement** | Figure 65 |
|---|---|---|




## Note

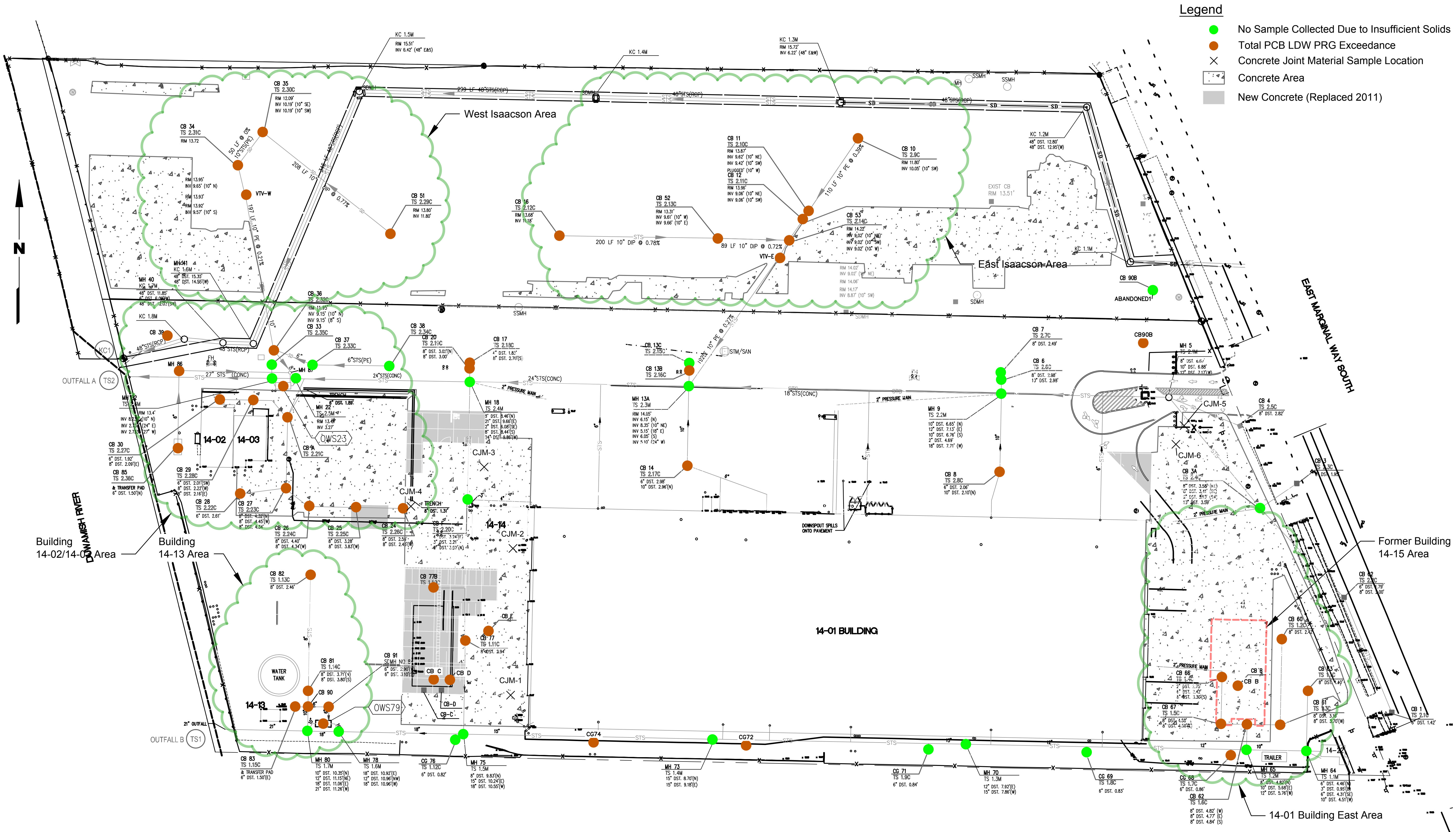
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Source: Boeing 2011

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Metals in Catch Basin Solids**

Figure 66




0 120 240
Scale in Feet

Note

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

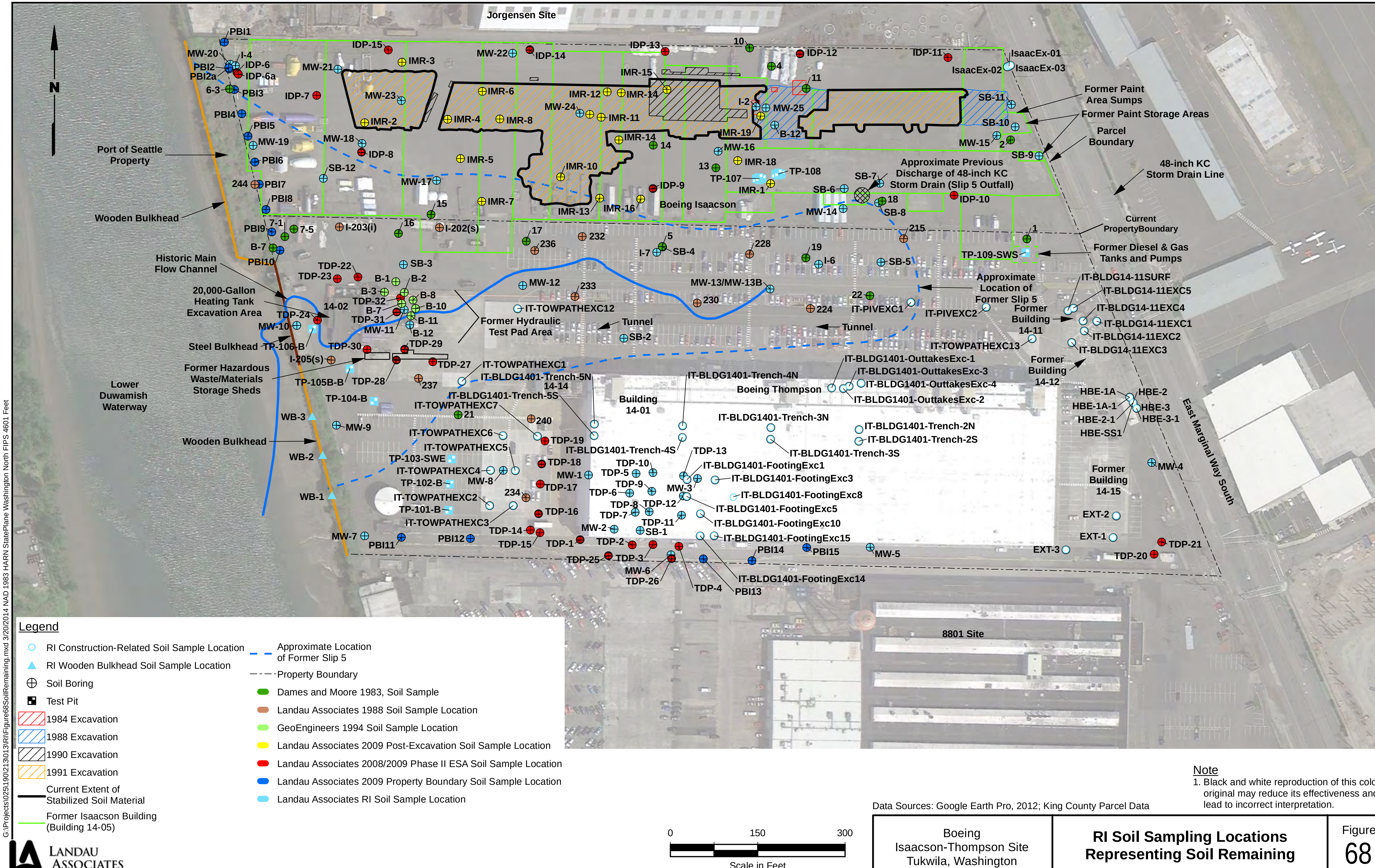
Source: Boeing 2011

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**PCBs in Catch Basin Solids**

Figure 67

LANDAU ASSOCIATES




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

**Note**

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

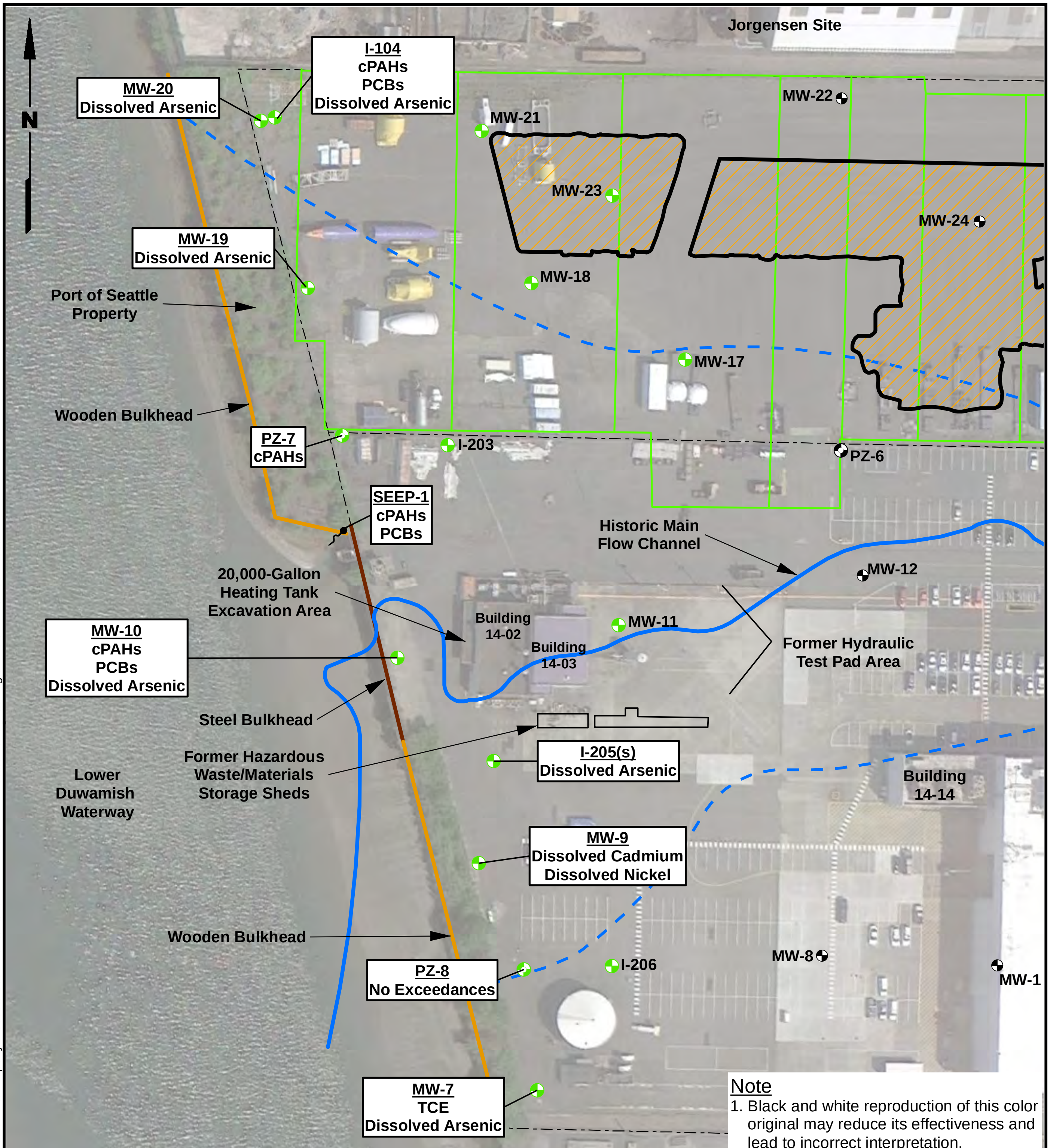
Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**RI Soil Sampling Locations Representing Soil Remaining**

Figure 68

G:\Projects\025\190\213\013\RI\Figure68SoilRemaining.mxd 3/20/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet




Note

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

Legend

- MW-22 Monitoring Well Location
- MW-10 Monitoring Well Location Where Groundwater Sampling Occured 1 Hour Before Low Tide and 1 Hour After a 0.0 Tide
- PZ-1 Piezometer Location
- PZ-7 Piezometer Location Where Groundwater Sampling Occured 1 Hour Before Low Tide and 1 Hour After a 0.0 Tide
- SEEP-1 Seep
- Current Extent of Stabilized Soil Material
- 1991 Excavation
- Property Boundary

0 120 240

Scale in Feet

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

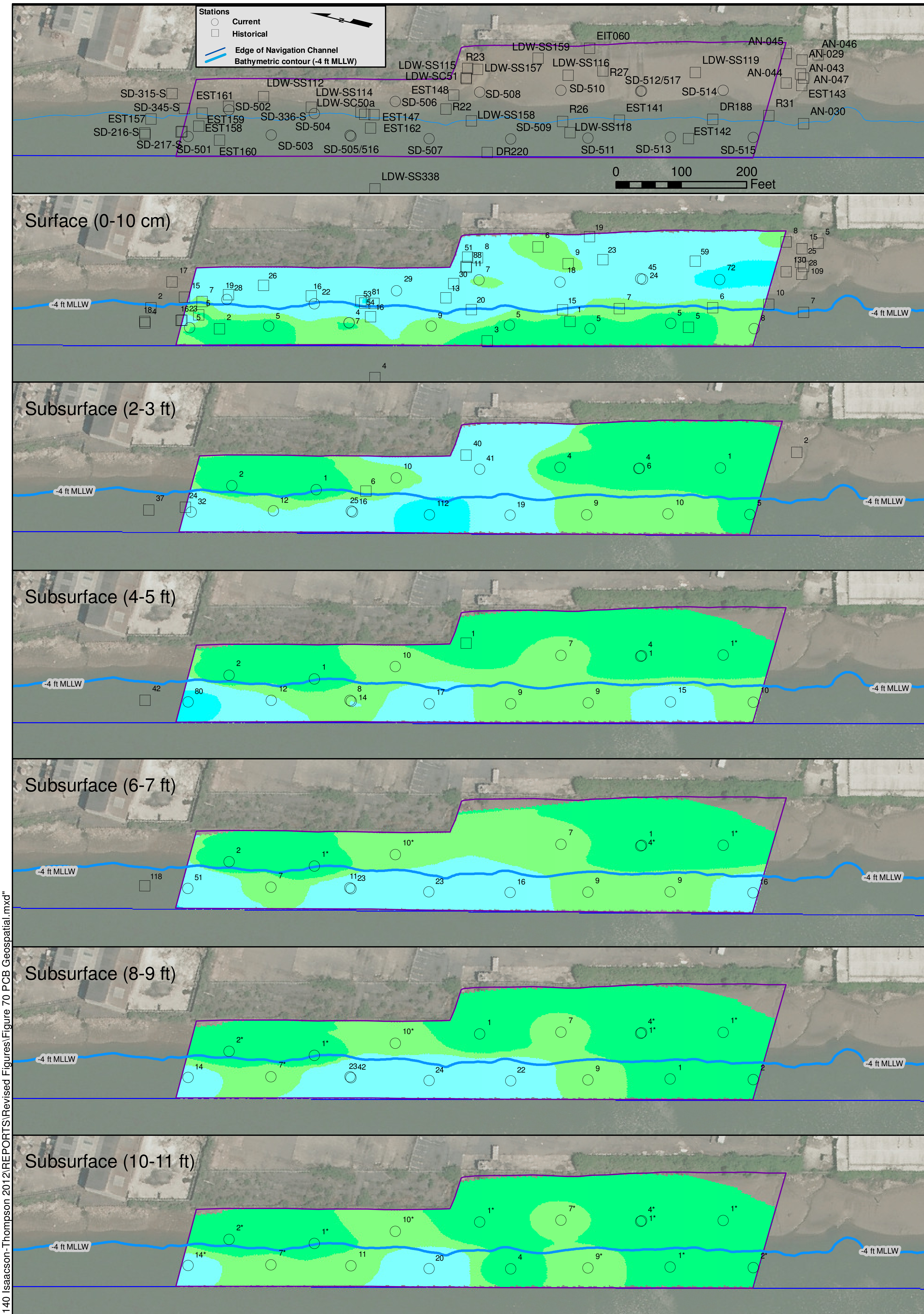
G:\Projects\025\190\213\013\RI\Figure69WesternHalfPropertyExceedances.mxd 3/19/2014 NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

Landau Associates

Boeing
Isaacson-Thompson Site
Tukwila, Washington

**Constituents Exceeding Groundwater Preliminary Cleanup Levels at Western Property Boundary**

Figure 69




File path: "P:\Boeing IT\LY12160140 Isaacson-Thompson 2012\REPORTS\Revised Figures\Figure 70 PCB Geospatial.mxd"

**Total PCBs (mg/kg OC)**

- < 6 mg/kg OC
- ≥ 6 and < 12 mg/kg OC (SMS SCO)
- ≥ 12 (SMS SCO) and <65 mg/kg OC (SMS CSL)
- ≥ 65 mg/kg OC (SMS CSL)

Abbreviations:
CSL = Cleanup Screening Level,
OC = Organic Carbon
SMS = Sediment Management Standards,
SCO = Sediment Cleanup Objective

Note:
Geospatial interpolation performed using Inverse Distance Weighting with a Power of 4, a search ellipse of 200 by 75 ft oriented parallel to the river channel. A maximum of 8 neighbors were used in the interpolation.

Concentrations are total PCBs in mg/kg OC * indicates a surrogate value filled down from a shallower interval

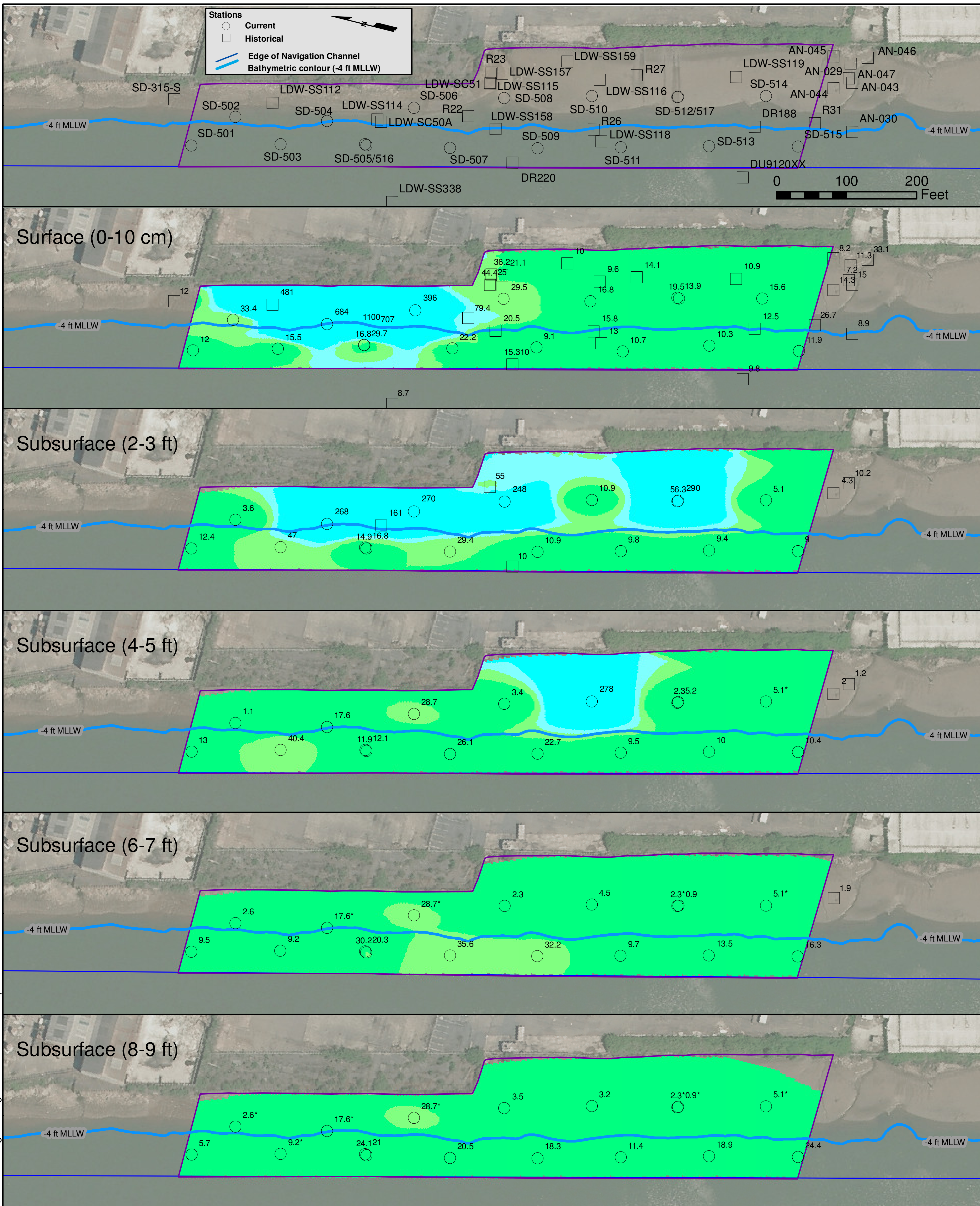
Bathymetric contour at -4 feet Mean Lower Low Water (MLLW) represents lower extent of intertidal zone.

Reporting limit for all samples shown is above the 2 µg/kg dw Human Seafood Consumption pCUL.

**GEOSPATIAL INTERPOLATION OF TOTAL PCBS COMPARED TO THE SMS**

Boeing Isaacson-Thompson Site
Tukwila, Washington

| By: RHG | Date:4/10/2014 | Project No. LY12160140 |
|---|---|---|
| amec | | Figure 70 |




**Arsenic (mg/kg dw)**

- ≥ 7 (PCUL Human Direct Contact–Site Wide) and < 28 mg/kg dw
- ≥ 28 and < 57 mg/kg dw (SMS SCO)
- ≥ 57 (SMS SCO) and < 93 mg/kg dw (SMS CSL)
- ≥ 93 mg/kg dw (SMS CSL)

Abbreviations:
CSL = Cleanup Screening Level
MLLW = Mean Lower Low Water
SMS = Sediment Management Standards
SCO = Sediment Cleanup Objectives

Note:
Geospatial interpolation performed using Inverse Distance Weighting with a Power of 4, a search ellipse of 200 by 75 ft oriented parallel to the river channel. A maximum of 8 neighbors were used in the interpolation.

Concentrations are Arsenic in mg/kg Dry Weight
* indicates a surrogate value filled down from a shallower interval

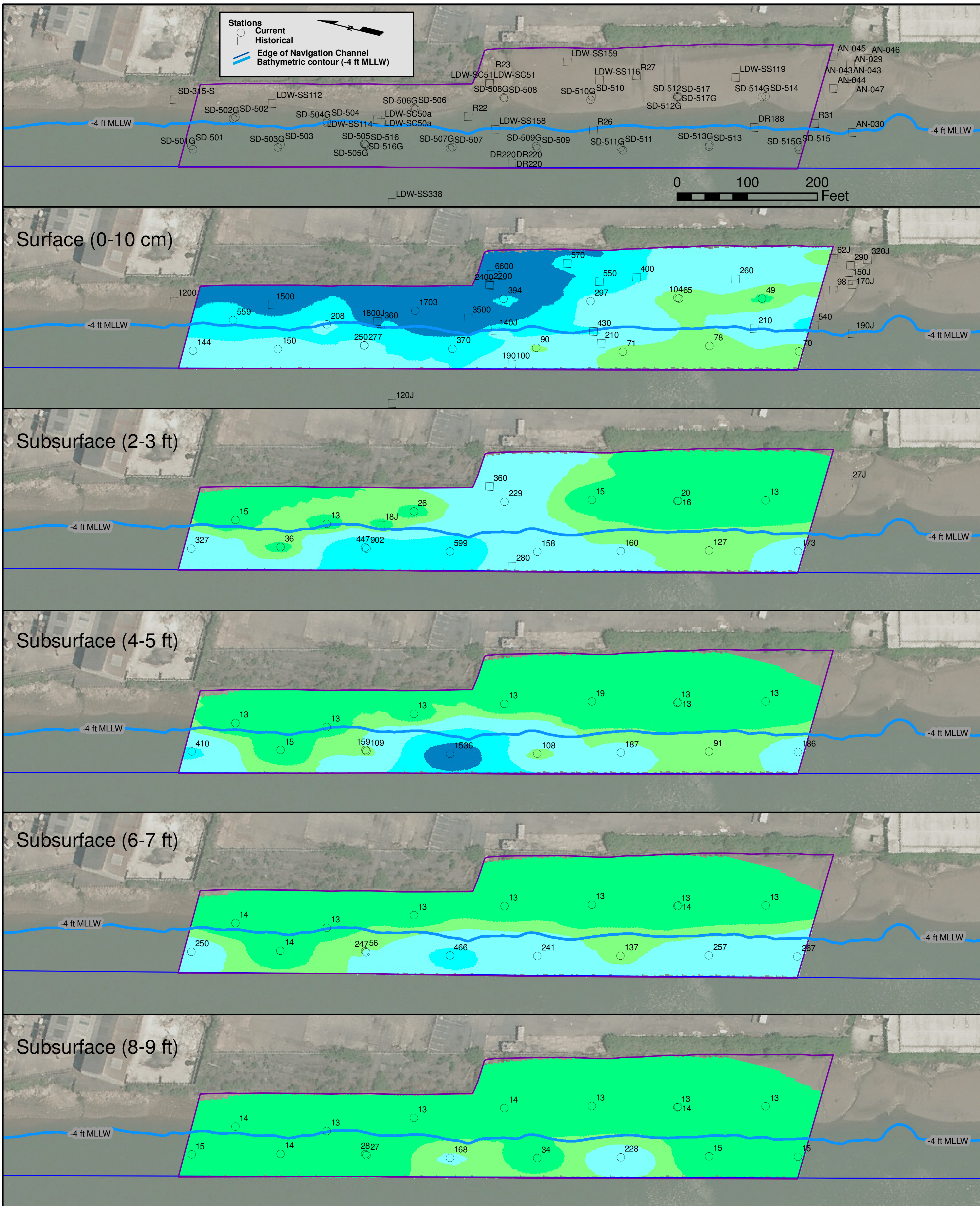
Bathymetric contour at -4 feet Mean Lower Low Water (MLLW) represents lower extent of intertidal zone.
Intertidal areas above -4 feet MLLW are considered potential clamming areas.

**GEOSPATIAL INTERPOLATION OF ARSENIC COMPARED TO THE SMS**

Boeing Isaacson-Thompson Site
Tukwila, Washington

| By: RHG | Date: 4/10/2014 | Project No. LY12160140 |
| --- | --- | --- |
| amec | | Figure 71 |

File path: "P:\Boeing IT\LY12160140 Isaacson-Thompson 2012\REPORTS\Revised Figures\Figure 71 Arsenic Geospatial.mxd"




**cPAH µgTEQ/kg**

- < 75 µgTEQ/kg
- ≥ 75 and < 150 µgTEQ/kg (PCUL Human Direct Contact–Clamming Areas)
- ≥ 150 (PCUL Human Direct Contact–Clamming Areas) and < 380 µgTEQ/kg (PCUL Human Direct Contact–Site Wide)
- ≥ 380 (PCUL Human Direct Contact–Site Wide) and < 1,000 µgTEQ/kg
- ≥ 1,000 µgTEQ/kg

Abbreviations:
MLLW = Mean Lower Low Water
PCUL = Preliminary Cleanup Level
TEQ = Toxic Equivalency Concentration

Note:
Geospatial interpolation performed using Inverse Distance Weighting with a Power of 4, a search ellipse of 200 by 75 ft oriented parallel to the river channel. A maximum of 8 neighbors were used in the interpolation.

Concentrations are cPAH µgTEQ/kg

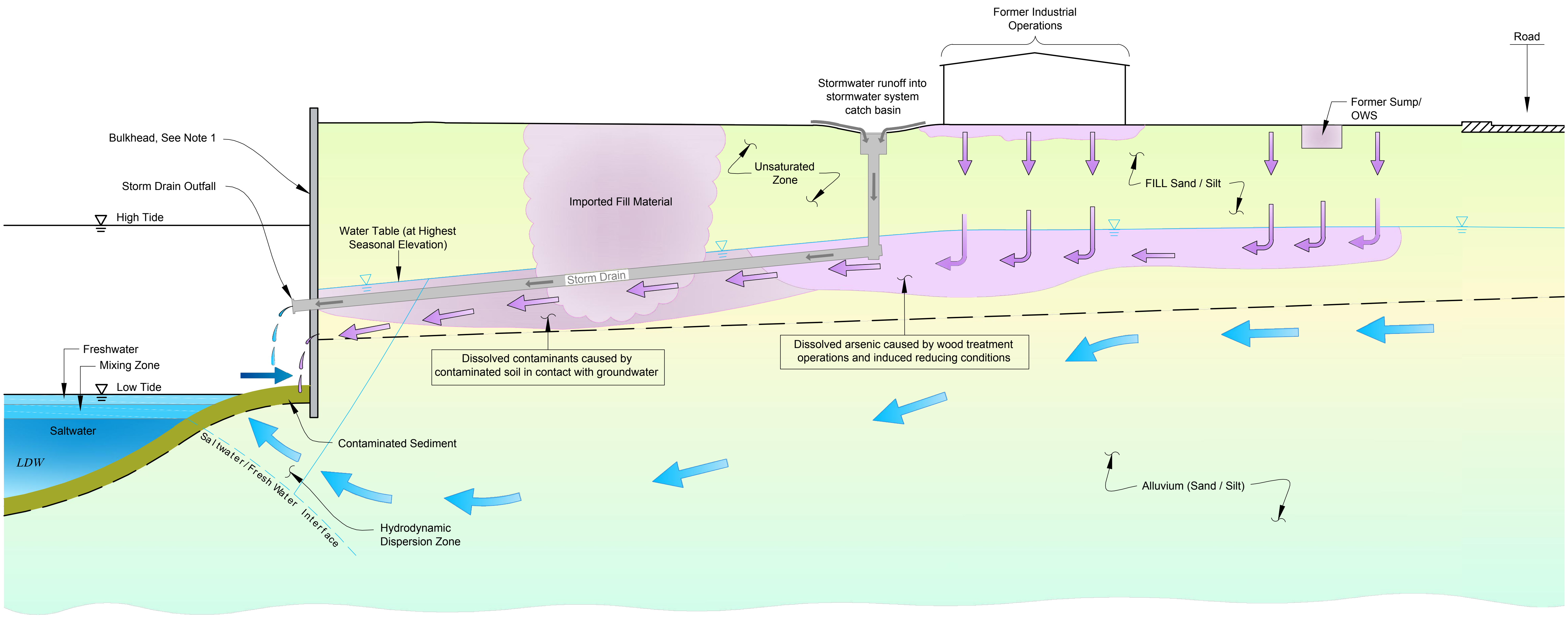
Bathymetric contour at -4 feet Mean Lower Low Water (MLLW) represents lower extent of intertidal zone.
Intertidal areas above -4 feet MLLW are considered potential clamming areas.

GEOSPATIAL INTERPOLATION OF CPAHS

Boeing Isaacson-Thompson Site
Tukwila, Washington

| By: RHG | Date:4/10/2014 | Project No. LY12160140 |
|---|---|---|
| amec | | Figure 72 |

File path: "P:\Boeing IT\LY12160140 Isaacson-Thompson 2012\REPORTS\Revised Figures\Figure 72 cPAH Geospatial.mxd"




## Legend

- Water Table
- Tidally Influenced Water Level
- Conceptual Boundary Between Stratigraphic Units
- Potential Transport of Dissolved Contaminants
- Potential Transport of Dissolved Contaminants
- LDW Water Intrusion

## Notes

1. Gaps in portions of the wooden bulkhead (which is not a solid structure) that may allow groundwater seepage through holes.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

LANDAU ASSOCIATES, INC. | G:\Projects\025\190\213\013\RI\Figure73 CSM.dwg (A) "Figure 73" 3/19/2014

LANDAU ASSOCIATES

| Boeing<br>Isaacson-Thompson Site<br>Tukwila, Washington | **Conceptual Site Model** | Figure<br>73 |
|---|---|---|

# TABLE 1
## SUMMARY OF RI AND CONSTRUCTION-RELATED SOIL SAMPLES AND FIELD SCREENING RESULTS
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Sample Date | Field Sample ID | Depth or Depth Range (ft, BGS) | Exploration Depth (ft, BGS) | Drilling Equipment | Depth to Groundwater (ft BGS) | Field Screening Results |
|---|---|---|---|---|---|---|
| **NORTH OF FORMER SLIP 5 AREA** | | | | | | |
| **Western Property Boundary (West of Stablizized Soil Area)** | | | | | | |
| 11/09/11 | IT-MW-20(2-3.5)-111109 | 2-3.5 | 26 | Hollow-Stem Auger | 13.5 | none |
| 11/09/11 | IT-MW-20(5-6.5)-111109 | 5-6.5 | 26 | Hollow-Stem Auger | 13.5 | none |
| 11/09/11 | IT-MW-20(8-9.5)-111109 | 8-9.5 | 26 | Hollow-Stem Auger | 13.5 | none |
| 11/09/11 | IT-MW-20(14.5-16)-111109 | 14.5-16 | 26 | Hollow-Stem Auger | 13.5 | none |
| **Northern Property Boundary** | | | | | | |
| 11/11/11 | IT-MW-21(2-3.5)-111111 | 2-3.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/11/11 | IT-MW-21(5-6.5)-111111 | 5-6.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/11/11 | IT-MW-21(8-9.5)-111111 | 8-9.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/11/11 | IT-MW-21(13.5-15)-111111 | 13.5-15 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/11/11 | IT-MW-21(17-18.5)-111111 | 17-18.5 | 26 | Hollow-Stem Auger | 12.5 | (sulfur odor, no sheen) |
| 11/11/11 | IT-MW-21(24.5-26)-111111 | 24.5-26 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/11/11 | IT-MW-22(2-3.5)-111111 | 2-3.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/11/11 | IT-MW-22(5-6.5)-111111 | 5-6.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/11/11 | IT-MW-22(8-9.5)-111111 | 8-9.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/11/11 | No sample collected for chemical analysis | 9-9.5 | 26 | Hollow-Stem Auger | 12.5 | wood |
| 11/11/11 | IT-MW-22(13.5-15)-111111 | 13.5-15 | 26 | Hollow-Stem Auger | 12.5 | none |
| **Stabilized Soil Area** | | | | | | |
| 11/09/11 | No sample collected for chemical analysis | 5-12.5 | 26 | Hollow-Stem Auger | 11.5 | (non-hydrocarbon odor, no sheen) |
| 11/09/11 | IT-MW-23(11-12.5)-111109 | 11-12.5 | 26 | Hollow-Stem Auger | 11.5 | (non-hydrocarbon odor, no sheen) |
| 11/09/11 | IT-MW-23(12.5-14)-111109 | 12.5-14 | 26 | Hollow-Stem Auger | 11.5 | (slight non-hydrocarbon odor, no sheen) |
| 11/09/11 | No sample collected for chemical analysis | 14-24 | 26 | Hollow-Stem Auger | 11.5 | (slight non-hydrocarbon odor, no sheen) |
| 11/14/11 | No sample collected for chemical analysis | 5-26 | 26 | Hollow-Stem Auger | 13 | (non-hydrocarbon odor, no sheen) |
| 11/14/11 | No sample collected for chemical analysis | 5.5 | 26 | Hollow-Stem Auger | 13 | PID = 1.5ppm |
| 11/14/11 | No sample collected for chemical analysis | 8.5 | 26 | Hollow-Stem Auger | 13 | PID = 1.8ppm |
| 11/14/11 | No sample collected for chemical analysis | 10.5 | 26 | Hollow-Stem Auger | 13 | PID = 1.1ppm |
| 11/14/11 | No sample collected for chemical analysis | 11.5 | 26 | Hollow-Stem Auger | 13 | PID = 1.2ppm |
| 11/14/11 | IT-MW-24(12.5-14)-111114 | 12.5-14 | 26 | Hollow-Stem Auger | 13 | (non-hydrocarbon odor, no sheen) |
| 11/14/11 | IT-MW-24(14-15.5)-111114 | 14-15.5 | 26 | Hollow-Stem Auger | 13 | (non-hydrocarbon odor, no sheen) |

**TABLE 1**
**SUMMARY OF RI AND CONSTRUCTION-RELATED SOIL SAMPLES AND FIELD SCREENING RESULTS**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Sample Date | Field Sample ID | Depth or Depth Range (ft, BGS) | Exploration Depth (ft, BGS) | Drilling Equipment | Depth to Groundwater (ft BGS) | Field Screening Results |
|---|---|---|---|---|---|---|
| **NORTH OF FORMER SLIP 5 AREA Con't** | | | | | | |
| 11/14/11 | IT-MW-25(8-9.5)-111114 | 8-9.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/14/11 | IT-MW-25(13.5-15)-111114 | 13.5-15 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/14/11 | No sample collected for chemical analysis | 13.5-14.5 | 26 | Hollow-Stem Auger | 12.5 | PID = 1.5 @ 14 ft (slight odor and sheen) |
| 11/14/11 | IT-MW-25(15.5-17)-111114 | 15.5-17 | 26 | Hollow-Stem Auger | 12.5 | none |
| **South of Stabilized Soil Area** | | | | | | |
| 11/15/11 | IT-MW-15(2-3.5)-111115 | 2-3.5 | 26 | Hollow-Stem Auger | 11.5 | none |
| 11/15/11 | IT-MW-15(5-6.5)-111115 | 5-6.5 | 26 | Hollow-Stem Auger | 11.5 | none |
| 11/15/11 | IT-MW-15(8-9.5)-111115 | 8-9.5 | 26 | Hollow-Stem Auger | 11.5 | none |
| 11/15/11 | IT-MW-15(12.5-14)-111115 | 12.5-14 | 26 | Hollow-Stem Auger | 11.5 | none |
| 11/10/11 | IT-MW-16(2-3.5)-111110 | 2-3.5 | 26 | Hollow-Stem Auger | 11 | none |
| 11/10/11 | IT-MW-16(5-6.5)-111110 | 5-6.5 | 26 | Hollow-Stem Auger | 11 | none |
| 11/10/11 | IT-MW-16(8-9.5)-111110 | 8-9.5 | 26 | Hollow-Stem Auger | 11 | none |
| 11/10/11 | IT-MW-16(12-13.5)-111110 | 12-13.5 | 26 | Hollow-Stem Auger | 11 | none |
| 11/08/11 | IT-MW-18(2-3.5)-111108 | 2-3.5 | 26 | Hollow-Stem Auger | 10.5 | none |
| 11/08/11 | IT-MW-18(5-6.5)-111108 | 5-6.5 | 26 | Hollow-Stem Auger | 10.5 | none |
| 11/08/11 | IT-MW-18(8-9.5)-111108 | 8-9.5 | 26 | Hollow-Stem Auger | 10.5 | none |
| 11/08/11 | IT-MW-18(11.5-13)-111108 | 11.5-13 | 26 | Hollow-Stem Auger | 10.5 | none |
| **Former Paint Storage Area** | | | | | | |
| 11/14/11 | IT-SB-9(2-3.5)-111114 | 2-3.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | IT-SB-9(5-6.5)-111114 | 5-6.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | IT-SB-9(8-8.5)-111114 | 8-8.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | IT-SB-9(14-15.5)-111114 | 14-15.5 | 25 | Direct Push | 13 | solid wood debris |
| 11/14/11 | No sample collected for chemical analysis | 2.5-22.5 | 25 | Direct Push | 13 | PID = 1.3-1.8 ppm (max at 12.5 ft BGS) |
| 11/01/11 | IT-SB-10(2-3.5)-111101 | 2-3.5 | 25 | Direct Push | 11.5 | none |
| 11/01/11 | IT-SB-10(5-6.5)-111101 | 5-6.5 | 25 | Direct Push | 11.5 | none |
| 11/01/11 | IT-SB-10(8-9.5)-111101 | 8-9.5 | 25 | Direct Push | 11.5 | none |
| 11/01/11 | IT-SB-10(13.5-15)-111101 | 13.5-15 | 25 | Direct Push | 11.5 | none |
| 11/14/11 | IT-SB-11(2-3.5)-111114 | 2-3.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | No sample collected for chemical analysis | 2.5-22.5 | 25 | Direct Push | 13 | PID = 2.2-3.3 ppm (max at 7.5 ft BGS) |
| 11/14/11 | IT-SB-11(5-6.5)-111114 | 5-6.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | IT-SB-11(8-9)-111114 | 8-9 | 25 | Direct Push | 13 | none |
| 11/14/11 | IT-SB-11(14-15.5)-111114 | 14-15.5 | 25 | Direct Push | 13 | none |
| **Former Diesel and Gasoline Tanks Area** | | | | | | |
| 10/25/11 | IT-TP-109-SWS(9-10)-111025 | 9-10 | 10 | Excavator | NE | none |

**TABLE 1**
**SUMMARY OF RI AND CONSTRUCTION-RELATED SOIL SAMPLES AND FIELD SCREENING RESULTS**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Sample Date | Field Sample ID | Depth or Depth Range (ft, BGS) | Exploration Depth (ft, BGS) | Drilling Equipment | Depth to Groundwater (ft BGS) | Field Screening Results |
|---|---|---|---|---|---|---|
| **NORTH OF FORMER SLIP 5 AREA (Cont.)** | | | | | | |
| **Observed Tar-Like Substance Area** | | | | | | |
| 10/26/11 | IT-TP-107-SWE(1-2)-111026 | 1-2 | 12 | Excavator | NE | none |
| 10/26/11 | IT-TP-107-SWN(1-2)-111026 | 1-2 | 12 | Excavator | NE | none |
| 10/26/11 | IT-TP-107-SWS(1-2)-111026 | 1-2 | 12 | Excavator | NE | none |
| 10/26/11 | IT-TP-107-SWW(1-2)-111026 | 1-2 | 12 | Excavator | NE | burnt wood (mild oil-like odor) |
| 10/26/11 | IT-TP-107-SWN(2-3)-111026 | 2-3 | 12 | Excavator | NE | none |
| 10/26/11 | IT-TP-107-B(11-12)-111026 | 11-12 | 12 | Excavator | NE | none |
| 10/26/11 | IT-TP-108-SWS(1-2)-111026 | 1-2 | 12 | Excavator | NE | tar and asphalt-like waste, bricks, burnt wood |
| 10/26/11 | IT-TP-108-SWE(1-2)-111026 | 1-2 | 12 | Excavator | NE | tar and asphalt-like waste, bricks, burnt wood |
| 10/26/11 | IT-TP-108-SWN(1-2)-111026 | 1-2 | 12 | Excavator | NE | none |
| 10/26/11 | IT-TP-108-SWW(1-2)-111026 | 1-2 | 12 | Excavator | NE | tar and asphalt-like waste, bricks, burnt wood |
| 10/26/11 | IT-TP-108-SWN(2-3)-111026 | 2-3 | 12 | Excavator | NE | none |
| 10/26/11 | IT-TP-108-B(11-12)-111026 | 11-12 | 12 | Excavator | NE | none |
| **Former Slip 5 Outfall Area** | | | | | | |
| 11/01/11 | IT-SB-6(2-3.5)-111101 | 2-3.5 | 25 | Direct Push | 12.5 | none |
| 11/01/11 | IT-SB-6(5-6.5)-111101 | 5-6.5 | 25 | Direct Push | 12.5 | none |
| 11/01/11 | IT-SB-6(8-9.5)-111101 | 8-9.5 | 25 | Direct Push | 12.5 | none |
| 11/01/11 | IT-SB-6(13.5-15)-111101 | 13.5-15 | 25 | Direct Push | 12.5 | none |
| 11/01/11 | IT-SB-7(2-3.5)-111101 | 2-3.5 | 25 | Direct Push | 12 | none |
| 11/01/11 | IT-SB-7(5-6.5)-111101 | 5-6.5 | 25 | Direct Push | 12 | none |
| 11/01/11 | IT-SB-7(8-9.5)-111101 | 8-9.5 | 25 | Direct Push | 12 | none |
| 11/01/11 | IT-SB-7(13-14.5)-111101 | 13-14.5 | 25 | Direct Push | 12 | none |
| 11/14/11 | IT-SB-8(2-3.5)-111114 | 2-3.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | No sample collected for chemical analysis | 2.5-22.5 | 25 | Direct Push | 13 | PID = 1.5 - 2.4 (max at 12.5 ft BGS) |
| 11/14/11 | IT-SB-8(5-6.5)-111114 | 5-6.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | IT-SB-8(8-9.5)-111114 | 8-9.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | IT-SB-8(14-15.5)-111114 | 14-15.5 | 25 | Direct Push | 13 | none |

**TABLE 1**
**SUMMARY OF RI AND CONSTRUCTION-RELATED SOIL SAMPLES AND FIELD SCREENING RESULTS**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Sample Date | Field Sample ID | Depth or Depth Range (ft, BGS) | Exploration Depth (ft, BGS) | Drilling Equipment | Depth to Groundwater (ft BGS) | Field Screening Results |
|---|---|---|---|---|---|---|
| **FORMER SLIP 5 AREA** | | | | | | |
| **FILL A: 1900-1946 Random Fill Consisting of Gravel, Sand, Slag, Demolition Waste, and Crushed Rocks** | | | | | | |
| 11/08/11 | IT-MW-14(2-3.5)-111108 | 2-3.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/08/11 | IT-MW-14(5-6.5)-111108 | 5-6.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/08/11 | IT-MW-14(8-9.5)-111108 | 8-9.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/08/11 | IT-MW-14(13-14.5)-111108 | 13-14.5 | 26 | Hollow-Stem Auger | 12 | none |
| **FILL B: 1946-1960 Random Fill Material** | | | | | | |
| 10/31/11 | IT-MW-9(2-3.5)-111031 | 2-3.5 | 26 | Hollow-Stem Auger | 12 | none |
| 10/31/11 | IT-MW-9(5-6.5)-111031 | 5-6.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/04/11 | IT-MW-9(8-9.5)-111104 | 8-9.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/04/11 | IT-MW-9(13-14.5)-111104 | 13-14.5 | 26 | Hollow-Stem Auger | 12 | none |
| 10/31/11 | IT-MW-10(2-3.5)-111031 | 2-3.5 | 26 | Hollow-Stem Auger | 12 | none |
| 10/31/11 | IT-MW-10(5-6.5)-111031 | 5-6.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/07/11 | IT-MW-10(8-9.5)-111107 | 8-9.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/07/11 | No sample collected for chemical analysis | 12.5-17.5 | 26 | Hollow-Stem Auger | 12 | wood chunks |
| 11/07/11 | IT-MW-10(13.5-15)-111107 | 13.5-15 | 26 | Hollow-Stem Auger | 12 | none |
| 10/31/11 | IT-MW-11(2-3.5)-111031 | 2-3.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 10/31/11 | IT-MW-11(5-6.5)-111031 | 5-6.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/07/11 | IT-MW-11(8-9.5)-111107 | 8-9.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/07/11 | IT-MW-11(13.5-15)-111107 | 13.5-15 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/07/11 | No sample collected for chemical analysis | 23.5-26 | 26 | Hollow-Stem Auger | 12.5 | (slight organic sheen, no odor) |
| 10/27/11 | IT-TP-104-B(12-13)-111027 | 12-13 | 13 | Excavator | 13 | Pipe in northern portion, punctured, with water flowing out |
| 10/27/11 | IT-TP-105B-B(11-12)-111027 | 11-12 | 12 | Excavator | NE | none |
| 10/28/11 | IT-TP-106B(11-12)-111028 | 11-12 | 12 | Excavator | NE | none |
| 07/15/11 | IT-TOWPATHEXC1-B(.8)-110715 | .8 | 0.8 | Excavator | NE | PID = 1.0 ppm (no odor, no sheen) |
| **FILL C: 1946-1960 Some Random Fill Along With Fill From Off-Site Sources (Cont.)** | | | | | | |
| 11/10/11 | IT-MW-17(2-3.5)-111110 | 2-3.5 | 26 | Hollow-Stem Auger | 13 | none |
| 11/10/11 | IT-MW-17(5-6.5)-111110 | 5-6.5 | 26 | Hollow-Stem Auger | 13 | brick fragments |
| 11/10/11 | IT-MW-17(8-9.5)-111110 | 8-9.5 | 26 | Hollow-Stem Auger | 13 | none |
| 11/10/11 | No sample collected for chemical analysis | 10-11 | 26 | Hollow-Stem Auger | 13 | brick and slag material (no odor, no sheen) |
| 11/10/11 | IT-MW-17(11-12.5)-111110 | 11-12.5 | 26 | Hollow-Stem Auger | 13 | wood fragments (no odor, no sheen) |
| 11/10/11 | IT-MW-17(14-15.5)-111110 | 14-15.5 | 26 | Hollow-Stem Auger | 13 | (sulfur-like odor, slight organic sheen) |
| 11/10/11 | IT-MW-17(15.5-17)-111110 | 15.5-17 | 26 | Hollow-Stem Auger | 13 | (sulfur-like odor, slight organic sheen) |
| 11/10/11 | IT-MW-17(18.5-19.75)-111110 | 18.5-19.75 | 26 | Hollow-Stem Auger | 13 | (sulfur-like odor, no sheen) |
| 11/10/11 | IT-MW-17(21.25-21.5)-111110 | 21.25-21.5 | 26 | Hollow-Stem Auger | 13 | PID = 50.6 ppm |
| 11/10/11 | IT-MW-17(21.5-23)-111110 | 21.5-23 | 26 | Hollow-Stem Auger | 13 | none |

**TABLE 1**
**SUMMARY OF RI AND CONSTRUCTION-RELATED SOIL SAMPLES AND FIELD SCREENING RESULTS**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Sample Date | Field Sample ID | Depth or Depth Range (ft, BGS) | Exploration Depth (ft, BGS) | Drilling Equipment | Depth to Groundwater (ft BGS) | Field Screening Results |
|---|---|---|---|---|---|---|
| **FORMER SLIP 5 AREA Con't** | | | | | | |
| 11/09/11 | IT-MW-19(2-3.5)-111109 | 2-3.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/09/11 | IT-MW-19(5-6.5)-111109 | 5-6.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/09/11 | IT-MW-19(8-9.5)-111109 | 8-9.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/09/11 | IT-MW-19(13-14.5)-111109 | 13-14.5 | 26 | Hollow-Stem Auger | 12 | none |
| 11/14/11 | No sample collected for chemical analysis | 0-4 | 11 | Direct Push | NE | trace slag material (no odor, no sheen) |
| 11/08/11 | IT-SB-3(2-3.5)-111108 | 2-3.5 | 11 | Direct Push | NE | trace slag  material (no odor, no sheen) |
| 11/14/11 | No sample collected for chemical analysis | 4-7 | 11 | Direct Push | NE | trace slag material (no odor, no sheen) |
| 11/14/11 | IT-SB-3(5-5.5)-111114 | 5-5.5 | 11 | Direct Push | NE | slag material (no odor, no sheen) |
| 11/14/11 | IT-SB-3(6.5-7)-111114 | 6.5-7 | 11 | Direct Push | NE | PID = 1.7 ppm, slag material (no odor, no sheen) |
| 11/01/11 | IT-SB-4(2-3.5)-111101 | 2-3.5 | 25 | Hollow-Stem Auger | 10.5 | none |
| 11/01/11 | IT-SB-4(5-6.5)-111101 | 5-6.5 | 25 | Hollow-Stem Auger | 10.5 | none |
| 11/01/11 | IT-SB-4(8-9)-111101 | 8-9 | 25 | Hollow-Stem Auger | 10.5 | none |
| 11/01/11 | IT-SB-4(11.5-13)-111101 | 11.5-13 | 25 | Hollow-Stem Auger | 10.5 | none |
| 11/14/11 | IT-SB-12(2-3.5)-111114 | 2-3.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | IT-SB-12(5-6.5)-111114 | 5-6.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | No sample collected for chemical analysis | 7.5 | 25 | Direct Push | 13 | PID= 1.8 |
| 11/14/11 | IT-SB-12(8-9.5)-111114 | 8-9.5 | 25 | Direct Push | 13 | none |
| 11/14/11 | No sample collected for chemical analysis | 13.5 | 25 | Direct Push | 13 | PID= 6.3 |
| 11/14/11 | IT-SB-12(14-15.5)-111114 | 14-15.5 | 25 | Direct Push | 13 | PID = 2.2 |
| 11/14/11 | No sample collected for chemical analysis | 17.5 | 25 | Direct Push | 13 | PID = 4.2 |
| 11/14/11 | No sample collected for chemical analysis | 22.5 | 25 | Direct Push | 13 | PID = 1.2 |
| **FILL D: 1960-1965 Slag, Construction, Demolition Debris, and Imported Soil** | | | | | | |
| 08/08/11 | IT-PIVEXC1-SW(2.1)-110808 | 2.1 | 4.2 | Excavator | NE | none |
| 08/08/11 | IT-PIVEXC1-B(4.2)-110808 | 4.2 | 4.2 | Excavator | NE | none |
| 10/31/11 | IT-SB-5(2-3.5)-111031 | 2-3.5 | 25 | Direct Push | 15.3 | none |
| 10/31/11 | IT-SB-5(5-6.5)-111031 | 5-6.5 | 25 | Direct Push | 15.3 | PID = 93.6 ppm, (hydrocarbon odor, no sheen) |
| 10/31/11 | No sample collected for chemical analysis | 7.5 | 25 | Direct Push | 15.3 | PID = 88.1 ppm |
| 10/31/11 | IT-SB-5(8-9.5)-111031 | 8-9.5 | 25 | Direct Push | 15.3 | none |
| 10/31/11 | IT-SB-5(16-17.5)-111031 | 16-17.5 | 25 | Direct Push | 15.3 | none |
| **FILL E: 1960-1965 Imported Construction-Quality Sand Fill Material** | | | | | | |
| 10/31/11 | IT-SB-2(2-3.5)-111031 | 2-3.5 | 25 | Direct Push | 13 | none |
| 10/31/11 | IT-SB-2(5-6.5)-111031 | 5-6.5 | 25 | Direct Push | 13 | none |
| 10/31/11 | IT-SB-2(8-9.5)-111031 | 8-9.5 | 25 | Direct Push | 13 | none |
| 10/31/11 | IT-SB-2(14-15.5)-111031 | 14-15.5 | 25 | Direct Push | 13 | none |

**TABLE 1**
**SUMMARY OF RI AND CONSTRUCTION-RELATED SOIL SAMPLES AND FIELD SCREENING RESULTS**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Sample Date | Field Sample ID | Depth or Depth Range (ft, BGS) | Exploration Depth (ft, BGS) | Drilling Equipment | Depth to Groundwater (ft BGS) | Field Screening Results |
|---|---|---|---|---|---|---|
| **FORMER SLIP 5 AREA Con't** | | | | | | |
| 11/03/11 | IT-MW-12(2-3.5)-111103 | 2-3.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/03/11 | IT-MW-12(5-6.5)-111103 | 5-6.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/03/11 | IT-MW-12(8-9.5)-111103 | 8-9.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/03/11 | IT-MW-12(13-14.5)-111103 | 13-14.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/03/11 | IT-MW-12(18-19.5)-111103 | 18-19.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/03/11 | IT-MW-12(23-24.5)-111103 | 23-24.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/03/11 | IT-MW-13(2-3.5)-111103 | 2-3.5 | 18.5 | Hollow-Stem Auger | 14 | none |
| 11/03/11 | IT-MW-13(5-6.5)-111103 | 5-6.5 | 18.5 | Hollow-Stem Auger | 14 | none |
| 11/03/11 | IT-MW-13(8-9.5)-111103 | 8-9.5 | 18.5 | Hollow-Stem Auger | 14 | none |
| 11/03/11 | No sample collected for chemical analysis | 10-12.5 | 18.5 | Hollow-Stem Auger | 14 | slag material (slight odor, slight sheen) |
| 11/03/11 | IT-MW-13(12.5-14)-111103 | 12.5-14 | 18.5 | Hollow-Stem Auger | 14 | slag material (slight odor, slight sheen) |
| 11/03/11 | IT-MW-13(15-16.5)-111103 | 15-16.5 | 18.5 | Hollow-Stem Auger | 14 | (slight odor, no sheen) |
| 11/10/11 | IT-MW-13B(2-3.5)-111110 | 2-3.5 | 13.5 | Hollow-Stem Auger | 12.5 | none |
| 11/10/11 | IT-MW-13B(5-6.5)-111110 | 5-6.5 | 13.5 | Hollow-Stem Auger | 12.5 | none |
| 11/11/11 | IT-MW-13B(6.5-8)-111111 | 6.5-8 | 13.5 | Hollow-Stem Auger | 12.5 | (hydrocarbon odor, slight sheen) |
| 11/11/11 | IT-MW-13B(8-9.5)-111111 | 8-9.5 | 13.5 | Hollow-Stem Auger | 12.5 | (non-hydrocarbon odor, no sheen) |
| 11/11/11 | No sample collected for chemical analysis | 9.5-11 | 13.5 | Hollow-Stem Auger | 12.5 | slag material, brick |
| 11/11/11 | IT-MW-13B(12.5-13.5)-111111 | 12.5-13.5 | 13.5 | Hollow-Stem Auger | 12.5 | none |
| 07/26/11 | IT-TOWPATH-EXC12-B(2.7)-110726 | 2.7 | 2.7 | Excavator | NE | -- |
| **SOUTH OF FORMER SLIP 5 AREA** | | | | | | |
| **Western Propery Boundary-South of Slip 5** | | | | | | |
| 10/31/11 | IT-MW-7(2-3.5)-111031 | 2-3.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 10/31/11 | IT-MW-7(5-6.5)-111031 | 5-6.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/04/11 | IT-MW-7(8-9.5)-111104 | 8-9.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/04/11 | IT-MW-7(13.5-15)-111104 | 13.5-15 | 26 | Hollow-Stem Auger | 12.5 | none |
| **Southern Property Boundary/Former Washdown System Collection Sumps** | | | | | | |
| 11/01/11 | IT-MW-5(2-3.5)-111101 | 2-3.5 | 25.5 | Hollow-Stem Auger | 12.5 | none |
| 11/01/11 | IT-MW-5(5-6.5)-111101 | 5-6.5 | 25.5 | Hollow-Stem Auger | 12.5 | none |
| 11/02/11 | IT-MW-5(8-9)-111102 | 8-9 | 25.5 | Hollow-Stem Auger | 12.5 | none |
| 11/02/11 | IT-MW-5(14-15.5)-111102 | 14-15.5 | 25.5 | Hollow-Stem Auger | 12.5 | none |
| 11/01/11 | IT-MW-6(2-3.5)-111101 | 2-3.5 | 25.5 | Hollow-Stem Auger | 13 | none |
| 11/01/11 | IT-MW-6(5-6.5)-111101 | 5-6.5 | 25.5 | Hollow-Stem Auger | 13 | none |
| 11/02/11 | IT-MW-6(8-9.5)-111102 | 8-9.5 | 25.5 | Hollow-Stem Auger | 13 | none |
| 11/02/11 | IT-MW-6(14-15.5)-111102 | 14-15.5 | 25.5 | Hollow-Stem Auger | 13 | none |
| 11/02/11 | No sample collected for chemical analysis | 19 | 25.5 | Hollow-Stem Auger | 13 | PID = 21.3 ppm |
| 11/02/11 | IT-MW-6(20-21.5)-111102 | 20-21.5 | 25.5 | Hollow-Stem Auger | 13 | PID = 25.0 ppm |
| 11/02/11 | IT-MW-6(23-24.5)-111102 | 23-24.5 | 25.5 | Hollow-Stem Auger | 13 | none |

# TABLE 1
## SUMMARY OF RI AND CONSTRUCTION-RELATED SOIL SAMPLES AND FIELD SCREENING RESULTS
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Sample Date | Field Sample ID | Depth or Depth Range (ft, BGS) | Exploration Depth (ft, BGS) | Drilling Equipment | Depth to Groundwater (ft BGS) | Field Screening Results |
|---|---|---|---|---|---|---|
| **SOUTH OF FORMER SLIP 5 AREA Con't** | | | | | | |
| **Eastern Property Boundary** | | | | | | |
| 09/03/10 | IT-HBE-1A-1-090310 | 0-1 | 5.5 | Excavator | NE | none |
| 09/03/10 | IT-HBE-1A(4.5-5.5)-090310 | 4.5-5.5 | 5.5 | Excavator | NE | none |
| 09/02/10 | IT-HBE-2-1-090210 | 0-1 | 5.5 | Excavator | NE | none |
| 09/07/10 | IT-HBE-2(4.0-4.5)-090710 | 4-4.5 | 5.5 | Excavator | NE | none |
| 09/03/10 | IT-HBE-3-1-090310 | 0-1 | 5.5 | Excavator | NE | none |
| 09/07/10 | IT-HBE-3(4.5-5.5)-090710 | 4.5-5.5 | 5.5 | Excavator | NE | none |
| 09/15/10 | IT-EXT1(0-1)-091510 | 0-1 | 5 | Excavator | NE | none |
| 09/15/10 | IT-EXT1(4-5)-091510 | 4-5 | 5 | Excavator | NE | none |
| 09/15/10 | IT-EXT2(0-1)-091510 | 0-1 | 5 | Excavator | NE | none |
| 09/15/10 | IT-EXT2(3-4)-091510 | 3-4 | 5 | Excavator | NE | none |
| 09/15/10 | IT-EXT2(3-4)-091510RE | 3-4 | 5 | Excavator | NE | none |
| 09/15/10 | IT-EXT3(0-1)-091510 | 0-1 | 5 | Excavator | NE | none |
| 09/15/10 | IT-EXT3(3-4)-091510 | 3-4 | 5 | Excavator | NE | none |
| 08/09/11 | IT-PIVExc2-B(5.0)-110809 | 5 | 5 | Excavator | NE | none |
| 08/09/11 | IT-PIVExc2-SW(2.5)-110809 | 2.5 | 5 | Excavator | NE | none |
| 08/02/11 | IT-TowpathExc13-(1.3)110802 | 1.3 | 1.3 | Excavator | NE | none |
| 07/28/11 | IT-Bldg-14-11Exc2-B(2.5)110728 | 2.5 | 2.5 | Excavator | NE | PID = 2.7 ppm (no odor, no sheen) |
| 07/28/11 | IT-Bldg-14-11Exc3-B(3.0)110728 | 3 | 3 | Excavator | NE | PID = 1.9 ppm (no odor, no sheen) |
| 07/28/11 | IT-Bldg-14-11Exc4-B(2.4)110728 | 2.4 | 2.4 | Excavator | NE | PID = 1.4 ppm (no odor, no sheen) |
| 07/28/11 | IT-Bldg-14-11Excl-B(2.1)110728 | 2.1 | 2.1 | Excavator | NE | PID = 1.0 ppm (no odor, no sheen) |
| 08/18/11 | IT-BLDG14-11-SURF-110818 | surface | 0.5 | Excavator | NE | PID = 0.2 ppm (no odor, no sheen) |
| 08/18/11 | IT-BUILDING14-11EXC5-B(.5)-110818 | 0.5 | 0.5 | Excavator | NE | PID = 0.2 ppm (no odor, no sheen) |
| 11/08/11 | IT-MW-4(2-3.5)-111108 | 2-3.5 | 26 | Hollow-Stem Auger | 11.5 | none |
| 11/08/11 | IT-MW-4(5-6.5)-111108 | 5-6.5 | 26 | Hollow-Stem Auger | 11.5 | none |
| 11/08/11 | IT-MW-4(8-9.5)-111108 | 8-9.5 | 26 | Hollow-Stem Auger | 11.5 | none |
| 11/08/11 | IT-MW-4(13.5-15)-111108 | 13.5-15 | 26 | Hollow-Stem Auger | 11.5 | none |
| 03/12/12 | IT-WB-1-120312 | surface | surface | SS Spoon | NE | none |
| 03/12/12 | IT-WB-2-120312 | surface | surface | SS Spoon | NE | none |
| 03/12/12 | IT-WB-3-120312 | surface | surface | SS Spoon | NE | none |

**TABLE 1**
**SUMMARY OF RI AND CONSTRUCTION-RELATED SOIL SAMPLES AND FIELD SCREENING RESULTS**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Sample Date | Field Sample ID | Depth or Depth Range (ft, BGS) | Exploration Depth (ft, BGS) | Drilling Equipment | Depth to Groundwater (ft BGS) | Field Screening Results |
|---|---|---|---|---|---|---|
| **SOUTH OF FORMER SLIP 5 AREA Con't** | | | | | | |
| **Northern Portion of 14-01 Building** | | | | | | |
| 05/20/11 | IT-Bldg1401-OutakesExc-1(3.5)-11052 | 3.5 | 3.5 | Excavator | NE | none |
| 05/20/11 | IT-Bldg1401-OutakesExc-2(3.7)-11052 | 3.7 | 3.7 | Excavator | NE | none |
| 05/23/11 | IT-Bldg1401-OutakesExc-3(2.9)110523 | 2.9 | 2.9 | Excavator | NE | none |
| 05/23/11 | IT-Bldg1401-OutakesExc-4(3.05)11052 | 3.05 | 3.05 | Excavator | NE | none |
| 05/02/11 | IT-BLDG1401-TRENCH-2N-110502 | 3 | 3 | Excavator | NE | none |
| 05/02/11 | IT-BLDG1401-TRENCH-2S-110502 | 3 | 3 | Excavator | NE | none |
| 05/03/11 | IT-Bldg1401-Trench-3N-110503 | 3 | 3 | Excavator | NE | none |
| 05/03/11 | IT-Bldg1401-Trench-3S-110503 | 3 | 3 | Excavator | NE | none |
| 05/12/11 | IT-Bldg1401-Trench-4N-110512 | 3 | 3 | Excavator | NE | none |
| 05/12/11 | IT-Bldg1401-Trench-4S-110512 | 3 | 3 | Excavator | NE | none |
| 05/13/11 | IT-Bldg1401-trench5N-110513 | 3 | 3 | Excavator | NE | none |
| 05/13/11 | IT-Bldg1401-trench5S-110513 | 3 | 3 | Excavator | NE | none |
| **Former Washdown/Degreaser Area** | | | | | | |
| 04/25/11 | IT-MW-1(3-4)-110425 | 3-4 | 25.5 | Hollow-Stem Auger | 12.5 | none |
| 04/25/11 | IT-MW-1(5-6)-110425 | 5-6 | 25.5 | Hollow-Stem Auger | 12.5 | brick fragments |
| 04/25/11 | No sample collected for chemical analysis | 6-6.5 | 25.5. | Hollow-Stem Auger | 12.5 | brick fragments |
| 04/25/11 | IT-MW-1(8-9)-110425 | 8-9 | 25.5 | Hollow-Stem Auger | 12.5 | none |
| 04/26/11 | IT-MW-2(2-3)-110426 | 2-3 | 25.5 | Hollow-Stem Auger | 8 | none |
| 04/26/11 | IT-MW-2(5-6)-110426 | 5-6 | 25.5 | Hollow-Stem Auger | 8 | none |
| 04/26/11 | IT-MW-2(8-9)-110426 | 8-9 | 25.5 | Hollow-Stem Auger | 8 | none |
| 04/26/11 | IT-MW-3-(2-3)-110426 | 2-3 | 25.5 | Hollow-Stem Auger | 13 | none |
| 04/26/11 | IT-MW-3-(5-6)-110426 | 5-6 | 25.5 | Hollow-Stem Auger | 13 | none |
| 04/26/11 | IT-MW-3-(9-10)-110426 | 9-10 | 25.5 | Hollow-Stem Auger | 13 | none |
| 04/25/11 | IT-SB-1(2-3)-110425 | 2-3 | 25.5 | Hollow-Stem Auger | 13 | none |
| 04/25/11 | No sample collected for chemical analysis | 4-4.5 | 25 | Hollow-Stem Auger | 13 | black brick fragment |
| 04/25/11 | IT-SB-1(5-6)110425 | 5-6 | 25.5 | Hollow-Stem Auger | 13 | none |
| 04/25/11 | IT-SB-1(8-9)-110425 | 8-9 | 25.5 | Hollow-Stem Auger | 13 | (slight organic odor, no sheen) |

**TABLE 1**
**SUMMARY OF RI AND CONSTRUCTION-RELATED SOIL SAMPLES AND FIELD SCREENING RESULTS**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Sample Date | Field Sample ID | Depth or Depth Range (ft, BGS) | Exploration Depth (ft, BGS) | Drilling Equipment | Depth to Groundwater (ft BGS) | Field Screening Results |
|---|---|---|---|---|---|---|
| **SOUTH OF FORMER SLIP 5 AREA Con't** | | | | | | |
| 06/24/11 | IT-BLDG1401-FOOTINGEXC10-B(1.5)1106 | 1.5 | 1.5 | Excavator | NE | none |
| 06/22/11 | IT-BLDG1401-FOOTINGEXC8-B(2.5)-110 | 2.5 | 2.5 | Excavator | NE | none |
| 06/23/11 | IT-Bldg1401-FootingExc1-SW(4.0) | 4 | 7.5 | Excavator | NE | none |
| 06/22/11 | IT-BLDG1401-FOOTINGEXC14-B(4.0)-110 | 4 | 4 | Excavator | NE | none |
| 06/22/11 | IT-BLDG1401-FOOTINGEXC15-B(4.0)-110 | 4 | 4 | Excavator | NE | none |
| 06/22/11 | IT-BLDG1401-FOOTINGEXC3-B(4.0)-110 | 4 | 4 | Excavator | NE | none |
| 06/23/11 | IT-Bldg1401-FootingExc5-SW(4.0) | 4 | 6 | Excavator | NE | none |
| 06/23/11 | IT-Bldg1401-FootingExc5-B(6.0) | 6 | 6 | Excavator | NE | none |
| 06/23/11 | IT-Bldg1401-FootingExc1-B(6.0) | 6 | 7.5 | Excavator | NE | none |
| 06/27/11 | IT-Bldg1401-FootingExc1-B(7.5)-1106 | 7.5 | 7.5 | Excavator | NE | none |
| **Former Washdown System Collection Tanks/Loading Dock Area** | | | | | | |
| 07/19/2011 | IT-TOWPATHEXC2-B(.7) | 0.7 | 0.7 | Excavator | NE | none |
| 07/19/2011 | IT-TOWPATHEXC3-B(.7) | 0.7 | 0.7 | Excavator | NE | none |
| 07/19/2011 | IT-TOWPATHEXC4-B(.7) | 0.7 | 0.7 | Excavator | NE | none |
| 07/19/2011 | IT-TOWPATHEXC5-B(.7) | 0.7 | 0.7 | Excavator | NE | none |
| 07/19/2011 | IT-TOWPATHEXC6-B(.7) | 0.7 | 0.7 | Excavator | NE | PID = 1.7 ppm (no odor, no sheen) |
| 07/19/2011 | IT-TOWPATHEXC7-B(.7) | 0.7 | 0.7 | Excavator | NE | PID = 1.0 ppm (no odor, no sheen) |
| 11/07/11 | IT-MW-8(2-3.5)-111107 | 2-3.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/07/11 | IT-MW-8(5-6.5)-111107 | 5-6.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/07/11 | IT-MW-8(8-9.5)-111107 | 8-9.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| 11/07/11 | IT-MW-8(14-15.5)-111107 | 14-15.5 | 26 | Hollow-Stem Auger | 12.5 | none |
| **Vicinity of I-206(s)** | | | | | | |
| 10/24/11 | IT-TP-101-B(12-13)111024 | 12-13 | 13 | Excavator | 13.25 | none |
| 10/25/11 | IT-TP-102-B(13-14)-111025 | 13-14 | 14 | Excavator | NE | none |
| 10/25/11 | IT-TP-103-SWE(5-6)-111025 | 5-6 | 13 | Excavator | NE | none |
| 10/25/11 | IT-TP-103-SWE(6-7)-111025 | 6-7 | 13 | Excavator | NE | none |
| 10/25/11 | IT-TP-103-SWE(12-13)-111025 | 12-13 | 13 | Excavator | NE | none |

ft = feet
max = maximum
BGS = below ground surface
ppm = parts per million
PID = photoionization detector

# TABLE 2
## MONITORING WELL AND PIEZOMETER SURVEY INFORMATION AND CONSTRUCTION SUMMARY
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Well ID | Washington State Plane Coordinate System, North Zone- NAD 83(91) | | Well Rim/Ground Elevation (NAVD88) | Top of 2-inch PVC Elevation (NAVD88) | Well Screen Interval (Top) (ft, BGS) | Well Screen Interval (Bottom) (ft, BGS) | Well Screen Interval Elevation (Top) (ft, NAVD88) | Well Screen Interval Elevation (Bottom) (ft, NAVD88) | Well Depth (ft, BGS) |
|---|---|---|---|---|---|---|---|---|---|
| | Northing | Easting | | | | | | | |
| I-104(s) | 1276122 | 195089.4 | 17.83 | 17.35 | 15 | 25 | 2.35 | -7.65 | 25.3 |
| I-200(s) | 1277540.8 | 194826.3 | 18.13 | 17.77 | 14 | 24 | 3.77 | -6.23 | 24.3 |
| I-203(s) | 1276266.3 | 194815.7 | 17.68 | 17.32 | 16 | 26.5 | 1.32 | -9.18 | 26.8 |
| I-205(s) | 1276304.8 | 194551.4 | 18.61 | 18.32 | 14 | 24.5 | 4.32 | -6.18 | 24.8 |
| I-206(s) | 1276403.5 | 194380.5 | 18.82 | 18.47 | 14 | 24.5 | 4.47 | -6.03 | 24.8 |
| MW-1 | 1276722.9 | 194380.7 | 19.31 | 18.95 | 10 | 20 | 8.95 | -1.05 | 20.3 |
| MW-2 | 1276767.2 | 194287.8 | 19.41 | 19.04 | 10 | 20 | 9.04 | -0.96 | 20.3 |
| MW-3 | 1276910.2 | 194374.7 | 19.35 | 19.03 | 10 | 20 | 9.03 | -0.97 | 20.3 |
| MW-4 | 1277693.1 | 194402.7 | 18.28 | 17.8 | 8 | 18 | 9.8 | -0.2 | 18.3 |
| MW-5 | 1277209.3 | 194257.2 | 18.93 | 18.52 | 8 | 18 | 10.52 | 0.52 | 18.3 |
| MW-6 | 1276867.2 | 194243.8 | 19.24 | 18.91 | 8 | 23 | 10.91 | -4.09 | 23.3 |
| MW-7 | 1276341.2 | 194276.7 | 19.14 | 18.81 | 8 | 18 | 10.81 | 0.81 | 18.3 |
| MW-8 | 1276578.9 | 194389.1 | 18.85 | 18.34 | 8 | 18 | 10.34 | 0.34 | 18.3 |
| MW-9 | 1276292.6 | 194466.5 | 18.65 | 18.26 | 8 | 18 | 10.26 | 0.26 | 18.3 |
| MW-10 | 1276224.3 | 194638 | 18.2 | 17.73 | 8 | 18 | 9.73 | -0.27 | 18.3 |
| MW-11 | 1276409.2 | 194665.2 | 18.64 | 18.21 | 8 | 18 | 10.21 | 0.21 | 18.3 |
| MW-12 | 1276612.8 | 194706.7 | 18.18 | 17.91 | 8 | 23 | 9.91 | -5.09 | 23.3 |
| MW-13 | 1276852.8 | 194772.7 | 17.62 | 17.17 | 8 | 18 | 9.17 | -0.83 | 18.3 |
| MW-14 | 1277163 | 194838.4 | 17.71 | 17.25 | 8 | 18 | 9.25 | -0.75 | 18.3 |
| MW-15 | 1277426.8 | 194964.1 | 17.89 | 17.54 | 8 | 18 | 9.54 | -0.46 | 18.3 |
| MW-16 | 1276948.2 | 194936.9 | 18.1 | 17.67 | 8 | 18 | 9.67 | -0.33 | 18.3 |
| MW-17 | 1276464.8 | 194887.1 | 18.62 | 18.12 | 8 | 23 | 10.12 | -4.88 | 23.3 |
| MW-18 | 1276336.4 | 194950.9 | 17.85 | 17.26 | 8 | 18 | 9.26 | -0.74 | 18.3 |
| MW-19 | 1276149.7 | 194947.1 | 18.2 | 17.84 | 8 | 18 | 9.84 | -0.16 | 18.3 |
| MW-20 | 1276110.2 | 195086.6 | 18.3 | 17.79 | 8 | 18 | 9.79 | -0.21 | 18.3 |
| MW-21 | 1276295 | 195078.2 | 17.91 | 17.49 | 8 | 18 | 9.49 | -0.51 | 18.3 |
| MW-22 | 1276595.3 | 195105.6 | 17.26 | 16.81 | 8 | 18 | 8.81 | -1.19 | 18.3 |
| MW-23 | 1276404.3 | 195024.1 | 16.88 | 16.43 | 8 | 18 | 8.43 | -1.57 | 18.3 |
| MW-24 | 1276710.5 | 195002.5 | 19.21 | 18.74 | 8 | 18 | 10.74 | 0.74 | 18.3 |
| MW-25 | 1277030.5 | 195011.9 | 17.75 | 17.3 | 8 | 18 | 9.3 | -0.7 | 18.3 |
| PZ-1 | 1277233.6 | 195058.7 | 17.36 | 17.06 | 14 | 24 | 3.06 | -6.94 | 24.3 |
| PZ-2 | 1277415.7 | 194568.2 | 18.47 | 17.95 | 14 | 24 | 3.95 | -6.05 | 24.3 |
| PZ-3 | 1277220.3 | 194822.9 | 17.43 | 17.15 | 14 | 24 | 3.15 | -6.85 | 24.3 |
| PZ-4 | 1276791.9 | 194580.3 | 18.63 | 17.86 | 14 | 24 | 3.86 | -6.14 | 24.3 |
| PZ-6 | 1276587 | 194821.4 | 18.59 | 18.19 | 14 | 24 | 4.19 | -5.81 | 24.3 |
| PZ-7 | 1276175.4 | 194828.5 | 17.94 | 17.44 | 14 | 24 | 3.44 | -6.56 | 24.3 |
| PZ-8 | 1276324 | 194386.6 | 19.07 | 18.83 | 14 | 24 | 4.83 | -5.17 | 24.3 |

BGS = below ground surface
ft = feet
PVC = poly vinyl chloride

# TABLE 3
## TIDE HEIGHT DURING NEARSHORE GROUNDWATER SAMPLE COLLECTION
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Well Name | Tide Height During Sample Collection | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1Q12 | | | 2Q12 | | | 3Q12 | | | 4Q12 | | |
| | Date | Time | Tide Height (ft MLLW) | Date | Time | Tide Height (ft MLLW) | Date | Time | Tide Height (ft MLLW) | Date | Time | Tide Height (ft MLLW) |
| **IT-I-104** | 12/8/2011 | 22:18 | -0.7 | 03/13/12 | 15:00 | -0.1 | 06/14/12 | 8:58 | 0.8 | 09/12/12 | 9:14 | 0.9 |
| **IT-I-203** | 12/7/2011 | 20:50 | -0.3 | 03/15/12 | 18:06 | 0.1 | 06/15/12 | 10:21 | 0.4 | 09/13/12 | 9:31 | 0.7 |
| **IT-I-205** | 12/6/2011 | 21:30 | 0.6 | 03/15/12 | 17:05 | 0.6 | 06/15/12 | 8:55 | 0.2 | 09/13/12 | 9:20 | 0.8 |
| **IT-I-206** | 12/06/11 | 20:30 | 0.3 | 03/12/12 | 14:15 | -0.3 | 06/19/12 | 10:50 | -1.1 | 09/14/12 | 10:48 | 0.8 |
| **IT-MW-7** | 12/05/11 | 20:50 | 1.3 | 03/12/12 | 14:01 | 0.1 | 06/19/12 | 11:31 | -1.6 | 09/14/12 | 9:26 | 1.3 |
| **IT-MW-9** | 12/06/11 | 20:15 | 0.4 | 03/12/12 | 15:30 | -0.5 | 06/15/12 | 8:39 | 0.4 | 09/13/12 | 10:01 | 0.7 |
| **IT-MW-10** | 12/06/11 | 21:35 | 0.3 | 03/15/12 | 18:15 | 0.1 | 06/14/12 | 9:30 | 0.9 | 09/13/12 | 9:35 | 0.7 |
| **IT-MW-11** | 12/07/11 | 20:03 | 0.4 | 03/15/12 | 17:02 | 0.6 | 06/19/13 | 11:20 | -1.5 | 09/13/12 | 10:41 | 1.2 |
| **IT-MW-17** | 12/12/11 | 23:00 | -0.8 | 03/14/12 | 16:00 | 0.2 | 06/18/12 | 10:11 | -0.8 | 09/12/12 | 9:50 | 1.2 |
| **IT-MW-18** | 12/08/11 | 22:40 | -0.3 | 03/14/12 | 17:01 | -0.3 | 06/18/12 | 11:16 | -1.3 | 09/12/12 | 9:05 | 0.9 |
| **IT-MW-19** | 12/07/11 | 22:00 | 0.0 | 03/13/12 | 16:23 | -0.5 | 06/14/12 | 7:58 | 1.1 | 09/12/12 | 9:56 | 1.3 |
| **IT-MW-20** | 12/08/11 | 21:03 | -0.6 | 03/13/12 | 14:55 | 0.0 | 06/14/12 | 7:59 | 1.1 | 09/12/13 | 7:57 | 1.3 |
| **IT-MW-21** | 12/08/11 | 21:40 | -0.9 | 03/14/12 | 16:05 | 0.1 | 06/18/12 | 11:15 | -1.3 | 09/12/12 | 9:31 | 1.0 |
| **IT-MW-23** | 12/12/11 | 23:55 | -1.6 | 03/14/12 | 17:10 | -0.3 | 06/18/12 | 10:20 | -0.9 | 09/13/12 | 10:40 | 1.2 |
| **IT-PZ-7** | 12/07/11 | 21:23 | -0.3 | 03/13/12 | 16:40 | -0.2 | 06/14/12 | 8:40 | 0.8 | 09/12/12 | 8:15 | 1.1 |
| **IT-PZ-8** | 12/05/11 | 20:45 | 1.2 | 03/12/12 | 15:45 | -0.3 | 06/15/12 | 9:50 | 0.1 | 09/13/12 | 10:38 | 1.2 |

# TABLE 4
## SOURCE MATERIAL SAMPLING LOCATION DESCRIPTIONS
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Sample Name | Sample Media | Date Sampled | Site | Sample Location Notes/Comments |
|---|---|---|---|---|
| IT-CB-66/67 | Storm Drain Solids | 4/3/2012 | Thompson | Composite catch basin solids from CB66 and CB67; both structures have filters, filter at CB66 is defective/not fitted properly. |
| IT-CB-77/77B/77E | Storm Drain Solids | 4/3/2012 | Thompson | Composite catch basin solids from CB77, CB77B, and CB77E; 75 percent of volume from CB77, 25 percent of volume from CB77B/77E. All structures are fitted with filters. |
| IT-CB-C/D | Storm Drain Solids | 4/3/2012 | Thompson | Composite catch basin solids from CBC/CBD; 75 percent of volume from CBC, 25 percent of volume from CBD. Both structures are fitted with filters. |
| IT-CG-72 | Storm Drain Solids | 4/4/2012 | Thompson | Catch basin solids (no surface solids present to sample). |
| IT-CG-74 | Storm Drain Solids | 4/4/2012 | Thompson | Catch basin solids (no surface solids present to sample). |
| IT-CJM-07 | Concrete Joint Material | 4/10/2012 | Isaacson | Weathered/old concrete joint material, dark black with tar-like appearance, collected from concrete panel remnants on west side of Isaacson. Asbestos containing, collected by the Boeing Asbestos Abatement team. |
| IT-CJM-08 | Concrete Joint Material | 4/10/2012 | Isaacson | Weathered/old concrete joint material, dark black with tar-like appearance, collected from concrete panel remnants on east side of Isaacson. Asbestos containing, collected by the Boeing Asbestos Abatement team. |
| IT-PAINT-01 | Paint Chips | 4/10/2012 | Thompson | Yellow-painted bollard surrounding large white tank on the east side of the 14-03 building, layer of white paint visible under yellow. |
| IT-PAINT-02 | Paint Chips | 4/10/2012 | Thompson | Yellow-painted bollards and railing surrounding hydrant north of the 14-02/14-03 buildings, multiple layers of yellow paint visible. |
| IT-PAINT-03 | Paint Chips | 4/10/2012 | Thompson | Beige-painted conex box on the north side of the 14-02 building, layers of red paint visible under beige, in very poor/peeling condition. |
| IT-PAINT-04 | Paint Chips | 4/10/2012 | Thompson | Grey-painted conex box on the west side of the 14-02 building in poor condition, layers of green and beige paint visible, in very poor/peeling condition. |
| IT-PAINT-05 | Paint Chips | 4/10/2012 | Thompson | Beige peeling paint on the concrete exterior of the south side of the 14-02 building. |
| IT-PAINT-06 | Paint Chips | 4/10/2012 | Thompson | Beige peeling paint on the concrete exterior of the 14-13 building, composite paint chip sample from all sides of the building, visibly appears to be the same paint covering the entire building. |
| IT-SURFACE-01 | Surface Debris | 4/3/2012 | Thompson | North side of 14-02/14-03 buildings, from mossy debris inside the chain-link fence housing equipment, some orange/blue paint chips in sample. |
| IT-SURFACE-02 | Surface Debris | 4/3/2012 | Thompson | West side of 14-02/14-03 buildings, dirt/needle/dust debris along concrete joint. |
| IT-SURFACE-03 | Surface Debris | 4/3/2012 | Thompson | South side of 14-02/14-03 buildings, mossy dirt and debris at the base of exterior equipment. |
| IT-SURFACE-04 | Surface Debris | 4/3/2012 | Thompson | East side of the water tank and 14-13 building, dirt/dust/debris. |
| IT-SURFACE-05 | Surface Debris | 4/3/2012 | Isaacson | Surface debris consisting of dirt, wet solids, and mossy material, near CB10. |
| IT-SURFACE-06 | Surface Debris | 4/3/2012 | Isaacson | Surface debris consisting of wet dirt, dust, and mossy material, north-east of CB10, along Isaacson fenceline. |
| IT-SURFACE-07 | Surface Debris | 4/3/2012 | Isaacson | Surface debris consisting of wet dirt, dust, and mossy material, near/southwest of VTV-E. |
| IT-SURFACE-08 | Surface Debris | 4/3/2012 | Isaacson | Surface debris near north fenceline of Isaacson consisting of wet, mossy, dirt and dust debris. |
| IT-SURFACE-09 | Surface Debris | 4/3/2012 | Isaacson | Surface debris near on fenceline of Isaacson consisting of wet, mossy, dirt and dust debris. |
| IT-SURFACE-10 | Surface Debris | 4/3/2012 | Isaacson | Surface debris on north fenceline of Isaacson, northwest of CB35, consisting of wet, mossy dirt and debris. |
| IT-SURFACE-11 | Surface Debris | 4/3/2012 | Isaacson | Surface debris consisting of mossy dirt/debris on south side of Isaacson along fenceline, south of CB51. |
| IT-SURFACE-12 | Surface Debris | 4/3/2012 | Isaacson | Surface debris consisting of mossy dirt/debris on south side of Isaacson along fenceline. |
| IT-SURFACE-13 | Surface Debris | 4/4/2012 | Thompson | Surface debris collected from dirt and solids built up near CB26, small blue paint flecks visible in sample. |
| IT-SURFACE-14 | Surface Debris | 4/4/2012 | Thompson | Surface debris collected from dirt and solids built up near CB17/CB20. |
| IT-SURFACE-15 | Surface Debris | 4/4/2012 | Thompson | Surface debris from dirt and solids built up near CB13/CB14; 10% of volume from CB13 area, 90% of volume from CB14 area. |
| IT-SURFACE-16 | Surface Debris | 4/10/2012 | Thompson | Surface debris consisting of gravelly dirt/dust/small rock chips along the north side of the 14-01 building, south of CB-08. |

# TABLE 5

## SUMMARY OF SEDIMENT GRAB AND CORE SAMPLE LOCATIONS
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Proposed Sample Location | State Plane Coordinates (WA SPC North NAD 83; Survey Feet) | | Estimated Mudline Elevation (feet MLLW) [1] | Sample Date | Samples Collected [2] | Comments |
|---|---|---|---|---|---|---|
| | Easting | Northing | | | | |
| **Grab Samples** | | | | | | |
| SD-501G | 1275941 | 195116 | -12.4 | 2/6/2012 | 0 to 10 cm | |
| SD-502G | 1275997 | 195071 | -2.8 | 2/6/2012 | 0 to 10 cm | |
| SD-503G | 1275973 | 194998 | -11.6 | 2/6/2012 | 0 to 10 cm | |
| SD-504G | 1276024 | 194939 | -4.1 | 2/6/2012 | 0 to 10 cm | |
| SD-505G [3] | 1276008 | 194881 | -10.5 | 2/6/2012 | 0 to 10 cm | Duplicate station |
| SD-516G | 1276008 | 194880 | -10.5 | 2/7/2012 | 0 to 10 cm | |
| SD-506G | 1276073 | 194822 | -0.7 | 2/7/2012 | 0 to 10 cm | |
| SD-507G | 1276033 | 194757 | -10.0 | 2/7/2012 | 0 to 10 cm | Station selected for dioxin/furan analysis |
| SD-508G | 1276120 | 194703 | -2.0 | 2/7/2012 | 0 to 10 cm | Station selected for dioxin/furan analysis |
| SD-509G | 1276063 | 194641 | -9.8 | 2/7/2012 | 0 to 10 cm | Station selected for dioxin/furan analysis |
| SD-510G | 1276149 | 194582 | 0.2 | 2/7/2012 | 0 to 10 cm | |
| SD-511G | 1276088 | 194520 | -10.7 | 2/7/2012 | 0 to 10 cm | |
| SD-512G [4] | 1276181 | 194461 | 0.1 | 2/7/2012 | 0 to 10 cm | Duplicate station |
| SD-517G | 1276182 | 194463 | 0.2 | 2/7/2012 | 0 to 10 cm | |
| *SD-513G* | 1276126 | 194402 | -9.1 | 2/7/2012 | 0 to 10 cm | |
| SD-514G | 1276210 | 194346 | 0.0 | 2/7/2012 | 0 to 10 cm | Station selected for dioxin/furan analysis |
| SD-515G | 1276149 | 194276 | -9.7 | 2/7/2012 | 0 to 10 cm | Station selected for dioxin/furan analysis |
| **Core Samples** | | | | | | |
| SD-501 | 1275945 | 195119 | -11.7 | 1/30/2012 | 1 to 7 feet | |
| SD-501R2 | 1275946 | 195119 | -11.5 | 2/17/2012 | 7 to 9 feet | Second core collected at SD-501 |
| SD-502 | 1276000 | 195068 | -2.6 | 1/30/2012 | 1 to 7 feet | |
| SD-503 | 1275978 | 194996 | -10.8 | 2/1/2012 | 1 to 8 feet | |
| SD-504 | 1276026 | 194940 | -3.8 | 1/30/2012 | 1 to 6 feet | |
| SD-505 [5] | 1276007 | 194879 | -10.6 | 2/2/2012 | 1 to 10 feet | Duplicate station |
| SD-516 | 1276006 | 194877 | -10.8 | 2/2/2012 | 1 to 11 feet | |
| SD-506 | 1276074 | 194824 | -0.5 | 1/31/2012 | 1 to 5 feet | |
| SD-507 | 1276031 | 194760 | -10.4 | 2/1/2012 | 1 to 11 feet | |
| SD-508 | 1276119 | 194702 | -2.0 | 1/31/12 | 1 to 10 feet | |
| SD-509 | 1276061 | 194639 | -10.2 | 2/1/2012 | 1 to 11 feet | |
| SD-510 | 1276152 | 194582 | 0.4 | 1/31/2012 | 1 to 10 feet | |
| SD-511 | 1276091 | 194524 | -10.2 | 2/1/2012 | 1 to 15 feet | |
| SD-512 [6] | 1276181 | 194462 | 0.2 | 2/2/2012 | 1 to 7 feet | Duplicate station |
| SD-517 | 1276180 | 194463 | 0.1 | 2/2/2012 | 1 to 5 feet | |
| SD-513 | 1276123 | 194402 | -9.5 | 2/1/2012 | 1 to 12 feet | |
| SD-514 | 1276212 | 194341 | 0.0 | 2/3/2012 | 1 to 4 feet | |
| SD-515 | 1276153 | 194279 | -9.0 | 2/3/2012 | 1 to 12 feet | |

Notes:
1. Estimated from bathymetric survey.
2. Surficial sediment (0 to 10 cm) was composited to represent the surface sample. Core samples were collected to represent 1 foot sample intervals.
3. Duplicate grab collected at this location (sample designated SD-516G).
4. Duplicate grab collected at this location (sample designated SD-517G).
5. Duplicate core collected at this location (sample designated SD-516).
6. Duplicate core collected at this location (sample designated SD-517).

Abbreviations:
cm = centimeter
MLLW = mean lower low water
NAD = North American Datum
WA SPC = Washington State Plane Coordinates

# TABLE 6
# UPLAND PRELIMINARY CLEANUP LEVELS
# BOEING ISAACSON-THOMPSON SITE
# TUKWILA, WASHINGTON

| | Groundwater | | Soil (a) | |
|---|---|---|---|---|
| **VOLATILES** | | | | |
| Acetone | 110,000 | µg/L | 510,000 | µg/kg |
| Acrylonitrile | 0.057 | µg/L | --- | µg/kg |
| Benzene | 2 | µg/L | 93 | µg/kg |
| Bromodichloromethane | 17 | µg/L | 89 | µg/kg |
| 2-Butanone | 73,000 | µg/L | 430,000 | µg/kg |
| n-Butylbenzene | 780 | µg/L | 27,000 | µg/kg |
| sec-Butylbenzene | --- | µg/L | --- | µg/kg |
| Carbon Disulfide | 3900 | µg/L | 75,000 | µg/kg |
| Carbon Tetrachloride | 0.46 | µg/L | 21 | µg/kg |
| Chlorobenzene | 270 | µg/L | 26,000 | µg/kg |
| Chloroethane | 21,000 | µg/L | 280,000 | µg/kg |
| Chloroform | 9.4 | µg/L | 200 | µg/kg |
| Chloromethane | 10.3 | µg/L | 1,600 | µg/kg |
| 4-Chlorotoluene | 2600 | µg/L | 400000 | µg/kg |
| 1,2-Dichlorobenzene | 440 | µg/L | 68,000 | µg/kg |
| 1,3-Dichlorobenzene | 960 | µg/L | 3,840 | µg/kg |
| 1,4-Dichlorobenzene | 1.7 | µg/L | 3,500 | µg/kg |
| 1,1-Dichloroethane | 33 | µg/L | 710 | µg/kg |
| 1,2-Dichloroethane | 3.6 | µg/L | 70 | µg/kg |
| 1,1-Dichloroethene | 3.2 | µg/L | 81 | µg/kg |
| cis-1,2-Dichloroethene | 130 | µg/L | 2600 | µg/kg |
| trans-1,2-Dichloroethene | 940 | µg/L | 19000 | µg/kg |
| 1,2-Dichloropropane | 3.7 | µg/L | 92 | µg/kg |
| Ethylbenzene | 1.7 | µg/L | 230 | µg/kg |
| Ethylene Dibromide | --- | µg/L | --- | µg/kg |
| 2-Hexanone | 3200 | µg/L | 32000 | µg/kg |
| Isopropylbenzene | 270 | µg/L | 78,000 | µg/kg |
| 4-Isopropyltoluene | --- | µg/L | --- | µg/kg |
| Methyl Iodide | --- | µg/L | --- | µg/kg |
| 4-Methyl-2-Pentanone (MIBK) | 19,000 | µg/L | 170,000 | µg/kg |
| Methylene Chloride | 230 | µg/L | 2400 | µg/kg |
| Naphthalene | 26 | µg/L | 2,100 | µg/kg |
| n-Propylbenzene | 530 | µg/L | 11,000 | µg/kg |
| Styrene | 77,000 | µg/L | 16,000,000 | µg/kg |
| 1,1,2,2-Tetrachloroethane | 0.33 | µg/L | 13 | µg/kg |
| Tetrachloroethene | 3.3 | µg/L | 260 | µg/kg |
| Toluene | 1300 | µg/L | 100,000 | µg/kg |
| 1,1,2-Trichloro-1,2,2-trifuoroethane | 59,000 | µg/L | 1,000,000,000 | µg/kg |
| 1,2,4-Trichlorobenzene | 1.13 | µg/L | 80 | µg/kg |
| 1,1,1-Trichloroethane | 46,000 | µg/L | 1,900,000 | µg/kg |
| 1,1,2-Trichloroethane | 2.3 | µg/L | 73 | µg/kg |
| Trichloroethene | 1.4 | µg/L | 51 | µg/kg |
| Trichlorofluoromethane | 6900 | µg/L | 200,000 | µg/kg |
| 1,2,4-Trimethylbenzene | 303 | µg/L | 800,000 | µg/kg |
| 1,3,5-Trimethylbenzene | 303 | µg/L | 800,000 | µg/kg |
| Vinyl Chloride | 0.53 | µg/L | 7.4 | µg/kg |
| m,p-Xylene | 1300 | µg/L | 160,000 | µg/kg |
| o-Xylene | 1600 | µg/L | 200,000 | µg/kg |

# TABLE 6
# UPLAND PRELIMINARY CLEANUP LEVELS
# BOEING ISAACSON-THOMPSON SITE
# TUKWILA, WASHINGTON

| | Groundwater | | Soil (a) | |
|---|---|---|---|---|
| **SEMIVOLATILES** | | | | |
| Acenaphthene | 120 | µg/L | 230,000 | µg/kg |
| Acenaphthylene | --- | µg/L | --- | µg/kg |
| Anthracene | 200 | µg/L | 1,600,000 | µg/kg |
| Benzo(a)anthracene | 0.0018 | µg/L | (b) | µg/kg |
| Benzo(a)pyrene | 0.00018 | µg/L | (b) | µg/kg |
| Benzo(b)fluoranthene | 0.0018 | µg/L | (b) | µg/kg |
| Benzo(g,h,i)perylene | --- | µg/L | --- | µg/kg |
| Benzo(k)fluoranthene | 0.0018 | µg/L | (b) | µg/kg |
| Total Benzofluoranthenes | 0.0018 | µg/L | (b) | µg/kg |
| Benzoic Acid | 2,240 | µg/L | 9,000 | µg/kg |
| Benzyl Alcohol | 182 | µg/L | 8,000,000 | µg/kg |
| Butylbenzylphthalate | 0.41 | µg/L | 1700 | µg/kg |
| Di-n-Butylphthalate | 47 | µg/L | 26,000 | µg/kg |
| Carbazole | --- | µg/L | 50,000 | µg/kg |
| 4-Chloro-3-methylphenol | 3700 | µg/L | 740000 | µg/kg |
| Chrysene | 0.018 | µg/L | (b) | µg/kg |
| Dibenz(a,h)anthracene | 0.0018 | µg/L | (b) | µg/kg |
| Dibenzofuran | 1.3 | µg/L | 80,000 | µg/kg |
| 1,2-Dichlorobenzene | 440 | µg/L | 68,000 | µg/kg |
| 1,3-Dichlorobenzene | --- | µg/L | 3,840 | µg/kg |
| 1,4-Dichlorobenzene | 1.7 | µg/L | 3,500 | µg/kg |
| Diethylphthalate | 4,236 | µg/L | 178,000 | µg/kg |
| 2,4-Dimethylphenol | 660 | µg/L | 95,000 | µg/kg |
| Dimethylphthalate | 1,100,000 | µg/L | 71 | µg/kg |
| bis(2-Ethylhexyl)phthalate | 1.2 | µg/L | 56,600 | µg/kg |
| Fluoranthene | 11 | µg/L | 230,000 | µg/kg |
| Fluorene | 45 | µg/L | 150,000 | µg/kg |
| Indeno(1,2,3-cd)pyrene | 0.0018 | µg/L | (b) | µg/kg |
| Isophorone | --- | µg/L | --- | µg/kg |
| 1-Methylnaphthalene | 2.3 | µg/L | 16,000 | µg/kg |
| 2-Methylnaphthalene | 64 | µg/L | 320,000 | µg/kg |
| 2-Methylphenol | 3100 | µg/L | 250,000 | µg/kg |
| 4-Methylphenol | 330 | µg/L | 41,000 | µg/kg |
| Naphthalene | 26 | µg/L | 2,100 | µg/kg |
| N-Nitrosodiphenylamine | 1.96 | µg/L | 204,000 | µg/kg |
| Di-n-Octyl phthalate | --- | µg/L | --- | µg/kg |
| Phenanthrene | --- | µg/L | --- | µg/kg |
| Phenol | 41000 | µg/L | 1,900,000 | µg/kg |
| Pyrene | 9.8 | µg/L | 240,000 | µg/kg |
| 1,2,4-Trichlorobenzene | 1.13 | µg/L | 80 | µg/kg |
| Total cPAH TEQ | 0.00018 | µg/L | 15 | µg/kg |
| **PCBs** | | | | |
| Aroclor 1242 | 0.000023 | µg/L | 0.72 | µg/kg |
| Aroclor 1248 | 0.000023 | µg/L | 220 | µg/kg |
| Aroclor 1254 | 0.0000055 | µg/L | 0.29 | µg/kg |
| Aroclor 1260 | 0.000023 | µg/L | 5.4 | µg/kg |
| Total PCBs | 0.000023 | µg/L | 1.8 | µg/kg |

# TABLE 6
# UPLAND PRELIMINARY CLEANUP LEVELS
# BOEING ISAACSON-THOMPSON SITE
# TUKWILA, WASHINGTON

| | Groundwater | | Soil (a) | |
|---|---|---|---|---|
| **TOTAL PETROLEUM HYDROCARBONS** | | | | |
| Diesel-Range Organics | 0.5 | mg/L | 2000 | mg/kg |
| Oil-Range Organics | 0.5 | mg/L | 2000 | mg/kg |
| Gasoline-Range Organics | 1.0/0.8 | mg/L | 100/30 | mg/kg |
| **METALS** | | | | |
| Antimony | 150 | µg/L | 5 | mg/kg |
| Arsenic | 8 | µg/L | 7 | mg/kg |
| Barium | 770 | µg/L | 640 | mg/kg |
| Beryllium | 12 | µg/L | 160 | mg/kg |
| Cadmium | 0.25 | µg/L | 1.3 | mg/kg |
| Chromium | 74 | µg/L | 1,480 | mg/kg |
| Chromium VI | 0.00058 | mg/L | 3.8 | mg/kg |
| Copper | 8 | µg/L | 36 | mg/kg |
| Lead | 2.5 | µg/L | 250 | mg/kg |
| Mercury | 12 | ng/L | 1.5 | mg/kg |
| Nickel | 8.2 | µg/L | 210 | mg/kg |
| Selenium | 5 | µg/L | 1.0 | mg/kg |
| Silver | 22 | µg/L | 170 | mg/kg |
| Thallium | 0.47 | µg/L | 0.67 | mg/kg |
| Zinc | 56 | µg/L | 1400 | mg/kg |

--- = Not available

mg/L = milligrams per liter
µg/L = micrograms per liter
ng/L = nanograms per liter
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
PCBs = polychorinated biphenyls
cPAHs = carcinogenic polycyclic hydrocarbons
TEQ = Total Equivalency Quotient
cPUL = preliminary Cleanup Level

(a) Soil cleanup levels are based on direct human contact and protection of groundwater. If during the remedy evaluation and selection process, exposure of terrestrial ecological receptors is determined to be an important exposure pathway at the Site, the soil cleanup levels for some constituents may be reduced.
(b) Use pCUL for total cPAH TEQ

# TABLE 7
## AIR PRELIMINARY CLEANUP LEVELS AND SUB-SLAB VAPOR SCREENING LEVELS
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Air pCUL ($\mu g/m^3$) | Vapor Attenuation Factor (a) | Sub-Slab Soil Vapor Screening Level ($\mu g/m^3$) (b) |
|---|---|---|---|
| **VOLATILES** | | | |
| acetone | 32000 (c) | 0.03 | 1100000 |
| benzene | 0.32 (d) | 0.03 | 11 |
| 2-butanone (MEK) | 2300 (d) | 0.03 | 77000 |
| carbon disulfide | 320 (d) | 0.03 | 11000 |
| carbon tetrachloride | 0.42 (d) | 0.03 | 14 |
| chlorobenzene | 23 (d) | 0.03 | 770 |
| chloroethane (ethyl chloride) | 4600 (d) | 0.03 | 150000 |
| chloroform | 0.11 (d) | 0.03 | 3.7 |
| chloromethane | 41 (d) | 0.03 | 1400 |
| cyclohexane | 2700 (d) | 0.03 | 90000 |
| dichlorobenzene;1,2- | 91 (d) | 0.03 | 3000 |
| dichlorobenzene;1,4- | 370 (d) | 0.03 | 12000 |
| dichloroethane;1,1- | 1.5 (c) | 0.03 | 50 |
| dichloroethane;1,2- | 0.1 (d) | 0.03 | 3.3 |
| dichloroethylene;1,1- | 91 (d) | 0.03 | 3000 |
| dichloropropane;1,2- | 1.8 (d) | 0.03 | 60 |
| 1,4-dioxane | -- | | -- |
| ethanol | -- | | -- |
| ethylbenzene | 460 (d) | 0.03 | 15000 |
| 4-ethyltoluene | -- | | -- |
| freon 11 | 320 (d) | 0.03 | 11000 |
| freon 12 | 91 (d) | 0.03 | 3000 |
| heptane | -- | | -- |
| hexane | 320 (d) | 0.03 | 11000 |
| 2-hexanone | 31 (c) | 0.03 | 1000 |
| methylene chloride | 5.3 (d) | 0.03 | 180 |
| 4-methyl-2-pentanone (MIBK) | 1400 (d) | 0.03 | 47000 |
| 2-propanol | -- | | -- |
| propylbenzene | 460 (d) | 0.03 | 15000 |
| styrene | 460 (d) | 0.03 | 15000 |
| tetrachloroethane;1,1,2,2- | 0.042 (c) | 0.03 | 1.4 |
| tetrachloroethylene | 9.6 (d) | 0.03 | 320 |
| tetrahydrofuran | -- | | -- |
| toluene | 2300 (d) | 0.03 | 77000 |
| trichloroethane;1,1,1- | 2300 (d) | 0.03 | 77000 |
| trichloroethane;1,1,2- | 0.16 (d) | 0.03 | 5.3 |
| trichloroethylene | 0.37 (d) | 0.03 | 12 |
| 1,2,4-trimethylbenzene | 3.2 (d) | 0.03 | 110 |
| 1,3,5-trimethylbenzene | -- | | -- |
| vinyl chloride | 0.28 (d) | 0.03 | 9.3 |
| xylene;m- | see total xylenes | | -- |
| xylene;o- | see total xylenes | | -- |
| xylene;p- | see total xylenes | | -- |
| xylenes (total) | 46 (c) | 0.03 | 1500 |

($\mu g/m^3$) = micrograms per cubic meter
pCUL = Preliminary Cleanup Level

(a) From EPA 2012
(b) Screening levels were calculated by dividing the pCULs for air by the sub-slab-to-indoor air vapor attenuation factor of 0.03.
(c) Residential TMCL from Table I-3
(d) MTCA Method B Air Cleanup Level

## TABLE 8

## PRELIMINARY CLEANUP LEVELS IN SURFACE SEDIMENTS
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Chemical Parameter | RAO 1: Human Seafood Consumption | RAO 2: Human Direct Contact | | RAO 3: Benthic Organisms Sediment Management Standards | | RAO 4: Ecological (River Otter Site-wide) | Preliminary Cleanup Levels (pCUL) |
|---|---|---|---|---|---|---|---|
| | Site-wide | Site-wide | Clamming areas [1] | SCO [2] | LAET [3] | | |
| **Metals** | | **mg/kg dw** | | **mg/kg dw** | **mg/kg dw** | | **mg/kg dw** |
| Arsenic | NC | 7 | 7 | 57 | 57 | — | 7 |
| Cadmium | — | — | — | 5.1 | 5.1 | — | 5.1 |
| Chromium | — | — | — | 260 | 260 | — | 260 |
| Copper | — | — | — | 390 | 390 | — | 390 |
| Lead | — | — | — | 450 | 450 | — | 450 |
| Mercury | — | — | — | 0.41 | 0.41 | — | 0.41 |
| Silver | — | — | — | 6.1 | 6.1 | — | 6.1 |
| Zinc | — | — | — | 410 | 410 | — | 410 |
| **Nonionizable Organic Compounds** | | | | | | | |
| **Aromatic Hydrocarbons** | | | | **mg/kg OC** | **µg/kg dw** | | **mg/kg OC** |
| *Total LPAH* | — | — | — | 370 | 5,200 | — | 370 |
| Naphthalene | — | — | — | 99 | 2,100 | — | 99 |
| Acenaphthylene | — | — | — | 66 | 1,300 | — | 66 |
| Acenaphthene | — | — | — | 16 | 500 | — | 16 |
| Fluorene | — | — | — | 23 | 540 | — | 23 |
| Phenanthrene | — | — | — | 100 | 1,500 | — | 100 |
| Anthracene | — | — | — | 220 | 960 | — | 220 |
| 2-Methylnaphthalene | — | — | — | 38 | 670 | — | 38 |
| *Total HPAH* | — | — | — | 960 | 12,000 | — | 960 |
| Fluoranthene | — | — | — | 160 | 1,700 | — | 160 |
| Pyrene | — | — | — | 1,000 | 2,600 | — | 1,000 |
| Benz[a]anthracene | — | — | — | 110 | 1,300 | — | 110 |
| Chrysene | — | — | — | 110 | 1,400 | — | 110 |
| Total benzofluoranthenes | — | — | — | 230 | 3,200 | — | 230 |
| Benzo[a]pyrene | — | — | — | 99 | 1,600 | — | 99 |
| Indeno[1,2,3-c,d]pyrene | — | — | — | 34 | 600 | — | 34 |
| Dibenzo[a,h]anthracene | — | — | — | 12 | 230 | — | 12 |
| Benzo[g,h,i]perylene | — | — | — | 31 | 670 | — | 31 |
| **Carcinogenic Polycyclic Aromatic Hydrocarbons** | | **µg TEQ/kg dw** | | | | | **µg TEQ/kg dw** |
| cPAH | NC | 380 | 150 | — | — | — | 150 [1] /380 |
| **Chlorinated Benzenes** | | | | **mg/kg OC** | **µg/kg dw** | | **mg/kg OC** |
| 1,2-Dichlorobenzene | — | — | — | 2.3 | 35 | — | 2.3 |
| 1,4-Dichlorobenzene | — | — | — | 3.1 | 110 | — | 3.1 |
| 1,2,4-Trichlorobenzene | — | — | — | 0.81 | 31 | — | 0.81 |
| Hexachlorobenzene | — | — | — | 0.38 | 22 | — | 0.38 |
| **Phthalate Esters** | | | | **mg/kg OC** | **µg/kg dw** | | **mg/kg OC** |
| Dimethyl phthalate | — | — | — | 53 | 71 | — | 53 |
| Diethyl phthalate | — | — | — | 61 | 200 | — | 61 |
| Di-n-butyl phthalate | — | — | — | 220 | 1,400 | — | 220 |
| Butyl benzyl phthalate | — | — | — | 4.9 | 63 | — | 4.9 |
| Bis[2-ethylhexyl]phthalate | — | — | — | 47 | 1,300 | — | 47 |
| Di-n-octyl phthalate | — | — | — | 58 | 6,200 | — | 58 |
| **Miscellaneous** | | | | **mg/kg OC** | **µg/kg dw** | | **mg/kg OC** |
| Dibenzofuran | — | — | — | 15 | 540 | — | 15 |
| Hexachlorobutadiene | — | — | — | 3.9 | 11 | — | 3.9 |
| N-nitrosodiphenylamine | — | — | — | 11 | 28 | — | 11 |
| Carbazole [4] | — | — | — | — | — | — | — |
| **Polychlorinated Biphenyls** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** |
| Total PCBs | 2 | 1,300 | 500 | 12 | 130 | 128-159 | 2 |
| **Ionizable Organic Compounds** | | | | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** |
| Phenol | — | — | — | 420 | 420 | — | 420 |
| 2-Methylphenol | — | — | — | 63 | 63 | — | 63 |
| 4-Methylphenol | — | — | — | 670 | 670 | — | 670 |
| 2,4-Dimethylphenol | — | — | — | 29 | 29 | — | 29 |
| Pentachlorophenol | — | — | — | 360 | 360 | — | 360 |
| Benzyl alcohol | — | — | — | 57 | 57 | — | 57 |
| Benzoic acid | — | — | — | 650 | 650 | — | 650 |
| | **µg TEQ/kg dw** | **µg TEQ/kg dw** | | | | | **µg TEQ/kg dw** |
| **Dioxins/Furans** | 2 | 37 | 13 | — | — | — | 2 |

Notes:

1. Clamming areas above -4 feet Mean Lower Low Water
2. Sediment Management Standards Sediment Cleanup Objectives (173-204-560) WAC.
3. LAET = Lowest-Apparent-Effects Threshold.

Abbreviations:

cPAH = carcinogenic polycyclic aromatic hydrocarbon
HPAH = high-molecular-weight polycyclic aromatic hydrocarbon
LAET = lowest-apparent-effects threshold
LPAH = low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg dw = milligrams per kilogram dry weight
mg/kg OC = milligrams per kilogram organic carbon normalized
PCBs = polychlorinated biphenyls
RAO = remedial action objective
SCO = sediment cleanup objective
TEQ = toxic equivalent concentration
µg/kg dw = micrograms per kilogram dry weight
WAC = Washington Administrative Code

# TABLE 9
## SUMMARY OF DEPTHS TO RIVER DEPOSITS/ALLUVIUM IN RI EXPLORATIONS
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| North of Slip 5 | | Slip 5 | | South of Slip 5 | |
|---|---|---|---|---|---|
| Location | Depth to Alluvium (ft, BGS) | Location | Depth to Alluvium (ft, BGS) | Location | Depth to Alluvium (ft, BGS) |
| IT-MW-15 | 10 | IT-MW- 9 | 10.5 | IT-MW- 1 | 5.5 |
| IT-MW-16 | 4 | IT-MW-10 | 10.5 | IT-MW- 2 | 8 |
| IT-MW-18 | 5 | IT-MW-11 | 12.5 | IT-MW- 3 | 8 |
| IT-MW-20 | 5.5 | IT-MW-12 | 13 | IT-MW- 4 | 10.5 |
| IT-MW-21 | 7 | IT-MW-13 | NE | IT-MW- 5 | 9.5 |
| IT-MW-22 | 4.5 | IT-MW-13B | NE | IT-MW- 6 | 9.5 |
| IT-MW-23 | NE | IT-MW-14 | 13 | IT-MW- 7 | 5 |
| IT-MW-24 | 24 | IT-MW-17 | 12.5 | IT-MW- 8 | 11 |
| IT-MW-25 | 24.5 | IT-MW-19 | 11.5 | IT-SB- 1 | 8 |
| IT-SB- 6 | 9 | IT-SB- 2 | 19.5 | IT-TP-101 | 6 |
| IT-SB- 7 | 13.5 | IT-SB- 3 | NE | IT-TP-102 | 6 |
| IT-SB- 8 | 5 | IT-SB- 4 | 5 | IT-TP-103 | 6 |
| IT-SB- 9 | 2 | IT-SB- 5 | 8.5 | | |
| IT-SB-10 | 3 | IT-SB-12 | 14.5 | | |
| IT-SB-11 | 6.5 | IT-TP-104 | 6 | | |
| IT-TP-107 | 10 | IT-TP-105 | NE | | |
| IT-TP-108 | 6 | IT-TP-105B | 6 | | |
| IT-TP-109 | NE | IT-TP-106 | NE | | |
| | | IT-TP-106B | 6 | | |

ft BGS = feet below ground surface
NE = Alluvium not encountered at this location

# TABLE 10
## SURFACE WATER LEVEL AND PRECIPITATION DATA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| RI Groundwater Monitoring Event | Measurement Date | Green River Mean Stage Height (feet) (a) (b) | Total Precipitation Prior to Groundwater Level Collection (inches) (c) | | | | LDW Daily Tidal Range (feet MLLW) | | LDW Daily Tidal Range (feet NAVD88) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2 days | 1 week | 2 week | 4 weeks | | | | |
| 1st | 12/5/2012 | 5.13 | 0.00 | 0.06 | 4.00 | 4.52 | 1.1 | 10.7 | -1.38 | 8.22 |
| 2nd | 3/6/2012 | 8.12 | 0.41 | 0.71 | 1.42 | 2.95 | 0.2 | 10.8 | -2.28 | 8.32 |
| 3rd | 6/13/2012 | 7.03 | 0.03 | 0.63 | 1.44 | 2.68 | 1.5 | 10.8 | -0.98 | 8.32 |
| 4th | 9/10/2012 | 2.95 | 0.01 | 0.01 | 0.01 | 0.01 | 1.3 | 9.4 | -1.18 | 6.92 |

LDW = Lower Duwamish Waterway
MLLW = mean lower low water

(a) mean stage height during data collection
(b) source: http://nwis.waterdata.usgs.gov/wa/nwis_USGS_Station 12113350 (Green River at Tukwila, WA) accessed December 2012
(c) source: http://mesowest.utah.edu Station KBFI (Seattle Boeing Field) accessed December 2012

# TABLE 11
## SUMMARY OF MEASURED DEPTHS TO GROUNDWATER AND CALCULATED GROUNDWATER ELEVATIONS (FT, MLLW)
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | | Measured Depth to Water (ft) | | | | | | | | Groundwater Elevation (ft, MLLW) | | | | Depth to Groundwater (BGS; ft) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Well Rim/Ground Elevation (MLLW) | Top of 2-inch PVC Elevation (MLLW) | 1Q12 (12/5/11) | Time | 2Q12 (3/6/12) | Time | 3Q12 (6/13/12) | Time | 4Q12 (9/10/12) | Time | 1Q12 (12/5/11) | 2Q12 (3/6/12) | 3Q12 (6/13/12) | 4Q12 (9/10/12) | 1Q12 (12/5/11) | 2Q12 (3/6/12) | 3Q12 (6/13/12) | 4Q12 (9/10/12) |
| **I-104** | 20.31 | 19.83 | 14.62 | 17:25 | 12.31 | 8:00 | 13.98 | 10:02 | 13.98 | 8:31 | 5.21 | 7.52 | 5.85 | 5.85 | 15.10 | 12.79 | 14.46 | 14.46 |
| **I-200** | 20.61 | 20.25 | 12.10 | 17:30 | 11.72 | 8:10 | 17.36 | 9:25 | 13.00 | 8:32 | 8.15 | 8.53 | 2.89 | 7.25 | 12.46 | 12.08 | 17.72 | 13.36 |
| **I-203** | 20.16 | 19.80 | 14.49 | 17:33 | 12.47 | 8:15 | 13.87 | 10:07 | 11.82 | 8:32 | 5.31 | 7.33 | 5.93 | 7.98 | 14.85 | 12.83 | 14.23 | 12.18 |
| **I-205** | 21.09 | 20.80 | 12.41 | 17:35 | 11.00 | 8:16 | 12.55 | 10:34 | 12.85 | 8:33 | 8.39 | 9.80 | 8.25 | 7.95 | 12.70 | 11.29 | 12.84 | 13.14 |
| **I-206** | 21.30 | 20.95 | 13.63 | 17:35 | 13.28 | 8:26 | 15.05 | 10:25 | 14.31 | 8:34 | 7.32 | 7.67 | 5.90 | 6.64 | 13.98 | 13.63 | 15.40 | 14.66 |
| **MW-1** | 21.79 | 21.43 | 13.47 | 17:36 | 13.34 | 8:28 | 15.12 | 10:29 | 14.28 | 8:42 | 7.96 | 8.09 | 6.31 | 7.15 | 13.83 | 13.70 | 15.48 | 14.64 |
| **MW-2** | 21.89 | 21.52 | 13.52 | 17:38 | 13.38 | 8:30 | 15.14 | 12:10 | 14.35 | 8:44 | 8.00 | 8.14 | 6.38 | 7.17 | 13.89 | 13.75 | 15.51 | 14.72 |
| **MW-3** | 21.83 | 21.51 | 13.42 | 17:40 | 13.23 | 8:32 | 15.34 | 10:32 | 14.26 | 8:44 | 8.09 | 8.28 | 6.17 | 7.25 | 13.74 | 13.55 | 15.66 | 14.58 |
| **MW-4** | 20.76 | 20.28 | 11.21 | 17:44 | 10.85 | 8:32 | 14.4 | 10:40 | 13.94 | 8:45 | 9.07 | 9.43 | 5.88 | 6.34 | 11.69 | 11.33 | 14.88 | 14.42 |
| **MW-5** | 21.41 | 21.00 | 12.84 | 17:50 | 12.51 | 8:35 | 14.81 | 10:32 | 13.90 | 8:51 | 8.16 | 8.49 | 6.19 | 7.10 | 13.25 | 12.92 | 15.22 | 14.31 |
| **MW-6** | 21.72 | 21.39 | 13.52 | 17:50 | 13.25 | 8:39 | 14.98 | 10:27 | 14.26 | 8:53 | 7.87 | 8.14 | 6.41 | 7.13 | 13.85 | 13.58 | 15.31 | 14.59 |
| **MW-7** | 21.62 | 21.29 | 14.52 | 17:56 | 13.90 | 8:40 | 15.3 | 10:20 | 15.12 | 9:00 | 6.77 | 7.39 | 5.99 | 6.17 | 14.85 | 14.23 | 15.63 | 15.45 |
| **MW-8** | 21.33 | 20.82 | 13.17 | 17:56 | 12.95 | 8:43 | 14.55 | 10:22 | 13.83 | 9:04 | 7.65 | 7.87 | 6.27 | 6.99 | 13.68 | 13.46 | 15.06 | 14.34 |
| **MW-9** | 21.13 | 20.74 | 12.00 | 18:00 | 11.80 | 8:50 | 11.93 | 10:10 | 12.41 | 9:05 | 8.74 | 8.94 | 8.81 | 8.33 | 12.39 | 12.19 | 12.32 | 12.80 |
| **MW-10** | 20.68 | 20.21 | 13.4 | 18:00 | 9.58 | 8:50 | 13.65 | 10:08 | 13.54 | 9:08 | 6.81 | 10.63 | 6.56 | 6.67 | 13.87 | 10.05 | 14.12 | 14.01 |
| **MW-11** | 21.12 | 20.69 | 12.16 | 18:05 | 12.02 | 8:55 | 12.85 | 10:16 | 12.67 | 9:10 | 8.53 | 8.67 | 7.84 | 8.02 | 12.59 | 12.45 | 13.28 | 13.10 |
| **MW-12** | 20.66 | 20.39 | 12.04 | 18:12 | 12.00 | 9:00 | 12.88 | 10:44 | 12.56 | 9:16 | 8.35 | 8.39 | 7.51 | 7.83 | 12.31 | 12.27 | 13.15 | 12.83 |
| **MW-13** | 20.10 | 19.65 | 11.58 | 18:14 | 11.23 | 9:25 | 13.99 | 11:00 | 12.33 | 9:18 | 8.07 | 8.42 | 5.66 | 7.32 | 12.03 | 11.68 | 14.44 | 12.78 |
| **MW-14** | 20.19 | 19.73 | 11.91 | 18:14 | 11.23 | 9:30 | 14.94 | 9:40 | 12.36 | 9:24 | 7.82 | 8.50 | 4.79 | 7.37 | 12.37 | 11.69 | 15.40 | 12.82 |
| **MW-15** | 20.37 | 20.02 | 11.82 | 18:15 | 11.54 | 9:34 | 16.82 | 9:29 | 12.65 | 9:32 | 8.20 | 8.48 | 3.20 | 7.37 | 12.17 | 11.89 | 17.17 | 13.00 |
| **MW-16** | 20.58 | 20.15 | 12.28 | 18:18 | 11.72 | 9:35 | 14.84 | 9:43 | 12.74 | 9:38 | 7.87 | 8.43 | 5.31 | 7.41 | 12.71 | 12.15 | 15.27 | 13.17 |
| **MW-17** | 21.10 | 20.60 | 12.66 | 18:20 | 12.34 | 9:38 | 13.46 | 9:50 | 13.10 | 9:40 | 7.94 | 8.26 | 7.14 | 7.50 | 13.16 | 12.84 | 13.96 | 13.60 |
| **MW-18** | 20.33 | 19.74 | 13.31 | 18:25 | 12.13 | 9:40 | 13.56 | 9:53 | 13.06 | 9:42 | 6.43 | 7.61 | 6.18 | 6.68 | 13.90 | 12.72 | 14.15 | 13.65 |
| **MW-19** | 20.68 | 20.32 | 15.56 | 18:27 | 13.05 | 9:45 | 14.71 | 9:56 | 14.62 | 9:44 | 4.76 | 7.27 | 5.61 | 5.70 | 15.92 | 13.41 | 15.07 | 14.98 |
| **MW-20** | 20.78 | 20.27 | 13.96 | 18:30 | 12.82 | 9:45 | 14.59 | 9:58 | 14.41 | 9:45 | 6.31 | 7.45 | 5.68 | 5.86 | 14.47 | 13.33 | 15.10 | 14.92 |
| **MW-21** | 20.39 | 19.97 | 12.60 | 18:33 | 11.87 | 9:48 | 13.45 | 9:55 | 12.98 | 9:46 | 7.37 | 8.10 | 6.52 | 6.99 | 13.02 | 12.29 | 13.87 | 13.40 |
| **MW-22** | 19.74 | 19.29 | 11.18 | 18:35 | 11.05 | 9:49 | 13.15 | 9:45 | 12.01 | 9:52 | 8.11 | 8.24 | 6.14 | 7.28 | 11.63 | 11.50 | 13.60 | 12.46 |
| **MW-23** | 19.36 | 18.91 | 11.94 | 18:39 | 11.00 | 9:50 | 12.80 | 9:48 | 11.96 | 9:53 | 6.97 | 7.91 | 6.11 | 6.95 | 12.39 | 11.45 | 13.25 | 12.41 |
| **MW-24** | 21.69 | 21.22 | 13.3 | 18:40 | 12.85 | 9:50 | 15.33 | 9:36 | 13.88 | 9:53 | 7.92 | 8.37 | 5.89 | 7.34 | 13.77 | 13.32 | 15.80 | 14.35 |
| **MW-25** | 20.23 | 19.78 | 11.83 | 18:56 | 11.34 | 9:51 | 14.70 | 9:33 | 12.36 | 9:56 | 7.95 | 8.44 | 5.08 | 7.42 | 12.28 | 11.79 | 15.15 | 12.81 |
| **PZ-1** | 19.84 | 19.54 | 11.34 | 19:03 | 11.05 | 9:52 | 15.30 | 9:31 | 12.10 | 10:00 | 8.20 | 8.49 | 4.24 | 7.44 | 11.64 | 11.35 | 15.60 | 12.40 |
| **PZ-2** | 20.95 | 20.43 | 12.14 | 19:05 | 11.93 | 10:00 | 16.00 | 10:45 | 13.25 | 10:00 | 8.29 | 8.50 | 4.43 | 7.18 | 12.66 | 12.45 | 16.52 | 13.77 |
| **PZ-3** | 19.91 | 19.63 | 11.39 | 19:10 | 11.17 | 10:05 | 15.08 | 9:29 | 12.26 | 10:02 | 8.24 | 8.46 | 4.55 | 7.37 | 11.67 | 11.45 | 15.36 | 12.54 |
| **PZ-4** | 21.11 | 20.34 | 12.33 | 19:11 | 12.33 | 10:10 | 14.25 | 10:56 | 13.04 | 10:05 | 8.01 | 8.01 | 6.09 | 7.30 | 13.10 | 13.10 | 15.02 | 13.81 |
| **PZ-6** | 21.07 | 20.67 | 12.41 | 19:15 | 12.74 | 10:20 | 14.08 | 9:47 | 13.22 | 10:08 | 8.26 | 7.93 | 6.59 | 7.45 | 12.81 | 13.14 | 14.48 | 13.62 |
| **PZ-7** | 20.42 | 19.92 | 12.21 | 19:20 | 11.31 | 10:20 | 11.78 | 9:59 | 12.06 | 10:10 | 7.71 | 8.61 | 8.14 | 7.86 | 12.71 | 11.81 | 12.28 | 12.56 |
| **PZ-8** | 21.55 | 21.31 | NM | | 13.73 | 10:25 | 15.23 | 10:16 | 14.89 | 10:12 | NM | 7.58 | 6.08 | 6.42 | NM | 13.97 | 15.47 | 15.13 |

MLLW = Mean Lower Low Water    BGS = Below Ground Surface    PVC = polyvinyl chloride    ft = feet    NM = Not Measured

**TABLE 12**
**MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS**
**NORTH OF FORMER SLIP 5 AREA**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| | | Western Property Boundary | | | | | | | | | | | Northern Property Boundary | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-I-104 | IT-I-104 | IT-DUP-2 (IT-I-104) | IT-I-104 | IT-DUP-1 (IT-I-104) | IT-I-104 | IT-DUP-1 (IT-I-104) | IT-MW-20 | IT-MW-20 | IT-MW-20 | IT-MW-20 | IT-MW-21 | IT-MW-21 | IT-MW-21 | IT-MW-21 |
| Laboratory Sample ID: | Preliminary | UA54G/UA54P/ UA55G/UA55O/ UB47G/UB47O | 6578917/6578918/ UM31B | 6578923/6578924/ UM31E | 6689134/6689135/ 6689136/UY55B | 6689137/6689138/ 6689139/UY55C | 6788036/6788037/ 6788038/VJ32C | 6788054/678805 /6788056/VJ32J | UA54E/UA54N/ UA55E/UA55M/ UB47E/UB47M | 6578915/6578916/ UM31A | 6689131/6689132/ 6689133/UY55A | 6788030/6788031/ 6788032/VJ32A | UA54F/UA54O/ UA55F/UA55N/ UB47F/UB47N | 6580634/6580635/ UM54C | 6692728/6692729/ 6692730/UZ18D | 6788048/6788049/ 6788050/VJ32G |
| Laboratory Data Package ID: | Cleanup | UA54/UA55/UB47 | 1295418/UM31 | 1295418/UM31 | 1316071/UY55 | 1316071/UY55 | 1335483/VJ32 | 1335483/VJ32 | UA54/UA55/UB47 | 1295418/UM31 | 1316071/UY55 | 1335483/VJ32 | UA54/UA55/UB47 | 1295735/UM54 | 1316786/UZ18 | 1335483/VJ32 |
| Sample Date: | Levels | 12/08/2011 | 3/13/2012 | 3/13/2012 | 6/14/2012 | 6/14/2012 | 9/12/2012 | 9/12/2012 | 12/08/2011 | 3/13/2012 | 6/14/2012 | 9/12/2012 | 12/08/2011 | 3/14/2012 | 6/18/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | -0.7 | -0.1 | -0.1 | 0.8 | 0.9 | 0.9 | 0.9 | -0.6 | 0.0 | 1.1 | 1.3 | -0.9 | 0.1 | -1.3 | 1.0 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | | |
| Acetone | 110,000 | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U | **3.7** J1 | 15 U | 3.0 U |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| 2-Butanone | 73,000 | 5.0 UJ | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 5.0 UJ | 1.0 U | 1.0 U | 1.0 U | 5.0 UJ | 1.0 U | 5.0 U | 1.0 U |
| 1,1-Dichloroethane | 33 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| 1,1-Dichloroethene | 3.2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | **0.2** J1 | **0.2** J1 | **0.2** | **0.2** J1 | **0.2** | **0.1** J1 | **0.2** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| trans-1,2-Dichloroethene | 940 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 1.0 U | 0.2 U |
| Tetrachloroethene | 3.3 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| Trichloroethene | 1.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.2** | **0.1** J1 | 0.5 U | 0.1 U |
| 1,3,5-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| Vinyl Chloride | 0.53 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.1** J1 | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| o-Xylene | 1600 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 UJ | 0.010 U | **0.024** | **0.033** | 0.010 U | 0.010 U | 0.020 U | 0.010 U | **0.043** | 0.010 U | 0.020 U | 0.010 U | 0.021 U | 0.010 U |
| Vinyl Chloride | 0.53 | **0.085** | **0.090** J | **0.085** | **0.075** | **0.084** | **0.082** | **0.091** | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U |
| Acrylonitrile | 0.057 | 0.050 U | NA | NA | NA | NA | NA | NA | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | 0.1 U |
| Benzoic Acid | 2,240 | 10 U | 6 UJ | 6 UJ | 6 U | 6 U | 6 U | 6 UJ | 10 U | 6 UJ | 6 U | 6 U | 10 U | 6 UJ | 6 U | 6 U |
| 2-Chlorophenol | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 2,4-Dimethylphenol | 660 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| bis(2-Ethylhexyl)phthalate | 1.2 | 1.0 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U |
| Fluorene | 45 | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | 0.1 U |
| Isophorone | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | 0.1 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | 0.1 U |
| 2-Methylphenol | 3100 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 4-Methylphenol | 330 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| Naphthalene | 26 | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U | 0.1 U | **0.1** J1 | **0.1** J1 | 1.0 U | 0.09 U | **0.1** J1 | **0.1** J1 |
| Phenol | 41,000 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | **1.5** | 0.5 U | 0.5 U | 0.5 U |
| **cPAHs (µg/L)** | | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | | |
| Benzo(a)anthracene | 0.0018 | 0.010 U | 0.0054 U | 0.0050 U | 0.0048 U | 0.0048 U | 0.0048 U | **0.0050** J1 | 0.010 U | 0.0049 U | 0.0049 U | 0.0048 U | 0.010 U | 0.0050 U | 0.0047 U | 0.0048 U |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0054 U | 0.0050 U | 0.0048 U | 0.0048 U | 0.0048 U | 0.0048 U | NA | 0.0049 U | 0.0049 U | 0.0048 U | NA | 0.0050 U | 0.0047 U | 0.0048 U |
| Benzo(k)fluoranthene | 0.0018 | NA | 0.0054 U | 0.0050 U | 0.0048 U | 0.0048 U | 0.0048 U | 0.0048 U | NA | 0.0049 U | 0.0049 U | 0.0048 U | NA | 0.0050 U | 0.0047 U | 0.0048 U |
| Chrysene | 0.018 | 0.010 U | 0.0054 U | 0.0050 U | 0.0048 U | 0.0048 U | 0.0048 U | 0.0048 U | 0.010 U | 0.0049 U | 0.0049 U | 0.0048 U | 0.010 U | 0.0050 U | 0.0047 U | 0.0048 U |
| Dibenz(a,h)anthracene | 0.0018 | 0.010 U | 0.0043 U | 0.0040 U | 0.0038 U | 0.0038 U | 0.0038 U | 0.0038 U | 0.010 U | 0.0040 U | 0.0039 U | 0.0039 U | 0.010 U | 0.0040 U | 0.0038 U | 0.0039 U |
| Indeno(1,2,3-cd)pyrene | 0.0018 | 0.010 U | 0.0043 U | 0.0040 U | 0.0038 U | 0.0038 U | 0.0038 U | 0.0038 U | 0.010 U | 0.0040 U | 0.0039 U | 0.0039 U | 0.010 U | 0.0040 U | 0.0038 U | 0.0039 U |
| Pyrene | 9.8 | NA | 0.011 U | 0.010 U | 0.0096 U | 0.0095 U | 0.0095 U | 0.0096 U | NA | 0.0099 U | 0.0097 U | 0.0096 U | NA | 0.0099 U | 0.0095 U | 0.0097 U |
| cPAHs TEQ | 0.00018 | ND | ND | ND | ND | ND | ND | **0.0005** J | ND | ND | ND | ND | ND | ND | ND | ND |
| **PCBs (µg/L)** | | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | | |
| Aroclor 1248 | 0.000023 | 0.010 U | 0.0051 U | 0.0051 U | 0.0047 U | 0.0048 U | 0.0049 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0047 U | 0.010 U | 0.0048 U | 0.0053 U | 0.0047 U |
| Aroclor 1260 | 0.000023 | 0.010 U | 0.0051 U | 0.0051 U | 0.0047 U | **0.0075** J1 | 0.0049 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0047 U | 0.010 U | 0.0048 U | 0.0053 U | 0.0047 U |
| Total PCBs | 0.000023 | ND | ND | ND | ND | **0.0075** J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

# TABLE 12
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Western Property Boundary | | | | | | | | | | | Northern Property Boundary | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-I-104 | IT-I-104 | IT-DUP-2 (IT-I-104) | IT-I-104 | IT-DUP-1 (IT-I-104) | IT-I-104 | IT-DUP-1 (IT-I-104) | IT-MW-20 | IT-MW-20 | IT-MW-20 | IT-MW-20 | IT-MW-21 | IT-MW-21 | IT-MW-21 | IT-MW-21 |
| Laboratory Sample ID: | Preliminary | UA54G/UA54P/ UA55G/UA55O/ UB47G/UB47O | 6578917/6578918/ UM31B | 6578923/6578924/ UM31E | 6689134/6689135/ 6689136/UY55B | 6689137/6689138/ 6689139/UY55C | 6788036/6788037/ 6788038/VJ32C | 6788054/678805 /6788056/VJ32J | UA54E/UA54N/ UA55E/UA55M/ UB47E/UB47M | 6578915/6578916/ UM31A | 6689131/6689132/ 6689133/UY55A | 6788030/6788031/ 6788032/VJ32A | UA54F/UA54O/ UA55F/UA55N/ UB47F/UB47N | 6580634/6580635/ UM54C | 6692728/6692729/ 6692730/UZ18D | 6788048/6788049/ 6788050/VJ32G |
| Laboratory Data Package ID: | Cleanup | UA54/UA55/UB47 | 1295418/UM31 | 1295418/UM31 | 1316071/UY55 | 1316071/UY55 | 1335483/VJ32 | 1335483/VJ32 | UA54/UA55/UB47 | 1295418/UM31 | 1316071/UY55 | 1335483/VJ32 | UA54/UA55/UB47 | 1295735/UM54 | 1316786/UZ18 | 1335483/VJ32 |
| Sample Date: | Levels | 12/08/2011 | 3/13/2012 | 3/13/2012 | 6/14/2012 | 6/14/2012 | 9/12/2012 | 9/12/2012 | 12/08/2011 | 3/13/2012 | 6/14/2012 | 9/12/2012 | 12/08/2011 | 3/14/2012 | 6/18/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | -0.7 | -0.1 | -0.1 | 0.8 | 0.9 | 0.9 | 0.9 | -0.6 | 0.0 | 1.1 | 1.3 | -0.9 | 0.1 | -1.3 | 1.0 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/L)** | | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 0.5 | 0.10 U | 0.073 U | 0.067 U | 0.029 U | 0.028 U | 0.029 U | 0.029 U | 0.10 U | 0.066 U | 0.029 U | 0.028 U | 0.10 U | 0.075 U | 0.030 U | 0.029 U |
| Oil-Range Organics | 0.5 | 0.20 U | 1.0 U | 0.95 U | 0.068 U | 0.066 U | 0.068 U | 0.067 U | 0.20 U | 0.95 U | 0.068 U | 0.066 U | 0.20 U | 1.1 U | 0.070 U | 0.067 U |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | | | | |
| Antimony | --- | 0.2 U | 0.42 U | 0.42 U | 0.42 U | 0.42 U | 0.33 U | 0.33 U | **0.3** | **0.45** J1 | 0.42 U | 0.33 U | **0.4** | 0.42 U | 0.33 U | 0.33 U |
| Arsenic | --- | **2310** | **2900** J | **2140** J | **1140** | **988** | **1080** | **1210** | **143** | **518** | **212** | **219** | **21,300** | **19,000** | **20,500** | **19,200** |
| Barium | --- | **6.7** | **7.7** | **8.3** | **5.4** | **5.4** | **6.9** | **5.8** | **16.2** | **5.0** | **5.8** | **7.9** | **17.2** | **16.1** | **16.2** | **17.9** |
| Beryllium | --- | 0.2 U | 0.13 U | 0.13 U | 0.13 U | 0.13 U | **0.067** J1 | **0.073** J1 | 0.2 U | 0.13 U | 0.13 U | 0.025 U | 0.2 U | 0.13 U | **0.068** J1 | **0.042** J1 |
| Cadmium | --- | 0.1 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.082 U | 0.082 U | 0.1 U | 0.20 U | 0.20 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | --- | **2.6** | **4.4** J | **5.5** J | **3.4** | **3.8** | **2.0** | **2.7** | **0.5** | **1.0** J1 | **2.2** | 0.50 U | **2.4** | **2.7** | **3.0** | **2.1** |
| Copper | --- | **18.5** | **5.4** J | **6.7** J | **10.7** | **11.9** | **4.0** J | **6.1** J | **3.0** | **8.0** | **2.6** | **3.1** | **69.7** | **7.5** | **13.1** | **20.8** |
| Lead | --- | **0.5** | **1.5** J | **1.9** J | **1.0** | **0.98** J1 | **0.39** J1 | **0.64** J1 | 0.1 U | **0.14** J1 | 0.080 U | 0.034 U | **0.3** | **0.19** J1 | **0.20** J1 | **0.21** J1 |
| Nickel | --- | **0.9** | **0.80** J1 | **0.91** J1 | 0.50 U | 0.50 U | **0.36** J1 | **0.38** J1 | **2.1** | **0.69** J1 | 0.50 U | **0.42** J1 | **4.0** | **3.1** | **2.4** | **1.9** J1 |
| Selenium | --- | 0.5 U | 0.27 U | 0.27 U | 0.27 U | 0.27 U | 0.50 U | 0.50 U | **2** | **0.97** J1 | **0.46** J1 | **0.62** J1 | 0.5 U | 0.27 U | **0.30** J1 | 0.50 U |
| Silver | --- | 0.2 U | 0.098 U | 0.098 U | 0.098 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.2 U | 0.098 U | 0.10 U | 0.10 U |
| Thallium | --- | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | --- | **8** | **12.3** J, J1 | **16.5** J | **12.3** J1 | **14.8** J1 | 4.7 UJ2 | **7.4** J1 | 4 U | 4.0 U | 4.0 U | 1.1 U | **10** | **6.1** J1 | **6.0** J1 | **6.4** J1 |
| **Method SW7196A (mg/L)** | | | | | | | | | | | | | | | | |
| Chromium VI | 0.00058 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | **0.010** | 0.010 U | 0.010 U |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | 1.60 UJ | **8.08** J, J1 | **12.8** | **10.6** | **5.14** | **8.58** | 20.0 U | **8.18** | **2.67** J1 | **1.43** | 20.0 U | 3.20 U | **9.63** J1 | **4.36** J1 |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | | | | |
| Antimony | 150 | 0.2 U | 0.42 U | 0.42 U | 0.42 U | 0.42 U | 0.33 U | 0.33 U | **0.2** | **0.55** J1 | 0.42 U | 0.33 U | **0.4** | 0.42 U | 0.33 U | 0.33 U |
| Arsenic | 8 | **2460** | **2180** | **2280** | **844** J | **1070** J | **1110** | **1180** | **135** | **449** | **211** | **221** | **22,600** | **17,000** | **18,200** | **19,500** |
| Barium | 770 | **3.9** | **3.6** | **3.3** | **2.9** | **3.3** | **3.7** | **3.6** | **14.2** | **1.4** J1 | **5.4** | **6.3** | **13.7** | **12.6** | **12.9** | **14.9** |
| Beryllium | 12 | 0.2 U | 0.13 U | 0.13 U | 0.13 U | 0.13 U | **0.036** J1 | **0.043** J1 | 0.2 U | 0.13 U | 0.13 U | 0.025 U | 0.2 U | 0.13 U | **0.054** J1 | **0.036** J1 |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.082 U | 0.082 U | 0.1 U | 0.20 U | 0.20 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | 74 | **3** | **3.4** | **3.2** | **3.1** | **3.0** | **2.0** | **2.0** J1 | 0.5 U | **0.94** J1 | **2.3** | 0.50 U | **2** | **2.8** | **3.3** | **2.1** |
| Copper | 8 | 0.5 U | 0.38 U | 0.38 U | 0.38 U | **2.2** | 0.40 U | **0.59** J1 | **3.1** | **7.2** | **2.5** | **2.7** | **0.6** | **1.2** J1 | **1.8** J1 | 0.74 UJ2 |
| Lead | 2.5 | 0.1 U | 0.080 U | 0.080 U | **0.66** J1 | **0.15** J1 | 0.034 U | 0.034 U | 0.1 U | 0.080 U | 0.080 U | **0.041** J1 | 0.1 U | 0.080 U | **0.084** J1 | 0.034 U |
| Nickel | 8.2 | **0.8** | 0.50 U | 0.50 U | 0.50 U | 0.50 U | **0.35** J1 | **0.50** J1 | **2.0** | **0.60** J1 | 0.50 U | **0.37** J1 | **3.4** | **2.9** | **2.4** | **1.5** J1 |
| Selenium | 5 | 0.5 U | 0.27 U | 0.27 U | 0.27 U | 0.27 U | 0.50 U | 0.50 U | **2.6** | **1.0** J1 | **0.41** J1 | **0.53** J1 | 0.5 U | **0.27** J1 | **0.28** J1 | 0.50 U |
| Silver | 22 | 0.2 U | 0.098 U | 0.098 U | 0.098 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.2 U | 0.098 U | 0.10 U | 0.10 U |
| Thallium | 0.47 | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | 56 | 4 U | 4.0 U | 4.0 U | 4.0 U | 4.0 U | 1.1 U | **2.4** J1 | 4 U | 4.0 U | 4.0 U | 2.9 UJ2 | 4 U | 4.0 U | **1.8** J1 | **2.3** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **3.01** J1 | 1.60 U | **2.38** J1 | **3.26** J1 | **0.631** | 1.60 U | 20.0 U | **4.34** | **1.82** J1 | 1.60 U | 20.0 U | 3.20 U | 3.20 U | 3.20 U |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | NA | **6.5** | **6.5** | **39.2** J | **48.1** J | NA | NA | **384** | **498** | NA | NA | **3.0** | **3.3** |
| Nitrate (Method 300.0) | --- | 0.1 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | 0.050 U | **0.9** | **1.6** | **1.0** | **0.84** | 0.1 U | 0.050 U | 0.050 U | 0.050 U |
| Sulfate ( Method 300.0) | --- | **3.8** | **0.67** J1 | **0.66** J1 | **0.84** J1 | **0.96** J1 | **4.1** J | **5.2** J | **69.1** | **11.7** | **61.1** | **63.5** | **16.3** | **10.2** J | **11.7** | **4.7** |
| Total Dissolved Solids (Method 160.1) | --- | **412** | **409** | **411** | **370** | **358** | **368** | **359** | **1160** | **320** | **800** | **894** | **371** | **444** | **415** J | **427** |
| **FIELD PARAMETERS** | | | | | | | | | | | | | | | | |
| Temperature (°C) | --- | 14.89 | 13.35 | 13.35 | 14.07 | 14.07 | 13.54 | 13.54 | 15.19 | 13.09 | 12.43 | 13.82 | 15.99 | 13.67 | 15.04 | 16.67 |
| Conductivity (uS/cm) | --- | 1494 | 527 | 527 | 373 | 373 | 535 | 535 | 4852 | 393 | 1112 | 1620 | 693 | 688 | 434 | 546 |
| Dissolved Oxygen (mg/L) | --- | 1.21 | 0.42 | 0.42 | 0.60 | 0.60 | 1.28 | 1.28 | 3.68 | 5.47 | 8.88 | 5.67 | 0.68 | 0.59 | 0.55 | 0.47 |
| pH (SU) | --- | 6.31 | 5.42 | 5.42 | 9.01 | 9.01 | 6.67 | 6.67 | 6.55 | 6.11 | 9.42 | 6.60 | 7.13 | 5.18 | 7.73 | 7.12 |
| ORP (mV) | --- | -47.5 | -154.0 | -154.0 | -98.1 | -98.1 | -128 | -128 | -12.7 | 98.4 | 143.4 | 93 | -215.8 | -172.6 | -169.4 | -140.3 |
| Turbidity (NTU) | --- | 4.45 | 2.75 | 2.75 | 4.29 | 4.29 | 47.2 | 47.2 | 2.05 | 8.58 | 72.81 | 45.9 | 3.67 | 3.78 | 11.36 | 3.29 |
| Ferrous Iron (mg/L) | --- | NA | 1.6 | 1.6 | 1.0 | 1.0 | 3.6 | 3.6 | NA | 0.0 | 0.0 | 0.0 | NA | 1.4 | 2.0 | 3.0 |

# TABLE 12
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Northern Property Boundary | | | | | | | | Stabilized Soil Area | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-22 | IT-MW-22 | IT-MW-22 | IT-MW-22 | IT-PZ-1 | IT-PZ-1 | IT-PZ-1 | IT-PZ-1 | IT-MW-23 | IT-MW-23 | IT-MW-23 | IT-MW-23 | IT-MW-24 | IT-MW-24 | IT-MW-24 | IT-MW-24 |
| Laboratory Sample ID: | Preliminary | UA54B/UA54K/ UA55B/UA55J/ UB47B/UB47J | 6571475/6571476/ UL18F | 6692734/6692735/ 6692736/UZ18F | 6789071/6789072/ 6789073/VJ53I | UB28B/UB28H/ UB29B/UB29G | 6571465/6571466/ UL18A | 6686957/6686958/ 6686959/UY34A | 6788013/6788014/ 6788015/VJ03I | UA90B/UA90E/ UA91B/UA91D | 6580632/6580633/ UM54B | 6692722/6692723/ 6692724/UZ18B | 6789065/6789066/ 6789067/VJ53G | UA54D/UA54M/ UA55D/UA55L/ UB47D/UB47L | 6571473/6571474/ UL18E | 6692737/6692738/ 6692739/UZ18G | 6788001/6788002/ 6788003/VJ03E |
| Laboratory Data Package ID: | Cleanup | UA54/UA55/UB47 | 1293989/UL18 | 1316786/UZ18 | 1335688/VJ53 | UB28/UB29 | 1293989/UL18 | 1315688/UY34 | 1335480/VJ03 | UA90/UA91 | 1295735/UM54 | 1316786/UZ18 | 1335688/VJ53 | UA54/UA55/UB47 | 1293989/UL18 | 1316786/UZ18 | 1335480/VJ03 |
| Sample Date: | Levels | 12/08/2011 | 03/07/2012 | 6/18/2012 | 9/13/2012 | 12/14/2011 | 03/07/2012 | 6/13/2012 | 9/11/2012 | 12/12/2011 | 3/14/2012 | 6/18/2012 | 9/13/2012 | 12/08/2011 | 03/07/2012 | 6/18/2012 | 9/11/2012 |
| Tide Level (ft MLLW): | | 3.1 | 5.8 | -0.4 | 6.9 | 9.8 | 3.8 | 7.8 | 2.0 | -1.6 | -0.3 | -0.9 | 1.2 | 0.3 | 4.8 | -0.2 | 8.9 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | | | |
| Acetone | 110,000 | 5.0 U | 3.0 U | 3.0 U | 3.0 U | **2.5** J1 | 3.0 U | 3.0 U | 3.0 U | **1100** | **600** | **740** | **140** | **1200** | **1000** | **700** J | **150** J |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | **0.7** J1 | 1.0 U | **0.6** J1 | 2.0 U | 5.0 U | 2.0 UJ | **1.0** J, J1 |
| 2-Butanone | 73,000 | 5.0 UJ | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 1.0 U | 1.0 U | 1.0 U | 50 U | **43** | **77** | **9.7** J1 | **110** J | **77** J1 | **76** J, J1 | **28** J, J1 |
| 1,1-Dichloroethane | 33 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | 0.5 U | 1.0 U | 0.5 U | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| 1,1-Dichloroethene | 3.2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | 0.5 U | 1.0 U | 0.5 U | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| cis-1,2-Dichloroethene | 130 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | 0.5 U | 1.0 U | 0.5 U | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| trans-1,2-Dichloroethene | 940 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | 0.5 U | 1.0 U | 0.5 U | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 5.0 U | **3.4** | 2.0 U | 1.0 U | 5.0 U | 10 U | 4.0 UJ | 2.0 UJ |
| Tetrachloroethene | 3.3 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | 0.5 U | 1.0 U | 0.5 U | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| Toluene | 1300 | 0.2 U | **0.3** | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | **0.8** J1 | 1.0 U | **0.7** J1 | 2.0 U | 5.0 U | 2.0 UJ | **1.2** J, J1 |
| Trichloroethene | 1.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | 0.5 U | 1.0 U | 0.5 U | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | **0.9** J1 | 1.0 U | **0.6** J1 | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| 1,3,5-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | **0.6** J | 1.0 U | 0.5 U | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| Vinyl Chloride | 0.53 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | 0.5 U | 1.0 U | 0.5 U | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| o-Xylene | 1600 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 2.0 U | 0.5 U | 1.0 U | 0.5 U | 2.0 U | 5.0 U | 2.0 UJ | 1.0 UJ |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | 0.019 UJ2 | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.20 U | 0.050 U | 0.033 U | 0.010 U | 0.40 U | 0.50 UJ | 0.10 U | 0.10 U |
| Vinyl Chloride | 0.53 | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U | **0.27** | **0.21** | **0.54** | **0.20** | 0.40 U | 0.50 UJ | 0.10 U | **0.11** J1 |
| Acrylonitrile | 0.057 | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA | 0.50 U | NA | NA | NA | 1.0 U | NA | NA | NA |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.5 U | 1 U | 0.1 U | 1.1 U | 0.1 U | 1 U | 0.1 U |
| Benzoic Acid | 2,240 | 10 U | 6 UJ | 6 U | 6 UJ | 10 UJ | 6 UJ | 6 U | 6 U | **560** | **350** | **240** | **81** J | **3400** | **420** J | **420** | **440** |
| 2-Chlorophenol | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 3 U | 5 U | **0.9** J1 | 1.1 U | 0.5 U | 5 U | 0.5 U |
| 2,4-Dimethylphenol | 660 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | **3** J | 5 U | **0.5** J1 | 1.1 U | **1** | 5 U | **1** |
| bis(2-Ethylhexyl)phthalate | 1.2 | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 10 U | 20 U | 2 U | 1.1 U | 2 U | 20 U | 2 U |
| Fluorene | 45 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.5 U | 1 U | **0.2** J1 | 1.1 U | 0.1 U | 1 U | 0.1 U |
| Isophorone | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 3 U | 5 U | 0.5 U | 1.1 U | 0.5 U | 5 U | **2** |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.5 U | 1 U | 0.1 U | 1.1 U | 0.1 U | 1 U | **0.2** J1 |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.5 U | 1 U | 0.1 U | 1.1 U | 0.1 U | 1 U | **0.1** J1 |
| 2-Methylphenol | 3100 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | **1.4** | 3 U | 5 U | **1** | 1.1 U | **1** | 5 U | **1** |
| 4-Methylphenol | 330 | **0.8** J1 | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | **28** | **42** | **87** | **28** | **25** | **13** | 5 U | **11** |
| Naphthalene | 26 | 1.0 U | **0.3** J1 | 0.1 U | **0.1** J1 | 1.0 U | 0.1 U | 0.1 U | **0.1** J1 | 1.0 U | 0.5 U | 1 U | **0.1** J1 | 1.1 U | **0.5** J1 | 1 U | **0.4** J1 |
| Phenol | 41,000 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | **78** | **82** | **350** | **82** | **1400** | **290** | **87** | **190** |
| **cPAHs (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | | | |
| Benzo(a)anthracene | 0.0018 | 0.010 U | 0.0051 U | 0.0050 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0053 U | 0.010 U | 0.025 U | 0.050 U | **0.019** | 0.010 U | **0.066** J1 | 0.20 | 0.0048 UJ |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0051 U | 0.0050 U | 0.0048 U | NA | 0.0048 U | 0.0048 U | 0.0053 U | NA | **0.048** J1 | 0.050 U | 0.0049 U | NA | 0.050 U | 0.050 U | **0.015** J |
| Benzo(k)fluoranthene | 0.0018 | NA | 0.0051 U | 0.0050 U | 0.0048 U | NA | 0.0048 U | 0.0048 U | 0.0053 U | NA | 0.025 U | 0.050 U | **0.0060** J1 | NA | 0.050 U | 0.050 U | 0.0048 UJ |
| Chrysene | 0.018 | 0.010 U | 0.0051 U | 0.0050 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0053 U | 0.010 U | 0.025 U | 0.050 U | 0.0049 U | 0.010 U | **0.076** J1 | 0.050 U | **0.069** J |
| Dibenz(a,h)anthracene | 0.0018 | 0.010 U | 0.0041 U | 0.0040 U | 0.0039 U | 0.010 U | 0.0039 U | 0.0038 U | 0.0043 U | 0.010 U | 0.020 U | 0.040 U | 0.0039 U | 0.010 U | 0.040 U | 0.040 U | 0.0039 UJ |
| Indeno(1,2,3-cd)pyrene | 0.0018 | 0.010 U | 0.0041 U | 0.0040 U | 0.0039 U | 0.010 U | 0.0039 U | 0.0038 U | 0.0043 U | 0.010 U | **0.029** J1 | 0.040 U | 0.0039 U | 0.010 U | 0.040 U | 0.040 U | 0.0039 UJ |
| Pyrene | 9.8 | NA | 0.010 U | 0.0099 U | 0.0097 U | NA | 0.0097 U | 0.0095 U | 0.011 U | NA | 0.050 U | 0.10 U | 0.0098 U | NA | 0.10 U | 0.10 U | **0.015** J, J1 |
| cPAHs TEQ | 0.00018 | ND | ND | ND | ND | ND | ND | ND | ND | ND | **0.008** J1 | ND | **0.0025** J | ND | **0.00736** J | ND | **0.002** J |
| **PCBs (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | | | |
| Aroclor 1248 | 0.000023 | 0.010 U | 0.0049 U | 0.0050 U | 0.0050 U | 0.010 U | **0.0086** J1 | 0.0048 U | 0.0049 U | 0.010 UJ | 0.0050 U | 0.0050 U | 0.0047 U | 0.010 U | 0.0048 UJ | 0.0048 UJ | 0.0050 UJ |
| Aroclor 1260 | 0.000023 | 0.010 U | 0.0049 U | 0.0050 U | 0.0050 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.010 UJ | 0.0050 U | 0.0050 U | 0.0047 U | 0.010 U | 0.0048 UJ | 0.0049 UJ | 0.0050 UJ |
| Total PCBs | 0.000023 | ND | ND | ND | ND | ND | **0.0086** J1 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

# TABLE 12
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Northern Property Boundary | | | | | | | | Stabilized Soil Area | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-22 | IT-MW-22 | IT-MW-22 | IT-MW-22 | IT-PZ-1 | IT-PZ-1 | IT-PZ-1 | IT-PZ-1 | IT-MW-23 | IT-MW-23 | IT-MW-23 | IT-MW-23 | IT-MW-24 | IT-MW-24 | IT-MW-24 | IT-MW-24 |
| Laboratory Sample ID: | Preliminary | UA54B/UA54K/ UA55B/UA55J/ UB47B/UB47J | 6571475/6571476/ UL18F | 6692734/6692735/ 6692736/UZ18F | 6789071/6789072/ 6789073/VJ53I | UB28B/UB28H/ UB29B/UB29G | 6571465/6571466/ UL18A | 6686957/6686958/ 6686959/UY34A | 6788013/6788014/ 6788015/VJ03I | UA90B/UA90E/ UA91B/UA91D | 6580632/6580633/ UM54B | 6692722/6692723/ 6692724/UZ18B | 6789065/6789066/ 6789067/VJ53G | UA54D/UA54M/ UA55D/UA55L/ UB47D/UB47L | 6571473/6571474/ UL18E | 6692737/6692738/ 6692739/UZ18G | 6788001/6788002/ 6788003/VJ03E |
| Laboratory Data Package ID: | Cleanup | UA54/UA55/UB47 | 1293989/UL18 | 1316786/UZ18 | 1335688/VJ53 | UB28/UB29 | 1293989/UL18 | 1315688/UY34 | 1335480/VJ03 | UA90/UA91 | 1295735/UM54 | 1316786/UZ18 | 1335688/VJ53 | UA54/UA55/UB47 | 1293989/UL18 | 1316786/UZ18 | 1335480/VJ03 |
| Sample Date: | Levels | 12/08/2011 | 03/07/2012 | 6/18/2012 | 9/13/2012 | 12/14/2011 | 03/07/2012 | 6/13/2012 | 9/11/2012 | 12/12/2011 | 3/14/2012 | 6/18/2012 | 9/13/2012 | 12/08/2011 | 03/07/2012 | 6/18/2012 | 9/11/2012 |
| Tide Level (ft MLLW): | | 3.1 | 5.8 | -0.4 | 6.9 | 9.8 | 3.8 | 7.8 | 2.0 | -1.6 | -0.3 | -0.9 | 1.2 | 0.3 | 4.8 | -0.2 | 8.9 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/L)** | | | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 0.5 | 0.10 U | 0.069 U | 0.029 U | 0.030 U | 0.10 U | 0.068 U | 0.029 U | 0.029 U | 0.10 U | 0.076 U | 0.200 | 0.100 | 0.10 UJ | 0.070 U | 0.210 | 0.180 |
| Oil-Range Organics | 0.5 | 0.20 U | 0.99 U | 0.068 U | 0.069 U | 0.20 U | 0.97 U | 0.068 U | 0.068 U | 0.20 U | 1.1 U | 0.082 J1 | 0.076 J1 | 0.20 UJ | 1.0 U | 0.300 | 0.260 |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | | | | | |
| Antimony | --- | 0.3 | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | 0.42 U | 0.33 U | 9.5 | 6.0 | 0.99 J1 | 1.9 | 19.4 | 55.9 | 18.1 | 9.0 |
| Arsenic | --- | 21,900 | 21,000 | 3810 | 11,500 | 6.7 | 7.5 | 6.6 | 5.2 | 77,100 | 76,800 | 34,200 | 36,100 | 212,000 | 227,000 | 125,000 | 274,000 |
| Barium | --- | 16.9 | 18.6 | 12.5 | 16.7 | 9.4 | 11.2 | 14.3 | 10.2 | 133 | 116 | 56.3 | 43.3 | 215 | 200 | 87.5 | 109 |
| Beryllium | --- | 0.2 U | 0.13 U | 0.025 U | 0.051 J1 | 0.2 U | 0.13 U | 0.13 U | 0.025 U | 1 U | 3.3 U | 0.50 | 0.61 | 2.2 | 1.8 | 0.93 J1 | 1.1 |
| Cadmium | --- | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.4 | 0.61 | 0.48 J1 | 0.27 J1 | 1.1 | 0.52 | 0.20 J1 | 0.082 U | 2.0 | 0.28 J1 | 0.24 U | 0.14 J1 |
| Chromium | --- | 3 | 4.6 | 1.1 J1 | 2.1 | 0.5 U | 0.60 U | 0.60 U | 0.50 U | 38 | 39.1 | 25.3 | 20.2 | 36 | 30.6 | 9.4 J1 | 25.8 |
| Copper | --- | 27 | 98.5 | 2.3 | 10.7 | 21.9 | 23.5 | 44.3 | 26.2 | 1790 | 837 | 1600 | 34.0 | 1230 | 288 | 45.6 | 481 |
| Lead | --- | 0.3 | 0.55 J1 | 0.041 J1 | 0.063 J1 | 0.1 U | 0.080 U | 0.080 J1 | 0.034 U | 2.8 | 1.8 | 2.0 | 0.22 J1 | 33.8 | 11.3 | 2.3 J1 | 9.9 |
| Nickel | --- | 1.8 | 1.3 J1 | 0.39 J1 | 0.75 J1 | 6.0 | 8.9 | 9.6 | 7.6 | 303 | 253 | 88.1 | 53.8 | 309 | 180 | 219 | 225 |
| Selenium | --- | 0.5 U | 0.27 U | 0.18 U | 0.50 U | 0.5 U | 0.27 U | 0.27 U | 0.50 UJ | 8.7 | 4.5 | 0.80 J1 | 1.1 J1 | 18 | 11.2 | 12.6 | 8.7 |
| Silver | --- | 0.2 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.5 | 0.098 U | 0.10 U | 0.10 U | 1.7 | 0.098 U | 0.50 U | 0.10 U |
| Thallium | --- | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.7 | 0.77 | 0.40 J1 | 0.15 U | 0.3 | 0.15 U | 0.15 U | 0.15 U |
| Zinc | --- | 7 | 6.6 J1 | 1.6 J1 | 2.7 J1 | 262 | 490 | 264 | 185 | 390 | 225 | 195 | 123 | 610 | 266 | 213 | 187 |
| **Method SW7196A (mg/L)** | | | | | | | | | | | | | | | | | |
| Chromium VI | 0.00058 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.037 | 0.018 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.050 U |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | 9.32 | 1.03 | 2.64 J1 | 20.0 U | 1.07 | 2.89 | 1.90 | 51.8 | 8.00 U | 3.20 U | 245 | 1750 | 8.00 U | 3.20 U | 3.20 U |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | | | | | |
| Antimony | 150 | 0.3 | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | 0.42 U | 0.33 U | 10.2 | 6.6 | 0.44 J1 | 2.1 | 19.8 | 55.2 | 17.6 | 8.6 |
| Arsenic | 8 | 24,000 | 18,900 | 4000 | 10,700 | 5.3 | 6.4 | 4.8 | 4.7 | 78,200 | 80,000 | 29,000 | 34,400 | 209,000 | 218,000 | 130,000 | 285,000 |
| Barium | 770 | 14.6 | 13.5 | 11.5 | 15.2 | 9.0 | 11.2 | 14.6 | 9.8 | 119 | 103 | 23.9 | 28.4 | 157 | 158 | 59.4 | 94.4 |
| Beryllium | 12 | 0.2 U | 0.13 U | 0.025 U | 0.028 J1 | 0.2 U | 0.13 U | 0.13 U | 0.025 U | 1 U | 3.3 U | 0.25 J1 | 0.48 J1 | 1.6 | 1.5 | 0.62 | 0.97 |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.3 | 0.57 | 0.56 | 0.38 J1 | 0.8 | 0.20 U | 0.056 J1 | 0.082 U | 0.8 | 0.20 U | 0.065 J1 | 0.091 J1 |
| Chromium | 74 | 3 | 3.1 | 1.1 J1 | 2.1 | 0.5 U | 0.60 U | 0.60 U | 0.50 U | 39 | 39.9 | 20.0 | 18.7 | 34 | 27.7 | 7.7 | 18.5 |
| Copper | 8 | 1.0 | 1.2 J1 | 0.42 UJ2 | 0.62 J1 | 17.3 | 21.2 | 41.3 | 25.0 | 2050 | 417 | 28.4 | 19.0 | 84.7 | 79.4 | 27.8 | 58.0 |
| Lead | 2.5 | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | 0.14 J1 | 0.034 U | 2.2 | 1.9 | 0.21 J1 | 0.17 J1 | 2.9 | 5.5 | 1.6 | 3.9 |
| Nickel | 8.2 | 1.9 | 1.1 J1 | 0.43 J1 | 0.72 J1 | 6.5 | 8.8 | 9.3 | 7.2 | 297 | 241 | 61.3 | 50.2 | 212 | 138 | 176 | 190 |
| Selenium | 5 | 0.8 | 0.27 U | 0.18 U | 0.50 U | 0.5 U | 0.27 U | 0.27 U | 0.50 UJ | 9.9 | 4.9 | 0.67 J1 | 1.2 J1 | 13.4 | 10.2 | 10.4 | 9.7 |
| Silver | 22 | 0.2 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.5 | 0.098 U | 0.10 U | 0.10 U | 0.8 | 0.098 U | 0.10 U | 0.10 U |
| Thallium | 0.47 | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.5 | 0.25 J1 | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | 56 | 6 | 4.0 U | 1.3 J1 | 2.4 J1 | 244 | 477 | 258 | 181 | 290 | 159 | 36.8 | 57.7 | 50 | 48.6 | 33.4 | 58.4 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | 0.00478 J1 | 0.654 | 2.90 J1 | 20.0 U | 1.15 | 2.41 | 2.27 | 53.1 | 8.00 U | 3.20 U | 137 | 38.5 | 8.00 U | 3.20 U | 3.20 U |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | 2.4 | 3.3 | NA | NA | 3.5 J | 3.1 | NA | NA | 38.7 | 31.3 | NA | NA | 44.4 | 45.2 |
| Nitrate (Method 300.0) | --- | 0.1 U | 0.050 U | 0.050 U | 0.050 U | 1.2 | 6.4 J | 0.050 UJ | 0.050 U | 0.1 U | 5.0 U | 0.050 U | 2.5 U | 5.0 U | 0.050 U | 0.050 U | 2.5 U |
| Sulfate ( Method 300.0) | --- | 6.4 | 22.4 | 24.8 | 9.5 | 19.5 | 28.1 | 42.6 J | 40.0 | 148 | 124 | 1.8 | 25.8 | 649 | 515 | 466 | 544 |
| Total Dissolved Solids (Method 160.1) | --- | 322 | 361 | 277 | 304 | 151 | 214 | 251 | 204 | 2360 | 2470 | 1350 J | 1130 | 3400 | 3430 | 3900 | 4220 |
| **FIELD PARAMETERS** | | | | | | | | | | | | | | | | | |
| Temperature (°C) | --- | 16.50 | 14.61 | 15.39 | 18.02 | 14.65 | 13.83 | 14.68 | 15.31 | 15.85 | 15.14 | 15.17 | 16.39 | 15.38 | 15.34 | 15.05 | 17.07 |
| Conductivity (uS/cm) | --- | 576 | 334 | 279 | 514 | 555 | 179 | 278 | 260 | 6625 | 2532 | 1063 | 1353 | 4640 | 2321 | 5200 | 4745 |
| Dissolved Oxygen (mg/L) | --- | 0.81 | 0.45 | 0.45 | 1.26 | 0.94 | 1.13 | 0.47 | 0.48 | 0.71 | 0.51 | 0.53 | 0.22 | 0.68 | 0.23 | 0.25 | 0.95 |
| pH (SU) | --- | 6.25 | 9.02 | 7.57 | 6.81 | 6.11 | 6.83 | 6.09 | 6.39 | 11.55 | 11.91 | 9.39 | 9.60 | 9.84 | 13.65 | 12.60 | 11.64 |
| ORP (mV) | --- | -73.9 | -153.9 | -158.9 | -127 | -170.2 | 127.9 | 64.1 | 23.0 | 14.6 | -316.5 | -256.1 | -194.0 | -218.8 | -458.4 | -468.2 | -485 |
| Turbidity (NTU) | --- | 5.86 | 4.80 | 2.57 | 11.9 | 4.47 | 20.40 | 8.50 | 11.7 | 31.81 | 25 | 31.95 | 7.80 | 15.10 | 16.27 | 12.37 | 47.3 |
| Ferrous Iron (mg/L) | --- | NA | 1.8 | 2.2 | 3.6 | NA | 0.0 | 1.4 | 1.8 | NA | 0.0 | 2.0 | 1.2 | NA | 0.0 | 0.0 | 0.0 |

# TABLE 12
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Stabilized Soil Area | | | | South of Stabilized Soil Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-25 | IT-MW-25 | IT-MW-25 | IT-MW-25 | IT-I-200 | IT-I-200 | IT-I-200 | IT-I-200 | IT-MW-15 | IT-MW-15 | IT-MW-15 | IT-MW-15 | IT-MW-16 | IT-MW-16 | IT-MW-16 | IT-MW-16 |
| Laboratory Sample ID: | Preliminary Cleanup Levels | UB08B/UB08G/ UB09B/UB09G | 6571469/6571470/ UL18C | 6686963/6686964/ 6686965/UY34C | 6788007/6788008/ 6788009/VJ03G | UA86B/UA86F/ UA87B/UA87E | 6568988/6568989/ UK92A | 6686960/6686961/ 6686962/UY34B | 6787989/6787990/ 6787991/VJ03A | UB28A/UB28G/ UB29A/UB29F | 6568990/6568991/ UK92B | 6686966/6686967/ 6686968/UY34D | 6787998/6787999/ 6788000/VJ03D | UB08A/UB08F/ UB09A/UB09F | 6571471/6571472/ UL18D | 6692740/6692741/ 6692742/UZ18H | 6787995/6787996/ 6787997/VJ03C |
| Laboratory Data Package ID: | | UB08/UB09 | 1293989/UL18 | 1315688/UY34 | 1335480/VJ03 | UA86/UA87 | 1293530/UK92 | 1315688/UY34 | 1335480/VJ03 | UB28/UB29 | 1293530/UK92 | 1315688/UY34 | 1335480/VJ03 | UB08/UB09 | 1293989/UL18 | 1316786/UZ18 | 1335480/VJ03 |
| Sample Date: | | 12/13/2011 | 03/07/2012 | 6/13/2012 | 9/11/2012 | 12/12/2011 | 03/06/2012 | 6/13/2012 | 9/11/2012 | 12/14/2011 | 03/06/2012 | 6/13/2012 | 9/11/2012 | 12/13/2011 | 03/07/2012 | 6/18/2012 | 9/11/2012 |
| Tide Level (ft MLLW): | | 7.1 | 3.9 | 7.9 | 4.7 | 7.3 | 8.5 | 6.6 | 1.9 | 11.7 | 9.6 | 7.1 | 1.8 | 8.7 | 4.3 | 1.5 | 8.7 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | | | |
| Acetone | 110,000 | 5.0 U | 3.0 U | 30 U | 6.0 U | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U | 3.0 U | 3.0 U | 3.0 U |
| Benzene | 2 | 0.2 U | 0.1 U | 1.0 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | **0.1** J1 | 0.1 U |
| 2-Butanone | 73,000 | 5.0 U | 1.0 U | 10 U | 2.0 U | 5.0 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 1.0 U | 1.0 U | 1.0 U | 5.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,1-Dichloroethane | 33 | **0.6** | **0.2** J1 | 1.0 U | **0.4** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | **0.3** J1 | **0.3** J1 |
| 1,1-Dichloroethene | 3.2 | 0.2 U | 0.1 U | 1.0 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | **0.1** J1 | 0.1 U |
| cis-1,2-Dichloroethene | 130 | **1.4** | **0.7** | **8.5** | **7.0** | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **1.0** | **0.3** | **2.8** | **3.3** |
| trans-1,2-Dichloroethene | 940 | 0.2 U | 0.1 U | 1.0 U | **0.5** | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | **0.4** | **0.5** |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 2.0 U | 0.4 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U |
| Tetrachloroethene | 3.3 | 0.2 U | **0.3** | 1.0 U | 0.2 U | 0.2 U | 0.1 U | **0.3** | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | **0.2** J1 | **0.1** J1 | **0.1** J1 |
| Toluene | 1300 | 0.2 U | 0.1 U | 1.0 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.1** J | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Trichloroethene | 1.4 | 0.2 U | **0.3** | 1.0 U | **0.3** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.2** | **0.2** J1 | **0.2** | **0.2** |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 1.0 U | **0.3** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,3,5-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 1.0 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Vinyl Chloride | 0.53 | **0.4** | 0.1 U | **1.6** J1 | **0.9** J | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.3** | 0.1 U | **0.8** | 0.1 U |
| o-Xylene | 1600 | **0.2** | 0.1 U | 1.0 U | **0.4** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.1** J | 0.1 U | **0.1** J1 | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | **0.028** | **0.30** | **0.17** | **0.12** | 0.020 U | 0.010 U | **0.011** J1 | 0.010 U | 0.020 U | 0.010 U | **0.013** J1 | 0.010 U | **0.20** | **0.18** | 0.18 U | **0.15** |
| Vinyl Chloride | 0.53 | **0.33** | **0.023** | **2.0** | **1.1** | 0.020 U | 0.010 U | 0.010 U | **0.020** | 0.020 U | 0.010 U | 0.010 U | 0.010 U | **0.25** | **0.051** | **0.80** | **0.035** |
| Acrylonitrile | 0.057 | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | **0.2** J1 | 0.1 U |
| Benzoic Acid | 2,240 | 10 UJ | 6 UJ | 6 U | 6 U | 10 U | 6 UJ | 6 U | 6 U | 10 UJ | 6 UJ | 6 U | 6 U | 10 UJ | 6 UJ | 6 U | 6 U |
| 2-Chlorophenol | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 2,4-Dimethylphenol | 660 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| bis(2-Ethylhexyl)phthalate | 1.2 | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U |
| Fluorene | 45 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U |
| Isophorone | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U |
| 2-Methylphenol | 3100 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 4-Methylphenol | 330 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| Naphthalene | 26 | 1.0 U | 0.1 U | **0.1** J1 | 0.1 U | 1.0 U | 0.1 U | 0.1 U | **0.1** J1 | 1.0 U | 0.1 U | **0.1** J1 | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U |
| Phenol | 41,000 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| **cPAHs (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | | | |
| Benzo(a)anthracene | 0.0018 | 0.010 U | **0.0070** J1 | **0.0080** J1 | **0.012** | 0.010 U | 0.0049 U | 0.010 U | 0.0047 U | 0.010 U | 0.0053 U | 0.0048 U | 0.0047 U | 0.010 U | 0.0050 U | 0.0047 U | 0.0048 U |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0051 U | 0.0049 U | NA | 0.0049 U | 0.010 U | 0.0047 U | NA | 0.0053 U | 0.0048 U | 0.0047 U | NA | 0.0050 U | 0.0047 U | 0.0048 U |
| Benzo(k)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0051 U | 0.0049 U | NA | 0.0049 U | 0.010 U | 0.0047 U | NA | 0.0053 U | 0.0048 U | 0.0047 U | NA | 0.0050 U | 0.0047 U | 0.0048 U |
| Chrysene | 0.018 | 0.010 U | 0.0049 U | 0.0051 U | 0.0049 U | 0.010 U | 0.0049 U | 0.010 U | 0.0047 U | 0.010 U | 0.0053 U | 0.0048 U | 0.0047 U | 0.010 U | 0.0050 U | 0.0047 U | 0.0048 U |
| Dibenz(a,h)anthracene | 0.0018 | 0.010 U | 0.0039 U | 0.0041 U | **0.0040** J1 | 0.010 U | 0.0039 U | 0.0080 U | 0.0038 U | 0.010 U | 0.0042 U | 0.0039 U | 0.0038 U | 0.010 U | 0.0040 U | 0.0038 U | 0.0039 U |
| Indeno(1,2,3-cd)pyrene | 0.0018 | 0.010 U | 0.0039 U | 0.0041 U | 0.0039 U | 0.010 U | 0.0039 U | 0.0080 U | 0.0038 U | 0.010 U | 0.0042 U | 0.0039 U | 0.0038 U | 0.010 U | 0.0040 U | 0.0038 U | 0.0039 U |
| Pyrene | 9.8 | NA | 0.0098 U | 0.010 U | 0.0097 U | NA | 0.0098 U | 0.020 U | 0.0094 U | NA | 0.011 U | 0.0096 U | 0.0094 U | NA | 0.010 U | 0.0094 U | 0.0097 U |
| cPAHs TEQ | 0.00018 | ND | **0.0007** J1 | **0.0008** J | **0.0016** J | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **PCBs (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | | | |
| Aroclor 1248 | 0.000023 | 0.010 U | 0.0048 U | 0.0050 U | 0.0050 U | 0.010 U | 0.0048 U | 0.0051 U | 0.0048 U | 0.010 U | 0.0049 U | 0.0047 U | 0.0048 U | 0.010 U | 0.0049 U | 0.0048 U | 0.0048 U |
| Aroclor 1260 | 0.000023 | 0.010 U | **0.017** | **0.024** | **0.011** | 0.010 U | 0.0048 U | 0.0051 U | 0.0048 U | 0.010 U | 0.0049 U | 0.0047 U | 0.0048 U | 0.010 U | 0.0049 U | 0.0048 U | 0.0048 U |
| Total PCBs | 0.000023 | ND | **0.017** | **0.024** | **0.011** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

# TABLE 12
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Stabilized Soil Area | | | | South of Stabilized Soil Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-25 | IT-MW-25 | IT-MW-25 | IT-MW-25 | IT-I-200 | IT-I-200 | IT-I-200 | IT-I-200 | IT-MW-15 | IT-MW-15 | IT-MW-15 | IT-MW-15 | IT-MW-16 | IT-MW-16 | IT-MW-16 | IT-MW-16 |
| Laboratory Sample ID: | Preliminary | UB08B/UB08G/ UB09B/UB09G | 6571469/6571470/ UL18C | 6686963/6686964/ 6686965/UY34C | 6788007/6788008/ 6788009/VJ03G | UA86B/UA86F/ UA87B/UA87E | 6568988/6568989/ UK92A | 6686960/6686961/ 6686962/UY34B | 6787989/6787990/ 6787991/VJ03A | UB28A/UB28G/ UB29A/UB29F | 6568990/6568991/ UK92B | 6686966/6686967/ 6686968/UY34D | 6787998/6787999/ 6788000/VJ03D | UB08A/UB08F/ UB09A/UB09F | 6571471/6571472/ UL18D | 6692740/6692741/ 6692742/UZ18H | 6787995/6787996/ 6787997/VJ03C |
| Laboratory Data Package ID: | Cleanup | UB08/UB09 | 1293989/UL18 | 1315688/UY34 | 1335480/VJ03 | UA86/UA87 | 1293530/UK92 | 1315688/UY34 | 1335480/VJ03 | UB28/UB29 | 1293530/UK92 | 1315688/UY34 | 1335480/VJ03 | UB08/UB09 | 1293989/UL18 | 1316786/UZ18 | 1335480/VJ03 |
| Sample Date: | Levels | 12/13/2011 | 03/07/2012 | 6/13/2012 | 9/11/2012 | 12/12/2011 | 03/06/2012 | 6/13/2012 | 9/11/2012 | 12/14/2011 | 03/06/2012 | 6/13/2012 | 9/11/2012 | 12/13/2011 | 03/07/2012 | 6/18/2012 | 9/11/2012 |
| Tide Level (ft MLLW): | | 7.1 | 3.9 | 7.9 | 4.7 | 7.3 | 8.5 | 6.6 | 1.9 | 11.7 | 9.6 | 7.1 | 1.8 | 8.7 | 4.3 | 1.5 | 8.7 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/L)** | | | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 0.5 | 0.10 U | 0.067 U | 0.028 U | 0.031 U | 0.10 U | 0.067 U | **0.041** J1 | 0.029 U | 0.10 U | 0.066 U | 0.029 U | 0.028 U | 0.10 U | 0.072 U | 0.031 U | 0.029 U |
| Oil-Range Organics | 0.5 | 0.20 U | 0.95 U | 0.066 U | 0.073 U | 0.20 U | 0.95 U | 0.074 U | 0.068 U | 0.20 U | 0.94 U | 0.067 U | 0.066 U | 0.20 U | 1.0 U | 0.072 U | 0.068 U |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | | | | | |
| Antimony | --- | **0.5** | **12.0** | **0.80** J1 | **0.61** J1 | 0.2 U | 0.42 U | 0.42 U | 0.33 U | 0.2 U | 0.42 U | 0.42 U | 0.33 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U |
| Arsenic | --- | **3300** | **3680** | **11,400** | **38,700** | **1.1** | 0.95 U | **1.8** J1 | **6.2** | **43.3** | **17.9** | **52.2** | **47.4** | **17.7** | **5.1** | **2.3** | **1070** |
| Barium | --- | **25.2** | **23.9** | **22.1** | **37.9** | **2.4** | **1.4** J1 | **11.3** | **14.2** J | **19.0** | **14.4** | **15.4** | **24.8** | **59.3** | **57.7** | **43.1** | **18.6** |
| Beryllium | --- | 0.2 U | **0.25** J1 | **0.27** J1 | **0.31** J1 | 0.2 U | 0.13 U | 0.13 U | 0.025 U | 0.2 U | 0.13 U | 0.13 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | **0.042** J1 |
| Cadmium | --- | **0.1** | **0.51** | **0.40** J1 | **0.79** | 0.1 U | 0.20 U | 0.20 U | 0.082 U | 0.1 U | 0.20 U | 0.20 U | 0.082 U | 0.1 U | 0.20 U | **0.11** J1 | **0.12** J1 |
| Chromium | --- | **1.5** | **3.7** | **18.1** | **13.4** | 0.5 U | 0.60 U | 0.60 U | 0.50 U | 1 U | 0.60 U | **1.2** J1 | 0.50 U | 0.5 U | 0.60 U | **0.70** J1 | **1.2** J1 |
| Copper | --- | **19.3** | **1160** | **327** | **449** | 0.5 U | 0.38 U | 0.38 U | **0.52** J1 | **1.0** | **0.64** J1 | **0.50** J1 | **1.1** J1 | **7.6** | **8.4** | **7.5** | **21.8** |
| Lead | --- | **0.1** | **3.8** | **2.9** | **9.2** | 0.1 U | 0.080 U | 0.080 U | 0.034 U | 0.1 U | 0.080 U | 0.080 U | 0.13 UJ2 | 0.1 U | 0.080 U | 0.034 U | 0.049 UJ2 |
| Nickel | --- | **7.4** | **8.2** | **7.7** | **11.3** | **2.5** | **0.93** J1 | **3.2** | **2.7** | **3.7** | **2.3** | **1.8** J1 | **5.1** | **6.1** | **4.1** | **7.7** | **7.3** |
| Selenium | --- | **0.9** | **1.9** J1 | **0.56** J1 | **0.69** J, J1 | 0.5 U | 0.27 U | 0.27 U | 0.50 U | 0.5 U | 0.27 U | 0.27 U | 0.50 U | **0.6** | 0.27 U | **0.20** J1 | 0.50 U |
| Silver | --- | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.2 U | 0.098 U | 0.10 U | 0.10 U |
| Thallium | --- | 0.2 U | 0.15 U | 0.15 U | **0.26** J1 | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | --- | **17** | **217** | **90.6** | **199** | 4 U | 4.0 U | 4.0 U | 2.4 UJ2 | **15** | **15.5** | **24.8** | **16.8** | **62** | **107** | **48.8** | **56.4** |
| **Method SW7196A (mg/L)** | | | | | | | | | | | | | | | | | |
| Chromium VI | 0.00058 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 UJ | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **748** | **90.4** | 3.20 U | 20.0 U | **1.67** J1 | **0.531** | 1.60 U | 20.0 U | **2.23** | **0.880** | **2.80** | 20.0 U | **5.72** J1 | **2.47** J1 | **22.9** |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | | | | | |
| Antimony | 150 | **0.6** | **12.3** | **0.77** J1 | 0.33 U | 0.2 U | 0.42 U | 0.42 U | 0.33 U | 0.2 U | 0.42 U | 0.42 U | 0.33 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U |
| Arsenic | 8 | **3290** | **3910** | **13,100** | **34,900** | **0.7** | 0.95 U | 0.95 U | **5.6** | **53.3** | **20.0** | **53.2** | **76.8** | **17.1** | **4.2** | **5.0** | **1040** |
| Barium | 770 | **25.3** | **14.6** | **19.6** | **17.6** | **2.0** | **1.5** J1 | **9.3** | **13.0** | **17.5** | **16.1** | **15.7** | **19.1** | **59.1** | **60.8** | **38.9** | **18.2** |
| Beryllium | 12 | 0.2 U | **0.19** J1 | **0.29** J1 | **0.21** J1 | 0.2 U | 0.13 U | 0.13 U | 0.025 U | 0.2 U | 0.13 U | 0.13 U | 0.025 U | 0.2 U | 0.13 U | **0.038** J1 | 0.025 U |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.20 U | 0.082 U | 0.1 U | 0.2 U | 0.20 U | 0.082 U | 0.1 U | 0.20 U | 0.20 U | 0.082 U | 0.1 U | 0.20 U | **0.11** J1 | 0.082 U |
| Chromium | 74 | **1.3** | **3.1** | **21.0** | **14.2** | **0.9** | 0.60 U | 0.60 U | 0.50 U | **0.6** | 0.60 U | **1.1** J1 | 0.50 U | 0.5 U | 0.60 U | **1.4** J1 | **1.2** J1 |
| Copper | 8 | **3.0** | **506** | **91.1** | **12.3** | **1.7** | 0.38 U | 0.38 U | 0.40 U | **1.3** | **0.44** J1 | 0.38 U | 0.40 U | **8.0** | **8.4** | **11.5** | **18.7** |
| Lead | 2.5 | 0.1 U | **1.4** | **0.76** J1 | **0.26** J1 | 0.1 U | 0.080 U | **0.088** J1 | 0.034 U | 0.1 U | **0.11** J1 | 0.080 U | 0.034 U | 0.1 U | 0.080 U | 0.034 U | 0.038 UJ2 |
| Nickel | 8.2 | **6.6** | **7.5** | **8.2** | **9.9** | **2.4** | **0.92** J1 | **3.0** | **3.3** | **2.5** | **2.5** | **2.1** | **2.8** | **6.1** | **4.0** | **9.1** | **7.3** |
| Selenium | 5 | **0.8** | **2.1** | **0.89** J1 | **0.66** J, J1 | 0.5 U | 0.27 U | 0.27 U | 0.50 U | 0.5 U | 0.27 U | 0.27 U | 0.50 U | **0.6** | 0.27 U | **0.23** J1 | 0.50 U |
| Silver | 22 | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.2 U | 0.098 U | 0.098 U | 0.10 U | 0.2 U | 0.098 U | 0.10 U | 0.10 U |
| Thallium | 0.47 | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | 56 | **15** | **64.0** | **62.8** | **40.4** | 4 U | 4.0 U | **4.1** J1 | 3.9 UJ2 | **13** | **18.9** | **25.4** | **20.0** | **62** | **109** | **55.2** | **55.8** |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **274** | **19.3** | 3.20 U | 20.0 U | **0.946** | **0.722** | **2.42** J1 | 20.0 U | **1.67** | **0.673** | **2.27** | 20.0 U | 3.20 U | **0.223** | **9.96** |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **10.5** | **15.1** | NA | NA | **1.8** | **13.8** | NA | NA | **1.7** | **2.3** | NA | NA | **12.7** | **5.7** |
| Nitrate (Method 300.0) | --- | 0.1 U | **0.43** | 0.050 UJ | 0.25 U | 0.1 U | 0.050 U | **0.085** J, J1 | 0.050 U | 0.1 U | **0.30** | 0.050 UJ | **0.12** | **7.6** | **8.2** | **2.3** | **3.2** |
| Sulfate ( Method 300.0) | --- | **77.1** | **156** | **120** | **97.9** | **3.9** | **4.2** | **31.4** | **31.6** | **6.0** | **7.6** | **1.5** | **66.2** | **141** | **153** | **140** | **65.6** |
| Total Dissolved Solids (Method 160.1) | --- | **579** | **579** | **667** | **673** | **72.0** | **45.5** | **248** | **328** | **298** | **317** | **361** | **318** | **614** | **336** | **544** | **485** |
| **FIELD PARAMETERS** | | | | | | | | | | | | | | | | | |
| Temperature (°C) | --- | 15.98 | 13.16 | 15.17 | 17.08 | 15.21 | 12.32 | 14.8 | 14.87 | 14.83 | 14.05 | 14.99 | 13.82 | 15.93 | 14.18 | 15.02 | 20.10 |
| Conductivity (uS/cm) | --- | 1718 | 490 | 479 | 613 | 183 | 61 | 314 | 625 | 1279 | 394 | 349 | 473 | 1853 | 597 | 557 | 634 |
| Dissolved Oxygen (mg/L) | --- | 0.91 | 0.63 | 0.50 | 0.34 | 0.93 | 0.86 | 0.66 | 8.34 | 0.92 | 0.39 | 0.42 | 1.14 | 1.15 | 0.71 | 0.44 | 0.64 |
| pH (SU) | --- | 6.23 | 10.53 | 7.98 | 7.10 | 5.65 | 6.61 | 6.25 | 6.38 | 6.46 | 6.84 | 5.97 | 6.08 | 6.50 | 8.21 | 6.83 | 6.31 |
| ORP (mV) | --- | -19.0 | -72.6 | -142.7 | -131.1 | 29.7 | 321.3 | -25.1 | -98 | -201.2 | 354.4 | -3.9 | -82 | 30.4 | 17.4 | -36.6 | 25 |
| Turbidity (NTU) | --- | 2.73 | 27.65 | 12.11 | 5.37 | 66.69 | 10.64 | 97.36 | 29.0 | 4.38 | 29.11 | 8.50 | 91.2 | 2.45 | 2.67 | 3.98 | 53.7 |
| Ferrous Iron (mg/L) | --- | NA | 0.8 | 3.4 | 2.4 | NA | 0.0 | 1.8 | 4.8 | NA | 1.2 | 2.2 | 4.0 | NA | 1.0 | 0.8 | 0.0 |

# TABLE 12
# MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
# NORTH OF FORMER SLIP 5 AREA
# BOEING ISAACSON-THOMPSON SITE
# TUKWILA, WASHINGTON

| | | South of Stabilized Soil Area | | | |
|---|---|---|---|---|---|
| Location: | | IT-MW-18 | IT-MW-18 | IT-MW-18 | IT-MW-18 |
| Laboratory Sample ID: | Preliminary | UA45H/UA54Q/ UA55H/UA55P/ UB47H/UB47P | 6580636/6580637/ UM54D | 6692731/6692732/ 6692733/UZ18E | 6788045/6788046/ 6788047/VJ32F |
| Laboratory Data Package ID: | Cleanup | UA45/UA55/UB47 | 1295735/UM54 | 1316786/UZ18 | 1335483/VJ32 |
| Sample Date: | Levels | 12/08/2011 | 3/14/2012 | 6/18/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | -0.3 | -0.3 | -1.3 | 0.9 |
| **VOLATILES (µg/L)** | | | | | |
| **Method SW8260C** | | | | | |
| Acetone | 110,000 | 5.0 U | 3.0 U | 15 U | 3.0 U |
| Benzene | 2 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| 2-Butanone | 73,000 | 5.0 UJ | 1.0 U | 5.0 U | 1.0 U |
| 1,1-Dichloroethane | 33 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| 1,1-Dichloroethene | 3.2 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | **1.0** | **0.3** | **0.7** J1 | **0.6** |
| trans-1,2-Dichloroethene | 940 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 1.0 U | 0.2 U |
| Tetrachloroethene | 3.3 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| Trichloroethene | 1.4 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| 1,3,5-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| Vinyl Chloride | 0.53 | **0.8** | **0.3** | **0.5** J1 | **0.2** |
| o-Xylene | 1600 | 0.2 U | 0.1 U | 0.5 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | |
| **Method SW8260C-SIM** | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | 0.013 UJ2 | 0.010 U |
| Vinyl Chloride | 0.53 | **0.87** | **0.20** | **0.53** | **0.27** |
| Acrylonitrile | 0.057 | **0.059** M | NA | NA | NA |
| **SEMIVOLATILES (µg/L)** | | | | | |
| **Method SW8270D** | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.09 U | 0.09 U | 0.1 U |
| Benzoic Acid | 2,240 | 10 U | 6 UJ | 6 U | 6 U |
| 2-Chlorophenol | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 2,4-Dimethylphenol | 660 | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| bis(2-Ethylhexyl)phthalate | 1.2 | **1.8** | 2 U | 2 U | 2 U |
| Fluorene | 45 | 1.0 U | 0.09 U | 0.09 U | 0.1 U |
| Isophorone | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.09 U | 0.09 U | 0.1 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.09 U | 0.09 U | 0.1 U |
| 2-Methylphenol | 3100 | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 4-Methylphenol | 330 | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| Naphthalene | 26 | 1.0 U | **0.1** J | 0.09 U | **0.2** J1 |
| Phenol | 41,000 | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| **cPAHs (µg/L)** | | | | | |
| **Method SW8270D-SIM** | | | | | |
| Benzo(a)anthracene | 0.0018 | 0.010 U | 0.0049 U | 0.0048 UJ | 0.0049 U |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0048 UJ | 0.0049 U |
| Benzo(k)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0048 UJ | 0.0049 U |
| Chrysene | 0.018 | 0.010 U | 0.0049 U | 0.0048 UJ | 0.0049 U |
| Dibenz(a,h)anthracene | 0.0018 | 0.010 U | 0.0040 U | 0.0038 UJ | 0.0039 U |
| Indeno(1,2,3-cd)pyrene | 0.0018 | 0.010 U | 0.0040 U | 0.0038 UJ | 0.0039 U |
| Pyrene | 9.8 | NA | 0.0099 U | 0.0095 UJ | 0.0098 U |
| cPAHs TEQ | 0.00018 | ND | ND | ND | ND |
| **PCBs (µg/L)** | | | | | |
| **Method SW8082** | | | | | |
| Aroclor 1248 | 0.000023 | 0.010 U | 0.0048 U | 0.0047 U | 0.0048 U |
| Aroclor 1260 | 0.000023 | 0.010 U | 0.0048 U | 0.0047 U | 0.0048 U |
| Total PCBs | 0.000023 | ND | ND | ND | ND |

# TABLE 12
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | South of Stabilized Soil Area | | | |
|---|---|---|---|---|---|
| Location: | | IT-MW-18 | IT-MW-18 | IT-MW-18 | IT-MW-18 |
| Laboratory Sample ID: | Preliminary | UA45H/UA54Q/ UA55H/UA55P/ UB47H/UB47P | 6580636/6580637/ UM54D | 6692731/6692732/ 6692733/UZ18E | 6788045/6788046/ 6788047/VJ32F |
| Laboratory Data Package ID: | Cleanup | UA45/UA55/UB47 | 1295735/UM54 | 1316786/UZ18 | 1335483/VJ32 |
| Sample Date: | Levels | 12/08/2011 | 3/14/2012 | 6/18/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | -0.3 | -0.3 | -1.3 | 0.9 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/L)** | | | | | |
| **NWTPH-Dx** | | | | | |
| Diesel-Range Organics | 0.5 | 0.10 U | 0.069 U | 0.028 U | 0.029 U |
| Oil-Range Organics | 0.5 | 0.20 U | 0.99 U | 0.066 U | 0.067 U |
| **TOTAL METALS (µg/L)** | | | | | |
| **Method 200.8** | | | | | |
| Antimony | --- | 0.2 U | 0.42 U | 0.33 U | 0.33 U |
| Arsenic | --- | **3600** | **2490** | **4890** | **6610** |
| Barium | --- | **12.9** | **14.4** | **14.0** | **11.0** |
| Beryllium | --- | 0.2 U | 0.13 U | **0.11** J1 | **0.15** J1 |
| Cadmium | --- | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | --- | **2.1** | **4.4** | **6.8** | **7.1** |
| Copper | --- | **8.2** | **6.4** | **6.2** | **13.0** |
| Lead | --- | **0.2** | **0.64** J1 | **0.56** J1 | **0.78** J1 |
| Nickel | --- | **3.4** | **1.7** J1 | **3.0** | **2.8** |
| Selenium | --- | 0.5 U | 0.27 U | **0.23** J1 | 0.50 U |
| Silver | --- | 0.2 U | 0.098 U | 0.10 U | 0.10 U |
| Thallium | --- | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | --- | **122** | **75.0** | **56.4** | **31.3** |
| **Method SW7196A (mg/L)** | | | | | |
| Chromium VI | 0.00058 | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | |
| Mercury | 12 | 20.0 U | **5.60** | **9.25** J1 | **10.7** |
| **DISSOLVED METALS (µg/L)** | | | | | |
| **Methods 200.8/SW7196A** | | | | | |
| Antimony | 150 | 0.2 U | 0.42 U | 0.33 U | 0.33 U |
| Arsenic | 8 | **3870** | **2980** | **5770** | **6650** |
| Barium | 770 | **12.2** | **9.9** | **12.7** | **12.4** |
| Beryllium | 12 | 0.2 U | 0.13 U | **0.079** J1 | **0.10** J1 |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | 74 | **2** | **3.6** | **7.0** | **6.7** |
| Copper | 8 | **0.8** | 0.38 U | **0.30** J1 | 0.91 UJ2 |
| Lead | 2.5 | 0.1 U | 0.080 U | **0.038** J1 | **0.080** J1 |
| Nickel | 8.2 | **3.3** | **1.3** J1 | **3.1** | **2.6** |
| Selenium | 5 | 0.5 U | 0.27 U | **0.19** J1 | 0.50 U |
| Silver | 22 | 0.2 U | 0.098 U | 0.10 U | 0.10 U |
| Thallium | 0.47 | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | 56 | **126** | **58.7** | **58.4** | **17.6** |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | |
| Mercury | 12 | 20.0 U | **1.68** J1 | 3.20 U | 3.20 U |
| **CONVENTIONALS (mg/L)** | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **6.7** | **7.3** |
| Nitrate (Method 300.0) | --- | **0.3** | 0.050 U | 0.050 U | 0.050 U |
| Sulfate ( Method 300.0) | --- | **1.4** | **49.9** | **32.2** | **43.5** |
| Total Dissolved Solids (Method 160.1) | --- | **360** | **580** | **480** J | **510** |
| **FIELD PARAMETERS** | | | | | |
| Temperature (°C) | --- | 15.26 | 13.04 | 14.49 | 16.08 |
| Conductivity (uS/cm) | --- | 634 | 847 | 580 | 607 |
| Dissolved Oxygen (mg/L) | --- | 0.69 | 0.50 | 0.53 | 0.39 |
| pH (SU) | --- | 6.23 | 5.30 | 7.04 | 7.22 |
| ORP (mV) | --- | -65.2 | -158.3 | -108.8 | -127.2 |
| Turbidity (NTU) | --- | 6.64 | 10 | 299.9 | 9.09 |
| Ferrous Iron (mg/L) | --- | NA | 1.6 | 2.6 | 2.6 |

PCBs = polychlorinated biphenyls
cPAHs = carcinogenic polycyclic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration
ng/L = nanograms per liter
µg/L = micrograms per liter
mg/L = milligrams per liter
mV = millivolts
SU = standard unit
uS/cm = milliSiemens per centimeter
C = Centigrade
ND = Not Detected.
NA = Not Applicable.
SIM = Selected Ion Monitoring

J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
M = Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match.
U = Indicates the compound was undetected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
UJ2 = The analyted was not detected in the sample at or above the numerical value shown; the numerical value is below the reporting limit, but greater than the detection limit.
Box = Exceeds preliminary cleanup level
Bold = Detected compound

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Western Property Boundary | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-I-205 | IT-I-205 | IT-I-205 | IT-I-205 | IT-MW-9 | IT-MW-9 | IT-MW-9 | IT-MW-9 | IT-MW-10 | IT-MW-10 | IT-MW-10 | IT-MW-10 |
| Laboratory Sample ID: | Preliminary | UA27F/UA27N/ UA28F/UA28M/ UB45F/UB45M | 6582521/6582522/ UM84B | 6690480/6690481/ 6690482/UZ00D | 6789062/6789063/ 6789064/VJ53F | UA27E/UA27M/ UA28E/UA28L/ UB45E/UB45L | 6577007/6577008/ UM00D | 6690471/6690472/ 6690473/UZ00A | 6789056/6789057/ 6789058/VJ53D | UA27G/UA27O/ UA28G/UA28N/ UB45G/UB45N | 65825256582526/ UM84D | 6689140/6689141/ 6689142/UY55D | 6789059/6789060/ 6789061/VJ53E |
| Laboratory Data Package ID: | Cleanup | UA27/UA28/UB45 | 1296009/UM84 | 1316296/UZ00 | 1335688/VJ53 | UA27/UA28/UB45 | 1295065/UM00 | 1316296/UZ00 | 1335688/VJ53 | UA27/UA28/UB45 | 1296009/UM84 | 1316071/UY55 | 1335688/VJ53 |
| Sample Date: | Levels | 12/06/2011 | 3/15/2012 | 6/15/2012 | 9/13/2012 | 12/06/2011 | 03/12/2012 | 6/15/2012 | 9/13/2012 | 12/06/2011 | 3/15/2012 | 6/14/2012 | 9/13/2012 |
| Tide Level (ft MLLW): | | 0.6 | 0.6 | 0.2 | 0.8 | 0.4 | -0.5 | 0.4 | 0.7 | 0.7 | 0.1 | 0.9 | 0.7 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | |
| Acetone | 110,000 | 2.6 UJ2 | 3.0 U | 3.0 U | 3.0 U | 1.7 UJ2 | 3.0 U | 3.0 U | 3.0 U | 2.8 UJ2 | 3.0 U | 3.0 U | **7.1** |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Bromodichloromethane | 17 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | **0.2** J1 | 0.1 U | 0.1 U |
| Carbon Disulfide | 3900 | 0.2 U | 0.4 U | 0.4 U | 0.4 U | 0.2 U | 0.4 U | 0.4 U | 0.4 U | 0.2 U | 0.4 U | 0.4 U | 0.4 U |
| Chloroform | 9.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **1.9** | **4.5** | 0.1 U | 0.1 U |
| 1,2-Dichlorobenzene | 440 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethane | 33 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | **0.1** J1 | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | **0.2** J1 |
| 4-Isopropyltoluene | --- | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | **0.2** J1 |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U |
| Naphthalene | 26 | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | **0.1** J1 |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | **0.2** | **2.0** |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| m,p-Xylene | 1300 | 0.4 U | 0.1 U | 0.1 U | **0.1** J1 | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | 0.012 UJ2 | 0.010 U | 0.020 U | **0.012** J1 | 0.021 U | **0.018** J1 | 0.020 U | 0.010 U | **0.014** J1 | 0.010 U |
| Vinyl Chloride | 0.53 | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | **0.011** J1 |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | **0.1** J1 | **0.2** J1 |
| Chrysene | 0.018 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| 2,4-Dichlorophenol | --- | 5.0 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U | 0.5 U | 0.5 U | 0.5 U |
| bis(2-Ethylhexyl)phthalate | 1.2 | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U |
| Fluoranthene | 11 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| Fluorene | 45 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| 4-Methylphenol | 330 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | **1.8** | 0.5 U | **71** | **44** |
| Naphthalene | 26 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | **0.2** J1 | **0.1** J1 | 0.1 U | 1.0 U | 0.1 U | **0.1** J1 | **0.1** J1 |
| Phenanthrene | --- | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| Phenol | 41,000 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| **cPAHs (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Benzo(a)anthracene | 0.0018 | 0.010 U | 0.0049 U | 0.0049 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.012 U | **0.0080** J1 | 0.0049 U | **0.0050** J1 |
| Benzo(a)pyrene | 0.00018 | 0.010 U | 0.0049 U | 0.0049 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.012 U | **0.010** | 0.0049 U | 0.0048 U |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0049 U | 0.0048 U | NA | 0.0048 U | 0.0048 U | 0.0049 U | NA | **0.011** | 0.0049 U | 0.0048 U |
| Benzo(k)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0049 U | 0.0048 U | NA | 0.0048 U | 0.0048 U | 0.0049 U | NA | **0.0050** J1 | 0.0049 U | 0.0048 U |
| Total Benzofluoranthenes | 0.0018 | 0.020 UJ | NA | NA | NA | 0.020 UJ | NA | NA | NA | 0.024 UJ | **0.016** J | NA | NA |
| Chrysene | 0.018 | 0.010 U | 0.0049 U | 0.0049 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.012 U | **0.0090** J1 | 0.0049 U | 0.0048 U |
| Dibenz(a,h)anthracene | 0.0018 | 0.010 U | 0.0039 U | 0.0039 U | 0.0038 U | 0.010 U | 0.0038 U | 0.0038 U | 0.0039 U | 0.012 U | 0.0039 U | 0.0039 U | 0.0038 U |
| Indeno(1,2,3-cd)pyrene | 0.0018 | 0.010 U | 0.0039 U | 0.0039 U | 0.0038 U | 0.010 U | 0.0038 U | 0.0038 U | 0.0039 U | 0.012 U | **0.0060** J1 | 0.0039 U | 0.0038 U |
| Pyrene | 9.8 | NA | 0.0098 U | 0.0098 U | 0.0095 U | NA | 0.0095 U | 0.0096 U | 0.0098 U | NA | **0.016** J1 | 0.0099 U | 0.0096 U |
| cPAH TEQ | 0.00018 | ND | ND | ND | ND | ND | ND | ND | ND | ND | **0.0131** J | ND | **0.0005** J |
| **PCBs (µg/L)** | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | |
| Aroclor 1248 | 0.000023 | 0.010 U | 0.0048 U | 0.0048 U | 0.0048 U | 0.010 U | 0.0049 U | 0.0047 U | 0.0047 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0047 U |
| Aroclor 1254 | 0.0000055 | 0.010 U | 0.0048 U | 0.0048 U | 0.0048 U | 0.010 U | 0.0049 U | 0.0047 U | 0.0047 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0047 U |
| Aroclor 1260 | 0.000023 | 0.010 U | 0.0048 U | 0.0048 U | 0.0048 U | 0.010 U | 0.0049 U | 0.0047 U | 0.0047 U | 0.010 U | 0.0048 U | **0.0065** J1 | **0.0060** J1 |
| Total PCBs | 0.000023 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | **0.0060** J |

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Western Property Boundary | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-I-205 | IT-I-205 | IT-I-205 | IT-I-205 | IT-MW-9 | IT-MW-9 | IT-MW-9 | IT-MW-9 | IT-MW-10 | IT-MW-10 | IT-MW-10 | IT-MW-10 |
| Laboratory Sample ID: | Preliminary | UA27F/UA27N/ UA28F/UA28M/ UB45F/UB45M | 6582521/6582522/ UM84B | 6690480/6690481/ 6690482/UZ00D | 6789062/6789063/ 6789064/VJ53F | UA27E/UA27M/ UA28E/UA28L/ UB45E/UB45L | 6577007/6577008/ UM00D | 6690471/6690472/ 6690473/UZ00A | 6789056/6789057/ 6789058/VJ53D | UA27G/UA27O/ UA28G/UA28N/ UB45G/UB45N | 65825256582526/ UM84D | 6689140/6689141/ 6689142/UY55D | 6789059/6789060/ 6789061/VJ53E |
| Laboratory Data Package ID: | Cleanup | UA27/UA28/UB45 | 1296009/UM84 | 1316296/UZ00 | 1335688/VJ53 | UA27/UA28/UB45 | 1295065/UM00 | 1316296/UZ00 | 1335688/VJ53 | UA27/UA28/UB45 | 1296009/UM84 | 1316071/UY55 | 1335688/VJ53 |
| Sample Date: | Levels | 12/06/2011 | 3/15/2012 | 6/15/2012 | 9/13/2012 | 12/06/2011 | 03/12/2012 | 6/15/2012 | 9/13/2012 | 12/06/2011 | 3/15/2012 | 6/14/2012 | 9/13/2012 |
| Tide Level (ft MLLW): | | 0.6 | 0.6 | 0.2 | 0.8 | 0.4 | -0.5 | 0.4 | 0.7 | 0.7 | 0.1 | 0.9 | 0.7 |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | |
| Antimony | --- | 0.2 U | 0.42 U | 0.33 U | 0.33 U | **0.2** | 0.42 U | 0.33 U | 0.33 U | **0.4** | **0.45** J1 | 0.42 U | 0.33 U |
| Arsenic | --- | **49.3** | **31.6** | **33.7** | **132** | **7.6** | **6.8** | **3.7** | **5.7** | **8.6** | 0.95 U | **169** | **272** |
| Barium | --- | **5.1** | **2.4** | **3.3** | **4.2** | **37.0** | **18.4** | **7.7** | **59.7** | **4.0** | **2.7** | **12.4** | **23.5** |
| Beryllium | --- | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | **0.031** J1 | 0.2 U | 0.13 U | 0.13 U | 0.025 U |
| Cadmium | --- | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | **0.45** J1 | 0.1 U | 0.20 U | **0.28** J1 | 0.082 U |
| Chromium | --- | **0.6** | **0.83** J1 | **0.49** J1 | 0.50 U | 0.5 U | 0.60 U | **0.20** J1 | 0.50 U | 0.5 U | **1.7** J1 | **1.8** J1 | **2.5** |
| Copper | --- | **1.1** | 0.38 U | 0.15 U | 0.40 U | **1.2** | **1.1** J1 | **1.2** J1 | **1.7** J1 | **1.7** | **1.0** J1 | **1.3** J1 | **0.78** J1 |
| Lead | --- | 0.1 U | 0.080 U | 0.034 U | **0.048** J1 | 0.1 U | 0.080 U | **0.099** J1 | **0.035** J1 | **0.2** | **0.26** J1 | **0.66** J1 | **0.18** J1 |
| Nickel | --- | **0.5** | 0.50 U | **0.15** J1 | 0.35 U | **1.8** | **1.1** J1 | **1.7** J1 | **9.9** | **1.4** | **0.63** J1 | **4.1** | **1.5** J1 |
| Selenium | --- | 0.5 U | 0.27 U | 0.18 U | 0.50 U | **4** | 0.27 U | 0.18 U | 0.50 U | 0.5 U | 0.27 U | 0.27 U | 0.50 U |
| Zinc | --- | 4 U | 4.0 U | 1.1 U | 1.1 U | **6** | 4.0 U | **2.0** J1 | **18.5** | 4 U | 4.0 U | 4.0 U | **1.7** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | 1.60 U | 0.160 U | **0.375** J1 | 20.0 U | **0.932** | **2.07** | 1.60 U | 20.0 U | **7.08** | 3.75 | **3.12** J1 |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | |
| Antimony | 150 | 0.2 U | 0.42 U | 0.33 U | 0.33 U | **0.2** | 0.42 U | 0.33 U | 0.33 U | **0.4** | 0.42 U | 0.42 U | 0.33 U |
| Arsenic | 8 | **46.9** | **31.2** | **32.4** | **121** | **6.6** | **5.5** | **2.9** | **1.4** J1 | **8.0** | **1.0** J1 | **140** | **226** |
| Barium | 770 | **4.7** | **2.2** | **2.8** | **4.6** | **35.0** | **18.2** | **7.1** | **64.7** | **3.6** | **1.6** J1 | **12.7** | **19.5** |
| Beryllium | 12 | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | **0.040** J1 | 0.2 U | 0.13 U | 0.13 U | 0.025 U |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | **0.47** J1 | 0.1 U | 0.20 U | 0.20 U | 0.082 U |
| Chromium | 74 | 0.5 U | **0.84** J1 | **0.38** J1 | 0.50 U | **0.6** | 0.60 U | **0.20** J1 | 0.50 U | **0.7** | **1.4** J1 | **1.7** J1 | **2.0** J1 |
| Copper | 8 | 0.5 U | 0.38 U | 0.15 U | 0.40 U | **1.5** | **0.92** J1 | **0.88** J1 | **1.1** J1 | **2.4** | **0.76** J1 | **0.55** J1 | 0.40 U |
| Lead | 2.5 | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | 0.034 U | 0.034 U | **0.1** | 0.080 U | 0.080 U | 0.034 U |
| Nickel | 8.2 | **0.6** | 0.50 U | 0.13 U | 0.35 U | **1.8** | **1.2** J1 | **1.9** J1 | **9.1** | **1.6** | 0.50 U | **3.6** | **1.2** J1 |
| Selenium | 5 | 0.5 U | 0.27 U | 0.18 U | 0.50 U | **3** | 0.27 U | 0.18 U | 0.50 U | 0.5 U | 0.27 U | 0.27 U | 0.50 U |
| Silver | 22 | 0.2 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.098 U | 0.098 U | 0.10 U |
| Zinc | 56 | 4 U | 4.0 U | **1.5** J1 | 1.1 U | **7** | **5.1** J1 | **2.6** J1 | **17.9** | 4 U | 4.0 U | 4.0 U | **2.4** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **2.02** J1 | 1.60 U | **3.38** J1 | 20.0 U | **0.853** | **1.30** | 1.60 U | 20.0 U | **2.51** | 3.20 U | **3.24** J1 |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **5.2** | **7.2** | NA | NA | **275** | **2810** | NA | NA | **2.6** | **5.5** |
| Nitrate (Method 300.0) | --- | 0.1 U | 0.050 U | 0.050 U | 0.050 U | **0.1** | 0.05 U | **0.088** J1 | **0.050** J1 | **0.1** | **0.32** | 0.050 U | 0.050 U |
| Sulfate ( Method 300.0) | --- | **0.1** | **0.79** J1 | 0.30 U | 0.30 U | **155** | **75.6** | **51.3** | **305** | **4.9** | **3.2** | 0.30 U | 0.30 U |
| Total Dissolved Solids (Method 160.1) | --- | **244** | **152** | **154** | **183** | **1820** | **1140** | **552** | **3890** | **116** | **53.5** | **137** | **165** |
| **FIELD PARAMETERS** | | | | | | | | | | | | | |
| Temperature (°C) | --- | 17.71 | 17.04 | 17.70 | 16.84 | 14.29 | 10.27 | 10.35 | 14.49 | 13.36 | 9.34 | 13.19 | 15.77 |
| Conductivity (uS/cm) | --- | 476 | 235 | 236 | 509 | 3764 | 1590 | 748 | 5572 | 188 | 52 | 157 | 4555 |
| Dissolved Oxygen (mg/L) | --- | 0.46 | 1.70 | 0.32 | 1.36 | 1.82 | 3.23 | 2.98 | 0.63 | 1.51 | 8.33 | 0.60 | 1.85 |
| pH (SU) | --- | 5.44 | 6.86 | 5.90 | 5.76 | 8.40 | 6.01 | 7.40 | 6.00 | 8.53 | 8.35 | 5.80 | 6.45 |
| ORP (mV) | --- | -88.8 | -101.6 | -129.4 | -65 | 35.0 | 82.5 | 66.3 | 64.5 | 35.3 | 33.9 | -17.7 | -113 |
| Turbidity (NTU) | --- | 3.02 | 4.63 | 1.14 | 87.3 | 16.58 | 37.39 | 19.58 | 6.15 | 4.78 | 8.83 | 7.08 | 20.4 |
| Ferrous Iron (mg/L) | --- | NA | 0.8 | 5.2 | 2.6 | NA | 1.0 | 0.8 | 1.2 | NA | 0.0 | 1.8 | 3.0 |

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Western Property Boundary | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-19 | IT-MW-19 | IT-MW-19 | IT-MW-19 | IT-PZ-7 | IT-PZ-7 | IT-PZ-7 | IT-PZ-7 | IT-Seep-1 | IT-Seep-1 | IT-Seep-1 |
| Laboratory Sample ID: | Preliminary | UA44F/UA44N/ UA45F/UA45M/ UB46F/UB46M | 6578919/6578920/ UM31C | 6689143/6689144/ 6689145/UY55I | 6788039/6788040/ 6788041/VJ32D | UA44E/UA44M/ UA45E/UA45L/ UB46E/UB46L | 6578921/6578922/ UM31D | 6689152/6689153/ 6689154/UY55G | 6788042/6788043/ 6788044/VJ32E | 6582528/6582529/ UM85A | 6695717/6695718/ 6695719/UZ55A | 6801231/6801232/ 6801233/VK67A |
| Laboratory Data Package ID: | Cleanup | UA44/UA45/UB46 | 1295418/UM31 | 1316071/UY55 | 1335483/VJ32 | UA44/UA45/UB46 | 1295418/UM31 | 1316071/UY55 | 1335483/VJ32 | 1296010/UM85 | 1317333/UZ55 | 1338005/VK67 |
| Sample Date: | Levels | 12/07/2011 | 3/13/2012 | 6/14/2012 | 9/12/2012 | 12/07/2011 | 3/13/2012 | 6/14/2012 | 9/12/2012 | 3/15/2012 | 6/20/2012 | 9/25/2012 |
| Tide Level (ft MLLW): | | 0.0 | -0.5 | 1.1 | 1.3 | -0.3 | -0.2 | 0.8 | 1.1 | 0.5 | -1.7 | 0.5 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | |
| Acetone | 110,000 | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Bromodichloromethane | 17 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Carbon Disulfide | 3900 | 0.2 U | 0.4 U | 0.4 U | 0.4 U | 0.2 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U | 0.4 U |
| Chloroform | 9.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2-Dichlorobenzene | 440 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethane | 33 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| 4-Isopropyltoluene | --- | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Naphthalene | 26 | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | **0.1** J1 | 0.1 U | 0.1 U | 0.1 U |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| m,p-Xylene | 1300 | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | **0.049** | **0.010** J1 | 0.020 U | 0.010 U | **0.014** J1 | 0.010 U | 0.010 U | 0.012 UJ2 | **0.010** J1 |
| Vinyl Chloride | 0.53 | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | **0.1** J1 | **0.1** J1 | 0.1 U | 0.1 U | 0.09 U |
| Chrysene | 0.018 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | 0.1 U | 0.1 U | 0.1 U | 0.09 U |
| 2,4-Dichlorophenol | --- | 5.0 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| bis(2-Ethylhexyl)phthalate | 1.2 | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U | 2 U | 2 U | 2 U |
| Fluoranthene | 11 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | 0.1 U | 0.1 U | 0.1 U | **0.2** J1 |
| Fluorene | 45 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | 0.1 U | 0.1 U | 0.1 U | 0.09 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | 0.1 U | 0.1 U | 0.1 U | 0.09 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | 0.1 U | 0.1 U | 0.1 U | 0.09 U |
| 4-Methylphenol | 330 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| Naphthalene | 26 | 1.0 U | 0.1 U | **0.1** J1 | **0.1** J1 | 1.0 U | **0.1** J | **0.2** J1 | **0.2** J1 | **0.1** J1 | **0.1** J1 | 0.09 U |
| Phenanthrene | --- | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | **0.2** J1 | 0.1 U | 0.1 U | **0.1** J1 |
| Phenol | 41,000 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.09 U | 0.09 U | **0.1** J1 | 0.1 U | 0.1 U | **0.2** J1 |
| **cPAHs (µg/L)** | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | |
| Benzo(a)anthracene | 0.0018 | 0.010 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.010 U | **0.0050** J1 | **0.0070** J1 | **0.011** | **0.0060** J1 | **0.0050** J1 | **0.11** |
| Benzo(a)pyrene | 0.00018 | 0.010 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.010 U | 0.0048 U | 0.0049 U | **0.0070** J1 | **0.0050** J1 | 0.0048 U | **0.11** |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0048 U | 0.0049 U | NA | 0.0048 U | 0.0049 U | **0.0080** J1 | **0.011** | **0.0060** J1 | **0.16** |
| Benzo(k)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0048 U | 0.0049 U | NA | 0.0048 U | 0.0049 U | **0.0090** J1 | 0.0048 U | 0.0048 U | **0.058** |
| Total Benzofluoranthenes | 0.0018 | 0.020 UJ | NA | NA | NA | 0.020 UJ | NA | NA | NA | NA | NA | NA |
| Chrysene | 0.018 | 0.010 U | 0.0049 U | 0.0048 U | 0.0049 U | **0.0054** J1 | 0.0048 U | 0.0049 U | **0.017** | **0.0080** J1 | **0.0050** J1 | **0.13** |
| Dibenz(a,h)anthracene | 0.0018 | 0.010 U | 0.0040 U | 0.0038 U | 0.0039 U | 0.010 U | 0.0038 U | 0.0039 U | **0.0090** J1 | 0.0039 U | 0.0038 U | **0.020** |
| Indeno(1,2,3-cd)pyrene | 0.0018 | 0.010 U | 0.0040 U | 0.0038 U | 0.0039 U | 0.010 U | 0.0038 U | 0.0039 U | **0.0070** J1 | **0.0040** J1 | 0.0038 U | **0.061** |
| Pyrene | 9.8 | NA | 0.0099 U | 0.0095 U | 0.0098 U | NA | **0.034** J1 | **0.053** | **0.092** | **0.012** J1 | **0.015** J1 | **0.22** |
| cPAH TEQ | 0.00018 | ND | ND | ND | ND | **0.0001** J | **0.0005** J | **0.0007** J | **0.0116** J | **0.0072** J | **0.0012** J | **0.152** |
| **PCBs (µg/L)** | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | |
| Aroclor 1248 | 0.000023 | 0.010 U | 0.0048 U | 0.0049 U | 0.0049 U | 0.010 U | 0.0047 U | 0.0049 U | 0.0047 U | 0.0048 U | 0.0047 U | 0.0047 U |
| Aroclor 1254 | 0.0000055 | 0.010 U | 0.0048 U | 0.0049 U | 0.0049 U | 0.010 U | 0.0047 U | 0.0049 U | 0.0047 U | **0.0097** | **0.011** | 0.0047 U |
| Aroclor 1260 | 0.000023 | 0.010 U | 0.0048 U | 0.0049 U | 0.0049 U | 0.010 U | 0.0047 U | 0.0049 U | 0.0047 U | 0.0048 U | 0.0047 U | 0.0047 U |
| Total PCBs | 0.000023 | ND | ND | ND | ND | ND | ND | ND | ND | **0.0097** | **0.011** | ND |

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Western Property Boundary | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-19 | IT-MW-19 | IT-MW-19 | IT-MW-19 | IT-PZ-7 | IT-PZ-7 | IT-PZ-7 | IT-PZ-7 | IT-Seep-1 | IT-Seep-1 | IT-Seep-1 |
| Laboratory Sample ID: | Preliminary | UA44F/UA44N/ UA45F/UA45M/ UB46F/UB46M | 6578919/6578920/ UM31C | 6689143/6689144/ 6689145/UY55I | 6788039/6788040/ 6788041/VJ32D | UA44E/UA44M/ UA45E/UA45L/ UB46E/UB46L | 6578921/6578922/ UM31D | 6689152/6689153/ 6689154/UY55G | 6788042/6788043/ 6788044/VJ32E | 6582528/6582529/ UM85A | 6695717/6695718/ 6695719/UZ55A | 6801231/6801232/ 6801233/VK67A |
| Laboratory Data Package ID: | Cleanup | UA44/UA45/UB46 | 1295418/UM31 | 1316071/UY55 | 1335483/VJ32 | UA44/UA45/UB46 | 1295418/UM31 | 1316071/UY55 | 1335483/VJ32 | 1296010/UM85 | 1317333/UZ55 | 1338005/VK67 |
| Sample Date: | Levels | 12/07/2011 | 3/13/2012 | 6/14/2012 | 9/12/2012 | 12/07/2011 | 3/13/2012 | 6/14/2012 | 9/12/2012 | 3/15/2012 | 6/20/2012 | 9/25/2012 |
| Tide Level (ft MLLW): | | 0.0 | -0.5 | 1.1 | 1.3 | -0.3 | -0.2 | 0.8 | 1.1 | 0.5 | -1.7 | 0.5 |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | |
| Antimony | --- | **0.8** | 0.42 U | 0.42 U | 0.33 U | 0.9 | **1.3** | **1.0** J1 | **0.68** J1 | **0.49** J1 | **0.43** J1 | 3.3 U |
| Arsenic | --- | **154** | **49.1** | **23.3** | **82.9** | **3** | **3.5** | **6.7** | **4.0** | **4.5** | **2.2** | **5.9** |
| Barium | --- | **18.4** | **15.1** | **10.7** | **17.6** | **93.4** | **28.7** | **20.8** | **235** | **6.8** | **8.5** | **28.8** |
| Beryllium | --- | 0.2 U | 0.13 U | 0.13 U | **0.031** J1 | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.13 U | 0.13 U | 0.025 U |
| Cadmium | --- | 0.1 U | 0.20 U | 0.20 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.20 U | 0.20 U | **0.14** J1 |
| Chromium | --- | 0.5 U | 0.60 U | 0.60 U | **0.90** J1 | **0.5** | **14.5** | **1.5** J1 | 0.50 U | **2.1** | **2.3** | **5.0** |
| Copper | --- | **3.0** | **3.5** | **2.3** | **4.6** | **0.8** | **6.7** | **0.95** J1 | 0.40 U | **1.4** J1 | **2.0** J1 | 4.0 U |
| Lead | --- | 0.1 U | 0.080 U | 0.080 U | 0.034 U | 0.1 U | **4.2** | **0.30** J1 | **0.10** J1 | **0.74** J1 | **2.7** | **0.95** J1 |
| Nickel | --- | **3.8** | **2.2** J | **1.1** J1 | **3.0** | **4.2** | **2.5** | **0.41** J1 | 0.35 U | **3.0** | **3.1** | **7.9** J1 |
| Selenium | --- | **0.6** | 0.27 U | 0.27 U | 0.50 U | 5 U | 0.27 U | **0.27** J1 | 0.50 U | 0.27 U | 0.27 U | **0.75** J1 |
| Zinc | --- | **8** | 4.0 U | 4.0 U | **4.3** J1 | 4 U | **8.2** J1 | 1.1 U | 1.1 U | 4.0 U | **4.9** J, J1 | **7.1** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | 1.60 U | **1.32** | **2.73** | 20.0 U | 1.60 U | **0.716** | 1.60 U | **2.86** J1 | **1.43** | 5.60 U |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | |
| Antimony | 150 | **0.8** | **0.43** J1 | **0.39** J1 | 0.33 U | **0.8** | **0.79** J1 | **0.84** J1 | **0.67** J1 | **0.56** J1 | 0.42 U | 1.7 U |
| Arsenic | 8 | **179** | **45.4** | **25.9** | **82.3** | **4** | **3.1** | **4.2** | **3.6** | **3.9** | **1.5** J1 | **4.0** J1 |
| Barium | 770 | **17.8** | **15.7** | **12.4** | **18.4** | **99.4** | **31.1** | **20.1** | **249** | **6.6** | **8.2** | **30.3** |
| Beryllium | 12 | 0.2 U | 0.13 U | **0.027** J1 | **0.034** J1 | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.13 U | 0.13 U | 0.025 U |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.20 U | 0.20 U | 0.41 U |
| Chromium | 74 | **0.8** | 0.60 U | **0.21** J1 | **0.72** J1 | **0.7** | 0.60 U | **0.14** J1 | 0.50 U | **1.9** J1 | **2.1** | **4.3** J1 |
| Copper | 8 | **2.6** | **3.3** | **2.8** | **4.0** | **0.9** | 0.38 U | **0.36** J1 | 0.40 U | **1.2** J1 | **0.63** J1 | 2.0 U |
| Lead | 2.5 | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | **0.037** J1 | **0.086** J1 | 0.080 U | 0.080 U | 0.17 U |
| Nickel | 8.2 | **4.3** | **1.9** J, J1 | **1.8** J1 | **3.1** | **4.4** | 0.50 U | **0.25** J1 | 0.35 U | **2.9** | **2.9** | **5.3** J1 |
| Selenium | 5 | 0.5 U | 0.27 U | **0.19** J1 | 0.50 U | 5 U | 0.27 U | **0.22** J1 | 0.50 U | 0.27 U | 0.27 U | 2.5 U |
| Silver | 22 | 0.2 U | 0.098 U | 0.046 U | 0.10 U | 0.2 U | 0.098 U | 0.046 U | 0.10 U | 0.098 U | 0.098 U | 0.50 U |
| Zinc | 56 | **9** | 4.0 U | **2.2** J1 | **3.6** J1 | 4 U | 4.0 U | **2.3** J1 | **1.3** J1 | **4.1** J1 | 4.0 UJ | 5.5 U |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | 3.20 U | **1.20** | **3.24** J1 | 20.0 U | 1.60 U | **0.458** J1 | 3.20 U | **2.21** J1 | **2.44** J1 | 5.60 U |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **2.1** | **11.2** | NA | NA | **674** | **4210** | NA | **2310** | **8740** |
| Nitrate (Method 300.0) | --- | **0.1** | **0.084** J1 | 0.050 U | 0.050 U | 0.5 U | 0.050 U | 0.050 U | 0.050 U | **0.44** | **0.39** | **0.27** |
| Sulfate ( Method 300.0) | --- | **133** | **81.2** | **52.7** | **39.4** | **304** | **173** | **176** | **457** | **263** | **278** | **1010** |
| Total Dissolved Solids (Method 160.1) | --- | **718** | **674** | **680** | **312** | **4200** | **1760** | **1350** | **5550** | **3450** | **4080** | **14,200** |
| **FIELD PARAMETERS** | | | | | | | | | | | | |
| Temperature (°C) | --- | 14.97 | 13.10 | 13.50 | 14.45 | 13.49 | 10.11 | 11.00 | 14.30 | NA | NA | NA |
| Conductivity (uS/cm) | --- | 727 | 903 | 733 | 1180 | 16504 | 2218 | 1785 | 9517 | NA | NA | NA |
| Dissolved Oxygen (mg/L) | --- | 1.74 | 4.00 | 2.38 | 1.18 | 1.33 | 0.68 | 0.43 | 0.46 | NA | NA | NA |
| pH (SU) | --- | 7.49 | 6.57 | 6.57 | 6.69 | 8.53 | 9.58 | 10.02 | 9.63 | NA | NA | NA |
| ORP (mV) | --- | 8.9 | 145.7 | 206.9 | 107 | -27.2 | -78.4 | -150.5 | -161.3 | NA | NA | NA |
| Turbidity (NTU) | --- | 0.42 | 2.81 | 0.08 | 4.80 | 1.94 | 4.22 | 8.37 | 8.35 | NA | NA | NA |
| Ferrous Iron (mg/L) | --- | NA | 0.0 | 0.0 | 0.0 | NA | 0.0 | 0.0 | 0.0 | NA | 0.4 | NA |

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Former Hydraulic Test Pad Area | | | | Former Slip 5 Outfall Area | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-11 | IT-MW-11 | IT-MW-11 | IT-MW-11 | IT-MW-14 | IT-MW-14 | IT-MW-14 | IT-MW-14 | IT-PZ-3 | IT-PZ-3 | IT-PZ-3 | IT-PZ-3 | IT-SB-8 |
| Laboratory Sample ID: | Preliminary | UA44C/UA44K/ UA45C/UA45J/ UB46C/UB46J | 6582519/6582520/ UM84A | 6693947/6693948/ 6693949/UZ37B | 6789047/6789048/ 6789049/VJ53A | UB08C/UB08H/ UB09C/UB09H | 6571467/6571468/ UL18B | 6697964/6697965/ 6697966/UZ66C | 6788010/6788011/ 6788012/VJ03H | UB28E/UB28K/ UB29E/UB29J/ UD90B | 6568992/6568993/ UK92C | 6689146/6689147/ 6689148/UY55E | 6787992/6787993/ 6787994/VJ03B | TW99A/TX06A/ TX06B |
| Laboratory Data Package ID: | Cleanup | UA44/UA45/UB46 | 1296009/UM84 | 1317022/UZ37 | 1335688/VJ53 | UB08/UB09 | 1293989/UL18 | 1317686/UZ66 | 1335480/VJ03 | UB28/UB29/UD90 | 1293530/UK92 | 1316071/UY55 | 1335480/VJ03 | TW99/TX06 |
| Sample Date: | Levels | 12/07/2011 | 3/15/2012 | 6/19/2012 | 9/13/2012 | 12/13/2011 | 03/07/2012 | 6/21/2012 | 9/11/2012 | 12/14/2011 | 03/06/2012 | 6/14/2012 | 9/11/2012 | 11/14/2011 |
| Tide Level (ft MLLW): | | 0.4 | 0.6 | -1.5 | 1.2 | 7.0 | 3.8 | -0.5 | 5.0 | 9.8 | 9.9 | 2.6 | 5.5 | NA |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | |
| Acetone | 110,000 | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U |
| Bromodichloromethane | 17 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U |
| Carbon Disulfide | 3900 | 0.2 U | 0.4 U | **0.6** | 0.4 U | 0.2 U | 0.4 U | 0.4 U | 0.4 U | 0.2 U | 0.4 U | 0.4 U | 0.4 U | 0.2 U |
| Chloroform | 9.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U |
| 1,2-Dichlorobenzene | 440 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U |
| 1,1-Dichloroethane | 33 | **0.2** J1 | **0.2** J1 | **0.2** J1 | **0.2** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U |
| cis-1,2-Dichloroethene | 130 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.1** J1 | **0.1** J1 | 0.1 U | 0.1 U | 0.2 U |
| 4-Isopropyltoluene | --- | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U |
| Naphthalene | 26 | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U |
| m,p-Xylene | 1300 | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | **0.023** | 0.010 U | 0.020 U |
| Vinyl Chloride | 0.53 | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | **0.023** | **0.046** | **0.053** | 0.020 U |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U |
| Chrysene | 0.018 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | **0.1** J1 | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U |
| 2,4-Dichlorophenol | --- | 5.0 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U | 0.5 U | 0.5 U | **0.9** J1 | 5.0 U | 0.5 U | 0.5 U | 0.5 U | 5.0 U |
| bis(2-Ethylhexyl)phthalate | 1.2 | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U | 1.0 U | 2 U | 2 U | 2 U | 1.0 U |
| Fluoranthene | 11 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U |
| Fluorene | 45 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U |
| 4-Methylphenol | 330 | **0.5** J1 | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U |
| Naphthalene | 26 | 1.0 U | 0.1 U | **0.1** J1 | 0.1 U | 1.0 U | 0.1 U | 0.1 U | **0.1** J1 | 1.0 U | 0.1 U | **0.2** J1 | 0.1 U | 1.0 U |
| Phenanthrene | --- | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U |
| Phenol | 41,000 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U |
| **cPAHs (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | |
| Benzo(a)anthracene | 0.0018 | 0.011 U | 0.0049 U | 0.0048 UJ | 0.0049 U | 0.010 U | 0.0047 U | 0.0050 U | 0.0047 U | 0.010 U | 0.0048 U | 0.0050 U | 0.0047 U | 0.011 U |
| Benzo(a)pyrene | 0.00018 | 0.011 U | 0.0049 U | 0.0048 UJ | 0.0049 U | 0.010 U | 0.0047 U | 0.0050 U | 0.0047 U | 0.010 U | 0.0048 U | 0.0050 U | 0.0047 U | 0.011 U |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0048 UJ | 0.0049 U | NA | 0.0047 U | 0.0050 U | 0.0047 U | NA | 0.0048 U | 0.0050 U | 0.0047 U | NA |
| Benzo(k)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0048 UJ | 0.0049 U | NA | 0.0047 U | 0.0050 U | 0.0047 U | NA | 0.0048 U | 0.0050 U | 0.0047 U | NA |
| Total Benzofluoranthenes | 0.0018 | 0.022 UJ | NA | NA | NA | 0.020 U | NA | NA | NA | 0.020 U | NA | NA | NA | 0.022 U |
| Chrysene | 0.018 | 0.011 U | 0.0049 U | 0.0048 UJ | 0.0049 U | 0.010 U | 0.0047 U | 0.0050 U | 0.0047 U | 0.010 U | 0.0048 U | 0.0050 U | 0.0047 U | 0.011 U |
| Dibenz(a,h)anthracene | 0.0018 | 0.011 U | 0.0039 U | 0.0038 UJ | 0.0039 U | 0.010 U | 0.0038 U | 0.0040 U | 0.0038 U | 0.010 U | 0.0038 U | 0.0040 U | 0.0038 U | 0.011 U |
| Indeno(1,2,3-cd)pyrene | 0.0018 | 0.011 U | 0.0039 U | 0.0038 UJ | 0.0039 U | 0.010 U | 0.0038 U | 0.0040 U | 0.0038 U | 0.010 U | 0.0038 U | 0.0040 U | 0.0038 U | 0.011 U |
| Pyrene | 9.8 | NA | 0.0098 U | 0.0095 UJ | 0.0098 U | NA | 0.0095 U | 0.0099 U | 0.0094 U | NA | 0.0095 U | 0.010 U | 0.0095 U | NA |
| cPAH TEQ | 0.00018 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **PCBs (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | |
| Aroclor 1248 | 0.000023 | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.010 U | 0.0051 U | 0.0049 U | 0.0048 U | 0.010 U |
| Aroclor 1254 | 0.0000055 | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.010 U | 0.0051 U | 0.0049 U | 0.0048 U | 0.010 U |
| Aroclor 1260 | 0.000023 | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.010 U | 0.0051 U | 0.0049 U | 0.0048 U | 0.010 U |
| Total PCBs | 0.000023 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Former Hydraulic Test Pad Area | | | | Former Slip 5 Outfall Area | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-11 | IT-MW-11 | IT-MW-11 | IT-MW-11 | IT-MW-14 | IT-MW-14 | IT-MW-14 | IT-MW-14 | IT-PZ-3 | IT-PZ-3 | IT-PZ-3 | IT-PZ-3 | IT-SB-8 |
| Laboratory Sample ID: | Preliminary | UA44C/UA44K/ UA45C/UA45J/ UB46C/UB46J | 6582519/6582520/ UM84A | 6693947/6693948/ 6693949/UZ37B | 6789047/6789048/ 6789049/VJ53A | UB08C/UB08H/ UB09C/UB09H | 6571467/6571468/ UL18B | 6697964/6697965/ 6697966/UZ66C | 6788010/6788011/ 6788012/VJ03H | UB28E/UB28K/ UB29E/UB29J/ UD90B | 6568992/6568993/ UK92C | 6689146/6689147/ 6689148/UY55E | 6787992/6787993/ 6787994/VJ03B | TW99A/TX06A/ TX06B |
| Laboratory Data Package ID: | Cleanup | UA44/UA45/UB46 | 1296009/UM84 | 1317022/UZ37 | 1335688/VJ53 | UB08/UB09 | 1293989/UL18 | 1317686/UZ66 | 1335480/VJ03 | UB28/UB29/UD90 | 1293530/UK92 | 1316071/UY55 | 1335480/VJ03 | TW99/TX06 |
| Sample Date: | Levels | 12/07/2011 | 3/15/2012 | 6/19/2012 | 9/13/2012 | 12/13/2011 | 03/07/2012 | 6/21/2012 | 9/11/2012 | 12/14/2011 | 03/06/2012 | 6/14/2012 | 9/11/2012 | 11/14/2011 |
| Tide Level (ft MLLW): | | 0.4 | 0.6 | -1.5 | 1.2 | 7.0 | 3.8 | -0.5 | 5.0 | 9.8 | 9.9 | 2.6 | 5.5 | NA |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | | |
| Antimony | --- | 0.2 U | 0.42 U | 0.33 U | 0.33 U | **1.1** | **1.1** | **0.49** J1 | **0.85** J1 | 0.2 U | 0.42 U | 0.10 U | 0.33 U | **0.2** |
| Arsenic | --- | **7.6** | **7.2** | **2.0** | **2.4** | **5.3** | **4.2** | **4.8** | **15.3** | 2.4U/**2.5*** | 0.95 U | **4.6** | **16.2** | **1.0** |
| Barium | --- | **8.0** | **5.0** | **4.3** | **3.6** | **9.5** | **10.6** | **21.3** | **22.1** | **6.4** | **5.3** | **7.5** | **10.7** | **11.3** |
| Beryllium | --- | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | **0.031** J1 | 0.2 U |
| Cadmium | --- | 0.1 U | 0.20 U | 0.048 U | 0.082 U | **0.4** | **0.44** J1 | **0.20** J1 | **0.31** J1 | 0.1 U | 0.20 U | 0.048 U | 0.082 U | **0.3** |
| Chromium | --- | 0.5 U | 0.60 U | 0.50 U | 0.50 U | 1 U | **1.2** J1 | **0.72** J1 | **0.65** J1 | **0.7** | 0.60 U | **0.69** J1 | **1.4** J1 | 0.5 U |
| Copper | --- | **0.6** | 0.38 U | 0.39 UJ2 | 0.40 U | **1.7** | **2.1** | **1.2** J1 | **0.81** J1 | **1.2** | **0.70** J1 | **0.35** J1 | **0.58** J1 | **7.8** |
| Lead | --- | **0.2** | **0.12** J1 | 0.034 U | **0.14** J1 | **0.1** | 0.080 U | 0.034 U | **0.052** J1 | **0.3** | **0.16** J1 | **0.052** J1 | 0.12 UJ2 | **0.2** |
| Nickel | --- | **0.7** | 0.50 U | **0.20** J1 | 0.35 U | **3.6** | **2.2** | **1.6** J1 | **2.4** | **0.6** | 0.50 U | **0.80** J1 | **1.1** J1 | **3.4** |
| Selenium | --- | 0.5 U | 0.27 U | 0.18 U | 0.50 U | 0.5 U | 0.27 U | **0.19** J1 | 0.50 UJ | 0.5 U | 0.27 U | 0.18 U | 0.50 U | **0.6** |
| Zinc | --- | 4 U | **5.5** J1 | **1.5** J1 | **2.1** J1 | **22** | **18.2** | **24.5** | **34.5** | **12** | **6.0** J1 | **4.6** J1 | **8.3** J1 | **24** |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **0.833** | 1.60 U | **0.704** | 20.0 U | **2.33** | **2.83** J1 | 1.60 U | 20.0 U | **4.89** J1 | **0.744** | **1.95** J1 | 20.0 U |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | | |
| Antimony | 150 | 0.2 U | 0.42 U | 0.33 U | 0.33 U | **1.1** | **0.92** J1 | **0.44** J1 | **0.77** J1 | 0.2 U | 0.42 U | 0.10 U | 0.33 U | **0.2** |
| Arsenic | 8 | **9.4** | **7.7** | **2.1** | **2.2** | **5.2** | **4.4** | **5.6** | **6.7** | **2.0** | 0.95 U | **4.2** | **14.4** | **1.0** |
| Barium | 770 | **7.9** | **5.3** | **5.3** | **3.9** | **9.4** | **10.8** | **19.5** | **22.1** | **5.3** | **4.7** | **7.1** | **10.8** | **9.9** |
| Beryllium | 12 | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | **0.041** J1 | 0.2 U |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | 0.082 U | **0.4** | **0.34** J1 | **0.24** J1 | **0.36** J1 | 0.1 U | 0.20 U | 0.048 U | 0.082 U | **0.3** |
| Chromium | 74 | 1 U | 0.60 U | 0.50 U | 0.50 U | **0.6** | **1.0** J1 | **0.64** J1 | **0.76** J1 | **0.8** | 0.60 U | **0.60** J1 | **1.6** J1 | 0.5 U |
| Copper | 8 | 0.5 U | 0.38 U | 0.46 UJ2 | 0.40 U | **1.8** | **1.9** J1 | **1.9** J1 | **0.76** J1 | **0.7** | 0.38 U | 0.15 U | **0.72** J1 | **7.2** |
| Lead | 2.5 | 0.1 U | 0.080 U | **0.25** J1 | 0.034 U | 0.1 U | 0.080 U | 0.034 U | **0.089** J1 | 0.1 U | 0.080 U | 0.034 U | 0.044 UJ2 | 0.1 U |
| Nickel | 8.2 | 0.5 U | 0.50 U | **0.41** J1 | 0.35 U | **3.6** | **2.1** | **1.9** J1 | **2.0** J1 | **0.5** | 0.50 U | **0.71** J1 | **1.7** J1 | **3.3** |
| Selenium | 5 | 0.5 U | 0.27 U | 0.18 U | 0.50 U | 0.5 U | 0.27 U | 0.18 U | 0.50 UJ | 0.5 U | 0.27 U | 0.18 U | 0.50 U | **0.7** |
| Silver | 22 | 0.2 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.098 U | 0.046 U | 0.10 U | 0.2 U |
| Zinc | 56 | 4 U | 4.0 U | **2.4** J1 | 1.1 U | **22** | **17.9** | **29.3** | **31.4** | 4 U | 4.0 U | **1.1** J1 | 3.4 UJ2 | **23** |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | 1.60 U | **1.53** | **2.11** J1 | 20.0 U | **3.25** J1 | **3.80** J1 | **4.42** J1 | 20.0 U | **3.53** J1 | **1.15** | **2.27** J1 | 20.0 U |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **3.9** | **3.3** | NA | NA | **3.8** | **3.9** | NA | NA | **1.2** | **2.6** | NA |
| Nitrate (Method 300.0) | --- | **0.1** | 0.050 U | 0.25 U | 0.050 U | **0.2** | **1.4** | 0.050 U | 0.050 U | 0.1 U | 0.050 U | 0.050 U | 0.050 U | **2.1** |
| Sulfate ( Method 300.0) | --- | **5.1** | **3.2** | **2.8** | **2.0** | **12.2** | **17.8** | **42.9** | **68.9** | **1.1** | **0.63** J1 | 0.30 U | **0.36** J1 | **13.2** |
| Total Dissolved Solids (Method 160.1) | --- | **196** | **189** | **175** J | **160** | **281** | **345** | **425** | **435** | **135** | **124** | **188** | **338** | **269** |
| **FIELD PARAMETERS** | | | | | | | | | | | | | | |
| Temperature (°C) | --- | 14.47 | 11.61 | 13.16 | 16.17 | 15.72 | 13.73 | 14.41 | 14.89 | 13.98 | 13.27 | 14.06 | 17.55 | NA |
| Conductivity (uS/cm) | --- | 840 | 229 | 196 | 3250 | 876 | 314 | 569 | 720 | 444 | 122 | 177 | 315 | NA |
| Dissolved Oxygen (mg/L) | --- | 1.44 | 0.63 | 0.33 | 1.17 | 1.23 | 1.07 | 0.35 | 1.15 | 1.00 | 0.38 | 0.40 | 5.86 | NA |
| pH (SU) | --- | 5.95 | 6.49 | 6.68 | 6.57 | 6.68 | 7.53 | 7.52 | 6.39 | 5.58 | 7.38 | 5.98 | 6.67 | NA |
| ORP (mV) | --- | -27.4 | -143.0 | -5.5 | -61 | 32.5 | -8.1 | 46.7 | -3 | -0.6 | -77.4 | 8.5 | -170 | NA |
| Turbidity (NTU) | --- | 5.07 | 3.09 | 4.92 | 5.25 | 2.53 | 3.2 | 10.95 | 6.61 | 49.24 | 11.42 | 17.32 | 58.2 | NA |
| Ferrous Iron (mg/L) | --- | NA | 1.4 | 1.6 | 3.2 | NA | 0.1 | 0.1 | 1.8 | NA | 1.3 | 1.6 | 5.6 | NA |

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Other | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-I-203 | IT-I-203 | IT-I-203 | IT-I-203 | IT-MW-12 | IT-DUP-2 (IT-MW-12) | IT-MW-12 | IT-MW-12 | IT-MW-12 | IT-MW-13 | IT-MW-13 | IT-MW-13 | IT-MW-13 |
| Laboratory Sample ID: | Preliminary | UA44D/UA44L/ UA45D/UA45K/ UB46D/UB46K | 6582523/6582524/ UM84C | 6690483/6690484/ 6690485/UZ00E | 6789053/6789054/ 6789055/VJ53C | UA86C/UA86G/ UA87C/UA87F | UA86A/UA86E/ UA87A/UA87D | 6571479/6571480/ UL18H | 6690486/6690487/ 6690488/UZ00F | 6788051/6788052/ 6788053/VJ32K | UB08D/UB08I/ UB09D/UB09I | 6571481/6571482/ UL18I | 6689156/6689157/ 6689158/UY55H | 6788027/6788028/ 6788029/VJ32L |
| Laboratory Data Package ID: | Cleanup | UA44/UA45/UB46 | 1296009/UM84 | 1316296/UZ00 | 1335688/VJ53 | UA86/UA87 | UA86/UA87 | 1293989/UL18 | 1316296/UZ00 | 1335483/VJ32 | UB08/UB09 | 1293989/UL18 | 1316071/UY55 | 1335483/VJ32 |
| Sample Date: | Levels | 12/07/2011 | 3/15/2012 | 6/15/2012 | 9/13/2012 | 12/12/2011 | 12/12/2011 | 03/07/2012 | 6/15/2012 | 9/12/2012 | 12/13/2011 | 03/07/2012 | 6/14/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | -0.3 | 0.1 | 0.4 | 0.7 | 8.3 | 8.3 | 8.2 | 4.3 | 6.3 | 6.9 | 9.0 | 7.9 | 6.6 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | |
| Acetone | 110,000 | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U | 5.0 U | 3.0 U | 3.0 U | 3.0 U | 5.0 U | 3.0 U | 3.0 U | **3.1** J1 |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Bromodichloromethane | 17 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Carbon Disulfide | 3900 | **0.2** | **0.4** J1 | 0.4 U | 0.4 U | 0.2 U | 0.2 U | 0.4 U | 0.4 U | 0.4 U | 0.2 U | 0.4 U | 0.4 U | 0.4 U |
| Chloroform | 9.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2-Dichlorobenzene | 440 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethane | 33 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 4-Isopropyltoluene | --- | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U |
| Naphthalene | 26 | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | 0.1 U |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| m,p-Xylene | 1300 | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | 0.019 UJ2 | **0.011** J1 | 0.020 U | 0.020 U | 0.010 U | 0.028 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U |
| Vinyl Chloride | 0.53 | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| Chrysene | 0.018 | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| 2,4-Dichlorophenol | --- | 5.0 U | 0.5 U | 0.5 U | 0.5 U | 5.3 U | 5.0 U | 0.5 U | 0.5 UJ | 0.5 UJ | 5.0 U | 0.5 U | 0.5 U | 0.5 U |
| bis(2-Ethylhexyl)phthalate | 1.2 | 1.0 U | 2 U | 2 U | 2 U | **1.5** | 1.0 U | 2 U | 2 U | 2 U | **3.3** | 2 U | 2 U | 2 U |
| Fluoranthene | 11 | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| Fluorene | 45 | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| 4-Methylphenol | 330 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 1.0 U | 0.5 U | 0.5 UJ | 0.5 UJ | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| Naphthalene | 26 | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 1.0 U | **0.2** J1 | 0.1 U | **0.1** J1 | 1.0 U | **0.1** J1 | 0.1 U | 0.1 U |
| Phenanthrene | --- | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| Phenol | 41,000 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 1.0 U | 0.5 U | 0.5 UJ | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.1 U | 0.09 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| **cPAHs (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | |
| Benzo(a)anthracene | 0.0018 | 0.010 U | **0.0050** J1 | 0.0048 U | **0.0050** J1 | 0.010 U | 0.010 U | 0.0047 U | 0.0048 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0053 U | 0.0048 U |
| Benzo(a)pyrene | 0.00018 | 0.010 U | 0.0049 U | 0.0048 U | 0.0047 U | 0.010 U | 0.010 U | 0.0047 U | 0.0048 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0053 U | 0.0048 U |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0048 U | 0.0047 U | NA | NA | 0.0047 U | **0.0050** J1 | 0.0048 U | NA | 0.0048 U | 0.0053 U | 0.0048 U |
| Benzo(k)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0048 U | 0.0047 U | NA | NA | 0.0047 U | 0.0048 U | 0.0048 U | NA | 0.0048 U | 0.0053 U | 0.0048 U |
| Total Benzofluoranthenes | 0.0018 | 0.020 UJ | NA | NA | NA | 0.020 U | 0.020 U | NA | NA | NA | 0.020 U | NA | NA | NA |
| Chrysene | 0.018 | 0.010 U | 0.0049 U | 0.0048 U | 0.0047 U | 0.010 U | 0.010 U | 0.0047 U | 0.0048 U | 0.0048 U | 0.010 U | 0.0048 U | 0.0053 U | 0.0048 U |
| Dibenz(a,h)anthracene | 0.0018 | 0.010 U | 0.0040 U | 0.0038 U | 0.0038 U | 0.010 U | 0.010 U | 0.0038 U | **0.0050** J1 | 0.0039 U | 0.010 U | 0.0039 U | 0.0042 U | 0.0039 U |
| Indeno(1,2,3-cd)pyrene | 0.0018 | 0.010 U | 0.0040 U | 0.0038 U | 0.0038 U | 0.010 U | 0.010 U | 0.0038 U | **0.0060** J1 | 0.0039 U | 0.010 U | 0.0039 U | 0.0042 U | 0.0039 U |
| Pyrene | 9.8 | NA | **0.018** J1 | **0.021** J1 | 0.026 J1 | NA | NA | 0.0095 U | 0.0097 U | 0.0097 U | NA | 0.0097 U | 0.011 U | 0.0097 U |
| cPAH TEQ | 0.00018 | ND | **0.001** J | ND | **0.0005** J | ND | ND | ND | **0.0016** J | ND | ND | ND | ND | ND |
| **PCBs (µg/L)** | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | |
| Aroclor 1248 | 0.000023 | 0.010 U | **0.019** | **0.024** | **0.019** | 0.010 U | 0.010 U | 0.0048 U | 0.0050 U | 0.0048 U | 0.010 U | 0.0050 U | 0.0047 U | 0.0048 U |
| Aroclor 1254 | 0.0000055 | **0.010** | 0.0047 U | 0.0048 U | 0.0047 U | **0.0080** J1 | **0.0080** J1 | 0.0048 U | 0.0050 U | 0.0048 U | **0.015** | **0.014** | **0.014** | **0.011** |
| Aroclor 1260 | 0.000023 | 0.010 U | 0.0047 U | 0.0048 U | 0.0047 U | 0.010 U | 0.010 U | 0.0048 U | 0.0050 U | 0.0048 U | 0.010 U | 0.0050 U | 0.0047 U | 0.0048 U |
| Total PCBs | 0.000023 | **0.010** | **0.019** | **0.024** | **0.019** | **0.0080** J | **0.0080** J | ND | ND | ND | **0.015** | **0.014** | **0.014** | **0.011** |

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Other | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-I-203 | IT-I-203 | IT-I-203 | IT-I-203 | IT-MW-12 | IT-DUP-2 (IT-MW-12) | IT-MW-12 | IT-MW-12 | IT-MW-12 | IT-MW-13 | IT-MW-13 | IT-MW-13 | IT-MW-13 |
| Laboratory Sample ID: | Preliminary | UA44D/UA44L/ UA45D/UA45K/ UB46D/UB46K | 6582523/6582524/ UM84C | 6690483/6690484/ 6690485/UZ00E | 6789053/6789054/ 6789055/VJ53C | UA86C/UA86G/ UA87C/UA87F | UA86A/UA86E/ UA87A/UA87D | 6571479/6571480/ UL18H | 6690486/6690487/ 6690488/UZ00F | 6788051/6788052/ 6788053/VJ32K | UB08D/UB08I/ UB09D/UB09I | 6571481/6571482/ UL18I | 6689156/6689157/ 6689158/UY55H | 6788027/6788028/ 6788029/VJ32L |
| Laboratory Data Package ID: | Cleanup | UA44/UA45/UB46 | 1296009/UM84 | 1316296/UZ00 | 1335688/VJ53 | UA86/UA87 | UA86/UA87 | 1293989/UL18 | 1316296/UZ00 | 1335483/VJ32 | UB08/UB09 | 1293989/UL18 | 1316071/UY55 | 1335483/VJ32 |
| Sample Date: | Levels | 12/07/2011 | 3/15/2012 | 6/15/2012 | 9/13/2012 | 12/12/2011 | 12/12/2011 | 03/07/2012 | 6/15/2012 | 9/12/2012 | 12/13/2011 | 03/07/2012 | 6/14/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | -0.3 | 0.1 | 0.4 | 0.7 | 8.3 | 8.3 | 8.2 | 4.3 | 6.3 | 6.9 | 9.0 | 7.9 | 6.6 |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | | |
| Antimony | --- | 0.2 U | **0.77** J1 | 0.33 U | 0.33 U | 0.2 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | **0.21** J1 | 0.33 U |
| Arsenic | --- | **3** | **2.4** | **1.5** J1 | **2.3** | **66.1** | **66.3** | **27.9** | **13.7** | **16.8** | **14.5** | **11.2** | **10.2** | **12.4** |
| Barium | --- | **76.5** | **41.2** | **31.6** | **152** | **169** | **162** | **42.4** | **15.6** | **20.6** | **18.3** | **15.0** | **13.8** | **14.2** |
| Beryllium | --- | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.2 U | 0.13 U | 0.025 U | **0.039** J1 | 0.2 U | 0.13 U | 0.025 U | 0.025 U |
| Cadmium | --- | 0.1 U | **0.28** J1 | 0.048 U | 0.082 U | 0.1 U | 0.1 U | 0.20 U | **0.051** J1 | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | --- | 1 U | 0.60 U | 0.10 U | 0.50 U | **0.8** | **0.9** | 0.60 U | **0.16** J1 | 0.50 U | **0.8** | **1.5** J1 | **1.6** J1 | **1.3** J1 |
| Copper | --- | 1 U | **1.4** J1 | 0.15 U | **0.60** J1 | **1.2** | **1.3** | 0.38 U | 0.15 U | 0.40 U | **4.8** | **3.2** | **5.1** | **2.6** |
| Lead | --- | 0.1 U | **0.87** J1 | 0.034 U | **0.076** J1 | **0.3** | **0.2** | 0.080 U | **0.093** J1 | 0.034 U | **0.3** | **0.093** J1 | **0.35** J1 | 0.034 U |
| Nickel | --- | **4.2** | **0.81** J1 | **0.16** J1 | 0.35 U | **2.9** J | **3.6** J | **0.70** J1 | **0.64** J1 | 0.35 U | **8** | **7.5** | **8.5** | **7.2** |
| Selenium | --- | **5** | 0.27 U | 0.18 U | 0.50 U | **2** | 2 U | 0.27 U | 0.18 U | 0.50 U | **2.2** | **0.87** J1 | **0.76** J1 | **0.62** J1 |
| Zinc | --- | 4 U | **23.9** | 1.1 U | **2.1** J1 | 4 U | 4 U | 4.0 U | 1.1 U | 1.1 U | **6** | 4.0 U | **5.8** J1 | 2.5 UJ2 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **2.49** J1 | 0.225 J1 | 1.60 U | 20.0 U | 20.0 U | 1.60 U | **0.259** J1 | **0.299** J1 | 20.0 U | **4.73** J1 | **4.48** J1 | **4.00** J1 |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | | |
| Antimony | 150 | 0.2 U | **0.86** J1 | 0.33 U | 0.33 U | 0.2 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | **0.33** J1 | 0.33 U |
| Arsenic | 8 | **3.7** | **2.2** | **2.0** J1 | **2.3** | **65.8** | **66.9** | **25.4** | **12.6** | **18.1** | **13.6** | **12.3** | **10** | **11.7** |
| Barium | 770 | **81.6** | **38.4** | **31.2** | **147** | **171** | **175** | **43.8** | **17.9** | **21.5** | **17.8** | **14.9** | **15.1** | **16.0** |
| Beryllium | 12 | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | **0.029** J1 |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | **0.084** J1 | 0.1 U | 0.1 U | 0.20 U | **0.13** J1 | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | 74 | **0.7** | 0.60 U | 0.10 U | 0.50 U | 0.5 U | 0.5 U | 0.60 U | **0.13** J1 | 0.50 U | **1.0** | **1.5** J1 | **1.3** J1 | **1.4** J1 |
| Copper | 8 | **1.2** | **0.42** J1 | 0.15 U | 0.40 U | **0.6** | **0.9** | 0.38 U | 0.15 U | 0.40 U | **4.1** | **2.9** | **4.9** | **3.0** |
| Lead | 2.5 | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.1 U | 0.080 U | **0.19** J1 | 0.034 U | 0.1 U | 0.080 U | **0.045** J1 | 0.034 U |
| Nickel | 8.2 | **4.8** | 0.50 U | **0.16** J1 | 0.35 U | **2.4** | **2.4** | **0.61** J1 | **0.40** J1 | **0.46** J1 | **7.9** | **7.6** | **7.4** | **7.7** |
| Selenium | 5 | 5 U | 0.27 U | 0.18 U | 0.50 U | **2** | **2** | 0.27 U | 0.18 U | 0.50 U | **2.1** | **0.75** J1 | **0.80** J1 | **0.83** J1 |
| Silver | 22 | 0.2 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.2 U | 0.098 U | 0.10 U | 0.10 U | 0.2 U | 0.098 U | 0.046 U | 0.1 U |
| Zinc | 56 | 4 U | 4.0 U | 1.1 U | 1.1 U | 4 U | 4 U | 4.0 U | **1.5** J1 | 1.1 U | **6** | **6.4** J1 | **5.0** J1 | 2.3 UJ2 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **1.71** J1 | **1.36** | **2.58** J1 | 20.0 U | 20.0 U | **1.11** | **1.75** | **1.10** | 20.0 U | **4.02** J1 | **7.18** J1 | **4.02** J1 |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **1030** | **4550** | NA | NA | NA | **36.0** | **70.0** | NA | NA | 19.2 | **26.6** |
| Nitrate (Method 300.0) | --- | 1.0 U | 0.050 U | 0.050 U | 0.050 U | 0.1 U | 0.1 U | 0.050 U | 0.050 U | 0.050 U | 0.1 U | 0.050 U | 0.050 U | 0.050 U |
| Sulfate ( Method 300.0) | --- | **420** | **299** | **405** | **542** | **106** | **104** | **18.3** | **6.0** | **8.4** | **76.7** | **105** | 72.6 | **63.9** |
| Total Dissolved Solids (Method 160.1) | --- | **4130** | **3540** | **1770** | **7240** | **1700** | **1720** | **611** | **330** | **330** | **616** | **604** | 704 | **638** |
| **FIELD PARAMETERS** | | | | | | | | | | | | | | |
| Temperature (°C) | --- | 14.56 | 12.86 | 13.43 | 14.79 | 15.61 | 15.61 | 13.65 | 15.1 | 16.98 | 15.93 | 14.73 | 15.07 | 16.77 |
| Conductivity (uS/cm) | --- | 6477 | 5012 | 2229 | 9596 | 6232 | 6232 | 675 | 428 | 605 | 22255 | 592 | 716 | 1020 |
| Dissolved Oxygen (mg/L) | --- | 1.28 | 0.81 | 0.32 | 0.44 | 0.98 | 0.98 | 0.40 | 0.46 | 2.40 | 0.86 | 0.39 | 0.52 | 1.13 |
| pH (SU) | --- | 10.13 | 8.28 | 10.85 | 9.13 | 7.05 | 7.05 | 8.84 | NA | 6.39 | 6.69 | 8.54 | 6.29 | 6.85 |
| ORP (mV) | --- | -144.5 | -271.3 | -283.1 | -199.3 | -99.9 | -99.9 | -123.5 | -113.0 | -105 | -151.8 | -62.0 | 14.5 | -44 |
| Turbidity (NTU) | --- | 0.95 | 2.50 | 0.53 | 8.39 | 13.89 | 13.89 | 5.81 | 9.18 | 48.7 | 5.72 | 2.9 | 106.44 | 6.65 |
| Ferrous Iron (mg/L) | --- | NA | 0.6 | 0.0 | 0.0 | NA | NA | 1.8 | 4.8 | 2.2 | NA | 1.8 | 2.2 | 2.8 |

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Other | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-17 | IT-MW-17 | IT-MW-17 | IT-MW-17 | IT-PZ-6 | IT-PZ-6 | IT-PZ-6 | IT-PZ-6 |
| Laboratory Sample ID: | Preliminary | UA90A/UA90D/ UA91A/UA91C | 6580630/6580631/ UM54A | 6692719/6692720/ 6692721/UZ18A | 6788033/6788034/ 6788035/VJ32B | UA54A/UA54J/ UA55A/UA55I/ UB47A/UB47I | 6571477/6571478/ UL18G | 6689149/6689150/ 6689151/UY55F | 6788004/6788005/ 6788006/VJ03F |
| Laboratory Data Package ID: | Cleanup | UA90/UA91 | 1295735/UM54 | 1316786/UZ18 | 1335483/VJ32 | UA54/UA55/UB47 | 1293989/UL18 | 1316071/UY55 | 1335480/VJ03 |
| Sample Date: | Levels | 12/12/2011 | 3/14/2012 | 6/18/2012 | 9/12/2012 | 12/08/2011 | 03/07/2012 | 6/14/2012 | 9/11/2012 |
| Tide Level (ft MLLW): | | -0.8 | 0.2 | -0.8 | 1.2 | 6.3 | 6.6 | 4.0 | 8.6 |
| **VOLATILES (µg/L)** | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | |
| Acetone | 110,000 | 5.0 UJ | 3.0 U | 3.0 U | 3.0 U | 5.0 U | 3.0 U | 3.0 U | 3.0 U |
| Benzene | 2 | 0.2 UJ | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | **0.1** J1 | **0.1** J1 |
| Bromodichloromethane | 17 | 0.2 UJ | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Carbon Disulfide | 3900 | 0.2 UJ | 0.4 U | 0.4 U | 0.4 U | 0.2 U | 0.4 U | 0.4 U | 0.4 U |
| Chloroform | 9.4 | 0.2 UJ | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2-Dichlorobenzene | 440 | 0.2 UJ | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | **0.2** J1 | **0.2** J1 |
| 1,1-Dichloroethane | 33 | 0.2 UJ | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | 0.2 UJ | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | **0.1** J1 | 0.1 U |
| 4-Isopropyltoluene | --- | 0.2 UJ | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 UJ | 0.2 U | 0.2 U | **0.3** J1 | 0.5 U | 0.2 U | 0.2 U | 0.2 U |
| Naphthalene | 26 | 0.5 UJ | 0.1 U | **0.2** J1 | **0.2** J1 | 0.5 U | 0.1 U | **0.1** J1 | **0.1** J1 |
| Toluene | 1300 | 0.2 UJ | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 UJ | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | **0.2** J1 | 0.1 J |
| m,p-Xylene | 1300 | 0.4 UJ | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 UJ | 0.010 U | 0.026 U | **0.011** J1 | 0.020 U | 0.010 U | **0.017** J1 | 0.010 U |
| Vinyl Chloride | 0.53 | 0.020 UJ | 0.010 U | 0.010 U | **0.140** | 0.020 U | **0.019** J1 | **0.014** J1 | **0.013** J1 |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | **0.1** J1 | 0.1 U | 1.2 U | 0.09 U | 0.1 U | 0.1 U |
| Chrysene | 0.018 | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.2 U | 0.09 U | 0.1 U | 0.1 U |
| 2,4-Dichlorophenol | --- | 5.0 U | 0.5 U | 0.5 U | 0.5 U | 5.9 U | 0.5 U | 0.5 U | 0.5 U |
| bis(2-Ethylhexyl)phthalate | 1.2 | **3.7** | 2 U | 2 U | 2 U | 1.2 U | 2 U | 2 U | 2 U |
| Fluoranthene | 11 | 1.0 U | 0.1 U | **0.2** J1 | **0.1** J1 | 1.2 U | 0.09 U | 0.1 U | 0.1 U |
| Fluorene | 45 | 1.0 U | 0.1 U | **0.1** J1 | 0.1 U | 1.2 U | 0.09 U | 0.1 U | 0.1 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | **0.1** J1 | **0.3** J1 | **0.3** J1 | 1.2 U | 0.09 U | 0.1 U | 0.1 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | **0.2** J1 | **0.3** J1 | 1.2 U | 0.09 U | 0.1 U | 0.1 U |
| 4-Methylphenol | 330 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.2 U | 0.5 U | 0.5 U | 0.5 U |
| Naphthalene | 26 | 1.0 U | 0.1 U | **0.2** J1 | **0.2** J1 | 1.2 U | **0.1** J1 | **0.1** J1 | **0.2** J1 |
| Phenanthrene | --- | 1.0 U | **0.2** J1 | **0.5** | **0.6** | 1.2 U | 0.09 U | 0.1 U | 0.1 U |
| Phenol | 41,000 | 1.0 U | 0.5 U | 0.5 U | **1** | 1.2 U | 0.5 U | 0.5 U | 0.5 U |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.2 UJ2 | **0.2** J1 | 1.2 U | 0.09 U | 0.1 U | 0.1 U |
| **cPAHs (µg/L)** | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | |
| Benzo(a)anthracene | 0.0018 | 0.010 U | 0.0049 U | **0.0070** J1 | **0.0060** J1 | 0.010 U | 0.0048 U | 0.0053 U | 0.0053 U |
| Benzo(a)pyrene | 0.00018 | 0.010 U | 0.0049 U | 0.0047 U | 0.0049 U | 0.010 U | 0.0048 U | 0.0053 U | 0.0053 U |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0047 U | 0.0049 U | NA | 0.0048 U | 0.0053 U | 0.0053 U |
| Benzo(k)fluoranthene | 0.0018 | NA | 0.0049 U | 0.0047 U | 0.0049 U | NA | 0.0048 U | 0.0053 U | 0.0053 U |
| Total Benzofluoranthenes | 0.0018 | 0.020 U | NA | NA | NA | 0.020 U | NA | NA | NA |
| Chrysene | 0.018 | 0.010 U | 0.0049 U | **0.010** | 0.0049 U | 0.010 U | 0.0048 U | 0.0053 U | 0.0053 U |
| Dibenz(a,h)anthracene | 0.0018 | 0.010 U | 0.0039 U | 0.0038 U | 0.0039 U | 0.010 U | 0.0038 U | 0.0042 U | 0.0042 U |
| Indeno(1,2,3-cd)pyrene | 0.0018 | 0.010 U | 0.0039 U | 0.0038 U | 0.0039 U | 0.010 U | 0.0038 U | 0.0042 U | 0.0042 U |
| Pyrene | 9.8 | NA | **0.048** J1 | **0.18** | **0.140** | NA | 0.0095 U | 0.011 U | 0.011 U |
| cPAH TEQ | 0.00018 | ND | ND | **0.0008** J | **0.0006** J | ND | ND | ND | ND |
| **PCBs (µg/L)** | | | | | | | | | |
| **Method SW8082** | | | | | | | | | |
| Aroclor 1248 | 0.000023 | 0.010 U | 0.0048 U | **0.016** | 0.0049 U | 0.010 U | 0.0053 U | 0.0050 U | 0.0055 U |
| Aroclor 1254 | 0.0000055 | 0.010 U | **0.012** | 0.0048 U | 0.0049 U | 0.010 U | 0.0053 U | 0.0050 U | 0.0055 U |
| Aroclor 1260 | 0.000023 | 0.010 U | 0.0048 U | 0.0048 U | 0.0049 U | 0.010 U | 0.0053 U | 0.0050 U | 0.0055 U |
| Total PCBs | 0.000023 | ND | **0.012** | **0.016** | ND | ND | ND | ND | ND |

# TABLE 13
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Other | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-17 | IT-MW-17 | IT-MW-17 | IT-MW-17 | IT-PZ-6 | IT-PZ-6 | IT-PZ-6 | IT-PZ-6 |
| Laboratory Sample ID: | | UA90A/UA90D/ UA91A/UA91C | 6580630/6580631/ UM54A | 6692719/6692720/ 6692721/UZ18A | 6788033/6788034/ 6788035/VJ32B | UA54A/UA54J/ UA55A/UA55I/ UB47A/UB47I | 6571477/6571478/ UL18G | 6689149/6689150/ 6689151/UY55F | 6788004/6788005/ 6788006/VJ03F |
| Laboratory Data Package ID: | | UA90/UA91 | 1295735/UM54 | 1316786/UZ18 | 1335483/VJ32 | UA54/UA55/UB47 | 1293989/UL18 | 1316071/UY55 | 1335480/VJ03 |
| Sample Date: | | 12/12/2011 | 3/14/2012 | 6/18/2012 | 9/12/2012 | 12/08/2011 | 03/07/2012 | 6/14/2012 | 9/11/2012 |
| Tide Level (ft MLLW): | | -0.8 | 0.2 | -0.8 | 1.2 | 6.3 | 6.6 | 4.0 | 8.6 |
| **TOTAL METALS (µg/L)** | | | | | | | | | |
| **Method 200.8** | | | | | | | | | |
| Antimony | --- | 1 U | **0.73** J1 | **1.4** | 0.33 U | 0.5 U | 0.42 U | **0.43** J1 | **0.46** J1 |
| Arsenic | --- | **16** | **9.2** | **63.1** | **5.5** J1 | **1560** | **462** | **7870** | **7280** |
| Barium | --- | **77** | **34.3** | **75.7** | **104** | **163** | **177** | **152** | **191** |
| Beryllium | --- | 1 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | 0.025 U |
| Cadmium | --- | 0.5 U | 0.20 U | 0.048 U | 0.08 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | --- | 2 U | **1.5** J1 | **0.50** J1 | 0.50 U | 1 U | **1.1** J1 | **0.83** J1 | **1.2** J1 |
| Copper | --- | 2 U | 1.6 UJ2 | **6.2** | **0.68** J1 | 1 U | **0.57** J1 | **0.29** J1 | **0.78** J1 |
| Lead | --- | 0.5 U | **0.59** J1 | **2.9** | **0.120** J1 | 0.1 U | **0.17** J1 | 0.034 U | 0.034 U |
| Nickel | --- | **5** | **1.0** J1 | **2.0** | **0.63** J1 | **4.5** | **1.4** J1 | **0.68** J1 | **0.69** J1 |
| Selenium | --- | 10 U | 0.27 UJ | **0.69** J1 | **0.66** J1 | 5 U | **0.29** J1 | **1.1** J1 | **0.59** J, J1 |
| Zinc | --- | 20 U | 4.0 U | **12.8** J1 | 1.1 U | 4 U | 4.0 U | 1.1 U | **8.4** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | |
| Mercury | 12 | 20.0 U | 1.60 U | **3.25** J1 | 3.20 U | 20.0 U | 3.20 U | 3.20 U | 3.20 U |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | |
| Antimony | 150 | 1 U | **0.61** J1 | **0.97** J1 | 0.33 U | 0.5 U | 0.42 U | **0.31** J1 | 0.33 U |
| Arsenic | 8 | [**23**] | [**9.6**] | [**12.5**] | **4.3** J1 | [**1530**] | [**437**] | [**6610**] | [**8010**] |
| Barium | 770 | **76** | **34.8** | **56.3** | **112** | **163** | **176** | **157** | **184** |
| Beryllium | 12 | 1 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | 0.025 U | 0.025 U |
| Cadmium | 0.25 | 0.5 U | 0.20 U | 0.048 U | 0.08 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | 74 | 2 U | **0.80** J1 | **0.15** J1 | 0.50 U | **1.4** | **1.1** J1 | **0.89** J1 | **0.98** J1 |
| Copper | 8 | 2 U | **0.62** J1 | **0.39** J1 | 0.4 U | **1.1** | 0.38 U | **0.25** J1 | 0.40 U |
| Lead | 2.5 | 0.5 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | 0.34 U | 0.034 U |
| Nickel | 8.2 | **5** | **0.68** J1 | **0.40** J1 | **0.73** J1 | **4.8** | **0.86** J1 | **0.73** J1 | **0.59** J1 |
| Selenium | 5 | 10 U | 0.27 UJ | **0.69** J1 | **0.82** J1 | **5** | **0.38** J1 | **1.4** J1 | 0.50 UJ |
| Silver | 22 | 1 U | 0.098 U | 0.10 U | 0.1 U | 0.2 U | 0.098 U | 0.046 U | 0.10 U |
| Zinc | 56 | 20 U | 4.0 U | **1.5** J1 | 1.1 U | 4 U | 4.0 U | 1.1 U | 1.7 UJ2 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | |
| Mercury | 12 | 20.0 U | 1.60 U | 1.60 U | **3.97** J1 | 20.0 U | **5.00** J1 | 3.20 U | 3.20 U |
| **CONVENTIONALS (mg/L)** | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **2290** | **6800** | NA | NA | **3450** | **2930** |
| Nitrate (Method 300.0) | --- | 0.1 U | **0.25** | **0.12** | 0.050 U | 0.5 U | 0.050 U | 0.050 U | 0.050 U |
| Sulfate ( Method 300.0) | --- | **648** | **286** | **326** | **1360** | **3.0** | **1.8** | **40.6** | **11.4** |
| Total Dissolved Solids (Method 160.1) | --- | **8210** | **3950** | **3820** J | **11200** | **5890** | **658** | **7180** | **7410** |
| **FIELD PARAMETERS** | | | | | | | | | |
| Temperature (°C) | --- | 12.11 | 9.69 | 12.78 | 16.63 | 14.85 | 14.17 | 15.14 | 16.22 |
| Conductivity (uS/cm) | --- | 26823 | 4351 | 5620 | 2230 | 11885 | 5860 | 7348 | 6537 |
| Dissolved Oxygen (mg/L) | --- | 0.80 | 2.29 | 0.41 | 0.99 | 0.79 | 0.44 | 0.32 | 0.49 |
| pH (SU) | --- | 9.07 | 10.40 | 10.09 | 9.63 | 6.50 | 8.90 | 6.76 | 6.86 |
| ORP (mV) | --- | -29.9 | -181.8 | -191.9 | -262 | -86.8 | -160.2 | -142.9 | -141.2 |
| Turbidity (NTU) | --- | 0.00 | 3.71 | 7.95 | 21.25 | 2.8 | 3.39 | 6.68 | 7.51 |
| Ferrous Iron (mg/L) | --- | NA | 0.0 | 0.0 | 0.0 | NA | 1.8 | 2.0 | 2.6 |

ng/L = nanograms per liter
µg/L = micrograms per liter
mg/L = milligrams per liter
mV = millivolts
SU = standard unit
uS/cm = milliSiemens per centimeter
C = Centigrade
ND = Not Detected.
NA = Not Applicable.
SIM = Selected Ion Monitoring

cPAHs = carcinogenic polycylic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls

J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
U = Indicates the compound was undetected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
UJ2 = The analyted was not detected in the sample at or above the numerical value shown; the numerical value is below the reporting limit, but greater than the detection limit.

Box = Exceeds preliminary cleanup level
Bold = Detected compound

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Western Property Boundary | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-I-206 | IT-I-206 | IT-I-206 | IT-I-206 | IT-MW-7 | IT-MW-7 | IT-MW-7 | IT-MW-7 | IT-PZ-8 | IT-PZ-8 | IT-PZ-8 | IT-PZ-8 |
| Laboratory Sample ID: | | UA27D/UA27L/ UA28D/UA28K/ UB45D/UB45K | 6577003/6577004/ UM00B | 6693953/6693954/ 6693955/UZ37D | 6790518/6790519/ 6790520/VJ63G | TZ99A/TZ99D/ UA00A/UA00C/ UB44A/UB44C | 6577001/6577002/ UM00A | 6693950/6693951/ 6693952/UZ37C | 6790515/6790516/ 6790517/VJ63F | TZ99B/TZ99E/ UA00B/UA00D/ UB44B/UB44D | 6577005/6577006/ UM00C | 6690474/6690475/ 6690476/UZ00B | 6789050/6789051/ 6789052/VJ53B |
| Laboratory Data Package ID: | | UA27/UA28/UB45 | 1295065/UM00 | 1317022/UZ37 | 1335985/VJ63 | TZ99/UA00/UB44 | 1295065/UM00 | 1317022/UZ37 | 1335985/VJ63 | TZ99/UA00/UB44 | 1295065/UM00 | 1316296/UZ00 | 1335688/VJ53 |
| Sample Date: | | 12/06/2011 | 03/12/2012 | 6/19/2012 | 9/14/2012 | 12/05/2011 | 03/12/2012 | 6/19/2012 | 9/14/2012 | 12/05/2011 | 03/12/2012 | 6/15/2012 | 9/13/2012 |
| Tide Level (ft MLLW): | | 0.3 | -0.3 | -1.1 | 0.8 | 1.3 | 0.1 | -1.6 | 1.3 | 1.2 | -0.3 | 0.1 | 1.2 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| sec-Butylbenzene | --- | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Chloroethane | 21,000 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Chloroform | 9.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethane | 33 | 0.2 U | **0.1** J1 | **0.1** J1 | **0.1** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethene | 3.2 | **0.1** J1 | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | **0.2** | **0.2** J1 | **0.3** | **0.2** | **1.7** | **2.8** | **2.3** | **1.2** | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| trans-1,2-Dichloroethene | 940 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | **0.1** J1 | **0.1** J1 | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2-Dichloropropane | 3.7 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U | **0.3** J1 | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U |
| Naphthalene | 26 | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | 0.1 U |
| Tetrachloroethene | 3.3 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.5** | **0.3** | **0.4** | **0.4** | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1,1-Trichloroethane | 46,000 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Trichloroethene | 1.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **1.8** | **1.4** | **1.4** | **1.3** | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Vinyl Chloride | 0.53 | **0.4** | **0.5** | **0.4** | **0.3** | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| m,p-Xylene | 1300 | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U |
| o-Xylene | 1600 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | **0.010** J1 | 0.010 U | **0.44** | **0.36** | **0.38** | **0.41** | 0.020 U | 0.010 U | **0.25** | 0.010 U |
| Vinyl Chloride | 0.53 | **0.31** | **0.46** | **0.37** | **0.24** | 0.020 U | **0.012** J1 | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U |
| Acrylonitrile | 0.057 | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.09 U |
| Anthracene | 200 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.09 U |
| Carbazole | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.6 U | 0.5 U | 0.5 U |
| 2,4-Dimethylphenol | 660 | 1.0 U | 0.5 U | 0.5 U | **1** | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.6 U | 0.5 U | 0.5 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.09 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.09 U |
| Naphthalene | 26 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.09 U |
| Phenanthrene | --- | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.09 U |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.09 U |
| **cPAHs (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0048 U | 0.0054 U | 0.0051 U | NA | 0.0048 U | 0.0050 U | 0.0048 U | NA | 0.0048 U | 0.0048 U | 0.0047 U |
| Pyrene | 9.8 | NA | 0.0095 U | 0.011 U | 0.010 U | NA | 0.0096 U | 0.010 U | 0.0096 U | NA | 0.0095 U | 0.0096 U | 0.0094 U |
| Total cPAHs TEQ | 0.00018 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/L)** | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | |
| Diesel-Range Organics | 0.5 | 0.10 U | 0.075 U | 0.031 U | 0.033 U | 0.10 U | 0.068 U | 0.030 U | 0.030 U | 0.10 U | 0.069 U | 0.030 U | 0.029 U |
| **NWTPH-G** | | | | | | | | | | | | | |
| Gasoline-Range Organics | 1.0/0.8 | 0.25 U | 0.05 U | 0.05 U | 0.05 U | 0.25 U | 0.05 U | 0.05 U | 0.05 U | 0.25 U | 0.05 U | 0.05 U | 0.05 U |

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Western Property Boundary | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-I-206 | IT-I-206 | IT-I-206 | IT-I-206 | IT-MW-7 | IT-MW-7 | IT-MW-7 | IT-MW-7 | IT-PZ-8 | IT-PZ-8 | IT-PZ-8 | IT-PZ-8 |
| Laboratory Sample ID: | | UA27D/UA27L/ UA28D/UA28K/ UB45D/UB45K | 6577003/6577004/ UM00B | 6693953/6693954/ 6693955/UZ37D | 6790518/6790519/ 6790520/VJ63G | TZ99A/TZ99D/ UA00A/UA00C/ UB44A/UB44C | 6577001/6577002/ UM00A | 6693950/6693951/ 6693952/UZ37C | 6790515/6790516/ 6790517/VJ63F | TZ99B/TZ99E/ UA00B/UA00D/ UB44B/UB44D | 6577005/6577006/ UM00C | 6690474/6690475/ 6690476/UZ00B | 6789050/6789051/ 6789052/VJ53B |
| Laboratory Data Package ID: | | UA27/UA28/UB45 | 1295065/UM00 | 1317022/UZ37 | 1335985/VJ63 | TZ99/UA00/UB44 | 1295065/UM00 | 1317022/UZ37 | 1335985/VJ63 | TZ99/UA00/UB44 | 1295065/UM00 | 1316296/UZ00 | 1335688/VJ53 |
| Sample Date: | | 12/06/2011 | 03/12/2012 | 6/19/2012 | 9/14/2012 | 12/05/2011 | 03/12/2012 | 6/19/2012 | 9/14/2012 | 12/05/2011 | 03/12/2012 | 6/15/2012 | 9/13/2012 |
| Tide Level (ft MLLW): | | 0.3 | -0.3 | -1.1 | 0.8 | 1.3 | 0.1 | -1.6 | 1.3 | 1.2 | -0.3 | 0.1 | 1.2 |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | |
| Arsenic | --- | **398** | **207** | **461** | **453** | **3.5** | **9.0** | **3.1** | **4.7** | **1.2** | 0.95 U | **0.94** J1 | **0.90** J1 |
| Barium | --- | **22.8** | **22.1** | **24.7** | **23.1** | **30.0** | **9.1** | **13.6** | **10.6** | **11.6** | **34.9** | **21.9** | **10.1** |
| Beryllium | --- | 0.2 U | 0.13 U | 0.025 U | **0.035** J1 | 0.2 U | 0.13 U | **0.026** J1 | **0.027** J1 | 0.2 U | 0.13 U | 0.025 U | 0.025 U |
| Chromium | --- | **1.1** | **0.97** J1 | **1.5** J1 | **1.4** J1 | 0.5 U | 0.60 U | 0.50 U | 0.50 U | **1.1** | 0.60 U | **0.49** J1 | **1.0** J1 |
| Copper | --- | **0.6** | **1.1** J1 | 0.15 U | 0.40 U | **2.0** | **2.4** | **1.5** J1 | **2.2** | 0.5 U | 0.38 U | **0.28** J1 | 0.40 U |
| Lead | --- | 0.1 U | **0.31** J1 | 0.034 U | **0.37** J1 | 0.1 U | **0.094** J1 | **0.042** J1 | 0.034 U | 0.1 U | 0.080 U | 0.034 U | **0.047** J1 |
| Nickel | --- | **1.4** | **0.55** J1 | **0.30** J1 | **0.42** J1 | **2.9** | **1.9** J1 | **2.6** | **1.7** J1 | **0.6** | 0.50 U | 0.13 U | 0.35 U |
| Selenium | --- | **0.8** | 0.27 U | **0.24** J1 | 0.50 U | **0.5** | **0.42** J1 | **0.75** J1 | **0.63** J1 | **2** | 0.27 U | **0.23** J1 | 0.50 U |
| Thallium | --- | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | **0.050** J1 | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | --- | 4 U | **20.1** | 1.1 U | 1.1 U | **4** | 4.0 U | **2.1** J1 | **1.5** J1 | 4 U | 4.0 U | 1.1 U | 1.1 U |
| **Method SW7196A (mg/L)** | | | | | | | | | | | | | |
| Chromium VI | 0.00058 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 UJ | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **3.38** J1 | 1.60 U | **2.61** J1 | 20.0 U | **4.29** | **1.77** | **2.06** | 20.0 U | 1.60 U | 0.160 U | **0.308** J1 |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | |
| Antimony | 150 | 0.2 U | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U |
| Arsenic | 8 | **401** | **190** | **464** | **445** | **3.6** | **8.7** | **3.6** | **3.2** | **2.0** | 0.95 U | **1.1** J1 | **1.0** J1 |
| Barium | 770 | **21.4** | **16.0** | **23.3** | **26.6** | **29.0** | **8.6** | **12.2** | **10.8** | **12.3** | **33.2** | **21.1** | **9.5** |
| Beryllium | 12 | 0.2 U | 0.13 U | 0.025 U | **0.027** J1 | 0.2 U | 0.13 U | **0.027** J1 | 0.025 U | 0.2 U | 0.13 U | 0.025 U | 0.025 U |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | 74 | **0.9** | **0.79** J1 | **1.4** J1 | **1.1** J1 | 0.5 U | 0.60 U | 0.50 U | 0.50 U | **1.0** | 0.60 U | **0.39** J1 | **1.0** J1 |
| Copper | 8 | 0.5 U | 0.38 U | 0.15 U | 0.40 U | **2.1** J | **2.6** | **2.0** | **2.3** | 0.5 U | 0.38 U | **2.8** | 0.40 U |
| Lead | 2.5 | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | **0.097** J1 | 0.034 U |
| Nickel | 8.2 | **0.9** | **0.75** J1 | **0.27** J1 | **0.42** J1 | **2.6** | **1.7** J1 | **2.6** | **1.7** J1 | **0.7** | 0.50 U | 0.13 U | 0.35 U |
| Selenium | 5 | **0.8** | 0.27 U | 0.18 U | 0.50 U | 0.5 U | **0.43** J1 | **0.69** J1 | **1.0** J1 | **3.8** | 0.27 U | **0.22** J1 | 0.50 U |
| Thallium | 0.47 | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | 56 | 4 U | **24.4** | 1.1 U | **1.5** J1 | **10** | **4.3** J1 | **4.5** J1 | **2.5** J1 | 4 U | 4.0 U | **4.2** J1 | **1.4** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **3.25** J1 | 1.60 U | **4.52** J1 | 20.0 U | **4.09** | **2.20** | **2.81** | 20.0 U | 1.60 U | **0.428** J1 | **0.419** J1 |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **38.6** | **29.5** | NA | NA | **18.4** | **13.4** | NA | NA | **1020** | **407** |
| Nitrate (Method 300.0) | --- | 0.1 U | 0.050 UJ | 0.25 U | 0.050 U | **1.2** | **1.2** | **0.97** | **1.5** | 0.1 U | 0.050 U | 0.050 U | 0.050 U |
| Sulfate ( Method 300.0) | --- | **22.1** | **11.2** | **6.0** | **27.8** | **22.7** | **20.9** J | **34.2** | **35.7** | **24.0** | **12.5** | **119** | **35.9** |
| Total Dissolved Solids (Method 160.1) | --- | **508** | **488** | **499** J | **560** | **194** | **167** | **230** J | **207** | **1250** | **2280** | **1890** | **998** |
| **FIELD PARAMETERS** | | | | | | | | | | | | | |
| Temperature (°C) | --- | 15.63 | 14.85 | 15.55 | 16.64 | 14.47 | 12.95 | 13.13 | 15.56 | 16.1 | 14.75 | 14.3 | 17.18 |
| Conductivity (uS/cm) | --- | 1006 | 711 | 787 | 684 | 517 | 176 | 243 | 192 | 1878 | 3546 | 2783 | 1830 |
| Dissolved Oxygen (mg/L) | --- | 0.52 | 1.18 | 0.45 | 0.53 | 1.36 | 1.81 | 3.19 | 1.13 | 1.4 | 0.61 | 0.43 | 0.93 |
| pH (SU) | --- | 6.11 | 7.36 | 6.92 | 7.42 | 5.15 | 6.99 | 5.48 | 6.61 | 6.8 | 7.23 | 7.06 | 6.60 |
| ORP (mV) | --- | -125.7 | -115.6 | -146.9 | -127.8 | 112.68 | -67.7 | 9.1 | 76.2 | -49.9 | -111.8 | -111.1 | -137 |
| Turbidity (NTU) | --- | 2.45 | 41.18 | 5.56 | 3.64 | 1.71 | 9.9 | 3.18 | 7.64 | 2.5 | 2.59 | 25.65 | 47.6 |
| Ferrous Iron (mg/L) | --- | NA | 1.6 | 0.6 | 2.2 | NA | 0.6 | 0.0 | 2.2 | NA | 1.8 | 3.8 | 2.0 |

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Southern Property Boundary | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-5 | IT-MW-5 | IT-MW-5 | IT-MW-5 | IT-MW-6 | IT-DUP-1 (IT-MW-6) | IT-MW-6 | IT-DUP-1 (IT-MW-6) | IT-MW-6 | IT-DUP-2 (IT-MW-6) | IT-MW-6 | IT-DUP-2 (IT-MW-6) |
| Laboratory Sample ID: | Preliminary Cleanup Levels | UB08E/UB08J/ UB09E/UB09J/ UD89A | 6572513/6572514/ UL36B | 6695720/6695721/ 6695722/UZ55B | 6789068/6789069/ 6789070/VJ53H | UA44A/UA44I/ UA45A/UA45H/ UB46A/UB46H | UA44G/UA44O/ UA45G/UA45N/ UB46G/UB46N | 6572517/6572518/ UL36D | 6572521/UL36F | 6697970/6697971/ 6697972/UZ66E | 6697973/6697974/ 6697975/UZ66F | 6789074/6789075/ 6789076/VJ53J | 6789077/6789078/ 6789079/VJ53K |
| Laboratory Data Package ID: | | UB08/UB09/UD89 | 1294218/UL36 | 1317333/UZ55 | 1335688/VJ53 | UA44/UA45/UB46 | UA44/UA45/UB46 | 1294218/UL36 | 1294218/UL36 | 1317686/UZ66 | 1317686/UZ66 | 1335688/VJ53 | 1335688/VJ53 |
| Sample Date: | | 12/13/2011 | 03/08/2012 | 6/20/2012 | 9/13/2012 | 12/07/2011 | 12/07/2011 | 03/08/2012 | 03/08/2012 | 6/21/2012 | 6/21/2012 | 9/13/2012 | 9/13/2012 |
| Tide Level (ft MLLW): | | 7.8 | 3.8 | 0.8 | 5.8 | 5.2 | 5.2 | 3.1 | 3.8 | 7.2 | 7.1 | 6.4 | 6.6 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | **0.1** J1 | **0.1** J1 | 0.1 U | 0.1 U |
| sec-Butylbenzene | --- | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | **0.2** J1 | **0.2** J1 | 0.1 U | 0.1 U |
| Chloroethane | 21,000 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | **0.2** J1 | **0.2** J1 | **1** | **1.1** | 0.1 U | **0.1** J1 |
| Chloroform | 9.4 | **0.2** | 0.1 U | 0.1 U | 0.1 U | **0.3** | **0.3** | 0.2 U | 0.2 U | **0.2** J1 | **0.1** J1 | **0.2** J1 | **0.2** J1 |
| 1,1-Dichloroethane | 33 | **0.5** | **0.1** J1 | **0.1** J1 | **0.1** J1 | **1.2** | **1.3** | **1.7** | **1.7** | **3.3** | **3.2** | **2.9** | **2.8** |
| 1,1-Dichloroethene | 3.2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.6** | **0.6** | **0.7** | **0.7** | **4.3** | **4.0** | **1.6** | **1.6** |
| cis-1,2-Dichloroethene | 130 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **130** | **140** | **150** | **160** | **240** | **260** | **200** | **200** |
| trans-1,2-Dichloroethene | 940 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **2.1** | **2.2** | **2.6** | **2.6** | **4.0** | **3.9** | **4.3** | **4.2** |
| 1,2-Dichloropropane | 3.7 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.5 U | 0.4 U | 0.4 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Naphthalene | 26 | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Tetrachloroethene | 3.3 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.7** | **0.6** | **0.8** | **0.8** | **0.9** | **0.9** | **1.3** | **1.3** |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1,1-Trichloroethane | 46,000 | **2.4** | **2.2** | **1.9** | **2.0** | **0.3** | **0.3** | **0.4** J1 | **0.4** J1 | **0.4** J1 | **0.4** J1 | **0.6** | **0.6** |
| Trichloroethene | 1.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **71** | **76** | **110** | **120** | **150** | **150** | **150** | **150** |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Vinyl Chloride | 0.53 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **94** | **100** | **110** | **110** | **120** | **130** | **97** | **100** |
| m,p-Xylene | 1300 | 0.4 U | 0.1 U | 0.1 U | 0.1 U | **0.2** J1 | **0.2** J1 | 0.2 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| o-Xylene | 1600 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.2** J1 | **0.1** J1 | 0.2 U | 0.2 U | **0.9** | **0.7** | 0.1 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | 0.010 U | 0.010 U | **0.56** | **0.58** | **1.1** | **0.95** | **0.77** J | **1.0** J | **1.3** | **1.4** |
| Vinyl Chloride | 0.53 | 0.020 U | 0.010 U | 0.010 U | 0.010 U | **42** ES | **43** ES | **96** | **94** | **140** | **140** | **110** | **110** |
| Acrylonitrile | 0.057 | 0.050 U | NA | NA | NA | **0.16** J | **0.16** J | NA | NA | NA | NA | NA | NA |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | **0.6** J1 | **0.1** J1 | **0.2** J1 | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Anthracene | 200 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Carbazole | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| 2,4-Dimethylphenol | 660 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U | 0.5 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Naphthalene | 26 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | **0.1** J1 | 0.1 U | 0.1 U | **0.1** J1 |
| Phenanthrene | --- | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| **cPAHs (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Benzo(b)fluoranthene | 0.0018 | NA | **0.0070** J1 | 0.0048 U | 0.0050 U | NA | NA | 0.0047 U | 0.0047 U | 0.0051 U | 0.0052 U | 0.0049 U | 0.0048 U |
| Pyrene | 9.8 | NA | 0.011 U | 0.0095 U | 0.010 U | NA | NA | 0.0094 U | 0.0095 U | 0.010 U | 0.010 U | 0.0097 U | 0.0095 U |
| Total cPAHs TEQ | 0.00018 | ND | **0.0007** J1 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/L)** | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | |
| Diesel-Range Organics | 0.5 | 0.10 U | 0.067 U | 0.029 U | 0.029 U | 0.10 U | 0.10 U | 0.068 U | 0.067 U | 0.031 U | 0.030 U | 0.028 U | 0.029 U |
| **NWTPH-G** | | | | | | | | | | | | | |
| Gasoline-Range Organics | 1.0/0.8 | 0.25 U | 0.05 U | 0.05 U | 0.05 U | 0.25 U | 0.25 U | 0.05 U | 0.05 U | **0.057** J1 | 0.05 U | 0.05 U | 0.05 U |

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Southern Property Boundary | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-5 | IT-MW-5 | IT-MW-5 | IT-MW-5 | IT-MW-6 | IT-DUP-1 (IT-MW-6) | IT-MW-6 | IT-DUP-1 (IT-MW-6) | IT-MW-6 | IT-DUP-2 (IT-MW-6) | IT-MW-6 | IT-DUP-2 (IT-MW-6) |
| Laboratory Sample ID: | Preliminary | UB08E/UB08J/ UB09E/UB09J/ UD89A | 6572513/6572514/ UL36B | 6695720/6695721/ 6695722/UZ55B | 6789068/6789069/ 6789070/VJ53H | UA44A/UA44I/ UA45A/UA45H/ UB46A/UB46H | UA44G/UA44O/ UA45G/UA45N/ UB46G/UB46N | 6572517/6572518/ UL36D | 6572521/UL36F | 6697970/6697971/ 6697972/UZ66E | 6697973/6697974/ 6697975/UZ66F | 6789074/6789075/ 6789076/VJ53J | 6789077/6789078/ 6789079/VJ53K |
| Laboratory Data Package ID: | Cleanup | UB08/UB09/UD89 | 1294218/UL36 | 1317333/UZ55 | 1335688/VJ53 | UA44/UA45/UB46 | UA44/UA45/UB46 | 1294218/UL36 | 1294218/UL36 | 1317686/UZ66 | 1317686/UZ66 | 1335688/VJ53 | 1335688/VJ53 |
| Sample Date: | Levels | 12/13/2011 | 03/08/2012 | 6/20/2012 | 9/13/2012 | 12/07/2011 | 12/07/2011 | 03/08/2012 | 03/08/2012 | 6/21/2012 | 6/21/2012 | 9/13/2012 | 9/13/2012 |
| Tide Level (ft MLLW): | | 7.8 | 3.8 | 0.8 | 5.8 | 5.2 | 5.2 | 3.1 | 3.8 | 7.2 | 7.1 | 6.4 | 6.6 |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | |
| Arsenic | --- | 0.6U/**0.4*** | 0.95 U | 0.95 U | **0.52** J1 | 2.2 | **2.1** | 0.95 U | 0.95 U | **0.68** J1 | **0.99** J1 | **1.0** J1 | **0.68** J1 |
| Barium | --- | **130** | **80.3** | **40.7** | **53.7** | **91.3** | **92.0** | **80.6** | **80.5** | **45.0** | **44.4** | **52.6** | **56.0** |
| Beryllium | --- | 0.2 U | 0.13 U | 0.13 U | **0.043** J1 | 0.2 U | 0.2 U | 0.13 U | 0.13 U | **0.029** J1 | **0.035** J1 | **0.027** J1 | **0.031** J1 |
| Chromium | --- | 0.5 U | 0.60 U | 0.60 U | 0.50 U | **0.5** | **0.5** | 0.60 U | **0.61** J1 | **0.54** J1 | **0.52** J1 | **0.62** J1 | **0.73** J1 |
| Copper | --- | **1.8** | **1.1** J1 | **1.3** J1 | **1.2** J1 | **0.9** | 0.5 U | **1.5** J1 | **1.6** J1 | **0.98** J1 | **1.1** J1 | **0.45** J1 | **0.46** J1 |
| Lead | --- | 0.1 U | 0.080 U | 0.080 U | 0.034 U | 0.1 U | 0.1 U | 0.080 U | 0.080 U | 0.034 U | 0.034 U | 0.034 U | **0.035** J1 |
| Nickel | --- | **10.2** | **6.9** | **2.6** | **5.6** | **2.5** J | **3.1** J | **1.8** J1 | **1.7** J1 | **2.6** | **2.4** | **2.6** | **3.9** |
| Selenium | --- | **0.6** | **0.53** J1 | 0.27 U | 0.50 U | **0.6** | **0.8** | 0.27 U | 0.27 U | 0.18 U | **0.21** J1 | 0.50 U | 0.50 U |
| Thallium | --- | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.2 U | 0.15 U | 0.15 U | 0.029 U | 0.029 U | 0.15 U | 0.15 U |
| Zinc | --- | **31** | **14.8** J1 | **7.4** J1 | **14.3** J1 | **10** | **10** | **5.4** J1 | **6.1** J1 | **6.9** J1 | **7.2** J1 | **8.6** J1 | **9.4** J1 |
| **Method SW7196A (mg/L)** | | | | | | | | | | | | | |
| Chromium VI | 0.00058 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **0.397** J1 | **0.772** | **0.669** | 20.0 U | 20.0 U | **9.97** J, J1 | **37.4** J | **1.23** | **1.12** | **0.950** | 1.60 U |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | |
| Antimony | 150 | 0.2 U | 0.42 U | 0.42 U | 0.33 U | 0.2 U | 0.2 U | 0.42 U | 0.42 U | 0.33 U | 0.33 U | 0.33 U | 0.33 U |
| Arsenic | 8 | **0.5** | 0.95 U | 0.95 U | **0.48** J1 | **2.1** | **2.2** | 0.95 U | 0.95 U | **0.66** J1 | **0.64** J1 | **2.7** | **0.74** J1 |
| Barium | 770 | **137** | **83.7** | **40.3** | **55.3** | **89.9** | **89.2** | **84.9** | **92.4** | **46.6** | **46.4** | **50.8** | **56.1** |
| Beryllium | 12 | 0.2 U | 0.13 U | 0.13 U | **0.030** J1 | 0.2 U | 0.2 U | 0.13 U | 0.13 U | 0.025 U | 0.025 U | **0.027** J1 | **0.044** J1 |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.20 U | **0.11** J1 | 0.1 U | 0.1 U | 0.20 U | 0.20 U | 0.048 U | 0.048 U | 0.082 U | 0.082 U |
| Chromium | 74 | 0.5 U | 0.60 U | 0.60 U | 0.50 U | **1** | 1 U | **0.61** J1 | 0.60 U | **0.60** J1 | **0.57** J1 | **0.65** J1 | **0.59** J1 |
| Copper | 8 | **1.7** | **1.4** J1 | **1.5** J1 | **1.4** J1 | **1.3** | **0.7** | **1.5** J, J1 | 0.38 UJ | **0.54** J1 | **0.68** J1 | 0.40 U | 0.40 U |
| Lead | 2.5 | 0.1 U | 0.080 U | 0.080 U | 0.034 U | 0.1 U | 0.1 U | 0.080 U | 0.080 U | 0.034 U | 0.034 U | 0.034 U | **0.17** J1 |
| Nickel | 8.2 | **10.3** | **7.9** | **2.5** | **5.8** | **3.1** | **2.9** | **2.0** J | 0.50 UJ | **2.1** | **2.3** | **3.1** | **3.5** |
| Selenium | 5 | **0.7** | **0.57** J1 | 0.27 U | **0.55** J1 | **0.6** | **0.7** | 0.27 U | 0.27 U | 0.18 U | 0.18 U | 0.50 U | 0.50 U |
| Thallium | 0.47 | 0.2 U | 0.15 U | 0.15 U | 0.15 U | 0.2 U | 0.2 U | 0.15 U | 0.15 U | 0.029 U | 0.029 U | 0.15 U | 0.15 U |
| Zinc | 56 | **33** | **18.0** | **7.5** J1 | **12.8** J1 | **10** | **10** | **6.8** J1 | 4.0 U | **8.3** J1 | **9.3** J1 | **8.5** J1 | **8.1** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **0.716** | **0.676** | **1.07** | 20.0 U | 20.0 U | 1.60 U | 1.60 U | **1.01** | **0.791** | **3.62** J1 | **1.98** J1 |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **3.9** | **4.8** | NA | NA | NA | NA | **4.4** | **4.4** | **4.8** | **4.8** |
| Nitrate (Method 300.0) | --- | **56.8** | **70.1** | **25.4** | **57.9** J | **0.1** | **0.1** | **0.83** J | **1.2** J | 0.050 U | 0.050 U | **0.060** J1 | **0.052** J1 |
| Sulfate ( Method 300.0) | --- | **97.3** | **76.1** | **48.0** | **85.6** | **10.1** | **10.1** | **14.4** J | **18.6** J | **15.5** J | **22.9** J | **30.4** | **30.7** |
| Total Dissolved Solids (Method 160.1) | --- | **573** | **657** | **430** | **553** | **334** | **334** | **319** | **359** | **332** | **325** | **302** | **304** |
| **FIELD PARAMETERS** | | | | | | | | | | | | | |
| Temperature (°C) | --- | 16.46 | 15.34 | 16.40 | 16.83 | 16.43 | 16.43 | 15.94 | 15.94 | 16.01 | 16.01 | 20.96 | 20.96 |
| Conductivity (uS/cm) | --- | 20248 | 1207 | 494 | 625 | 1186 | 1186 | 577 | 577 | 408 | 408 | 3985 | 3985 |
| Dissolved Oxygen (mg/L) | --- | 1.07 | 0.49 | 2.41 | 0.47 | 1.54 | 1.54 | 0.53 | 0.53 | 0.47 | 0.47 | 0.74 | 0.74 |
| pH (SU) | --- | 5.97 | 6.30 | 8.38 | 6.10 | 5.59 | 5.59 | 7.35 | 7.35 | 7.43 | 7.43 | 6.17 | 6.17 |
| ORP (mV) | --- | -165.6 | 87.4 | 2 | 32.6 | 4.8 | 4.8 | 38.1 | 38.1 | 59.2 | 59.2 | 33 | 33 |
| Turbidity (NTU) | --- | 3.97 | 4.07 | 12.46 | 4.71 | 3.16 | 3.16 | 5.86 | 5.86 | 3.75 | 3.75 | 64.7 | 64.7 |
| Ferrous Iron (mg/L) | --- | NA | 0.2 | 0.0 | 0.0 | NA | NA | 0.8 | 0.8 | 0.6 | 0.6 | 1.6 | 1.6 |

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Eastern Property Boundary | | | | | | | | Former Washdown/Aqueous Degreaser Area | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-4 | IT-MW-4 | IT-MW-4 | IT-MW-4 | IT-PZ-2 | IT-PZ-2 | IT-PZ-2 | IT-PZ-2 | IT-MW-1 | IT-MW-1 | IT-MW-1 | IT-MW-1 |
| Laboratory Sample ID: | Preliminary Cleanup Levels | UB28C/UB28I/ UB29C/UB29H/ UD90A | 6572511/6572512/ UL36A | 6692725/6692726/ 6692727/UZ18C | 6790509/6790510/ 6790511/VJ63D | UB28D/UB28J/ UB29D/UB29I | 6572515/6572516/ UL36C | 6693944/6693945/ 6693946/UZ37A | 6790512/6790513/ 6790514/VJ63E | UA27B/UA27J/ UA28B/UA28I/ UB45B/UB45I | 6574126/6574127/ UL60B | 6697958/6697959/ 6697960/UZ66A | 6790506/6790507/ 6790508/VJ63C |
| Laboratory Data Package ID: | | UB28/UB29/UD90 | 1294218/UL36 | 1316786/UZ18 | 1335985/VJ63 | UB28/UB29 | 1294218/UL36 | 1317022/UZ37 | 1335985/VJ63 | UA27/UA28/UB45 | 1294477/UL60 | 1317686/UZ66 | 1335985/VJ63 |
| Sample Date: | | 12/14/2011 | 03/08/2012 | 6/18/2012 | 9/14/2012 | 12/14/2011 | 03/08/2012 | 6/19/2012 | 9/14/2012 | 12/06/2011 | 03/09/2012 | 6/21/2012 | 9/14/2012 |
| Tide Level (ft MLLW): | | 11.2 | 4.8 | 3.4 | 1.5 | 12.0 | 3.4 | -0.4 | 3.7 | 4.2 | 4.9 | 5.7 | 1.2 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| sec-Butylbenzene | --- | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Chloroethane | 21,000 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Chloroform | 9.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethane | 33 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethene | 3.2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.4** | **0.4** | **0.3** | **0.1** J1 | **0.2** | **0.3** | **0.2** J1 | **0.2** |
| trans-1,2-Dichloroethene | 940 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2-Dichloropropane | 3.7 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.2** | **0.2** J1 | **0.2** J1 | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U |
| Naphthalene | 26 | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | **0.9** | 0.5 U | 0.1 U | 0.1 U | 0.1 U |
| Tetrachloroethene | 3.3 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1,1-Trichloroethane | 46,000 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Trichloroethene | 1.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Vinyl Chloride | 0.53 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | **0.2** | **0.3** | **0.3** | **0.2** |
| m,p-Xylene | 1300 | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U |
| o-Xylene | 1600 | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | **0.1** J1 | 0.1 U | **0.1** J1 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | 0.043 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U |
| Vinyl Chloride | 0.53 | 0.020 U | **0.088** | 0.010 U | 0.010 U | 0.020 U | **0.026** | **0.017** J1 | 0.010 U | **0.17** | **0.25** | **0.33** | **0.21** |
| Acrylonitrile | 0.057 | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | |
| Acenaphthene | 120 | 1.0 U | 0.09 U | 0.1 U | 0.1 U | 1.0 U | **0.6** | **1** | **0.6** | **8.0** | **8** | **8** | **7** |
| Anthracene | 200 | 1.0 U | 0.09 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | **0.2** J1 | 0.09 U |
| Carbazole | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 2,4-Dimethylphenol | 660 | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.09 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.09 U |
| Naphthalene | 26 | 1.0 U | **0.1** J1 | 0.1 U | 0.1 U | 1.0 U | **0.2** J1 | **0.1** J1 | **0.7** | 1.0 U | 0.1 U | **0.1** J1 | **0.1** J1 |
| Phenanthrene | --- | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | **4.2** | **4** | **4** | **2** |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.1 UJ | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | **0.1** J1 | 0.09 U |
| **cPAHs (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0047 U | 0.0054 U | 0.0048 U | NA | 0.0048 U | 0.0049 U | 0.0049 U | NA | 0.0050 U | 0.0048 U | 0.0048 U |
| Pyrene | 9.8 | NA | 0.0095 U | 0.011 U | 0.0095 U | NA | 0.0095 U | 0.0098 U | 0.0098 U | NA | 0.010 U | **0.011** J1 | **0.011** J1 |
| Total cPAHs TEQ | 0.00018 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/L)** | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | |
| Diesel-Range Organics | 0.5 | 0.10 U | 0.067 U | 0.028 U | 0.030 U | 0.10 U | 0.068 U | 0.029 U | 0.031 U | 0.10 U | 0.073 U | **0.037** J1 | 0.029 U |
| **NWTPH-G** | | | | | | | | | | | | | |
| Gasoline-Range Organics | 1.0/0.8 | 0.25 U | 0.05 U | 0.05 U | 0.05 U | 0.25 U | 0.05 U | 0.05 U | 0.05 U | 0.25 U | 0.05 U | 0.05 U | 0.05 U |

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Eastern Property Boundary | | | | | | | | Former Washdown/Aqueous Degreaser Area | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-4 | IT-MW-4 | IT-MW-4 | IT-MW-4 | IT-PZ-2 | IT-PZ-2 | IT-PZ-2 | IT-PZ-2 | IT-MW-1 | IT-MW-1 | IT-MW-1 | IT-MW-1 |
| Laboratory Sample ID: | | UB28C/UB28I/ UB29C/UB29H/ UD90A | 6572511/6572512/ UL36A | 6692725/6692726/ 6692727/UZ18C | 6790509/6790510/ 6790511/VJ63D | UB28D/UB28J/ UB29D/UB29I | 6572515/6572516/ UL36C | 6693944/6693945/ 6693946/UZ37A | 6790512/6790513/ 6790514/VJ63E | UA27B/UA27J/ UA28B/UA28I/ UB45B/UB45I | 6574126/6574127/ UL60B | 6697958/6697959/ 6697960/UZ66A | 6790506/6790507/ 6790508/VJ63C |
| Laboratory Data Package ID: | | UB28/UB29/UD90 | 1294218/UL36 | 1316786/UZ18 | 1335985/VJ63 | UB28/UB29 | 1294218/UL36 | 1317022/UZ37 | 1335985/VJ63 | UA27/UA28/UB45 | 1294477/UL60 | 1317686/UZ66 | 1335985/VJ63 |
| Sample Date: | | 12/14/2011 | 03/08/2012 | 6/18/2012 | 9/14/2012 | 12/14/2011 | 03/08/2012 | 6/19/2012 | 9/14/2012 | 12/06/2011 | 03/09/2012 | 6/21/2012 | 9/14/2012 |
| Tide Level (ft MLLW): | | 11.2 | 4.8 | 3.4 | 1.5 | 12.0 | 3.4 | -0.4 | 3.7 | 4.2 | 4.9 | 5.7 | 1.2 |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | |
| Arsenic | --- | 2.1U/**1.8*** | **1.1** J1 | **4.6** | **2.0** J1 | **8.8** | **8.9** | **3.8** | **20.2** | **10.8** | **10.6** | **10.8** | **12.1** |
| Barium | --- | **7.7** | **4.6** | **2.8** | **2.9** | **14.1** | **11.2** | **11.9** | **18.9** | **35.6** | **39.7** | **52.1** | **60.0** |
| Beryllium | --- | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | **0.074** J1 | **0.080** J1 | 0.2 U | 0.13 U | **0.056** J1 | **0.054** J1 |
| Chromium | --- | **1.2** | **0.84** J1 | **2.1** | **1.8** J1 | 2 U | **2.3** | **2.8** | **3.5** | **1.7** | **2.6** | **2.3** | **2.8** |
| Copper | --- | 0.5 U | 0.38 U | **0.34** J1 | 0.40 U | **1.4** | 0.38 U | 0.42 UJ2 | **1.4** J1 | **1.0** | 0.38 U | 0.15 U | 0.40 U |
| Lead | --- | 0.1 U | 0.080 U | 0.034 U | 0.034 U | **0.2** | 0.080 U | **0.14** J1 | 0.034 U | 0.1 U | 0.080 U | 0.034 U | **0.085** J1 |
| Nickel | --- | **1.9** | **0.75** J1 | **1.4** J1 | **0.81** J1 | **0.8** | 0.50 U | **0.55** J1 | **1.1** J1 | **2.4** | **2.0** | **1.8** J1 | **1.9** J1 |
| Selenium | --- | 0.5 U | 0.27 U | 0.18 U | 0.50 U | **0.7** | 0.27 U | **0.20** J1 | 0.50 U | **0.7** | 0.27 U | **0.18** J1 | 0.50 U |
| Thallium | --- | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | --- | 4 U | 4.0 U | **1.2** J1 | **1.4** J1 | 4 U | 4.0 U | **1.4** J1 | 1.1 U | **4** | 4 U | 4.4 UJ2 | **5.1** J1 |
| **Method SW7196A (mg/L)** | | | | | | | | | | | | | |
| Chromium VI | 0.00058 | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | **0.010** | 0.010 U | 0.010 U |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **0.575** | **1.56** | **1.16** | 20.0 U | 3.20 U | 1.60 U | **2.95** J1 | 20.0 U | 1.60 U | 1.60 U | 1.60 U |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | |
| Antimony | 150 | 0.2 U | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U |
| Arsenic | 8 | **1.9** | **1.4** J1 | **3.0** | **1.4** J1 | **7.7** | **9.7** | **3.0** | **20.0** | **10.9** | **11.1** | **10.7** | **11.9** |
| Barium | 770 | **7.6** | **5.0** | **3.2** | **2.9** | **11.6** | **12.2** | **10.8** | **20.5** | **33.6** | **40.2** | **54.0** | **60.2** |
| Beryllium | 12 | 0.2 U | 0.13 U | 0.025 U | 0.025 U | 0.2 U | 0.13 U | **0.072** J1 | **0.046** J1 | 0.2 U | 0.13 U | **0.062** J1 | **0.052** J1 |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | 74 | **0.8** | **0.93** J1 | **2.0** | **2.0** | 2 U | **2.4** | **2.6** | **3.1** | **1.5** | **2.5** | **2.4** | **2.9** |
| Copper | 8 | 0.5 U | 0.38 U | **0.30** J1 | 0.40 U | **0.6** | 0.38 U | 0.35 UJ2 | 0.40 U | 0.5 U | 0.38 U | **0.33** J1 | **0.57** J1 |
| Lead | 2.5 | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | **0.035** J1 | 0.034 U |
| Nickel | 8.2 | **2.1** | **0.64** J1 | **1.1** J1 | **0.42** J1 | **0.7** | 0.50 U | **0.57** J1 | **0.97** J1 | **2.4** | **2.1** | **2.0** | **2.1** |
| Selenium | 5 | 0.5 U | 0.27 U | **0.20** J1 | 0.50 U | **0.7** | 0.27 U | **0.37** J1 | 0.50 U | **0.6** | 0.27 U | **0.20** J1 | 0.50 U |
| Thallium | 0.47 | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | 56 | 4 U | **4.0** J1 | **1.6** J1 | 1.1 U | 4 U | 4.0 U | 1.1 U | **2.0** J1 | 4 U | 4.0 U | 5.0 UJ2 | **4.3** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | **1.12** | **1.53** | **2.09** | 20.0 U | 1.60 U | **1.69** J1 | **3.86** J1 | 20.0 U | **3.36** J1 | 1.60 U | **4.14** J1 |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **2.2** | **2.3** | NA | NA | **8.4** | **14.8** | NA | NA | **10.2** | **10.7** |
| Nitrate (Method 300.0) | --- | 0.1 U | 0.050 U | 0.050 U | 0.050 U | 0.1 U | 0.050 U | 0.25 U | 0.050 U | 0.1 U | 0.050 UJ | 0.050 U | 0.050 U |
| Sulfate ( Method 300.0) | --- | **25.7** | **21.9** | **26.9** | **23.5** | **3.5** | **2.8** | 0.30 U | **42.3** | 0.1 U | 0.30 U | **0.47** J1 | 0.30 U |
| Total Dissolved Solids (Method 160.1) | --- | **247** | **225** | **299** J | **267** | **373** | **403** | **444** J | **576** | **450** | **368** | **408** | **404** |
| **FIELD PARAMETERS** | | | | | | | | | | | | | |
| Temperature (°C) | --- | 15.23 | 14.05 | 14.33 | 14.71 | 13.90 | 14.27 | 15.19 | 15.42 | 16.93 | 16.90 | 16.75 | 16.97 |
| Conductivity (uS/cm) | --- | 840 | 421 | 327 | 3803 | 13.11 | 724 | 464 | 606 | 722 | 904 | 691 | 847 |
| Dissolved Oxygen (mg/L) | --- | 1.33 | 0.63 | 0.61 | 1.24 | 2.27 | 0.41 | 0.97 | 0.65 | 1.39 | 0.35 | 0.43 | 1.77 |
| pH (SU) | --- | 5.43 | 7.05 | 6.10 | 5.97 | 6.00 | 7.62 | 7.45 | 6.93 | 6.80 | 8.48 | 7.03 | 6.63 |
| ORP (mV) | --- | 17.9 | -56.1 | -17.6 | -57 | -12.6 | -126.7 | -67.9 | -83.6 | -71.8 | -121.4 | -104.1 | -118 |
| Turbidity (NTU) | --- | 7.13 | 3.74 | 9.97 | 60.1 | 85.31 | 12.23 | NA | 9.6 | 2.91 | 2.04 | NA | 5.04 |
| Ferrous Iron (mg/L) | --- | NA | 1.8 | 3.1 | 2.8 | NA | 2.0 | 2.4 | 2.2 | NA | 2.6 | 2.4 | 2.6 |

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Former Washdown/Aqueous Degreaser Area | | | | | | | | North of 14-01 Building | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-2 | IT-MW-2 | IT-MW-2 | IT-MW-2 | IT-MW-3 | IT-MW-3 | IT-MW-3 | IT-MW-3 | IT-PZ-4 | IT-PZ-4 | IT-PZ-4 | IT-PZ-4 |
| Laboratory Sample ID: | Preliminary | UA27A/UA27I/ UA28A/UA28H/ UB45A/UB45H | 6574128/6574129/ UL60C | 6697967/6697968/ 6697969/UZ66D | 6790503/6790504/ 6790505/VJ63B | UA27C/UA27K/ UA28C/UA28J/ UB45C/UB45J | 6574130/6574131/ UL60D | 6697961/6697962/ 6697963/UZ66B | 6790500/6790501/ 6790502/VJ63A | UA44B/UA44J/ UA45B/UA45I/ UB46B/UB46I | 6574124/6574125/ UL60A | 6693956/6693957/ 6693958/UZ37E | 6788057/6788058/ 6788059/VJ32I |
| Laboratory Data Package ID: | Cleanup | UA27/UA28/UB45 | 1294477/UL60 | 1317686/UZ66 | 1335985/VJ63 | UA27/UA28/UB45 | 1294477/UL60 | 1317686/UZ66 | 1335985/VJ63 | UA44/UA45/UB46 | 1294477/UL60 | 1317022/UZ37 | 1335483/VJ32 |
| Sample Date: | Levels | 12/06/2011 | 03/09/2012 | 6/21/2012 | 9/14/2012 | 12/06/2011 | 03/09/2012 | 6/21/2012 | 9/14/2012 | 12/07/2011 | 03/09/2012 | 6/19/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | 4.4 | 3.9 | 4.3 | 4.0 | 1.7 | 2.0 | 2.4 | 1.1 | 3.4 | 6.4 | -0.5 | 7.3 |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | |
| Benzene | 2 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| sec-Butylbenzene | --- | 0.2 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Chloroethane | 21,000 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Chloroform | 9.4 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethane | 33 | 0.2 U | 0.1 U | **0.5** J1 | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethene | 3.2 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | **0.2** J1 | **0.2** J1 | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| trans-1,2-Dichloroethene | 940 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2-Dichloropropane | 3.7 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | **0.1** J1 | 0.1 U | **0.2** J1 | **0.1** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 1.0 U | 1.0 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U | 0.5 U | 0.2 U | 0.2 U | 0.2 U |
| Naphthalene | 26 | 0.5 U | 0.1 U | **13** | **6.2** | 0.5 U | 0.1 U | 0.1 U | 0.1 U | 0.5 U | 0.1 U | 0.1 U | 0.1 U |
| Tetrachloroethene | 3.3 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Toluene | 1300 | **0.1** J1 | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1,1-Trichloroethane | 46,000 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Trichloroethene | 1.4 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | **0.5** J1 | 0.5 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Vinyl Chloride | 0.53 | **0.3** | **0.4** | **0.7** J1 | 0.5 U | **0.1** J1 | **0.1** J1 | **0.3** | **0.2** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| m,p-Xylene | 1300 | 0.4 U | 0.1 U | 0.5 U | 0.5 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U | 0.4 U | 0.1 U | 0.1 U | 0.1 U |
| o-Xylene | 1600 | 0.2 U | 0.1 U | 0.5 U | 0.5 U | **0.2** J1 | **0.1** J1 | **0.1** J1 | **0.1** J1 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C-SIM** | | | | | | | | | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U | 0.020 U | 0.010 U | 0.010 U | 0.010 U |
| Vinyl Chloride | 0.53 | **0.30** | **0.39** | **0.81** | **0.40** | **0.12** | **0.10** | **0.34** | **0.17** | **0.060** | **0.046** | **0.051** | **0.051** |
| Acrylonitrile | 0.057 | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA | 0.050 U | NA | NA | NA |
| **SEMIVOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | |
| Acenaphthene | 120 | **0.8** J1 | **1** | **3** | **3** | **9.2** | **6** | **7** | **4** | 1.0 U | **0.5** | **0.6** | **0.6** |
| Anthracene | 200 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.09 U |
| Carbazole | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U | **3.5** | **3** | **1** | 0.5 U | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 2,4-Dimethylphenol | 660 | 1.0 U | 0.5 U | **1** | **1** | 1.0 U | 0.5 U | 0.5 U | **0.7** J1 | 1.0 U | 0.5 U | 0.5 U | 0.5 UJ |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | **2** | **2** | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.09 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | **1** | **1** | 1.0 U | 0.1 U | 0.09 U | 0.1 U | 1.0 U | 0.1 U | 0.1 U | 0.09 U |
| Naphthalene | 26 | 1.0 U | 0.1 U | **9** | **5** | 1.0 U | **0.2** J1 | **0.1** J1 | **0.1** J1 | 1.0 U | 0.1 U | **0.1** J1 | 0.09 U |
| Phenanthrene | --- | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | **0.3** J1 | **0.4** J1 | **0.2** J1 | 1.0 U | 0.1 U | 0.1 U | 0.09 U |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.1 U | 0.1 U | 1.0 U | 0.1 U | **0.1** J1 | 0.1 U | 1.0 U | 0.1 U | **0.1** J1 | 0.09 U |
| **cPAHs (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0048 U | 0.0049 U | 0.0048 U | NA | 0.0048 U | 0.0047 U | 0.0048 U | NA | 0.0048 U | 0.0049 U | 0.0047 U |
| Pyrene | 9.8 | NA | 0.0095 U | 0.0098 U | 0.0096 U | NA | 0.0097 U | 0.0095 U | 0.0097 U | NA | 0.0097 U | 0.0098 U | 0.0094 U |
| Total cPAHs TEQ | 0.00018 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/L)** | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | |
| Diesel-Range Organics | 0.5 | 0.10 U | 0.070 U | **0.041** J1 | 0.028 U | 0.10 U | 0.072 U | 0.029 U | 0.029 U | 0.10 U | 0.069 U | 0.029 U | 0.032 U |
| **NWTPH-G** | | | | | | | | | | | | | |
| Gasoline-Range Organics | 1.0/0.8 | 0.25 U | 0.05 U | **0.083** J1 | 0.05 U | 0.25 U | 0.05 U | 0.05 U | 0.05 U | 0.25 U | 0.05 U | 0.05 U | 0.05 U |

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Former Washdown/Aqueous Degreaser Area | | | | | | | | North of 14-01 Building | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: | | IT-MW-2 | IT-MW-2 | IT-MW-2 | IT-MW-2 | IT-MW-3 | IT-MW-3 | IT-MW-3 | IT-MW-3 | IT-PZ-4 | IT-PZ-4 | IT-PZ-4 | IT-PZ-4 |
| Laboratory Sample ID: | Preliminary | UA27A/UA27I/ UA28A/UA28H/ UB45A/UB45H | 6574128/6574129/ UL60C | 6697967/6697968/ 6697969/UZ66D | 6790503/6790504/ 6790505/VJ63B | UA27C/UA27K/ UA28C/UA28J/ UB45C/UB45J | 6574130/6574131/ UL60D | 6697961/6697962/ 6697963/UZ66B | 6790500/6790501/ 6790502/VJ63A | UA44B/UA44J/ UA45B/UA45I/ UB46B/UB46I | 6574124/6574125/ UL60A | 6693956/6693957/ 6693958/UZ37E | 6788057/6788058/ 6788059/VJ32I |
| Laboratory Data Package ID: | Cleanup | UA27/UA28/UB45 | 1294477/UL60 | 1317686/UZ66 | 1335985/VJ63 | UA27/UA28/UB45 | 1294477/UL60 | 1317686/UZ66 | 1335985/VJ63 | UA44/UA45/UB46 | 1294477/UL60 | 1317022/UZ37 | 1335483/VJ32 |
| Sample Date: | Levels | 12/06/2011 | 03/09/2012 | 6/21/2012 | 9/14/2012 | 12/06/2011 | 03/09/2012 | 6/21/2012 | 9/14/2012 | 12/07/2011 | 03/09/2012 | 6/19/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | 4.4 | 3.9 | 4.3 | 4.0 | 1.7 | 2.0 | 2.4 | 1.1 | 3.4 | 6.4 | -0.5 | 7.3 |
| **TOTAL METALS (µg/L)** | | | | | | | | | | | | | |
| **Method 200.8** | | | | | | | | | | | | | |
| Arsenic | --- | **5.4** | **4.8** | **1.8** J1 | **5.1** | **2.0** | **3.3** | **1.2** J1 | **2.0** J1 | **24.4** | **23.6** | **24.2** | **27.7** |
| Barium | --- | **35.7** | **38.9** | **29.3** J | **73.1** | **64.7** | **110** | **49.7** | **73.3** | **40.9** | **32.2** | **35.8** | **37.0** |
| Beryllium | --- | 0.2 U | 0.13 U | **0.059** J1 | **0.16** J1 | 0.2 U | 0.13 U | **0.045** J1 | **0.052** J1 | 0.2 U | 0.13 U | 0.025 U | 0.025 U |
| Chromium | --- | **10** | **9.1** | **3.7** | **9.9** | **1.6** | **3.2** | **1.9** J1 | **2.5** | 2 U | **0.82** J1 | **0.74** J1 | **0.86** J1 |
| Copper | --- | **0.8** | 0.38 U | 0.15 U | 0.40 U | 0.5 U | 0.38 U | **0.29** J1 | 0.40 U | 0.5 U | 0.38 U | 0.15 U | 0.40 U |
| Lead | --- | **0.2** | 0.080 U | 0.034 U | **0.067** J1 | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | 0.034 U | 0.034 U |
| Nickel | --- | **3.0** | **2.4** | **1.6** J1 | **2.9** | **1.4** | **1.5** J1 | **0.33** J1 | **0.87** J1 | **1.0** | **0.61** J1 | **1.2** J1 | **1.1** J1 |
| Selenium | --- | **0.8** | 0.27 U | **0.21** J1 | 0.50 U | **0.7** | **0.36** J1 | 0.18 U | 0.50 U | 0.5 U | 0.27 U | 0.18 U | 0.50 U |
| Thallium | --- | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | --- | 4 U | 4.0 U | 2.1 UJ2 | **2.1** J1 | 4 U | 4.0 U | 2.4 UJ2 | 1.1 U | 4 U | 4.0 U | 1.1 U | 1.1 U |
| **Method SW7196A (mg/L)** | | | | | | | | | | | | | |
| Chromium VI | 0.00058 | **0.019** J | **0.015** J | 0.010 U | 0.010 UJ | 0.010 U | **0.015** | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U | 0.010 U |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | 3.20 U | 3.20 U | 3.20 U | 20.0 U | 1.60 U | 1.60 U | 1.60 U | 20.0 U | 1.60 U | **0.449** J1 | **0.560** |
| **DISSOLVED METALS (µg/L)** | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | | | | | | |
| Antimony | 150 | 0.2 U | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U | 0.2 U | 0.42 U | 0.33 U | 0.33 U |
| Arsenic | 8 | **5.1** | **5.6** | **3.6** | **4.9** | **2.2** | **3.6** | **0.98** J1 | **2.3** | **22.2** | **24.4** | **22.0** | **26.2** |
| Barium | 770 | **33.2** | **40.5** | **59.3** | **76.4** | **64.8** | **112** | **50.3** | **75.5** | **39.6** | **34.0** | **35.8** | **35.6** |
| Beryllium | 12 | 0.2 U | 0.13 U | **0.11** J1 | **0.17** J1 | 0.2 U | 0.13 U | **0.037** J1 | **0.055** J1 | 0.2 U | 0.13 U | 0.025 U | 0.025 U |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | 74 | **6.4** | **9.1** | **7.2** | **10.8** | **1.8** | **3.4** | **2.0** J1 | **2.2** | 1 U | **0.89** J1 | **0.79** J1 | **1.0** J1 |
| Copper | 8 | 0.5 U | 0.38 U | 0.15 U | 0.40 U | 0.5 U | 0.38 U | **0.28** J1 | **0.47** J1 | 0.5 U | 0.38 U | 0.15 U | 0.40 U |
| Lead | 2.5 | 0.1 U | **0.086** J1 | **0.059** J1 | **0.034** J1 | 0.1 U | 0.080 U | 0.034 U | 0.034 U | 0.1 U | 0.080 U | 0.034 U | 0.034 U |
| Nickel | 8.2 | **2.8** | **2.2** | **2.9** | **2.3** | **1.4** | **1.7** J1 | **0.37** J1 | **0.70** J1 | **0.8** | **0.77** J1 | **1.1** J1 | **0.72** J1 |
| Selenium | 5 | **0.8** | **0.31** J1 | **0.35** J1 | 0.50 U | **0.7** | **0.30** J1 | 0.18 U | 0.50 U | 0.5 U | 0.27 U | 0.18 U | 0.50 U |
| Thallium | 0.47 | 0.2 U | 0.15 U | **0.032** J1 | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | 56 | 4 U | 4.0 U | **3.0** J1 | **3.2** J1 | 4 U | 4.0 U | 5.3 UJ2 | **1.9** J1 | 4 U | 4.0 U | 1.1 U | **1.7** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | | | | | | |
| Mercury | 12 | 20.0 U | 3.20 U | 3.20 U | **4.02** J1 | 20.0 U | **5.32** J1 | **1.94** J1 | **5.24** | 20.0 U | **1.66** J1 | **2.07** J1 | **1.62** J1 |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **20.8** J | **12.6** J | NA | NA | **9.7** | **9.7** | NA | NA | **85.4** | **110** |
| Nitrate (Method 300.0) | --- | 0.1 U | 0.050 U | 0.050 U | 0.050 U | 0.1 U | 0.050 U | 0.050 U | 0.050 U | 0.1 U | 0.050 U | 0.25 U | 0.050 U |
| Sulfate ( Method 300.0) | --- | **1.8** | 0.30 U | **22.3** J | **1.6** | 0.1 U | 0.30 U | 0.30 U | **0.42** J1 | 0.1 U | 0.30 U | **0.65** J1 | 0.30 U |
| Total Dissolved Solids (Method 160.1) | --- | **565** | **506** | **560** | **608** | **469** | **565** | **379** | **407** | **435** | **443** | **519** J | **444** |
| **FIELD PARAMETERS** | | | | | | | | | | | | | |
| Temperature (°C) | --- | 17.59 | 17.21 | 17.00 | 16.97 | 17.47 | 17.80 | 17.82 | 18.90 | 14.07 | 12.88 | 13.45 | 14.90 |
| Conductivity (uS/cm) | --- | 949 | 1109 | 981 | 1140 | 808 | 1341 | 609 | 7020 | 492 | 937 | 728 | 640 |
| Dissolved Oxygen (mg/L) | --- | 0.58 | 0.44 | 0.36 | 1.10 | 1.12 | 0.44 | 0.32 | 0.89 | 0.86 | 0.50 | 0.34 | 0.30 |
| pH (SU) | --- | 6.16 | 8.54 | 7.69 | 6.59 | 7.36 | 8.70 | 6.77 | 6.49 | 6.72 | 8.07 | NA | 7.35 |
| ORP (mV) | --- | -15.55 | -126.9 | -94.6 | -119 | -57.8 | -110.1 | -82.2 | -120 | -34.1 | -100.0 | -134.9 | -78.5 |
| Turbidity (NTU) | --- | 1.83 | 4.79 | 1.54 | 13.4 | 2.06 | 3.79 | 2.82 | 47.2 | 1.31 | 5.79 | 1.34 | 9.73 |
| Ferrous Iron (mg/L) | --- | NA | 3.0 | 3.0 | 3.8 | NA | 3.2 | 2.0 | 2.2 | NA | 1.6 | 4.4 | 0.0 |

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Storage Tank Area | | | |
|---|---|---|---|---|---|
| Location: | | IT-MW-8 | IT-MW-8 | IT-MW-8 | IT-MW-8 |
| Laboratory Sample ID: | | UA54C/UA54L/ UA55C/UA55K/ UB47C/UB47K | 6572519/6572520/ UL36E | 6690477/6690478/ 6690479/UZ00C | 6788024/6788025/ 6788026/VJ32H |
| Laboratory Data Package ID: | | UA54/UA55/UB47 | 1294218/UL36 | 1316296/UZ00 | 1335483/VJ32 |
| Sample Date: | | 12/08/2011 | 03/08/2012 | 6/15/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | 1.5 | 4.7 | 2.2 | 5.6 |
| **VOLATILES (µg/L)** | | | | | |
| **Method SW8260C** | | | | | |
| Benzene | 2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| sec-Butylbenzene | --- | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Chloroethane | 21,000 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Chloroform | 9.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethane | 33 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1-Dichloroethene | 3.2 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| cis-1,2-Dichloroethene | 130 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| trans-1,2-Dichloroethene | 940 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2-Dichloropropane | 3.7 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Methylene Chloride | 230 | 0.5 U | 0.2 U | 0.2 U | 0.2 U |
| Naphthalene | 26 | 0.5 U | 0.1 U | 0.1 U | 0.1 U |
| Tetrachloroethene | 3.3 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Toluene | 1300 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,1,1-Trichloroethane | 46,000 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Trichloroethene | 1.4 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| 1,2,4-Trimethylbenzene | 303 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| Vinyl Chloride | 0.53 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| m,p-Xylene | 1300 | 0.4 U | 0.1 U | 0.1 U | 0.1 U |
| o-Xylene | 1600 | 0.2 U | 0.1 U | 0.1 U | 0.1 U |
| **VOLATILES (µg/L)** | | | | | |
| **Method SW8260C-SIM** | | | | | |
| Tetrachloroethene | 3.3 | 0.020 U | 0.010 U | 0.019 UJ2 | 0.010 U |
| Vinyl Chloride | 0.53 | 0.020 U | 0.010 U | 0.010 U | 0.010 U |
| Acrylonitrile | 0.057 | 0.050 U | NA | NA | NA |
| **SEMIVOLATILES (µg/L)** | | | | | |
| **Method SW8270D** | | | | | |
| Acenaphthene | 120 | **1.2** | **0.4** J1 | **0.2** J1 | 0.1 U |
| Anthracene | 200 | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| Carbazole | --- | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 2,4-Dimethylphenol | 660 | 1.0 U | 0.5 U | 0.5 U | 0.5 U |
| 1-Methylnaphthalene | 2.3 | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| 2-Methylnaphthalene | 64 | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| Naphthalene | 26 | 1.0 U | **0.1** J1 | 0.1 U | 0.1 U |
| Phenanthrene | --- | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| Pyrene | 9.8 | 1.0 U | 0.1 U | 0.1 U | 0.1 U |
| **cPAHs (µg/L)** | | | | | |
| **Method SW8270D-SIM** | | | | | |
| Benzo(b)fluoranthene | 0.0018 | NA | 0.0050 U | 0.0050 U | 0.0049 U |
| Pyrene | 9.8 | NA | 0.010 U | 0.0099 U | 0.0097 U |
| Total cPAHs TEQ | 0.00018 | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/L)** | | | | | |
| **NWTPH-Dx** | | | | | |
| Diesel-Range Organics | 0.5 | 0.10 U | 0.070 U | 0.029 U | 0.029 U |
| **NWTPH-G** | | | | | |
| Gasoline-Range Organics | 1.0/0.8 | 0.25 U | 0.05 U | 0.05 U | 0.05 U |

# TABLE 14
## MONITORING WELLS - GROUNDWATER ANALYTICAL RESULTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Storage Tank Area | | | |
|---|---|---|---|---|---|
| Location: | | IT-MW-8 | IT-MW-8 | IT-MW-8 | IT-MW-8 |
| Laboratory Sample ID: | | UA54C/UA54L/ UA55C/UA55K/ UB47C/UB47K | 6572519/6572520/ UL36E | 6690477/6690478/ 6690479/UZ00C | 6788024/6788025/ 6788026/VJ32H |
| Laboratory Data Package ID: | | UA54/UA55/UB47 | 1294218/UL36 | 1316296/UZ00 | 1335483/VJ32 |
| Sample Date: | | 12/08/2011 | 03/08/2012 | 6/15/2012 | 9/12/2012 |
| Tide Level (ft MLLW): | | 1.5 | 4.7 | 2.2 | 5.6 |
| **TOTAL METALS (µg/L)** | | | | | |
| **Method 200.8** | | | | | |
| Arsenic | --- | **88.5** | **1.6** J1 | **1.9** J1 | **3.0** |
| Barium | --- | **37.4** | **44.1** | **30.0** | **32.7** |
| Beryllium | --- | 0.2 U | 0.13 U | 0.13 U | 0.025 U |
| Chromium | --- | 0.5 U | 0.60 U | 0.60 U | 0.50 U |
| Copper | --- | **0.7** | **0.57** J1 | **0.56** J1 | **0.50** J1 |
| Lead | --- | 0.1 U | 0.080 U | 0.080 U | 0.034 U |
| Nickel | --- | **4.4** | **1.2** J1 | **1.2** J1 | **0.82** J1 |
| Selenium | --- | **0.7** | 0.27 U | 0.27 U | 0.50 U |
| Thallium | --- | 0.2 U | 0.15 U | 0.15 U | 0.15 U |
| Zinc | --- | 4 U | 4.0 U | 4.0 U | 1.4 UJ2 |
| **Method SW7196A (mg/L)** | | | | | |
| Chromium VI | 0.00058 | 0.010 U | 0.010 U | 0.010 UJ | 0.010 UJ |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | |
| Mercury | 12 | 20.0 U | **1.60** J1 | 1.60 U | 1.60 U |
| **DISSOLVED METALS (µg/L)** | | | | | |
| **Methods 200.8/SW7196A** | | | | | |
| Antimony | 150 | 0.2 U | 0.42 U | **0.10** J1 | 0.33 U |
| Arsenic | 8 | **2.8** | **1.5** J1 | **1.5** J1 | **2.1** |
| Barium | 770 | **36.9** | **44.8** | **31.7** | **32.8** |
| Beryllium | 12 | 0.2 U | 0.13 U | 0.025 U | 0.025 U |
| Cadmium | 0.25 | 0.1 U | 0.20 U | 0.048 U | 0.082 U |
| Chromium | 74 | 1 U | 0.60 U | **0.70** J1 | 0.50 U |
| Copper | 8 | **1.3** | **0.54** J1 | **0.56** J1 | 0.44 UJ2 |
| Lead | 2.5 | 0.1 U | 0.080 U | 0.034 U | 0.034 U |
| Nickel | 8.2 | **4.2** | **1.5** J1 | **1.5** J1 | **1.0** J1 |
| Selenium | 5 | 0.5 U | 0.27 U | **0.19** J1 | 0.50 U |
| Thallium | 0.47 | 0.2 U | 0.15 U | 0.029 U | 0.15 U |
| Zinc | 56 | 4 U | 4.0 U | **1.2** J1 | **2.6** J1 |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | |
| Mercury | 12 | 20.0 U | 1.60 U | **1.61** J1 | 1.60 U |
| **CONVENTIONALS (mg/L)** | | | | | |
| Chloride (Method 300.0) | --- | NA | NA | **17.6** | **16.3** |
| Nitrate (Method 300.0) | --- | 0.1 U | **0.12** | **0.11** | 0.050 U |
| Sulfate ( Method 300.0) | --- | **153** | **176** | **95.1** J | **88.1** |
| Total Dissolved Solids (Method 160.1) | --- | **891** | **948** | **784** | **687** |
| **FIELD PARAMETERS** | | | | | |
| Temperature (°C) | --- | 14.76 | 14.46 | 14.89 | 16.04 |
| Conductivity (uS/cm) | --- | 3082 | 1862 | 948 | 864 |
| Dissolved Oxygen (mg/L) | --- | 1.13 | 0.54 | 0.26 | 0.53 |
| pH (SU) | --- | 6.71 | 8.11 | 7.11 | 7.72 |
| ORP (mV) | --- | -23.9 | 21.5 | 1.6 | 9.1 |
| Turbidity (NTU) | --- | 2.52 | 2.94 | 0.61 | 16.7 |
| Ferrous Iron (mg/L) | --- | NA | 0.8 | 0.6 | 2.2 |

TEQ = Toxic Equivalent Concentration
cPAHs = carcinogenic polycyclic aromatic hydrocarbons
ng/L = nanograms per liter
µg/L = micrograms per liter
mg/L = milligrams per liter
mV = millivolts
SU = standard unit
uS/cm = milliSiemens per centimeter
C = Centigrade
ND = Not Detected.
NA = Not Applicable.
SIM = Selected Ion Monitoring

*Sample results include original digest and analysis and re-digest and analysis.
E = Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
R = The sample results are rejected due to serious deficiencies in the ability to analyze the samples and meet quality control criteria. The presence or absence of the analyte cannot be verified.
S = Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte.
U = Indicates the compound was undetected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
UJ2 = The analyted was not detected in the sample at or above the numerical value shown; the numerical value is below the reporting limit, but greater than the detection limit.

Box = Exceeds preliminary cleanup level
Bold = Detected compound

# TABLE 15
## SUMMARY OF GROUNDWATER PRELIMINARY CLEANUP LEVEL EXCEEDANCES
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | | | Number of Exceedances During Four Quarterly Groundwater Monitoring Events | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PCBs | | | | | | | | | | | | |
| **Sample Location** | Acrylonitrile | Vinyl Chloride | Benzoic Acid | bis(2-Ethylhexyl) phthalate | Total cPAHs TEQ | Aroclor 1248 | Aroclor 1260 | Total PCBs | Dissolved Arsenic | Dissolved Cadmium | Chromium VI | Dissolved Copper | Dissolved Lead | Dissolved Nickel | Dissolved Selenium | Dissolved Thallium | Dissolved Zinc | Total Mercury |
| <u>Western Property Boundary</u> | | | | | | | | | | | | | | | | | | |
| I-104(s) | - | - | - | - | 1 | - | 1 | 1 | 4 | - | - | - | - | - | - | - | - | - |
| MW-20 | - | - | - | - | - | - | - | - | 4 | - | - | - | - | - | - | - | - | - |
| <u>Northern Property Boundary</u> | | | | | | | | | | | | | | | | | | |
| MW-21 | - | - | - | - | - | - | - | - | 4 | - | 1 | - | - | - | - | - | - | - |
| MW-22 | - | - | - | - | - | - | - | - | 4 | - | - | - | - | - | - | - | - | - |
| PZ-1 | - | - | - | - | - | 1 | - | 1 | - | 4 | - | 4 | - | 2 | - | - | 4 | - |
| <u>Stabilized Soil Area</u> | | | | | | | | | | | | | | | | | | |
| MW-23 | - | 1 | - | - | 2 | - | - | - | 4 | - | 2 | 4 | - | 4 | 1 | 1 | 3 | 2 |
| MW-24 | - | - | 1 | - | 2 | - | - | - | 4 | 1 | - | 4 | 3 | 4 | 4 | - | 1 | 1 |
| MW-25 | - | 2 | - | - | 3 | - | 3 | 3 | 4 | - | - | 3 | - | 1 | - | - | 2 | 2 |
| <u>South of Stabilized Soil Area</u> | | | | | | | | | | | | | | | | | | |
| I-200(s) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| MW-15 | - | - | - | - | - | - | - | - | 4 | - | - | - | - | - | - | - | - | - |
| MW-16 | - | 1 | - | - | - | - | - | - | 2 | - | - | 3 | - | 1 | - | - | 2 | - |
| MW-18 | 1 | 1 | - | 1 | - | - | - | - | 4 | - | - | - | - | - | - | - | 3 | - |
| **TOTAL EXCEEDANCES** | **1** | **5** | **1** | **1** | **8** | **1** | **4** | **5** | **38** | **5** | **3** | **18** | **3** | **12** | **5** | **1** | **15** | **5** |
| **TOTAL NUMBER OF LOCATIONS WITH EXCEEDANCES** | **1** | **4** | **1** | **1** | **4** | **1** | **2** | **3** | **10** | **2** | **2** | **5** | **1** | **5** | **2** | **1** | **6** | **3** |

"-": No exceedances
cPAH = carcinogenic polycylclic aromatic hydrocarbon
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls

# TABLE 16
## SUMMARY OF GROUNDWATER PRELIMINARY CLEANUP LEVEL EXCEEDANCES
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Number of Exceedances During 4 Quarterly Groundwater Monitoring Events | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | PCBs | | | | | | |
| **Sample Location** | Chrysene | bis(2-Ethylhexyl) phthalate | Total cPAHs TEQ | Aroclor 1248 | Aroclor 1254 | Aroclor 1260 | Total PCBs | Dissolved Arsenic | Dissolved Cadmium | Dissolved Nickel |
| Western Property Boundary | | | | | | | | | | |
| I-205(s) | - | - | - | - | - | - | - | 4 | - | - |
| MW-9 | - | - | - | - | - | - | - | - | 1 | 1 |
| MW-10 | - | - | 2 | - | - | 1 | 1 | 2 | - | - |
| MW-19 | - | - | - | - | - | - | - | 4 | - | - |
| PZ-7 | - | - | 3 | - | - | - | - | - | - | - |
| Seep-1 (a) | - | - | 3 | - | 2 | - | 2 | - | - | - |
| Former Hydraulic Test Pad Area | | | | | | | | | | |
| MW-11 | - | - | - | - | - | - | - | 1 | - | - |
| Former Slip 5 Outfall Area | | | | | | | | | | |
| MW-14 | 1 | - | - | - | - | - | - | - | 3 | - |
| PZ-3 | - | - | - | - | - | - | - | 1 | - | - |
| SB-8 (b) | - | - | - | - | - | - | - | - | 1 | - |
| Other | | | | | | | | | | |
| I-203(s) | - | - | 2 | 3 | 1 | - | 4 | - | - | - |
| MW-12 | - | 1 | 1 | - | 1 | - | 1 | 4 | - | - |
| MW-13 | - | 1 | - | - | 4 | - | 4 | 4 | - | - |
| MW-17 | - | 1 | 2 | 1 | 1 | - | 2 | 3 | - | - |
| PZ-6 | - | - | - | - | - | - | - | 4 | - | - |
| **TOTAL EXCEEDANCES** | **1** | **3** | **13** | **4** | **9** | **1** | **14** | **27** | **5** | **1** |
| **TOTAL NUMBER OF LOCATIONS WITH EXCEEDANCES** | **1** | **3** | **6** | **2** | **5** | **1** | **6** | **9** | **3** | **1** |

"-": No exceedance
cPAH = carcinogenic polycylclic aromatic hydrocarbon
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls

(a) Samples collected during three quarterly sampling events at this location
(b) One grab sample was collected from the soil boring at this location

# TABLE 17
## SUMMARY OF GROUNDWATER PRELIMINARY CLEANUP LEVEL EXCEEDANCES
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Sample Location | Acrylonitrile | 1,1-Dichloroethene | cis-1,2-Dichloroethene (cis-1,2-DCE) | Trichloroethene (TCE) | Vinyl Chloride (VC) | cPAHs TEQ | Dissolved Arsenic | Chromium VI | Dissolved Nickel |
|---|---|---|---|---|---|---|---|---|---|
| Western Property Boundary | | | | | | | | | |
| I-206(s) | - | - | - | - | - | - | 4 | - | - |
| MW-7 | - | - | - | 1 | - | - | 1 | - | - |
| IT-PZ-8 | - | - | - | - | - | - | - | - | - |
| Southern Property Boundary | | | | | | | | | |
| MW-5 | - | - | - | - | - | 1 | - | - | 1 |
| MW-6 | 1 | 1 | 4 | 4 | 4 | - | - | - | - |
| Eastern Property Boundary | | | | | | | | | |
| MW-4 | - | - | - | - | - | - | - | - | - |
| PZ-2 | - | - | - | - | - | - | 2 | - | - |
| Former Washdown/Aqueous Degreaser Area | | | | | | | | | |
| MW-1 | - | - | - | - | - | - | 4 | 1 | - |
| MW-2 | - | - | - | - | 1 | - | - | 2 | - |
| MW-3 | - | - | - | - | - | - | - | 1 | - |
| North of Building 14-01 | | | | | | | | | |
| PZ-4 | - | - | - | - | - | - | 4 | - | - |
| Storage Tank Area | | | | | | | | | |
| MW-8 | - | - | - | - | - | - | - | - | - |
| **TOTAL EXCEEDANCES** | **1** | **1** | **4** | **5** | **5** | **1** | **15** | **4** | **1** |
| **TOTAL NUMBER OF LOCATIONS WITH EXCEEDANCES** | **1** | **1** | **1** | **2** | **2** | **1** | **5** | **3** | **1** |

"-": No exceedance
cPAHs = carcinogenic polycyclic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration

# TABLE 18
# DETECTED ARSENIC CONCENTRATIONS IN RI AND CONSTRUCTION-RELATED SOIL SAMPLES NORTH OF FORMER SLIP 5 AREA BOEING ISAACSON-THOMPSON SITE TUKWILA, WASHINGTON

| Sample ID | Sample Date | Sample Depth | Arsenic (mg/kg) |
|---|---|---|---|
| | | | PCL 7 |
| **West of Stabilized Soil Area** | | | |
| MW-20 | 11/9/2011 | 2 to 3.5 | 7.5 |
| MW-20 | 11/9/2011 | 5 to 6.5 | 139 |
| MW-20 | 11/9/2011 | 8 to 9.5 | 5.5 |
| MW-20 | 11/9/2011 | 14.5 to 16 | 10.5 |
| **Northern Property Boundary** | | | |
| MW-21 | 11/11/2011 | 2 to 3.5 | 36.6 |
| MW-21 | 11/11/2011 | 5 to 6.5 | 36.5 |
| MW-21 | 11/11/2011 | 8 to 9.5 | 139 |
| MW-21 | 11/11/2011 | 13.5 to 15 | 221 |
| MW-21 | 11/11/2011 | 17 to 18.5 | 12.6 |
| MW-22 | 11/11/11 | 2 to 3.5 | 3.0 |
| MW-22 | 11/11/11 | 5 to 6.5 | 56.4 |
| MW-22 | 11/11/11 | 8 to 9.5 | 535 |
| MW-22 | 11/11/11 | 13.5 to 15 | 58.8 |
| **Stabilized Soil Area** | | | |
| MW-23 | 11/9/11 | 11 to 12.5 | 102 |
| MW-23 | 11/9/11 | 12.5 to 14 | 331 |
| MW-24 | 11/14/11 | 12.5 to 14 | 1640 |
| MW-24 | 11/14/11 | 14 to 15.5 | 1130 |
| MW-25 | 11/14/11 | 8 to 9.5 | 87.9 |
| MW-25 | 11/14/11 | 13.5 to 15 | 55.8 |
| MW-25 | 11/14/11 | 15.5 to 17 | 37.7 |
| **South of Stabilized Soil Area** | | | |
| MW-15 | 11/15/11 | 2 to 3.5 | 7.3 |
| MW-15 | 11/15/11 | 5 to 6.5 | 3.0 |
| MW-15 | 11/15/11 | 8 to 9.5 | 3.8 |
| MW-15 | 11/15/11 | 12.5 to 14 | 2.4 |
| MW-16 | 11/10/11 | 2 to 3.5 | 13.2 |
| MW-16 | 11/10/11 | 5 to 6.5 | 80.6 |
| MW-16 | 11/10/11 | 8 to 9.5 | 3.3 |
| MW-18 | 11/8/11 | 2 to 3.5 | 8.8 |
| MW-18 | 11/8/11 | 5 to 6.5 | 35.5 |
| MW-18 | 11/8/11 | 8 to 9.5 | 18.9 |
| MW-18 | 11/8/11 | 11.5 to 13 | 13.5 |

mg/kg = milligrams per kilogram
PCL = Prelilminary Cleanup Level
Box = Exceedance of PCL

# TABLE 19
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Western Property Boundary (West of Stabilized Soil Area) | | | | Northern Property Boundary | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-20(2-3.5) TW35G 11/09/2011 | IT-MW-20(5-6.5) TW35H 11/09/2011 | IT-MW-20(8-9.5) TW35I 11/09/2011 | IT-MW-20(14.5-16) TW35J 11/09/2011 | IT-MW-21(2-3.5) TW89D 11/11/2011 | IT-MW-21(5-6.5) TW89E 11/11/2011 | IT-MW-21(8-9.5) TW89F 11/11/2011 | IT-MW-21(13.5-15) TW89G 11/11/2011 | IT-MW-21(17-18.5) TW89H 11/11/2011 | IT-MW-21(24.5-26) TW89M 11/11/2011 | IT-MW-22(2-3.5) TW89I 11/11/2011 | IT-MW-22(5-6.5) TW89J 11/11/2011 | IT-MW-22(8-9.5) TW89K 11/11/2011 | IT-MW-22(13.5-15) TW89L 11/11/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | |
| Chloromethane | 1,600 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 UJ | 1.3 UJ | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.0 U |
| Methylene Chloride | 2,400 | **2.2** | **1.7** J1 | **3.5** | **3.7** | **2.9** | **13** | **3.2** | **9.4** | **7.7** | **2.5** J1 | **5.4** | **1.6** J1 | **2.1** J1 | **1.9** J1 |
| Acetone | 510,000 | **58** | **76** | **130** | **10** | **22** J | **48** J | **46** J | **21** J | **24** J | **20** J | **25** J | **18** J | **44** J | **19** J |
| Carbon Disulfide | 75,000 | **2.0** | 1.1 U | 1.4 U | 1.1 U | **3.3** | 1.3 U | **2.2** | **2.4** | **2.1** | **4.5** | **2.6** | **2.8** | **1.3** J1 | **3.9** |
| 2-Butanone | 430,000 | **11** | **3.6** J1 | **5.9** J1 | 5.4 U | 5.8 U | 6.5 U | **4.3** J1 | 7.0 U | 5.9 U | 6.3 U | **3.7** J1 | 6.5 U | **6.1** J1 | 5.0 U |
| Trichloroethene | 51 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | **1.4** | 1.3 U | **0.8** J1 | **1.0** J1 | **1.0** J1 | **1.4** | **1.5** | **0.9** J1 | **1.7** | 1.0 U |
| Benzene | 93 | **1.9** | **0.6** J1 | **0.8** J1 | **1.0** J1 | 1.2 U | 1.3 U | 1.6 U | 1.4 U | **0.7** J1 | 1.3 U | **1.6** | 1.3 U | **0.8** J1 | 1.0 U |
| Tetrachloroethene | 260 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.0 U |
| Toluene | 100,000 | **1.1** | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | **1.9** | 1.3 U | 1.5 U | 1.0 U |
| Ethylbenzene | 230 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.0 U |
| Styrene | 16,000,000 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | **0.8** J1 | 1.3 U | 1.5 U | 1.0 U |
| Trichlorofluoromethane | 200,000 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.0 U |
| m,p-Xylene | 160,000 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | **1.2** J1 | 1.3 U | 1.5 U | 1.0 U |
| o-Xylene | 200,000 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | **0.7** J1 | 1.3 U | 1.5 U | 1.0 U |
| Methyl Iodide | --- | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | **6.3** | 1.0 U |
| 1,3,5-Trimethylbenzene | 800,000 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.0 U |
| 1,2,4-Trimethylbenzene | 800,000 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.0 U |
| Isopropylbenzene | 78,000 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.0 U |
| n-Propylbenzene | 11,000 | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.0 U |
| 4-Isopropyltoluene | --- | 1.1 U | 1.1 U | 1.4 U | 1.1 U | 1.2 U | 1.3 U | 1.6 U | 1.4 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.0 U |
| Naphthalene | 2,100 | 5.3 U | 5.6 U | 7.1 U | 5.4 U | 5.8 U | 6.5 U | 7.8 U | 7.0 U | 5.9 U | 6.3 U | 6.5 U | 6.5 U | 7.3 U | 5.0 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | |
| Phenol | 1,900,000 | 20 U | 19 U | 20 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | NA | 19 U | 19 U | 18 U | 19 U |
| Benzyl Alcohol | 8,000,000 | 20 U | 19 U | 20 U | 19 U | 18 UJ | 18 UJ | 19 UJ | 19 UJ | 19 UJ | NA | 19 UJ | 19 UJ | 18 UJ | 19 UJ |
| 4-Methylphenol | 41,000 | 40 U | 38 U | 39 U | 38 U | 37 U | 36 U | **14** J1 | 37 U | 38 U | NA | 38 U | **23** J1 | **34** J1 | 38 U |
| 2,4-Dimethylphenol | 95,000 | 40 U | 38 U | 39 U | 38 U | 37 UJ | 36 U | 38 U | 37 U | 38 U | NA | 38 U | 38 U | 37 U | 38 U |
| Benzoic Acid | 9,000 | 400 U | 380 U | 390 U | 380 U | 370 U | 360 U | 380 U | 370 U | 380 U | NA | 380 U | 380 U | 370 U | 380 U |
| Naphthalene | 2,100 | **89** | 19 U | 20 U | 19 U | **13** J1 | **27** | **17** J1 | 19 U | 19 U | NA | 19 U | **55** | **17** J1 | 19 U |
| 2-Methylnaphthalene | 320,000 | **140** | 19 U | 20 U | 19 U | **10** J1 | **48** | 19 U | 19 U | 19 U | NA | 19 U | **35** | 18 U | 19 U |
| Acenaphthylene | --- | 20 U | 19 U | 20 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | NA | 19 U | **11** J1 | 18 U | 19 U |
| Acenaphthene | 230,000 | 20 U | 19 U | 20 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | NA | 19 U | **19** | 18 U | 19 U |
| Dibenzofuran | 80,000 | 20 U | 19 U | 20 U | 19 U | 18 U | **15** J1 | 19 U | 19 U | 19 U | NA | 19 U | **19** | 18 U | 19 U |
| Fluorene | 150,000 | 20 U | 19 U | 20 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | NA | 19 U | **21** | 18 U | 19 U |
| Phenanthrene | --- | **110** | **10** J1 | 20 U | 19 U | **16** J1 | **47** | **14** J1 | 19 U | 19 U | NA | **15** J1 | **66** | **21** | 19 U |
| Anthracene | 1,600,000 | 20 U | 19 U | 20 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | NA | 19 U | **16** J1 | 18 U | 19 U |
| Fluoranthene | 230,000 | **49** | 19 U | 20 U | 19 U | 18 U | **20** | **14** J1 | 19 U | **22** | NA | 19 U | **60** | **19** | 19 U |
| Pyrene | 240,000 | **120** | 19 U | 20 U | 19 U | 18 U | **19** | **17** J1 | 19 U | **17** J1 | NA | **16** J1 | **68** | **20** | 19 U |
| Benzo(a)anthracene | --- | **12** J1 | 19 U | 20 U | 19 U | 18 U | **14** J1 | **12** J1 | 19 U | 19 U | NA | 19 U | **21** | 18 U | 19 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | 25 U | 24 U | 24 U | 24 U | 24 U | 23 U | 21 UJ2 | 42 U | 26 U | NA | 34 U | 26 U | 30 U | 30 U |
| Chrysene | --- | **72** | 19 U | 20 U | 19 U | **20** | **21** | **15** J1 | 19 U | 19 U | NA | **44** | **23** | **10** J1 | 19 U |
| Benzo(a)pyrene | --- | 20 U | 19 U | 20 U | 19 U | 18 U | **13** J1 | **15** J1 | 19 U | 19 U | NA | **14** J1 | 19 U | 18 U | 19 U |
| Indeno(1,2,3-cd)pyrene | --- | **19** J1 | 19 U | 20 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | NA | 19 U | 19 U | 18 U | 19 U |
| Dibenz(a,h)anthracene | --- | 20 U | 19 U | 20 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | NA | 19 U | 19 U | 18 U | 19 U |
| Benzo(g,h,i)perylene | --- | **27** | 19 U | 20 U | 19 U | 18 U | 18 U | **12** J1 | 19 U | 19 U | NA | 19 U | 19 U | 18 U | 19 U |
| 1-Methylnaphthalene | 16,000 | **34** | 19 U | 20 U | 19 U | 18 U | **38** | 19 U | 19 U | 19 U | NA | 19 U | **26** | 18 U | 19 U |
| Total Benzofluoranthenes | --- | **78** | 19 U | 20 U | 19 U | **12** J1 | **17** J1 | **21** | 19 U | 19 U | NA | **26** | **32** | **12** J1 | 19 U |
| Total cPAH TEQ | 15 | **12** J | ND | ND | ND | **1.4** J | **16** J | **18** J | ND | ND | NA | **17** J | **5.5** | **1.3** J | ND |

# TABLE 19
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Western Property Boundary (West of Stabilized Soil Area) | | | | Northern Property Boundary | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-20(2-3.5) TW35G 11/09/2011 | IT-MW-20(5-6.5) TW35H 11/09/2011 | IT-MW-20(8-9.5) TW35I 11/09/2011 | IT-MW-20(14.5-16) TW35J 11/09/2011 | IT-MW-21(2-3.5) TW89D 11/11/2011 | IT-MW-21(5-6.5) TW89E 11/11/2011 | IT-MW-21(8-9.5) TW89F 11/11/2011 | IT-MW-21(13.5-15) TW89G 11/11/2011 | IT-MW-21(17-18.5) TW89H 11/11/2011 | IT-MW-21(24.5-26) TW89M 11/11/2011 | IT-MW-22(2-3.5) TW89I 11/11/2011 | IT-MW-22(5-6.5) TW89J 11/11/2011 | IT-MW-22(8-9.5) TW89K 11/11/2011 | IT-MW-22(13.5-15) TW89L 11/11/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | |
| Naphthalene | 2,100 | **100** | **3.5** J1 | 4.0 U | 4.9 U | **8.0** | **35** | **13** | 4.6 U | 4.5 U | NA | 4.7 U | **69** | **27** | 4.8 U |
| 2-Methylnaphthalene | 320,000 | **220** | **3.2** J1 | 4.0 U | 4.9 U | **8.9** | **57** | **4.9** | 4.6 U | 4.5 U | NA | **2.9** J1 | **35** | **9.9** | 4.8 U |
| 1-Methylnaphthalene | 16,000 | **230** | **3.5** J1 | 4.0 U | 4.9 U | **6.3** | **61** | **4.3** J1 | 4.6 U | 4.5 U | NA | **3.0** J1 | **10** | **9.5** | 4.8 U |
| Total Naphthalenes | --- | **550** | **10.2** J1 | 4.0 U | 4.9 U | **23.2** | **153** | **22.2** J1 | 4.6 U | 4.5 U | NA | **5.9** J1 | **114** | **46.4** | 4.8 U |
| Acenaphthylene | --- | 4.9 U | 4.8 U | 4.0 U | 4.9 U | 4.5 U | 4.4 U | 4.6 U | 4.6 U | 4.5 U | NA | 4.7 U | **22** | **5.0** | 4.8 U |
| Acenaphthene | 230,000 | 4.9 U | 4.8 U | 4.0 U | 4.9 U | 4.5 U | 4.4 U | 4.6 U | 4.6 U | 4.5 U | NA | 4.7 U | **29** | **6.9** | 4.8 U |
| Fluorene | 150,000 | 4.9 U | 4.8 U | 4.0 U | 4.9 U | 4.5 U | **3.8** J1 | 4.6 U | 4.6 U | 4.5 U | NA | 4.7 U | **26** | **6.4** | 4.8 U |
| Phenanthrene | --- | **140** | **6.6** | **3.3** J1 | 4.9 U | **10** | **85** | **14** | 4.6 U | 4.5 U | NA | **11** | **93** | **37** | **5.2** |
| Anthracene | 1,600,000 | 4.9 U | 4.8 U | 4.0 U | 4.9 U | 4.5 U | **12** | 4.6 U | 4.6 U | 4.5 U | NA | 4.7 U | **21** | **6.1** | 4.8 U |
| Fluoranthene | 230,000 | **58** | **4.8** | 4.0 U | 4.9 U | **8.5** | **32** | **7.8** | 4.6 U | 4.5 U | NA | **8.4** | **120** | **36** | **10** |
| Pyrene | 240,000 | **88** | **3.1** J1 | 4.0 U | 4.9 U | **9.8** | **27** | **7.0** | 4.6 U | 4.5 U | NA | **11** | **100** | **32** | **13** |
| Benzo(a)anthracene | --- | **14** | 4.8 U | 4.0 U | 4.9 U | **6.3** | **14** | **4.0** J1 | 4.6 U | 4.5 U | NA | **5.5** | **28** | **10** | **9.4** |
| Chrysene | --- | **55** | **3.8** J1 | 4.0 U | 4.9 U | **16** | **26** | **7.3** | 4.6 U | 4.5 U | NA | **33** | **34** | **15** | **9.5** |
| Benzo(a)pyrene | --- | **14** | 4.8 U | 4.0 U | 4.9 U | **8.2** | **20** | **6.2** | 4.6 U | 4.5 U | NA | **11** | **26** | **12** | **13** |
| Indeno(1,2,3-cd)pyrene | --- | **16** | 4.8 U | 4.0 U | 4.9 U | **6.5** | **6.9** | **3.6** J1 | 4.6 U | 4.5 U | NA | **5.0** | **16** | **6.6** | **5.0** |
| Dibenz(a,h)anthracene | --- | **5.7** | 4.8 U | 4.0 U | 4.9 U | **2.8** J1 | **3.4** J1 | 4.6 U | 4.6 U | 4.5 U | NA | 4.7 U | **5.0** | 4.6 U | 4.8 U |
| Benzo(g,h,i)perylene | --- | **21** | **4.6** J1 | 4.0 U | 4.9 U | **10** | **10** | **6.0** | 4.6 U | 4.5 U | NA | **13** | **19** | **10** | **6.9** |
| Dibenzofuran | 80,000 | 4.9 U | 4.8 U | 4.0 U | 4.9 U | **2.5** J1 | **24** | **3.2** J1 | 4.6 U | 4.5 U | NA | 4.7 U | **26** | **9.4** | 4.8 U |
| Total Benzofluoranthenes | --- | **65** | **3.4** J1 | 4.0 U | 4.9 U | **15** | **17** | **10** | 4.6 U | 4.5 U | NA | **14** | **41** | **20** | **15** |
| Total cPAH TEQ | 15 | **24.62** | **0.4** J | ND | ND | **11.42** J | **24.39** J | **8.0** J | ND | ND | NA | **13.8** | **34.8** | **15.8** | **16.0** |
| **PCBs (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | |
| Aroclor 1260 | 5.4 | 32 U | 33 U | 32 UJ | 32 U | 32 U | 32 U | 33 U | 31 U | 32 U | NA | 32 U | 32 U | 31 U | 31 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | ND | ND | ND | ND | ND | NA | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | **1400** | 6.2 U | 6.8 U | 6.4 U | **21** J | **18** J | 6.4 U | 5.8 U | 5.6 U | NA | **64** J | **13** J | **10** J | 5.9 U |
| Oil-Range Organics | 2,000 | **190** | 12 U | 14 U | 13 U | **100** | **41** | 13 U | 12 U | 11 U | NA | **220** | **25** | **22** | 12 U |
| **NWTPH-G** | | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | **22** | **10** | 11 U | 7.5 U | 7.7 U | 8.2 U | 8.2 U | 7.6 U | 6.4 U | 8.2 U | 7.6 U | 9.4 U | 8.0 U | 6.9 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | | | |
| Antimony | 5 | **0.6** | 0.2 U | 0.3 U | 0.2 U | **0.6** | 0.2 U | 0.3 U | 0.2 U | 0.2 U | NA | 0.2 U | 0.3 U | 0.3 U | 0.2 U |
| Barium | 640 | **324** | **60.5** | **67.1** | **31.7** | **67.3** | **52.0** | **66.3** | **28.7** | **23.3** | NA | **26.6** | **67.3** | **67.6** | **39.0** |
| Beryllium | 160 | **0.3** | **0.3** | **0.3** | 0.2 U | 0.2 U | **0.3** | 0.3 U | 0.2 U | 0.2 U | NA | 0.2 U | **0.4** | **0.3** | 0.2 U |
| Cadmium | 1.3 | **13.5** | 0.1 U | 0.1 U | 0.1 U | **2.1** | **0.3** | **0.2** | 0.1 U | 0.1 U | NA | 0.1 U | **0.7** | **0.3** | 0.1 U |
| Chromium | 1,480 | **594** | **17.2** | **17.1** | **11.8** | **100** | **15.1** | **15.4** | **10.2** | **10.6** | NA | **15.6** | **24** | **15.1** | **11.9** |
| Chromium VI | 3.8 | 0.462 U | 0.491 U | 0.528 U | 0.486 U | **0.461** | 0.458 U | 0.517 U | 0.490 U | 0.500 U | NA | 0.438 U | 0.547 U | 0.526 U | 0.512 U |
| Copper | 36 | **150** | **83.1** | **22.3** | **12.8** | **65.7** | **21.8** | **668** | **183** | **11.4** | NA | **14.3** | **28.8** | **804** | **388** |
| Lead | 250 | **684** | **5.2** | **5.2** | **3.9** | **112** | **14.4** | **9.1** | **2.3** | **1.0** | NA | **4.1** | **12.2** | **6.8** | **1.8** |
| Mercury | 1.5 | **0.08** | **0.05** | **0.06** | 0.02 U | **0.18** | **0.11** | **0.07** | **0.03** | 0.03 U | NA | 0.02 U | **0.14** | **0.10** | 0.03 U |
| Nickel | 210 | **65.6** | **12.9** | **13.8** | **6.0** | **22.8** | **11.3** | **14.3** | **8.0** | **7.1** | NA | **9.0** | **17.2** | **13.2** | **8.4** |
| Silver | 170 | **1.6** | 0.2 U | 0.3 U | 0.2 U | **0.2** | 0.2 U | 0.3 U | 0.2 U | 0.2 U | NA | 0.2 U | 0.3 U | 0.3 U | 0.2 U |
| Zinc | 1,400 | **2350** | **78** | **37** | **26** | **295** | **58** | **63** | **99** | **26** | NA | **26** | **62** | **66** | **235** |

# TABLE 19
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Stabilized Soil Area | | | | | | | South of Stabilized Soil Area | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-23(11-12.5) TW35A 11/09/2011 | IT-MW-23(12.5-14) TW35B 11/09/2011 | IT-MW-24(12.5-14) TX01D 11/14/2011 | IT-MW-24(14-15.5) TX01E 11/14/2011 | IT-MW-25(8-9.5) TX01A 11/14/2011 | IT-MW-25(13.5-15) TX01B 11/14/2011 | IT-MW-25(15.5-17) TX01C 11/14/2011 | IT-MW-15(2-3.5) TX21A 11/15/2011 | IT-MW-15(5-6.5) TX21B 11/15/2011 | IT-MW-15(8-9.5) TX21C 11/15/2011 | IT-MW-15(12.5-14) TX21D 11/15/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | |
| Chloromethane | 1,600 | 1.2 U | **1.2** J1 | 1.2 UJ | 1.5 UJ | 1.2 U | 1.2 UJ | 1.3 UJ | 1.3 UJ | 1.4 UJ | 1.4 UJ | 1.4 UJ |
| Methylene Chloride | 2,400 | **2.2** J, J1 | **2.4** J1 | **1.4** J, J1 | **1.5** J, J1 | **2.3** J1 | **1.4** J, J1 | **3.3** J | **2.7** J | **2.2** J, J1 | **3.1** J | **2.0** J, J1 |
| Acetone | 510,000 | **1600** | **370** | **420** J | **500** J | **35** J | **18** J | **38** J | **26** J | **51** J | **22** J | **19** J |
| Carbon Disulfide | 75,000 | **1.6** | **1.6** | 1.2 U | **2.8** | 1.2 U | **2.4** J | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| 2-Butanone | 430,000 | **130** | **82** | **32** | **46** | 5.9 U | 6.0 U | 6.7 U | 6.4 U | 7.0 U | 7.1 U | 7.1 U |
| Trichloroethene | 51 | 1.2 U | 1.2 U | **2.1** | **1.7** | 1.2 U | **1.8** | 1.3 U | **0.9** J1 | **1.8** | **1.6** | **1.2** J1 |
| Benzene | 93 | **0.8** J1 | **0.8** J1 | **1.3** | 1.5 U | 1.2 U | 1.2 U | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| Tetrachloroethene | 260 | 1.2 U | 1.2 U | 1.2 U | 1.5 U | **1.6** | 1.2 U | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| Toluene | 100,000 | **1.0** J1 | **1.1** J1 | **0.8** J1 | 1.5 U | 1.2 U | 1.2 U | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| Ethylbenzene | 230 | 1.2 U | 1.2 U | 1.2 U | 1.5 U | 1.2 U | **1.2** J1 | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| Styrene | 16,000,000 | 1.2 U | 1.2 U | 1.2 U | 1.5 U | 1.2 U | 1.2 U | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| Trichlorofluoromethane | 200,000 | 1.2 U | 1.2 U | **2.1** J | **0.8** J, J1 | **1.7** | **0.8** J, J1 | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| m,p-Xylene | 160,000 | 1.2 U | 1.2 U | 1.2 U | 1.5 U | 1.2 U | **4.3** | **2.3** | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| o-Xylene | 200,000 | 1.2 U | 1.2 U | 1.2 U | 1.5 U | 1.2 U | **4.1** | **1.6** | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| Methyl Iodide | --- | 1.2 U | 1.2 U | 1.2 U | 1.5 U | 1.2 U | 1.2 UJ | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| 1,3,5-Trimethylbenzene | 800,000 | **0.7** J1 | **0.7** J1 | 1.2 U | 1.5 U | 1.2 U | **1.4** | **0.8** J1 | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| 1,2,4-Trimethylbenzene | 800,000 | **1.1** J1 | **1.0** J1 | 1.2 U | 1.5 U | 1.2 U | **2.9** | **1.7** | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| Isopropylbenzene | 78,000 | 1.2 U | 1.2 U | 1.2 U | 1.5 U | 1.2 U | **1.2** J1 | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| n-Propylbenzene | 11,000 | 1.2 U | 1.2 U | 1.2 U | 1.5 U | 1.2 U | **1.3** | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| 4-Isopropyltoluene | --- | **1.9** J | **2.9** J | 1.2 U | 1.5 U | 1.2 U | 1.2 U | 1.3 U | 1.3 U | 1.4 U | 1.4 U | 1.4 U |
| Naphthalene | 2,100 | 6.1 U | 6.1 U | 6.1 U | 7.3 U | 5.9 U | **0.7** J, J1 | **1.1** J, J1 | 6.4 U | 7.0 U | 7.1 U | 7.1 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | |
| Phenol | 1,900,000 | **28** | **210** | 20 U | **160** | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Benzyl Alcohol | 8,000,000 | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| 4-Methylphenol | 41,000 | **20** J1 | **81** | 40 U | 36 U | 37 U | 36 U | 38 U | 39 U | 39 U | 40 U | 37 U |
| 2,4-Dimethylphenol | 95,000 | 38 U | 39 U | 40 U | 36 U | 37 U | 36 U | 38 U | 39 U | 39 U | 40 U | 37 U |
| Benzoic Acid | 9,000 | 380 U | 390 U | 400 U | 360 U | 370 U | 360 U | 380 U | 390 U | 390 U | 400 U | 370 U |
| Naphthalene | 2,100 | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| 2-Methylnaphthalene | 320,000 | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Acenaphthylene | --- | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Acenaphthene | 230,000 | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Dibenzofuran | 80,000 | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Fluorene | 150,000 | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Phenanthrene | --- | 19 U | 19 U | 20 U | 18 U | **27** | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Anthracene | 1,600,000 | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Fluoranthene | 230,000 | 19 U | 19 U | 20 U | 18 U | **20** | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Pyrene | 240,000 | 19 U | 19 U | 20 U | 18 U | **26** | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Benzo(a)anthracene | --- | 19 U | 19 U | 20 U | 18 U | **14** J1 | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | 23 U | 37 U | **17** J1 | **24** | **72** | **94** | **86** | 130 U | **240** | 180 U | 23 U |
| Chrysene | --- | 19 U | 19 U | 20 U | 18 U | **27** | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Benzo(a)pyrene | --- | 19 U | 19 U | 20 U | 18 U | **14** J1 | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Indeno(1,2,3-cd)pyrene | --- | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Dibenz(a,h)anthracene | --- | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Benzo(g,h,i)perylene | --- | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| 1-Methylnaphthalene | 16,000 | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Total Benzofluoranthenes | --- | 19 U | 19 U | 20 U | 18 U | 18 U | 18 U | 19 U | 20 U | 19 U | 20 U | 19 U |
| Total cPAH TEQ | 15 | ND | ND | ND | ND | **16** J | ND | ND | ND | ND | ND | ND |

# TABLE 19
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Stabilized Soil Area | | | | | | | South of Stabilized Soil Area | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-23(11-12.5) TW35A 11/09/2011 | IT-MW-23(12.5-14) TW35B 11/09/2011 | IT-MW-24(12.5-14) TX01D 11/14/2011 | IT-MW-24(14-15.5) TX01E 11/14/2011 | IT-MW-25(8-9.5) TX01A 11/14/2011 | IT-MW-25(13.5-15) TX01B 11/14/2011 | IT-MW-25(15.5-17) TX01C 11/14/2011 | IT-MW-15(2-3.5) TX21A 11/15/2011 | IT-MW-15(5-6.5) TX21B 11/15/2011 | IT-MW-15(8-9.5) TX21C 11/15/2011 | IT-MW-15(12.5-14) TX21D 11/15/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | |
| Naphthalene | 2,100 | **2.9** J1 | **3.2** J1 | **9.0** | **4.2** J1 | **3.2** J1 | **4.0** J1 | **4.4** J1 | **2.8** J1 | 4.9 U | 4.7 U | **5.0** |
| 2-Methylnaphthalene | 320,000 | **3.6** J1 | **3.0** J1 | **9.6** | **5.9** | **4.4** J1 | **3.8** J1 | **4.6** J1 | 4.9 U | 4.9 U | 4.7 U | **2.5** J1 |
| 1-Methylnaphthalene | 16,000 | **7.9** | **4.9** | **7.9** | **4.5** | **3.3** J1 | **4.2** J1 | **3.9** J1 | 4.9 U | 4.9 U | 4.7 U | **2.5** J1 |
| Total Naphthalenes | --- | **14.4** J1 | **11.1** J1 | **26.5** | **14.6** J1 | **10.9** J1 | **12.0** | **12.9** J1 | **2.8** J1 | 4.9 U | 4.7 U | **10.0** J1 |
| Acenaphthylene | --- | 4.6 U | 4.9 U | 5.0 U | 4.4 U | 4.7 U | 4.6 U | 4.8 U | 4.9 U | 4.9 U | 4.7 U | 4.7 U |
| Acenaphthene | 230,000 | 4.6 U | 4.9 U | 5.0 U | 4.4 U | **4.1** J1 | 4.6 U | 4.8 U | **2.6** J1 | 4.9 U | 4.7 U | 4.7 U |
| Fluorene | 150,000 | 4.6 U | 4.9 U | 5.0 U | 4.4 U | 4.7 U | **6.4** | **4.6** J1 | 4.9 U | 4.9 U | 4.7 U | 4.7 U |
| Phenanthrene | --- | **4.4** J1 | **5.2** | **22** | **8.7** | **14** | **6.4** | **4.6** J1 | **22** | **5.5** | **2.7** J1 | **3.9** J1 |
| Anthracene | 1,600,000 | 4.6 U | 4.9 U | **3.0** J1 | 4.4 U | 4.7 U | 4.6 U | 4.8 U | **4.4** J1 | 4.9 U | 4.7 U | 4.7 U |
| Fluoranthene | 230,000 | 4.6 U | **2.9** J1 | **14** | **5.2** | **12** | **4.8** | 4.8 U | **20** | **4.7** J1 | 4.7 U | 4.7 U |
| Pyrene | 240,000 | 4.6 U | **3.1** J1 | **16** | **6.3** | **15** | **5.1** | **2.6** J1 | **23** | **4.4** J1 | 4.7 U | 4.7 U |
| Benzo(a)anthracene | --- | 4.6 U | 4.9 U | **6.6** | **2.7** J1 | **8.3** | **2.5** J1 | 4.8 U | **10** | **2.5** J1 | 4.7 U | 4.7 U |
| Chrysene | --- | 4.6 U | 4.9 U | **14** | **5.6** | **24** | **5.6** | **3.8** J1 | **12** | **3.3** J1 | 4.7 U | 4.7 U |
| Benzo(a)pyrene | --- | 4.6 U | 4.9 U | **12** | **4.0** J1 | **12** | **5.3** | 4.8 U | **12** | **2.6** J1 | 4.7 U | 4.7 U |
| Indeno(1,2,3-cd)pyrene | --- | 4.6 U | 4.9 U | **5.2** | 4.4 U | **4.2** J1 | 4.6 U | 4.8 U | **7.4** | 4.9 U | 4.7 U | 4.7 U |
| Dibenz(a,h)anthracene | --- | 4.6 U | 4.9 U | **2.9** J1 | 4.4 U | **3.4** J1 | 4.6 U | 4.8 U | **3.3** J1 | 4.9 U | 4.7 U | 4.7 U |
| Benzo(g,h,i)perylene | --- | 4.6 U | 4.9 U | **8.9** | **3.6** J1 | **9.8** | **2.9** J1 | **3.6** J1 | **8.6** | 4.9 U | 4.7 U | 4.7 U |
| Dibenzofuran | 80,000 | 4.6 U | 4.9 U | **4.3** J1 | 4.4 U | 4.7 U | **2.4** J1 | 4.8 U | 4.9 U | 4.9 U | 4.7 U | 4.7 U |
| Total Benzofluoranthenes | --- | 4.6 U | 4.9 U | **13** | **7.5** | **14** | 4.6 U | 4.8 U | **17** | 4.9 U | 4.7 U | 4.7 U |
| Total cPAH TEQ | 15 | ND | ND | **15** J | **5.1** J | **15** J | **5.6** J | **0.04** J | **16** | **2.9** J | ND | ND |
| **PCBs (µg/kg)** | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | |
| Aroclor 1260 | 5.4 | 33 U | 31 U | 32 U | 32 U | 32 U | 32 U | 33 U | 32 U | 32 U | 31 U | 33 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | 6.6 U | 6.2 U | **30** | 6.0 U | **24** | **51** | **6.8** | 6.0 U | 6.4 U | 5.3 U | 6.6 U |
| Oil-Range Organics | 2,000 | 13 U | **15** | **45** | 12 U | **100** | **53** | **18** | 12 U | 13 U | 11 U | 13 U |
| **NWTPH-G** | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 8.3 U | 7.6 U | 7.5 U | 8.1 U | **10** | 7.0 U | 8.4 U | 8.1 U | 7.0 U | 7.4 U | 8.7 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | |
| Antimony | 5 | 0.2 UJ | 0.3 U | **0.3** | 0.2 U | 0.2 U | 0.2 UJ | 0.2 U | 0.2 UJ | 0.2 U | 0.2 U | 0.3 U |
| Barium | 640 | **50.7** J | **27.9** | **56.5** | **39.1** | **62.2** | **30.0** J | **28.6** | **51.0** | **44.2** | **33.6** | **50.9** |
| Beryllium | 160 | 0.2 U | 0.3 U | **0.3** | 0.2 U | **0.2** | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U |
| Cadmium | 1.3 | 0.1 U | 0.1 U | **0.3** | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Chromium | 1,480 | **13.2** | **11.6** | **16.6** | **9.9** | **18.2** | **10.7** | **8.7** | **15.0** | **12.2** | **8.6** | **12.4** |
| Chromium VI | 3.8 | **0.521** | 0.517 U | 0.511 U | 0.484 U | 0.449 UJ | 0.496 U | 0.477 U | 0.475 U | 0.500 U | 0.423 U | 0.533 U |
| Copper | 36 | **180** | **514** | **226** | **322** | **85.7** | **303** | **224** | **15.7** | **17.2** | **11.0** | **20.2** |
| Lead | 250 | **2.2** J | **2.2** | **18.0** | **3.6** | **8.4** | **2.8** | **1.4** | **17.1** J | **3.4** | **17.4** | **2.5** |
| Mercury | 1.5 | **0.21** J | **0.15** | **1.14** | **0.54** | **0.05** | **0.02** | 0.02 U | **0.11** | **0.07** | 0.02 U | **0.03** |
| Nickel | 210 | **10.1** | **8.3** | **13.6** | **8.8** | **20.3** | **10.6** | **9.0** | **15.5** | **10.8** | **7.9** | **9.5** |
| Silver | 170 | 0.2 U | 0.3 U | 0.3 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U |
| Zinc | 1,400 | **44** | **98** | **127** | **95** | **71** | **135** | **187** | **51** | **27** | **29** | **27** |

# TABLE 19
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | South of Stabilized Soil Area | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-16(2-3.5) TW45L 11/10/2011 | IT-MW-16(5-6.5) TW45M 11/10/2011 | IT-MW-16(8-9.5) TW45N 11/10/2011 | IT-MW-16(12-13.5) TW45O 11/10/2011 | IT-MW-18(2-3.5) TW27A 11/08/2011 | IT-MW-18(5-6.5) TW27B 11/08/2011 | IT-MW-18(8-9.5) TW27D 11/08/2011 | IT-MW-18(11.5-13) TW27C 11/08/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | |
| Chloromethane | 1,600 | 1.3 UJ | 1.1 UJ | 1.3 UJ | 1.3 UJ | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Methylene Chloride | 2,400 | **3.6** | **3.3** | **5.7** | **4.1** | **3.0** | 2.8 U | 2.7 U | 2.5 U |
| Acetone | 510,000 | **37** | **30** | **38** | **23** J | **12** J | **22** J | **22** J | **23** J |
| Carbon Disulfide | 75,000 | **1.7** | 1.1 U | **3.8** | **1.8** J | **4.0** | **2.0** | **2.6** | **3.7** |
| 2-Butanone | 430,000 | **3.2** J1 | 5.3 U | **5.0** J1 | 6.5 U | 6.2 U | 6.9 U | 6.8 U | 6.1 U |
| Trichloroethene | 51 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Benzene | 93 | **1.7** | **0.5** J1 | **1.1** J1 | **1.1** J1 | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Tetrachloroethene | 260 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Toluene | 100,000 | **0.9** J1 | 1.1 U | **0.9** J1 | **0.6** J1 | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Ethylbenzene | 230 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Styrene | 16,000,000 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Trichlorofluoromethane | 200,000 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| m,p-Xylene | 160,000 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| o-Xylene | 200,000 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Methyl Iodide | --- | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| 1,3,5-Trimethylbenzene | 800,000 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| 1,2,4-Trimethylbenzene | 800,000 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Isopropylbenzene | 78,000 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| n-Propylbenzene | 11,000 | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| 4-Isopropyltoluene | --- | 1.3 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U |
| Naphthalene | 2,100 | 6.3 U | 5.3 U | 6.5 U | 6.5 U | 6.2 U | 6.9 U | 6.8 U | 6.1 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | |
| Phenol | 1,900,000 | 19 U | 18 U | 19 U | 19 U | 20 U | 19 U | **10** J1 | **11** J1 |
| Benzyl Alcohol | 8,000,000 | 19 U | 18 U | 19 U | 19 U | 20 U | **18** J1 | **25** | 20 U |
| 4-Methylphenol | 41,000 | 39 U | 37 U | 38 U | 38 U | 39 U | **45** | **43** | 40 U |
| 2,4-Dimethylphenol | 95,000 | 39 U | 37 U | 38 U | 38 U | 39 U | **16** J1 | 38 U | 40 U |
| Benzoic Acid | 9,000 | 390 U | 370 U | 380 U | 380 U | 390 U | **140** J1 | 380 U | 400 U |
| Naphthalene | 2,100 | 19 U | 18 U | 19 U | 19 U | 20 U | **66** | **55** | **13** J1 |
| 2-Methylnaphthalene | 320,000 | 19 U | 18 U | 19 U | 19 U | **9.8** J1 | **57** | **36** | 20 U |
| Acenaphthylene | --- | 19 U | 18 U | 19 U | 19 U | 20 U | **15** J1 | **13** J1 | 20 U |
| Acenaphthene | 230,000 | 19 U | 18 U | 19 U | 19 U | 20 U | **18** J1 | **14** J1 | 20 U |
| Dibenzofuran | 80,000 | 19 U | 18 U | 19 U | 19 U | 20 U | **38** | **25** | 20 U |
| Fluorene | 150,000 | 19 U | 18 U | 19 U | 19 U | 20 U | **23** | **30** | 20 U |
| Phenanthrene | --- | **88** | 18 U | **26** | 19 U | **18** J1 | **86** | **85** | **11** J1 |
| Anthracene | 1,600,000 | **19** | 18 U | 19 U | 19 U | 20 U | **16** J1 | **14** J1 | 20 U |
| Fluoranthene | 230,000 | **110** | 18 U | **26** | 19 U | 20 U | **79** | **80** | 20 U |
| Pyrene | 240,000 | **160** J | 18 U | **37** J | 19 U | **14** J1 | **68** | **58** | 20 U |
| Benzo(a)anthracene | --- | **80** | 18 U | **19** | 19 U | 20 U | **21** | **13** J1 | 20 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | 34 U | 32 U | 67 U | 43 U | **22** J1 | **29** | **32** | **17** J1 |
| Chrysene | --- | **98** | 18 U | **32** | 19 U | **27** | **29** | **21** | 20 U |
| Benzo(a)pyrene | --- | **110** | 18 U | **25** | 19 U | 20 U | 19 U | 19 U | 20 U |
| Indeno(1,2,3-cd)pyrene | --- | **50** | 18 U | **13** J1 | 19 U | 20 U | 19 U | 19 U | 20 U |
| Dibenz(a,h)anthracene | --- | **13** J1 | 18 U | 19 U | 19 U | 20 U | 19 U | 19 U | 20 U |
| Benzo(g,h,i)perylene | --- | **54** | 18 U | **21** | 19 U | **13** J1 | 19 U | 19 U | 20 U |
| 1-Methylnaphthalene | 16,000 | 19 U | 18 U | 19 U | 19 U | 20 U | **52** | **32** | 20 U |
| Total Benzofluoranthenes | --- | **130** | 18 U | **33** | 19 U | **17** J1 | **34** | **33** | 20 U |
| Total cPAH TEQ | 15 | **138.28** J | ND | **31.82** J | ND | **2.0** J | **5.8** | **4.8** J | ND |

# TABLE 19
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## NORTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | South of Stabilized Soil Area | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | IT-MW-16(2-3.5) TW45L 11/10/2011 | IT-MW-16(5-6.5) TW45M 11/10/2011 | IT-MW-16(8-9.5) TW45N 11/10/2011 | IT-MW-16(12-13.5) TW45O 11/10/2011 | IT-MW-18(2-3.5) TW27A 11/08/2011 | IT-MW-18(5-6.5) TW27B 11/08/2011 | IT-MW-18(8-9.5) TW27D 11/08/2011 | IT-MW-18(11.5-13) TW27C 11/08/2011 |
| **PAHs (µg/kg)** | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | |
| Naphthalene | 2,100 | **5.7** | 4.7 U | **5.8** | **2.7** J1 | **6.5** | **71** | **30** | **3.6** J1 |
| 2-Methylnaphthalene | 320,000 | **4.0** J1 | 4.7 U | **4.7** | 4.8 U | **10** | **51** | **17** | 5.0 U |
| 1-Methylnaphthalene | 16,000 | **4.4** J1 | **2.6** J1 | **4.0** J1 | 4.8 U | **8.9** | **59** | **18** | 5.0 U |
| Total Naphthalenes | --- | **14.1** J1 | **2.6** J1 | **14.5** J1 | **2.7** J1 | **25.4** | **181** | **65** | **3.6** J1 |
| Acenaphthylene | --- | **4.0** J1 | 4.7 U | **2.8** J1 | 4.8 U | 4.9 U | **20** | 4.8 U | 5.0 U |
| Acenaphthene | 230,000 | 4.6 U | 4.7 U | **4.0** J1 | 4.8 U | 4.9 U | **34** | **16** | 5.0 U |
| Fluorene | 150,000 | **2.7** J1 | 4.7 U | **3.2** J1 | 4.8 U | 4.9 U | **24** | **12** | 5.0 U |
| Phenanthrene | --- | **32** | **6.1** | **36** | **3.5** J1 | **19** | **100** | **51** | **8.1** |
| Anthracene | 1,600,000 | **7.1** | 4.7 U | **5.5** | 4.8 U | 4.9 U | **13** | **9.0** | 5.0 U |
| Fluoranthene | 230,000 | **53** | **51** | **39** | **3.0** J1 | **9.2** | **59** | **41** | **5.1** |
| Pyrene | 240,000 | **60** | **170** | **44** | **3.4** J1 | **11** | **48** | **34** | **5.0** |
| Benzo(a)anthracene | --- | **33** | **120** | **22** | 4.8 U | **6.0** | **13** | **9.8** | 5.0 U |
| Chrysene | --- | **45** | **140** | **40** | 4.8 U | **25** | **19** | **14** | **2.9** J1 |
| Benzo(a)pyrene | --- | **51** | **250** | **33** | **3.4** J1 | **7.4** | **24** | **12** | 5.0 U |
| Indeno(1,2,3-cd)pyrene | --- | **31** | **100** | **16** | 4.8 U | **7.6** | **6.4** | **4.5** J1 | 5.0 U |
| Dibenz(a,h)anthracene | --- | **11** | **37** | **6.7** | 4.8 U | **6.5** | 4.7 U | **2.7** J1 | 5.0 U |
| Benzo(g,h,i)perylene | --- | **36** | **110** | **26** | 4.8 U | **12** | **10** | **7.9** | 5.0 U |
| Dibenzofuran | 80,000 | **2.5** J1 | 4.7 U | **3.0** J1 | 4.8 U | **2.5** J1 | **29** | **15** | **2.8** J1 |
| Total Benzofluoranthenes | --- | **64** | **260** | **43** | 4.8 U | **13** | **17** | **19** | 5.0 U |
| Total cPAH TEQ | 15 | **65** | **303** | **42** J | **3.4** J | **11** J | **27.8** | **16** | **0.03** J |
| **PCBs (µg/kg)** | | | | | | | | | |
| **Method SW8082** | | | | | | | | | |
| Aroclor 1260 | 5.4 | 30 U | 32 U | 30 U | 30 U | 32 U | 33 U | **29** J1 | 33 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | ND | ND | **29** J | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | |
| Diesel-Range Organics | 2,000 | **12** | 5.3 U | **14** | 6.1 U | **26** | **27** | **32** | 6.8 U |
| Oil-Range Organics | 2,000 | **47** | **12** | **57** | 12 U | **110** | **34** | **41** | **20** |
| **NWTPH-G** | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 7.5 U | 7.6 U | 6.9 U | 7.9 U | 6.4 U | 9.2 U | 8.7 U | 8.5 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | |
| Antimony | 5 | 0.2 U | 0.2 U | 0.2 U | 0.2 UJ | 0.2 UJ | 0.2 U | 0.3 U | 0.3 U |
| Barium | 640 | **55.0** | **34.9** | **43.7** | **27.6** | **44.3** J | **52.8** | **59.7** | **70.7** |
| Beryllium | 160 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | **0.4** | **0.3** | **0.3** |
| Cadmium | 1.3 | **0.2** | 0.1 U | **0.2** | 0.1 U | 0.1 U | **0.4** | **0.5** | **0.2** |
| Chromium | 1,480 | **18.7** | **12.1** | **20.5** | **9.6** | **53.3** J | **15.3** | **16.8** | **16.1** |
| Chromium VI | 3.8 | 0.458 U | 0.457 U | 0.463 U | 0.482 U | 0.419 UJ | 0.528 U | 0.520 U | 0.543 U |
| Copper | 36 | **70.1** | **21.2** | **44.4** | **11.9** | **15.7** J | **20.9** | **30.8** | **25.9** |
| Lead | 250 | **33.3** | **7.7** | **33.5** | **1.4** | **7.6** | **6.4** | **7.6** | **4.9** |
| Mercury | 1.5 | **0.15** | 0.03 U | **0.10** | 0.03 U | 0.02 U | **0.06** | **0.06** | **0.06** |
| Nickel | 210 | **14.0** | **9.4** | **15.4** | **8.2** | **10.7** | **14.6** | **15.4** | **14.2** |
| Silver | 170 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.3 U |
| Zinc | 1,400 | **129** | **31** | **75** | **45** | **41** | **46** | **57** | **37** |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ND = Not Detected.
NA = Not Analyzed
PCBs - polychlorinated biphenyls
PAHs =polcyclic aromatic hydrocarbons
cPAH= carcinogenic PAH
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
UJ2 = The analyted was not detected in the sample at or above the numerical value shown; the numerical value is below the reporting limit, but greater than the detection limit.

Bold = Exceedance
Box = Exceeds Preliminary Cleanup Level.

# TABLE 20
## DETECTED ARSENIC CONCENTRATIONS IN RI AND CONSTRUCTION-RELATED SOIL SAMPLES
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Sample ID | Sample Date | Sample Depth | Arsenic (mg/kg) |
|---|---|---|---|
| | | | PCL 7 |
| **Fill A Material** | | | |
| **1900-1946 Random Fill, Consisting of Gravel, Sand, Slag, Demolition Waste, and Crushed Rocks** | | | |
| MW-14 | 11/8/2011 | 2 to 3.5 | 2.4 |
| MW-14 | 11/8/2011 | 5 to 6.5 | 4.7 |
| MW-14 | 11/8/2011 | 8 to 9.5 | 7.2 |
| MW-14 | 11/8/2011 | 13 to 14.5 | 1.6 |
| **Fill B Material** | | | |
| **1946-1960 Random Fill Material** | | | |
| ***Vicinity of I-205(s)*** | | | |
| MW-9 | 10/31/11 | 2 to 3.5 | 2.5 |
| MW-9 | 10/31/11 | 5 to 6.5 | 6.2 |
| MW-9 | 11/4/11 | 8 to 9.5 | 11.1 |
| MW-9 | 11/4/11 | 13 to 14.5 | 2.5 |
| MW-10 | 10/31/11 | 2 to 3.5 | 4.6 |
| MW-10 | 10/31/11 | 5 to 6.5 | 1.6 |
| MW-10 | 11/7/11 | 8 to 9.5 | 2.2 |
| MW-10 | 11/7/11 | 13 to 14.5 | 209 |
| MW-11 | 10/31/11 | 2 to 3.5 | 6.6 |
| MW-11 | 10/31/11 | 5 to 6.5 | 2.9 |
| MW-11 | 11/7/11 | 8 to 9.5 | 7.8 |
| MW-11 | 11/7/11 | 13 to 14.5 | 3.7 |
| TP-104-B | 10/27/11 | 12 to 13 | 2.0 |
| TP-105-B | 10/27/11 | 11 to 12 | 2.3 |
| TP-106-B | 10/28/11 | 11 to 12 | 4.2 |
| IT-TOWPATHEXC1 | 7/15/11 | 0.8 | 3.6 |
| **Fill C Material** | | | |
| **1946-1960 Some Random Fill Along With Fill From Off-Site Sources** | | | |
| MW-17 | 11/10/11 | 2 to 3.5 | 10.5 |
| MW-17 | 11/10/11 | 5 to 6.5 | 29.3 |
| MW-17 | 11/10/11 | 8 to 9.5 | 31.5 |
| MW-17 | 11/10/11 | 11 to 12.5 | 13.9 |
| MW-17 | 11/10/11 | 14 to 15.5 | 60.3 |
| MW-17 | 11/10/11 | 15.5 to 17 | 299 |
| MW-17 | 11/10/11 | 18.5 to 19.75 | 76.4 |
| MW-17 | 11/10/11 | 21.25 to 21.5 | 33.9 |
| MW-17 | 11/10/11 | 21.5 to 23 | 78.5 |
| MW-19 | 11/9/11 | 2 to 3.5 | 3.4 |
| MW-19 | 11/9/11 | 5 to 6.5 | 13.1 |
| MW-19 | 11/9/11 | 8 to 9.5 | 7.5 |
| MW-19 | 11/9/11 | 13 to 14.5 | 10.5 |
| SB-3 | 11/14/11 | 2 to 3.5 | 2.7 |
| SB-3 | 11/14/11 | 5 to 5.5 | 4 |
| SB-3 | 11/14/11 | 6.5 to 7 | 40.1 |
| SB-4 | 11/1/11 | 2 to 3.5 | 9.7 |
| SB-4 | 11/1/11 | 5 to 6.5 | 7.6 |
| SB-4 | 11/1/11 | 8 to 9 | 4.8 |
| SB-4 | 11/1/11 | 11.5 to 13 | 1.9 |
| SB-12 | 11/14/11 | 2 to 3.5 | 12.3 |
| SB-12 | 11/14/11 | 5 to 6.5 | 10.4 |
| SB-12 | 11/14/11 | 8 to 9.5 | 9.2 |
| SB-12 | 11/14/11 | 14 to 15.5 | 24.6 |
| TOWPATH-EXC12 | 7/26/11 | 2.7 | 2.2 |

# TABLE 20
## DETECTED ARSENIC CONCENTRATIONS IN RI AND CONSTRUCTION-RELATED SOIL SAMPLES
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Sample ID | Sample Date | Sample Depth | Arsenic (mg/kg) |
|---|---|---|---|
| | | | PCL 7 |
| **Fill D Material** | | | |
| **1960-1965 Slag, Construction, and Demolition Debris, and Imported Soil** | | | |
| PIVEXC1 | 8/8/11 | 4.2 | 2.5 |
| SB-5 | 10/31/11 | 2 to 3.5 | 16.9 |
| SB-5 | 10/31/11 | 5 to 6.5 | 5.9 |
| SB-5 | 10/31/11 | 8 to 9.5 | 4.3 |
| SB-5 | 10/31/11 | 16 to 17.5 | 1.2 |
| **Fill E Material** | | | |
| **1960-1965 Imported Construction-Quality Sand Fill Material** | | | |
| MW-12 | 11/3/11 | 2 to 3.5 | 1.9 |
| MW-12 | 11/3/11 | 5 to 6.5 | 1.4 |
| MW-12 | 11/3/11 | 8 to 9.5 | 2.3 |
| MW-12 | 11/3/11 | 13 to 14.5 | 1.7 |
| MW-12 | 11/3/11 | 18 to 19.5 | 92 |
| MW-12 | 11/3/11 | 23 to 24.5 | 22.7 |
| MW-13 | 11/3/11 | 2 to 3.5 | 2.7 |
| MW-13 | 11/3/11 | 5 to 6.5 | 3.1 |
| MW-13 | 11/3/11 | 8 to 9.5 | 2.7 |
| MW-13 | 11/3/11 | 12.5 to 14 | 24.4 |
| MW-13 | 11/3/11 | 15 to 16.5 | 19.5 |
| MW-13B | 11/10/11 | 2 to 3.5 | 3.8 |
| MW-13B | 11/10/11 | 5 to 6.5 | 2.5 |
| MW-13B | 11/11/11 | 6.5 to 8 | 7.2 |
| MW-13B | 11/11/11 | 8 to 9.5 | 12.1 |
| MW-13B | 11/11/11 | 12.5 to 13.5 | 8.9 |
| SB-2 | 10/31/11 | 2 to 3.5 | 1.7 |
| SB-2 | 10/31/11 | 5 to 6.5 | 2.3 |
| SB-2 | 10/31/11 | 8 to 9.5 | 1.8 |
| SB-2 | 10/31/11 | 14 to 15.5 | 1.7 |

mg/kg = milligrams per kilogram
PCL = Prelilminary Cleanup Level
Box = Exceedance of PCL

# TABLE 21
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | FILL A: 1900-1946 Random Fill Consisting of Gravel, Sand, Slag, Demolition Waste, and Crushed Rocks | | | | FILL B: 1946-1960 Random Fill Material | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Vicinity of I-205(s) and I-206(s) | |
| | Preliminary Cleanup Levels | IT-MW-14(2-3.5) TW27J 11/08/2011 | IT-MW-14(5-6.5) TW27K 11/08/2011 | IT-MW-14(8-9.5) TW27L 11/08/2011 | IT-MW-14(13-14.5) TW27M 11/08/2011 | IT-MW-9(2-3.5) TU65P 10/31/2011 | IT-MW-9(5-6.5) TU65C 10/31/2011 | IT-MW-9(8-9.5) TV85C 11/04/2011 | IT-MW-9(13-14.5) TV85D 11/04/2011 | IT-MW-10(2-3.5) TU65D 10/31/2011 | IT-MW-10(5-6.5) TU65E 10/31/2011 | IT-MW-10(8-9.5) TV99G 11/07/2011 | IT-MW-10(13.5-15) TV99H 11/07/2011 | IT-TP-104-B(12-13) TU13A 10/27/2011 | IT-TP-105B-B(11-12) TU13B 10/27/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | |
| Methylene Chloride | 2,400 | **2.6** | **2.7** | **2.9** | **4.5** | **2.4** J, J1 | **3.1** J | **10** J | **2.1** J | **2.7** J | **3.5** J | **2.3** J1 | **2.9** | 2.6 U | 2.7 U |
| Acetone | 510,000 | **15** J | **65** J | **25** J | **23** J | **50** | **55** | **34** | 11 U | **50** | 7.1 U | **7.7** | **64** | **30** J | **36** J |
| Carbon Disulfide | 75,000 | **1.7** | 1.2 U | 1.3 U | **12** | **1.8** | **1.7** | 1.2 U | 1.1 U | **1.2** J1 | 1.1 U | 1.2 U | 1.3 U | **4.7** | **4.2** |
| 1,1-Dichloroethane | 710 | 1.0 UJ | 1.2 UJ | 1.3 UJ | 1.5 UJ | 1.2 U | 1.1 U | 1.2 UJ | 1.1 UJ | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| cis-1,2-Dichloroethene | 2,600 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| 2-Butanone | 430,000 | 5.0 U | **3.3** J1 | 6.3 U | 7.4 U | **7.1** | **5.9** | 6.1 UJ | 5.7 UJ | **4.6** J1 | 5.7 U | 6.1 U | **5.1** J1 | 6.4 U | 6.6 U |
| Trichloroethene | 51 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| Benzene | 93 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | **0.9** J1 | 1.1 U | 1.2 U | 1.1 U | **1.0** J1 | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| Toluene | 100,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | **1.1** J1 | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| Ethylbenzene | 230 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| Trichlorofluoromethane | 200,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| 1,1,2-Trichloro-1,2,2-trifuoroethane | 1,000,000,000 | 2.0 U | 2.4 U | 2.5 U | 3.0 U | 2.4 U | 2.3 U | 2.4 U | 2.3 U | 2.5 U | 2.3 U | 2.5 U | 2.7 U | 2.6 U | 2.7 U |
| m,p-Xylene | 160,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| o-Xylene | 200,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| 1,4-Dichlorobenzene | 3,500 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| Methyl Iodide | --- | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | **0.8** J1 | 1.3 U | 1.3 U |
| 1,3,5-Trimethylbenzene | 800,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| 1,2,4-Trimethylbenzene | 800,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| Isopropylbenzene | 78,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| n-Propylbenzene | 11,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| sec-Butylbenzene | --- | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| 4-Isopropyltoluene | --- | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| n-Butylbenzene | 27,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.3 U | 1.1 U | 1.2 U | 1.3 U | 1.3 U | 1.3 U |
| Naphthalene | 2,100 | 5.0 U | 6.0 U | 6.3 U | 7.4 U | **10** | **1.9** J1 | 6.1 U | 5.7 U | 6.3 U | 5.7 U | 6.1 U | 6.7 U | 6.4 U | 6.6 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | |
| Phenol | 1,900,000 | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | **11** J1 | 19 U | 20 U |
| 1,3-Dichlorobenzene | 3,840 | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| 1,4-Dichlorobenzene | 3,500 | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| Benzyl Alcohol | 8,000,000 | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | **19** | 19 U | 20 U |
| 1,2-Dichlorobenzene | 68,000 | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| 2-Methylphenol | 250,000 | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| 4-Methylphenol | 41,000 | 110 U | 110 U | 110 U | 39 U | 36 U | 38 U | 37 U | 37 U | 39 U | 36 U | 39 U | **62** | 39 U | 39 U |
| Isophorone | --- | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| 2,4-Dimethylphenol | 95,000 | 110 U | 110 U | 110 U | 39 U | 36 U | 38 U | 37 U | 37 U | 39 U | 36 U | 39 U | 39 U | 39 U | 39 U |
| Benzoic Acid | 9,000 | 1100 U | 1100 U | 1100 U | 390 U | 360 U | 380 U | 370 U | 370 U | 390 U | 360 U | 390 U | **180** J1 | 390 UJ | 390 UJ |
| Naphthalene | 2,100 | 57 U | 55 U | 56 U | 20 U | **47** | **26** | **18** J1 | 18 U | 19 U | 18 U | 20 U | **170** | 19 U | 20 U |
| 2-Methylnaphthalene | 320,000 | 57 U | 55 U | 56 U | 20 U | **55** | **13** J1 | **16** J1 | 18 U | 19 U | 18 U | 20 U | **120** | 19 U | 20 U |
| Acenaphthylene | --- | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| Acenaphthene | 230,000 | 57 U | 55 U | 56 U | 20 U | **90** | **200** | **13** J1 | 18 U | 19 U | 18 U | 20 U | **85** | 19 U | 20 U |
| Dibenzofuran | 80,000 | 57 U | 55 U | 56 U | 20 U | **52** | **260** | **16** J1 | 18 U | 19 U | 18 U | 20 U | **71** | 19 U | 20 U |
| Fluorene | 150,000 | 57 U | 55 U | 56 U | 20 U | **73** | **300** | 18 U | 18 U | 19 U | 18 U | 20 U | **99** J | 19 U | 20 U |
| N-Nitrosodiphenylamine | 204,000 | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| Phenanthrene | --- | **31** J1 | **53** J1 | **39** J1 | 20 U | **200** | **830** | **52** | 18 U | **36** | 18 U | **30** | **210** | 11 J1 | 20 U |
| Carbazole | 50,000 | 57 U | 55 U | 56 U | 20 U | **13** J1 | **86** | 18 U | 18 U | 19 U | 18 U | 20 U | **18** J1 | 19 U | 20 U |
| Anthracene | 1,600,000 | 57 U | 55 U | 56 U | 20 U | **22** | **190** | **11** J1 | 18 U | 19 U | 18 U | 20 U | **22** | 19 U | 20 U |
| Di-n-Butylphthalate | 26,000 | 57 U | 55 U | 56 U | 20 U | 18 U | **11** J1 | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| Fluoranthene | 230,000 | 57 U | **50** J1 | **28** J1 | 20 U | **93** | **340** | **24** | 18 U | **40** | 18 U | **42** | **81** | 19 U | 20 U |
| Pyrene | 240,000 | **34** J1 | **78** | **31** J1 | 20 U | **70** | **300** | **33** J | 18 U | **40** | 18 U | **59** J | **93** J | 19 U | 20 U |
| Butylbenzylphthalate | 1,700 | 57 U | 55 U | 56 U | 20 U | 18 U | **16** J1 | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| Benzo(a)anthracene | --- | 57 U | **39** J1 | **34** J1 | 20 U | **16** J1 | **69** | **9.2** J1 | 18 U | **16** J1 | 18 U | **20** | **26** | 19 U | 20 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | 71 U | **58** J1 | **56** J1 | **23** J1 | 18 UJ2 | 29 U | 40 U | 22 UJ2 | 23 UJ2 | 15 UJ2 | 25 U | 58 U | 24 U | 24 U |
| Chrysene | --- | **71** | **86** | **65** | 20 U | **20** | **69** | **26** | 18 U | **28** | 18 U | **24** | **38** | 19 U | 20 U |
| Di-n-Octyl phthalate | --- | 57 U | 55 U | 56 U | 20 U | 18 U | 19 U | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| Benzo(a)pyrene | --- | 57 U | **42** J1 | 56 U | 20 U | 18 U | **65** | **9.2** J1 | 18 U | **21** | 18 U | **30** | **21** | 19 U | 20 U |
| Indeno(1,2,3-cd)pyrene | --- | 57 U | 55 U | 56 U | 20 U | 18 U | **32** | 18 U | 18 U | **14** J1 | 18 U | 20 U | 19 U | 19 U | 20 U |
| Dibenz(a,h)anthracene | --- | 57 U | 55 U | 56 U | 20 U | 18 U | **14** J1 | 18 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U | 20 U |
| Benzo(g,h,i)perylene | --- | 57 U | 55 U | 56 U | 20 U | 18 U | **49** | 18 U | 18 U | **22** | 18 U | **15** J1 | **16** J1 | 19 U | 20 U |
| 1-Methylnaphthalene | 16,000 | 57 U | 55 U | 56 U | 20 U | **32** | **14** J1 | **15** J1 | 18 U | 19 U | 18 U | 20 U | **81** | 19 U | 20 U |
| Total Benzofluoranthenes | --- | 57 U | **69** | **37** J1 | 20 U | **14** J1 | **100** | **17** J1 | 18 U | **44** | 18 U | **36** | **38** | 19 U | 20 U |
| Total cPAH TEQ | 15 | **0.71** | **54** J | **8** J | ND | **3** J | **87** J | **12** J | ND | **29** J | ND | **36** | **28** | ND | ND |

# TABLE 21
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | FILL A: 1900-1946 Random Fill Consisting of Gravel, Sand, Slag, Demolition Waste, and Crushed Rocks | | | | FILL B: 1946-1960 Random Fill Material | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | Vicinity of I-205(s) and I-206(s) | |
| | Preliminary Cleanup Levels | IT-MW-14(2-3.5) TW27J 11/08/2011 | IT-MW-14(5-6.5) TW27K 11/08/2011 | IT-MW-14(8-9.5) TW27L 11/08/2011 | IT-MW-14(13-14.5) TW27M 11/08/2011 | IT-MW-9(2-3.5) TU65P 10/31/2011 | IT-MW-9(5-6.5) TU65C 10/31/2011 | IT-MW-9(8-9.5) TV85C 11/04/2011 | IT-MW-9(13-14.5) TV85D 11/04/2011 | IT-MW-10(2-3.5) TU65D 10/31/2011 | IT-MW-10(5-6.5) TU65E 10/31/2011 | IT-MW-10(8-9.5) TV99G 11/07/2011 | IT-MW-10(13.5-15) TV99H 11/07/2011 | IT-TP-104-B(12-13) TU13A 10/27/2011 | IT-TP-105B-B(11-12) TU13B 10/27/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | |
| Naphthalene | 2,100 | 14 U | 9.0 J1 | 10 J1 | 2.7 J1 | 43 | 18 | 40 | 3.2 J1 | 3.8 J1 | 4.6 U | 4.5 J1 | 200 | 3.6 J1 | 5.3 |
| 2-Methylnaphthalene | 320,000 | 14 U | 14 J1 | 12 J1 | 2.6 J1 | 54 | 14 | 35 | 3.9 J1 | 4.6 J1 | 4.6 U | 3.2 J1 | 130 | 3.8 J1 | 4.6 U |
| 1-Methylnaphthalene | 16,000 | 14 U | 13 J1 | 10 J1 | 4.9 U | 32 | 15 | 35 | 2.4 J1 | 3.9 J1 | 4.6 U | 4.9 U | 82 | 3.7 J1 | 4.6 U |
| Total Naphthalenes | --- | 14 U | 36.0 J1 | 32 J1 | 5.3 J1 | 129 | 47 | 110 | 9.5 J1 | 12.3 J1 | 4.6 U | 7.7 J1 | 412 | 11.1 J1 | 5.3 |
| Acenaphthylene | --- | 14 U | 14 U | 12 U | 4.9 U | 2.6 J1 | 5.1 | 4.6 U | 4.6 U | 4.8 U | 4.6 U | 4.9 U | 4.9 U | 4.8 U | 4.6 U |
| Acenaphthene | 230,000 | 14 U | 14 U | 12 U | 4.9 U | 110 | 210 | 29 | 4.6 U | 3.8 J1 | 4.6 U | 3 J1 | 90 | 4.1 J1 | 2.5 J1 |
| Fluorene | 150,000 | 14 U | 11 J1 | 12 U | 4.9 U | 86 | 350 | 17 | 4.6 U | 3.5 J1 | 4.6 U | 2.5 J1 | 72 | 4.8 U | 4.6 U |
| Phenanthrene | --- | 12 J1 | 40 | 28 | 2.8 J1 | 200 | 1200 | 76 | 7.2 | 26 | 4.6 U | 29 | 190 | 7.7 | 3.8 J1 |
| Anthracene | 1,600,000 | 14 U | 12 J1 | 12 U | 4.9 U | 22 | 300 | 15 | 4.6 U | 6.3 | 4.6 U | 6.2 | 30 | 4.8 U | 4.6 U |
| Fluoranthene | 230,000 | 8.2 J1 | 30 | 16 | 4.9 U | 96 | 630 | 35 | 3.5 J1 | 30 | 4.6 U | 42 | 83 | 5 | 4.8 |
| Pyrene | 240,000 | 10 J1 | 40 | 19 | 4.9 U | 65 | 390 | 28 | 3.5 U | 23 | 4.6 U | 48 | 64 | 6.2 | 4.4 J1 |
| Benzo(a)anthracene | --- | 14 U | 34 | 13 | 4.9 U | 18 | 100 | 12 | 4.6 U | 14 | 4.6 U | 21 | 21 | 4.8 U | 4.6 U |
| Chrysene | --- | 22 | 120 | 39 | 2.4 J1 | 21.0 | 99.0 | 30.0 | 2.3 J1 | 21.0 | 4.6 U | 25.0 | 31.0 | 3.0 J1 | 4.6 U |
| Benzo(a)pyrene | --- | 9.6 J1 | 26 | 15 | 4.9 U | 9.4 | 80 | 8.9 | 3.3 J1 | 14 | 4.6 U | 30 | 23 | 4.8 U | 4.6 U |
| Indeno(1,2,3-cd)pyrene | --- | 14 U | 14 J1 | 12 U | 4.9 U | 3.8 J1 | 49 | 3.3 J1 | 4.6 U | 11 | 4.6 U | 17 | 11 | 4.8 U | 4.6 U |
| Dibenz(a,h)anthracene | --- | 14 U | 19 | 12 U | 4.9 U | 4.6 U | 19 | 4.6 | 4.6 U | 5.2 M | 4.6 U | 6.5 | 4.1 J1 | 4.8 U | 4.6 U |
| Benzo(g,h,i)perylene | --- | 14 U | 26 | 17 | 4.9 U | 6.6 | 64 | 8.8 | 4.6 U | 15 | 4.6 U | 22 | 16 | 4.8 U | 4.6 U |
| Dibenzofuran | 80,000 | 14 U | 14 U | 12 U | 4.9 U | 59 | 270 | 22 | 4.6 U | 4.2 J1 | 4.6 U | 4.9 U | 61 | 2.6 J1 | 4.6 U |
| Total Benzofluoranthenes | --- | 14 U | 41 | 24 | 4.9 U | 18 | 130 | 17 | 4.6 U | 33 | 4.6 U | 42 | 37 | 4.8 U | 4.6 U |
| Total cPAH TEQ | 15 | 9.8 | 38 | 19 | 0.024 | 14 J | 111 | 13 J | 3.3 J | 20.5 J | ND | 38.9 | 30.6 J | 0.5 J | ND |
| **PCBs (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | |
| Aroclor 1248 | 220 | 32 U | 32 U | 33 U | 31 U | 32 U | 32 U | 32 U | 32 U | 33 U | 31 U | 29 U | 69 | 36 U | 34 U |
| Aroclor 1254 | 0.29 | 32 U | 32 U | 33 U | 31 U | 32 U | 32 U | 32 U | 32 U | 33 U | 31 U | 29 U | 160 | 36 U | 34 U |
| Aroclor 1260 | 5.4 | 32 U | 32 U | 33 U | 31 U | 32 U | 32 U | 32 U | 32 U | 33 U | 31 U | 29 U | 64 | 36 U | 34 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 293 | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | 38 | 76 | 52 | 6.2 U | 9.4 | 18 | 12 | 5.5 U | 6.1 | 5 U | 5.5 U | 35 | 5.8 U | 5.8 U |
| Oil-Range Organics | 2,000 | 290 | 460 | 250 | 12 U | 15 | 77 | 43 | 11 U | 19 | 10 U | 11 U | 56 | 12 U | 12 U |
| **NWTPH-G** | | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 5.7 U | 7.0 U | 8.0 U | 9.0 U | 5.7 U | 6.4 U | 6.7 U | 6.8 U | 6.8 U | 6.2 U | 7.8 | 8.7 | 7.6 U | 8 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | | | |
| Antimony | 5 | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 UJ | 0.2 U |
| Barium | 640 | 42.3 | 50.6 | 60.5 | 26.4 | 38.7 | 46.1 | 50.8 | 26.3 | 53.6 | 38.4 | 38.7 | 71.4 | 35.6 J | 27.6 |
| Beryllium | 160 | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U | 0.2 | 0.2 U | 0.2 U | 0.2 | 0.2 U | 0.2 U | 0.4 | 0.2 U | 0.2 U |
| Cadmium | 1.3 | 0.1 | 0.2 | 0.1 | 0.7 | 0.1 U | 0.5 | 0.2 | 0.1 U | 0.1 | 0.1 U | 0.1 U | 0.6 | 0.1 | 0.1 U |
| Chromium | 1,480 | 20.0 | 14.7 | 16.1 | 18.9 | 21.1 | 13.2 | 13.7 | 10.6 | 21.6 | 24.1 | 22.2 | 21 | 11 | 12 |
| Chromium VI | 3.8 | 0.445 U | 0.489 U | 0.488 U | 0.520 U | 0.453 U | 0.448 U | 0.467 U | 0.482 U | 0.45 U | 0.415 U | 0.426 U | 0.564 U | 0.498 U | 0.47 U |
| Copper | 36 | 37.1 | 23.7 | 29.0 | 42.8 | 14 | 54.2 | 17.9 | 14.3 | 25.8 | 10.5 | 14.1 | 32.7 | 11.9 | 9.9 |
| Lead | 250 | 7.3 | 11.6 | 23.6 | 8.5 | 3.7 | 14.7 | 5.3 | 4.8 | 23.4 | 1.9 | 5.1 | 30.5 | 2.9 | 2.1 |
| Mercury | 1.5 | 0.02 U | 0.05 | 0.05 | 0.02 U | 0.03 U | 0.03 | 0.04 | 0.03 U | 0.04 | 0.02 U | 0.02 U | 0.12 | 0.02 U | 0.03 U |
| Nickel | 210 | 30.0 | 16.0 | 13.6 | 5.7 | 31.7 | 18.1 | 14.6 | 9.6 | 33.0 | 39.0 | 32.0 | 19.5 | 13.7 | 10.3 |
| Silver | 170 | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U | 0.2 U |
| Thallium | 0.67 | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U | 0.2 U |
| Zinc | 1,400 | 48 | 59 | 94 | 80 | 33 | 63 | 56 | 35 | 46 | 28 | 32 | 88 | 37 | 31 |

# TABLE 21
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | FILL B: 1946-1960 Random Fill Material | | | | | | FILL C: 1946-1960 Some Random Fill Along with Fill From Off-Site Sources | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Hazardous Material Storage Sheds Paint Storage Area | Former Hydraulic Test Pad Area | | | | | | | | | | | | |
| | Preliminary Cleanup Levels | IT-TP-106B(11-12) TU48J 10/28/2011 | IT-TOWPATHEXC1-B(.8) TE27A 07/15/2011 | IT-MW-11(2-3.5) TU65F 10/31/2011 | IT-MW-11(5-6.5) TU65G 10/31/2011 | IT-MW-11(8-9.5) TV99D 11/07/2011 | IT-MW-11(13.5-15) TV99E 11/07/2011 | IT-MW-17(2-3.5) TW45A 11/10/2011 | IT-MW-17(5-6.5) TW45B 11/10/2011 | IT-MW-17(8-9.5) TW45C 11/10/2011 | IT-MW-17(11-12.5) TW45D 11/10/2011 | IT-MW-17(14-15.5) TW45E 11/10/2011 | IT-MW-17(15.5-17) TW45F 11/10/2011 | IT-MW-17(18.5-19.75) TW45G 11/10/2011 | IT-MW-17(21.25-21.5) TW45H 11/10/2011 | IT-MW-17(21.5-23) TW45I 11/10/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | | |
| Methylene Chloride | 2,400 | **12** | **10** J | **2.0** J | **3.4** J | **1.3** J1 | **1.4** J1 | **2.5** | **3.7** | **4.4** | **4.9** | **2.0** J1 | **5.5** J1 | 3.8 U | **2.5** | **5.0** |
| Acetone | 510,000 | **43** J | **16** | 31 U | 14 U | **40** J | **28** | **35** | **49** | **16** | **39** | **81** | **250** | **17** | **17** | **11** |
| Carbon Disulfide | 75,000 | **3.4** J | **8.2** | **0.5** J1 | 1.2 U | **2.0** J | **18** | **1.6** | 1.3 U | 1.2 U | 1.7 U | **13** | **86** | **2.7** | **1.6** | **3.4** |
| 1,1-Dichloroethane | 710 | 1.5 U | 0.9 U | **0.6** J1 | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| cis-1,2-Dichloroethene | 2,600 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| 2-Butanone | 430,000 | **5.0** J1 | 4.7 U | **3.4** J1 | 5.8 U | **5.6** | **4.5** J1 | **3.7** J1 | **7.7** | 6.1 U | 8.7 U | **10** | **50** | 9.5 U | 6.0 U | 5.9 U |
| Trichloroethene | 51 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| Benzene | 93 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | **0.6** J1 | **0.9** J1 | **2.1** | **1.1** J1 | 1.2 U | **1.9** | **1.4** | **4.7** | 1.9 U | 1.2 U | 1.2 U |
| Toluene | 100,000 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | **0.9** J, J1 | **0.8** J1 | **1.6** | **1.1** J1 | 1.2 U | **1.4** J1 | **1.2** J1 | **4.0** | 1.9 U | 1.2 U | 1.2 U |
| Ethylbenzene | 230 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| Trichlorofluoromethane | 200,000 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| 1,1,2-Trichloro-1,2,2-trifuoroethane | 1,000,000,000 | 2.9 UJ | 1.9 U | **0.8** J1 | 2.3 U | **1.5** J, J1 | **5.5** | 2.3 U | 2.6 U | 2.4 U | 3.5 U | 2.7 U | 7.4 U | 3.8 U | 2.4 U | 2.3 U |
| m,p-Xylene | 160,000 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | **0.7** J1 | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| o-Xylene | 200,000 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| 1,4-Dichlorobenzene | 3,500 | 1.5 UJ | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| Methyl Iodide | --- | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| 1,3,5-Trimethylbenzene | 800,000 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| 1,2,4-Trimethylbenzene | 800,000 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | **1.0** J1 | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| Isopropylbenzene | 78,000 | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| n-Propylbenzene | 11,000 | 1.5 UJ | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| sec-Butylbenzene | --- | 1.5 UJ | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | **0.9** J1 | **2.7** J1 | 1.9 U | 1.2 U | 1.2 U |
| 4-Isopropyltoluene | --- | 1.5 U | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | **0.7** J1 | **2.0** J1 | 1.9 U | 1.2 U | 1.2 U |
| n-Butylbenzene | 27,000 | 1.5 UJ | 0.9 U | 1.0 U | 1.2 U | 1.0 UJ | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.7 U | 1.3 U | 3.7 U | 1.9 U | 1.2 U | 1.2 U |
| Naphthalene | 2,100 | 7.3 U | 4.7 U | 4.8 U | 5.8 U | **2.3** J, J1 | **1.4** J, J1 | 5.6 U | 6.5 U | 6.1 U | **2.2** J1 | **2.6** J1 | **6.0** J1 | 9.5 U | 6.0 U | 5.9 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | | |
| Phenol | 1,900,000 | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | **9.0** J1 | 18 U | 19 UJ | **33** | **330** | **80** | 18 U | **9.8** J1 |
| 1,3-Dichlorobenzene | 3,840 | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 U | 18 U | 19 U | 19 U | 18 U | 18 U |
| 1,4-Dichlorobenzene | 3,500 | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 U | 18 U | 19 U | 19 U | 18 U | 18 U |
| Benzyl Alcohol | 8,000,000 | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 U | 18 U | **32** | 19 U | 18 U | **30** |
| 1,2-Dichlorobenzene | 68,000 | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 U | 18 U | 19 U | 19 U | 18 U | 18 U |
| 2-Methylphenol | 250,000 | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 UJ | 18 U | **15** J1 | **50** | 18 U | 18 U |
| 4-Methylphenol | 41,000 | 37 U | 36 U | 39 U | 38 U | 38 U | 39 U | 36 U | 36 U | 36 U | 37 UJ | **27** J1 | **840** | **180** | 37 U | 36 U |
| Isophorone | --- | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 U | 18 U | 19 U | 19 U | 18 U | 18 U |
| 2,4-Dimethylphenol | 95,000 | 37 U | 36 U | 39 U | 38 U | 38 U | 39 U | 36 U | 36 U | 36 U | 37 UJ | 36 U | 38 U | **62** | 37 U | 36 U |
| Benzoic Acid | 9,000 | 370 U | 360 U | 390 U | 380 U | 380 U | 390 U | 360 U | 360 U | 360 U | 370 UJ | 360 U | **120** J1 | 380 U | 370 U | 360 U |
| Naphthalene | 2,100 | **100** | **16** J | 19 U | 19 U | **96** | **32** | **24** | **9.9** J1 | 18 U | **39** | **140** | **280** | **84** | 18 U | 18 U |
| 2-Methylnaphthalene | 320,000 | **31** | 18 U | 19 U | 19 U | **59** | **39** | **30** | **15** J1 | 18 U | **63** | **110** | **140** | **45** | 18 U | 18 U |
| Acenaphthylene | --- | 19 U | **30** | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 U | 18 U | 19 U | **12** J1 | 18 U | 18 U |
| Acenaphthene | 230,000 | **82** | 18 U | 19 U | 19 U | **57** | **27** | **10** J1 | 18 U | 18 U | 19 U | **18** | **44** | **25** | 18 U | 18 U |
| Dibenzofuran | 80,000 | **45** | 18 U | **9.7** J1 | 19 U | **58** | **32** | **13** J1 | 18 U | 18 U | **10** J1 | 18 U | **59** | **59** | 18 U | 18 U |
| Fluorene | 150,000 | **84** | 18 U | 19 U | 19 U | **74** J | **32** J | **9.0** J1 | 18 U | 18 U | 19 U | **18** | **55** | **49** | 18 U | 18 U |
| N-Nitrosodiphenylamine | 204,000 | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 U | **48** | **130** | 19 U | 18 U | 18 U |
| Phenanthrene | --- | **150** | **40** | **32** | 19 U | **220** | **65** | **190** | **54** | 18 U | **120** | **360** | **290** | **170** | 18 U | 18 U |
| Carbazole | 50,000 | 19 U | **10** J | 19 U | 19 U | **23** | 19 U | **24** | 18 U | 18 U | **10** J1 | 18 U | 19 U | 19 U | 18 U | 18 U |
| Anthracene | 1,600,000 | **10** J1 | **33** | 19 U | 19 U | **31** | **16** J1 | **35** | 18 U | 18 U | 19 U | **29** | **82** | **41** | 18 U | 18 U |
| Di-n-Butylphthalate | 26,000 | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | **20** | 18 U | 18 U | 19 U | 18 U | **2200** | 19 U | **20** | 18 U |
| Fluoranthene | 230,000 | **17** J1 | **160** | **25** | 19 U | **160** | **56** | **260** | **59** | 18 U | **66** | **600** | **270** | **70** | 18 U | 18 U |
| Pyrene | 240,000 | **16** J1 | **350** | **24** | 19 U | **170** J | **68** J | **320** | **100** | **15** J1 | **68** | **910** | **510** | **73** | 18 U | **11** J1 |
| Butylbenzylphthalate | 1,700 | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 U | 18 U | 19 U | 19 U | 18 U | 18 U |
| Benzo(a)anthracene | --- | 19 U | **270** | 19 U | 19 U | **54** | **16** J1 | **140** | **57** | 18 U | **35** | **260** | **140** | **19** | 18 U | 18 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | 23 U | 23 U | 21 UJ2 | 28 U | 25 U | 100 U | 62 U | 55 U | 33 U | 23 U | 48 U | 84 U | 35 U | 53 U | 48 U |
| Chrysene | --- | 19 U | **420** | **12** J1 | 19 U | **63** | **23** | **220** | **130** | **10** J1 | **48** | **490** | **310** | **19** | 18 U | 18 U |
| Di-n-Octyl phthalate | --- | 19 U | 18 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 19 U | 18 U | 19 U | 19 U | 18 U | 18 U |
| Benzo(a)pyrene | --- | 19 U | **1200** | 19 U | 19 U | **48** | **18** J1 | **160** | **51** | 18 U | **31** | **380** | **120** | **13** J1 | 18 U | 18 U |
| Indeno(1,2,3-cd)pyrene | --- | 19 U | **1100** J | 19 U | 19 U | **22** | 19 U | **70** | **31** | 18 U | **20** | **120** | **28** | 19 U | 18 U | 18 U |
| Dibenz(a,h)anthracene | --- | 19 U | **380** | 19 U | 19 U | 19 U | 19 U | **32** | **11** J1 | 18 U | 19 U | **31** | 19 U | 19 U | 18 U | 18 U |
| Benzo(g,h,i)perylene | --- | 19 U | **1200** J | 19 U | 19 U | **31** | 19 U | **88** | **34** | 18 U | **22** | **140** | **35** | 19 U | 18 U | 18 U |
| 1-Methylnaphthalene | 16,000 | **29** | 18 U | 19 U | 19 U | **29** | **36** | **17** J1 | **9.9** J1 | 18 U | **22** | **67** | **110** | **34** | 18 U | 18 U |
| Total Benzofluoranthenes | --- | **9.3** J1 | **1900** | **12** J1 | 19 U | **79** | **23** | **270** | **94** | 18 U | **58** | **560** | **220** | **24** | 18 U | 18 U |
| Total cPAH TEQ | 15 | **1** J | **1569** | **1.3** J | ND | **64** | **22** J | **213.4** | **71.6** J | **0.1** | **42.78** | **482** | **161.9** | **17.49** J | ND | ND |

# TABLE 21
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | FILL B: 1946-1960 Random Fill Material | | | | | | FILL C: 1946-1960 Some Random Fill Along with Fill From Off-Site Sources | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Hazardous Material Storage Sheds Paint Storage Area | Former Hydraulic Test Pad Area | | | | | | | | | | | | |
| | Preliminary Cleanup Levels | IT-TP-106B(11-12) TU48J 10/28/2011 | IT-TOWPATHEXC1-B(.8) TE27A 07/15/2011 | IT-MW-11(2-3.5) TU65F 10/31/2011 | IT-MW-11(5-6.5) TU65G 10/31/2011 | IT-MW-11(8-9.5) TV99D 11/07/2011 | IT-MW-11(13.5-15) TV99E 11/07/2011 | IT-MW-17(2-3.5) TW45A 11/10/2011 | IT-MW-17(5-6.5) TW45B 11/10/2011 | IT-MW-17(8-9.5) TW45C 11/10/2011 | IT-MW-17(11-12.5) TW45D 11/10/2011 | IT-MW-17(14-15.5) TW45E 11/10/2011 | IT-MW-17(15.5-17) TW45F 11/10/2011 | IT-MW-17(18.5-19.75) TW45G 11/10/2011 | IT-MW-17(21.25-21.5) TW45H 11/10/2011 | IT-MW-17(21.5-23) TW45I 11/10/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | | |
| Naphthalene | 2,100 | 59 J | 4.7 U | 20 | 4.8 U | 66 | 25 | 31 | 18 | 3.4 J1 | 100 | 120 | 220 | 110 | 5.2 | 5.4 |
| 2-Methylnaphthalene | 320,000 | 6.6 J | 4.7 U | 10 | 4.8 U | 45 | 21 | 39 | 19 | 2.6 J1 | 160 | 110 | 120 | 52 | 3.2 J1 | 4.4 J1 |
| 1-Methylnaphthalene | 16,000 | 7.6 | 4.7 U | 5.6 | 4.8 U | 24 | 18 | 26 | 13 | 4.7 U | 73 | 82 | 100 | 37 | 3.6 J1 | 4.0 J1 |
| Total Naphthalenes | --- | 73.2 J | ND | 35.6 | 4.8 U | 135 | 64 | 96 | 50 | 6 J1 | 333 | 312 | 440 | 199 | 12 J1 | 13.8 J1 |
| Acenaphthylene | --- | 4.6 U | 4.7 U | 4.8 U | 4.8 U | 4.7 U | 4.8 U | 8.6 J1 | 2.6 J1 | 4.7 U | 8.5 | 11 U | 32 | 17 | 4.5 U | 4.6 U |
| Acenaphthene | 230,000 | 28 J | 4.7 U | 5.5 | 4.8 U | 57 | 24 | 8.8 U | 4.5 U | 4.7 U | 4.8 U | 58 | 93 | 28 | 2.5 J1 | 5.5 |
| Fluorene | 150,000 | 22 J | 4.7 U | 3.9 J1 | 4.8 U | 61 | 30 | 12 | 4.5 U | 4.7 U | 3.3 J1 | 37 | 85 | 49 | 2.5 J1 | 4.1 J1 |
| Phenanthrene | --- | 51 J | 5.2 | 18 | 2.5 J1 | 170 | 66 | 190 | 49 | 8.1 | 200 | 440 | 410 | 170 | 11 | 56 |
| Anthracene | 1,600,000 | 3.8 J1 | 4.7 U | 2.7 J1 | 4.8 U | 31 | 18 | 39 | 5.7 | 4.7 U | 14 | 56 | 120 | 54 | 4.5 U | 7.5 |
| Fluoranthene | 230,000 | 9.1 | 8.8 | 16 | 2.7 J1 | 130 | 64 | 310 | 78 | 17 | 130 | 450 | 410 | 140 | 11 | 32 |
| Pyrene | 240,000 | 7.4 | 8.9 | 14 | 3.4 J1 | 100 | 50 | 350 | 100 | 18 | 98 | 600 | 590 | 110 | 11 | 44 |
| Benzo(a)anthracene | --- | 2.8 J, J1 | 5.8 | 5.8 | 4.8 U | 40 | 17 | 160 | 52 | 9.0 | 57 | 170 | 120 | 19 | 3.9 J1 | 16 |
| Chrysene | --- | 3.5 J, J1 | 7.5 | 7.3 | 4.8 U | 48.0 | 22.0 | 240 | 110 | 12 | 68 | 280 | 260 | 21 | 6.3 | 17 |
| Benzo(a)pyrene | --- | 2.6 J, J1 | 9.9 | 5.6 | 4.8 U | 37 | 20 | 210 | 64 | 12 | 63 | 240 | 140 | 25 | 5.0 | 16 |
| Indeno(1,2,3-cd)pyrene | --- | 4.6 U | 4.7 U | 3.9 J1 | 4.8 U | 18 | 8.3 | 120 | 27 | 6.4 | 30 | 88 | 57 | 7.7 | 4.5 U | 6.1 |
| Dibenz(a,h)anthracene | --- | 4.6 U | 4.7 U | 4.8 U | 4.8 U | 7.2 | 3.4 J1 | 46 | 16 | 4.7 U | 14 | 38 | 18 | 4.7 U | 4.5 U | 4.6 U |
| Benzo(g,h,i)perylene | --- | 4.6 U | 3.1 J | 4.8 J1 | 4.8 U | 22 | 11 | 140 | 39 | 7.5 | 39 | 130 | 94 | 7.9 | 3.7 J1 | 7.3 |
| Dibenzofuran | 80,000 | 8.4 J | 4.7 U | 6.3 | 4.8 U | 55 | 27 | 17 | 5.0 | 4.7 U | 21 | 22 | 67 | 80 | 3.3 J1 | 2.9 J1 |
| Total Benzofluoranthenes | --- | 4.6 U | 20 J | 11 | 4.8 U | 61 | 26 | 320 | 86 | 19 | 100 | 290 | 180 | 21 | 9.2 | 21 |
| Total cPAH TEQ | 15 | 2.9 J | 12.6 | 7.7 J | ND | 50.1 | 25.7 J | 277 | 83 | 16 | 84 | 301 | 180 | 30 | 6.4 J | 20 J |
| **PCBs (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | | |
| Aroclor 1248 | 220 | 33 U | 32 U | 31 U | 32 U | 31 U | 32 U | 32 U | 91 U | 91 U | 31 U | 110 U | 110 U | 30 U | 32 U | 32 U |
| Aroclor 1254 | 0.29 | 33 U | 32 U | 31 U | 32 U | 31 U | 32 U | 85 | 260 | 320 | 66 | 230 | 270 | 30 U | 32 U | 32 U |
| Aroclor 1260 | 5.4 | 33 U | 32 U | 31 U | 32 U | 31 U | 32 U | 77 | 250 | 240 | 33 | 190 | 200 | 30 U | 32 U | 32 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | ND | ND | 162 | 510 | 560 | 99 | 420 | 470 | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | 9.4 | 6.2 | 6.2 | 5.2 U | 14 | 13 | 160 | 23 | 5.2 U | 51 J | 240 | 900 | 9.5 | 6.2 U | 5.8 U |
| Oil-Range Organics | 2,000 | 12 U | 18 | 17 | 10 U | 42 | 26 | 380 | 72 | 10 U | 77 J | 580 | 1800 | 15 | 12 U | 12 U |
| **NWTPH-G** | | | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 8.2 U | 5.8 U | 5.5 U | 5.1 U | 11 | 7.3 U | 7.0 U | 9.2 U | 6.1 U | 10 U | 9.9 | 33 | 9.5 U | 8.2 U | 6.7 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | | | | |
| Antimony | 5 | 0.2 UJ | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 | 0.3 | 0.2 U | 3.9 | 0.6 | 0.4 | 0.4 | 0.2 U | 0.2 U |
| Barium | 640 | 43.5 | 43.5 | 52.5 | 51.4 | 51.4 | 47.6 | 165 | 71.1 | 37.6 | 83.6 | 645 | 295 | 71.0 | 57.3 | 35.5 |
| Beryllium | 160 | 0.2 U | 0.2 U | 0.2 | 0.2 | 0.2 | 0.2 U | 0.3 | 0.2 | 0.2 U | 0.3 U | 0.3 | 0.3 U | 0.3 U | 0.2 U | 0.2 U |
| Cadmium | 1.3 | 0.2 | 0.1 U | 0.1 | 0.1 U | 0.2 | 0.2 | 3.0 | 6.2 | 0.1 | 28.1 | 15.3 | 2.5 | 0.1 U | 0.1 U | 1.1 |
| Chromium | 1,480 | 13.5 | 16.1 | 21.3 | 18.9 | 17.3 | 13.3 | 138 | 108 | 31.2 | 247 | 238 | 58.4 | 11.3 | 15.1 | 25.6 |
| Chromium VI | 3.8 | 0.494 U | 0.45 UJ | 0.412 U | 0.431 U | 0.432 UJ | 0.493 U | 0.429 U | 0.459 U | 0.424 U | 1.79 | 0.585 U | 8.32 | 0.564 U | 0.587 | 0.489 U |
| Copper | 36 | 14.5 | 38.7 | 22.5 | 15.2 | 39.3 | 17.6 | 82.6 | 318 | 41.8 | 279 | 353 | 1070 | 27.3 | 18.7 | 47.3 |
| Lead | 250 | 4.1 J | 6.1 | 7.5 | 2.5 | 11.4 | 4.2 | 210 | 467 | 9.3 | 2160 | 1120 | 338 | 16.3 | 10.9 | 81.0 |
| Mercury | 1.5 | 0.02 UJ | 0.04 | 0.07 | 0.02 U | 0.14 | 0.04 | 0.37 | 0.06 | 0.03 | 0.10 | 0.10 | 0.45 | 0.03 U | 0.08 | 0.02 U |
| Nickel | 210 | 12.5 | 18.0 | 28.7 | 26.4 | 24.0 | 13.2 | 46.0 | 330 | 37.5 | 164 | 171 | 33.7 | 10.9 | 9.8 | 39.4 |
| Silver | 170 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 | 0.7 | 0.2 U | 1.7 | 0.8 | 0.5 | 0.3 U | 0.2 U | 0.2 U |
| Thallium | 0.67 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.3 U | 1.1 | 0.3 U | 0.2 U | 0.2 U |
| Zinc | 1,400 | 38 | 43 | 45 | 34 | 63 | 39 | 470 | 1220 | 78 | 5780 | 9040 | 1400 | 60 | 38 | 224 |

# TABLE 21
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | FILL C: 1946-1960 Some Random Fill Along with Fill From Off-Site Sources | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | IT-MW-19(2-3.5) TW35C 11/09/2011 | IT-MW-19(5-6.5) TW35D 11/09/2011 | IT-MW-19(8-9.5) TW35E 11/09/2011 | IT-MW-19(13-14.5) TW35F 11/09/2011 | IT-SB-3(2-3.5) TW27E 11/08/2011 | IT-SB-3(5-5.5) TX02I 11/14/2011 | IT-SB-3(6.5-7) TX02J 11/14/2011 | IT-SB-4(2-3.5) TU90E 11/01/2011 | IT-SB-4(5-6.5) TU90R 11/01/2011 | IT-SB-4(8-9) TU90F 11/01/2011 | IT-SB-4(11.5-13) TU90G 11/01/2011 | IT-SB-12(2-3.5) TX02K 11/14/2011 | IT-SB-12(5-6.5) TX01J 11/14/2011 | IT-SB-12(8-9.5) TX01K 11/14/2011 | IT-SB-12(14-15.5) TX01L 11/14/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | | |
| Methylene Chloride | 2,400 | **4.3** | **3.0** | **2.8** | **2.3** J1 | 1.2 U | 1.2 U | 0.6 U | **2.0** J1 | **1.6** J, J1 | **2.4** J1 | **1.6** J1 | **1.3** J1 | **2.0** J, J1 | **2.2** J, J1 | **2.1** J, J1 |
| Acetone | 510,000 | **27** | **23** | **34** | **20** | 1.2 UJ | 1.2 UJ | 0.6 UJ | **66** J | **36** J | 20 UJ | 18 UJ | **41** J | **27** J | **120** J | **12** J |
| Carbon Disulfide | 75,000 | 1.3 U | 1.2 U | **2.3** | **1.7** | 1.2 U | 1.2 U | 0.6 U | **2.3** | 1.4 U | 1.4 U | **1.3** | **1.9** | **18** | **2.5** | **2.3** |
| 1,1-Dichloroethane | 710 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | **3.6** | **2.5** | **1.0** J1 | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 UJ | 1.5 UJ | 1.2 UJ |
| cis-1,2-Dichloroethene | 2,600 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | **17** | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| 2-Butanone | 430,000 | 6.4 U | 6.2 U | **3.6** J1 | 6.2 U | 1.2 U | 1.2 UJ | 0.6 UJ | **7.7** | 7.2 U | 6.8 U | 5.8 U | **3.4** J1 | 6.8 U | **19** | 6.0 U |
| Trichloroethene | 51 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 5.9 U | 6.0 U | 3.2 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | **0.8** J1 | **1.0** J1 | **2.2** | **1.1** J1 |
| Benzene | 93 | 1.3 U | 1.2 U | **2.4** | 1.2 U | 1.2 U | 1.2 U | 0.6 U | **0.8** J1 | **1.2** J1 | **0.8** J1 | 1.2 U | **1.2** J1 | 1.4 U | **1.1** J1 | **0.7** J1 |
| Toluene | 100,000 | 1.3 U | **0.8** J1 | **0.9** J1 | 1.2 U | 5.9 U | 6.0 U | 3.2 U | **0.8** J1 | 1.4 U | 1.4 U | 1.2 U | **0.8** J1 | 1.4 U | 1.5 U | 1.2 U |
| Ethylbenzene | 230 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| Trichlorofluoromethane | 200,000 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | **0.3** J1 | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| 1,1,2-Trichloro-1,2,2-trifuoroethane | 1,000,000,000 | 2.6 U | 2.5 U | 2.6 U | 2.5 U | 1.2 U | 1.2 U | 0.6 U | 2.3 U | 2.9 U | 2.7 U | 2.3 U | 2.5 U | 2.7 U | 3.0 U | 2.4 U |
| m,p-Xylene | 160,000 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| o-Xylene | 200,000 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| 1,4-Dichlorobenzene | 3,500 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| Methyl Iodide | --- | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| 1,3,5-Trimethylbenzene | 800,000 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| 1,2,4-Trimethylbenzene | 800,000 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 5.9 U | 6.0 U | 3.2 U | **0.6** J1 | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| Isopropylbenzene | 78,000 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| n-Propylbenzene | 11,000 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 UJ | 0.6 UJ | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| sec-Butylbenzene | --- | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| 4-Isopropyltoluene | --- | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| n-Butylbenzene | 27,000 | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.2 U | 1.2 U | 0.6 U | 1.2 U | 1.4 U | 1.4 U | 1.2 U | 1.2 U | 1.4 U | 1.5 U | 1.2 U |
| Naphthalene | 2,100 | 6.4 U | 6.2 U | 6.4 U | 6.2 U | 1.2 U | 1.2 U | 0.6 U | 5.8 U | 7.2 U | 6.8 U | 5.8 U | 6.1 U | 6.8 U | 7.4 U | 6.0 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | | |
| Phenol | 1,900,000 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 UJ | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | **28** |
| 1,3-Dichlorobenzene | 3,840 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | **14** J1 | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| 1,4-Dichlorobenzene | 3,500 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| Benzyl Alcohol | 8,000,000 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 19 U | 19 U | 18 U | 19 U | 19 UJ | 17 UJ | 18 UJ |
| 1,2-Dichlorobenzene | 68,000 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| 2-Methylphenol | 250,000 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 UJ | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| 4-Methylphenol | 41,000 | 39 U | 37 U | 37 U | 38 U | 39 U | 35 U | 40 UJ | 37 U | 38 U | 38 U | 37 U | 37 U | 38 U | 35 U | **25** J1 |
| Isophorone | --- | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | **300** | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| 2,4-Dimethylphenol | 95,000 | 39 U | 37 U | 37 UJ | 38 U | 39 U | 35 U | 40 UJ | 37 UJ | 38 UJ | 38 UJ | 37 UJ | 37 U | 38 U | 35 U | 36 U |
| Benzoic Acid | 9,000 | 390 U | 370 U | 370 U | 380 U | 390 U | 350 U | 400 UJ | 370 UJ | 380 UJ | 380 UJ | 370 UJ | 370 U | 380 U | 350 U | 360 U |
| Naphthalene | 2,100 | **9.8** J1 | 19 U | **13** J1 | **15** J1 | 19 U | 18 U | **25** | **110** | **20** | 19 U | 18 U | **15** J1 | 19 U | 17 U | **22** |
| 2-Methylnaphthalene | 320,000 | **14** J1 | 19 U | **25** | **32** | 19 U | 18 U | **14** J1 | **190** | **23** | 19 U | 18 U | **13** J1 | 19 U | 17 U | 18 U |
| Acenaphthylene | --- | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| Acenaphthene | 230,000 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| Dibenzofuran | 80,000 | 20 U | 19 U | 18 U | **10** J1 | 19 U | 18 U | 20 U | **36** | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| Fluorene | 150,000 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| N-Nitrosodiphenylamine | 204,000 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| Phenanthrene | --- | **98** | **70** | **26** | **24** | 19 U | **16** J1 | **33** | **89** | **27** | 19 U | 18 U | **58** | **44** | **20** | **14** J1 |
| Carbazole | 50,000 | **16** J, J1 | **11** J, J1 | 18 UJ | 19 UJ | 19 U | 18 U | 20 U | **11** J, J1 | 19 U | 19 UJ | 18 UJ | 19 U | 19 U | 17 U | 18 U |
| Anthracene | 1,600,000 | **19** J1 | **16** J1 | 18 U | 19 U | 19 U | 18 U | 20 U | **15** J1 | 19 U | 19 U | 18 U | **17** J1 | 19 U | 17 U | 18 U |
| Di-n-Butylphthalate | 26,000 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | **150** | 19 U | 19 U | 18 U | **34** | 19 U | 17 U | 18 U |
| Fluoranthene | 230,000 | **150** | **110** | **33** | **20** | 19 U | **19** | **19** J1 | **62** | **23** | 19 U | 18 U | **120** | **70** | **17** | **11** J1 |
| Pyrene | 240,000 | **140** | **120** | **39** | **27** | 19 U | **36** J | **36** J | **69** | **26** | 19 U | 18 U | **200** J | **82** | **16** J1 | **14** J1 |
| Butylbenzylphthalate | 1,700 | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| Benzo(a)anthracene | --- | **69** | **90** | **20** | 19 U | 19 U | **12** J1 | **11** J1 | **41** | 19 U | 19 U | 18 U | **87** | **37** | 17 U | 18 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | 25 U | 56 U | 33 U | 32 U | **21** J1 | **530** | 25 U | 58 U | 45 U | 24 U | 23 U | 46 U | **24** | **15** J1 | **15** J1 |
| Chrysene | --- | **78** | **99** | **28** | **10** J1 | 19 U | **22** | **18** J1 | **68** | **24** | 19 U | 18 U | **120** | **50** | **10** J1 | 18 U |
| Di-n-Octyl phthalate | --- | 20 U | 19 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 19 U | 19 U | 18 U | 19 U | 19 U | 17 U | 18 U |
| Benzo(a)pyrene | --- | **90** | **94** | **28** | 19 U | 19 U | **8.8** J1 | **11** J1 | **41** | **14** J1 | 19 U | 18 U | **94** | **34** | 17 U | 18 U |
| Indeno(1,2,3-cd)pyrene | --- | **53** | **48** | **17** J1 | 19 U | 19 U | 18 U | 20 U | **32** | 19 U | 19 U | 18 U | **58** | 19 U | 17 U | 18 U |
| Dibenz(a,h)anthracene | --- | **14** J1 | **15** J1 | 18 U | 19 U | 19 U | 18 U | 20 U | **14** J1 | 19 U | 19 U | 18 U | **19** | 19 U | 17 U | 18 U |
| Benzo(g,h,i)perylene | --- | **64** | **56** | **24** | 19 U | 19 U | **12** J1 | 20 U | **44** | **16** J1 | 19 U | 18 U | **84** | **17** J1 | 17 U | 18 U |
| 1-Methylnaphthalene | 16,000 | **14** J1 | 19 U | **17** J1 | **26** | 19 U | 18 U | 20 U | **130** | **14** J1 | 19 U | 18 U | **9.4** J1 | 19 U | 17 U | 18 U |
| Total Benzofluoranthenes | --- | **130** | **150** | **44** | **12** J1 | 19 U | **22** | **21** | **99** | **24** | 19 U | 18 U | **180** | **69** | **11** J1 | 18 U |
| Total cPAH TEQ | 15 | **117** J | **125** | **36** J | **1** J | ND | **12.42** J | **14.38** J | **60** J | **17** J | ND | ND | **130** | **45** | **1** J | ND |

# TABLE 21
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | FILL C: 1946-1960 Some Random Fill Along with Fill From Off-Site Sources | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | IT-MW-19(2-3.5) TW35C 11/09/2011 | IT-MW-19(5-6.5) TW35D 11/09/2011 | IT-MW-19(8-9.5) TW35E 11/09/2011 | IT-MW-19(13-14.5) TW35F 11/09/2011 | IT-SB-3(2-3.5) TW27E 11/08/2011 | IT-SB-3(5-5.5) TX02I 11/14/2011 | IT-SB-3(6.5-7) TX02J 11/14/2011 | IT-SB-4(2-3.5) TU90E 11/01/2011 | IT-SB-4(5-6.5) TU90R 11/01/2011 | IT-SB-4(8-9) TU90F 11/01/2011 | IT-SB-4(11.5-13) TU90G 11/01/2011 | IT-SB-12(2-3.5) TX02K 11/14/2011 | IT-SB-12(5-6.5) TX01J 11/14/2011 | IT-SB-12(8-9.5) TX01K 11/14/2011 | IT-SB-12(14-15.5) TX01L 11/14/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | | |
| Naphthalene | 2,100 | 18 | 6.9 | 6.0 | 10 | 4.8 U | 5.9 | 13 | 100 | 14 | 4.4 U | 4.7 U | 18 | 9.8 | 7.7 | 31 |
| 2-Methylnaphthalene | 320,000 | 21 | 7.2 | 8.2 | 17 | 4.8 U | 11 | 8.4 | 170 | 11 | 2.3 J1 | 4.7 U | 18 | 12 | 9.4 | 4.6 U |
| 1-Methylnaphthalene | 16,000 | 17 | 7.0 | 7.1 | 17 | 4.8 U | 9.2 | 5.8 | 140 | 12 | 2.4 J1 | 4.7 U | 14 | 9.0 | 6.9 | 4.6 U |
| Total Naphthalenes | --- | 56 | 21.1 | 21.3 | 44 | 4.8 U | 26.1 | 27.2 | 410 | 37 | 4.7 J1 | 4.7 U | 50 | 30.8 | 24 | 31 |
| Acenaphthylene | --- | 4.2 J1 | 4.6 U | 4.6 U | 4.8 U | 4.8 U | 4.3 U | 4.8 U | 9.0 | 4.6 U | 4.4 U | 4.7 U | 4.5 J1 | 3.7 J1 | 4.6 U | 5.1 |
| Acenaphthene | 230,000 | 15 | 3.8 J1 | 4.6 U | 6.8 | 4.8 U | 4.3 U | 5.8 | 8.0 U | 4.6 U | 4.4 U | 4.7 U | 4.7 U | 7.1 | 4.6 U | 2.6 J1 |
| Fluorene | 150,000 | 9.4 | 2.7 J1 | 4.6 U | 4.5 J1 | 4.8 U | 2.5 J1 | 2.9 J1 | 8.0 U | 2.7 J1 | 4.4 U | 4.7 U | 3.1 J1 | 4.8 U | 4.6 U | 4.6 U |
| Phenanthrene | --- | 140 | 39 | 20 | 22 | 4.8 U | 27 | 20 | 78 | 33 | 3.8 J1 | 5.9 | 74 | 230 | 30 | 22 |
| Anthracene | 1,600,000 | 29 | 9.7 | 3.1 J1 | 3.9 J1 | 4.8 U | 3.0 J1 | 3.4 J1 | 19 | 6.1 | 4.4 U | 4.7 U | 17 | 58 | 2.8 J1 | 4.6 U |
| Fluoranthene | 230,000 | 210 | 62 | 29 | 25 | 4.8 U | 30 | 20 | 58 | 29 | 4.4 U | 3.5 J1 | 200 | 180 | 25 | 17 |
| Pyrene | 240,000 | 170 | 69 | 28 | 21 | 4.8 U | 34 | 21 | 62 | 26 | 4.4 U | 3.0 J1 | 230 | 120 | 20 | 16 |
| Benzo(a)anthracene | --- | 100 | 43 | 17 | 7.4 | 4.8 U | 19 | 9.1 | 35 | 11 | 4.4 U | 2.6 J1 | 110 | 43 | 7.3 | 2.5 J1 |
| Chrysene | --- | 110 | 53 | 22 | 9.6 | 4.8 U | 42 | 14 | 56 | 22 | 4.4 U | 4.7 U | 140 | 67 | 14 | 5.0 |
| Benzo(a)pyrene | --- | 110 | 49 | 24 | 14 | 4.8 U | 19 | 8.2 | 55 | 19 | 4.4 U | 4.7 U | 110 | 37 | 6.1 | 4.6 U |
| Indeno(1,2,3-cd)pyrene | --- | 57 | 25 | 14 | 4.3 J1 | 4.8 U | 11 | 4.8 U | 32 | 11 | 4.4 U | 4.7 U | 75 | 21 | 3.8 J1 | 4.6 |
| Dibenz(a,h)anthracene | --- | 21 | 11 | 6.1 | 4.8 U | 4.8 U | 7.4 | 2.8 J1 | 16 | 4.6 U | 4.4 U | 4.7 U | 26 | 7.5 | 4.6 U | 4.6 U |
| Benzo(g,h,i)perylene | --- | 77 | 30 | 16 | 5.5 | 4.8 U | 22 | 4.8 | 43 | 13 | 4.4 U | 4.7 U | 89 | 24 | 5.5 | 8.4 |
| Dibenzofuran | 80,000 | 9.8 | 3.3 J1 | 3.9 J1 | 9.3 | 4.8 U | 4.4 | 4.8 U | 40 | 5.9 | 4.4 U | 4.7 U | 9.8 | 14 | 3.8 J1 | 4.3 J1 |
| Total Benzofluoranthenes | --- | 170 | 63 | 37 | 17 | 4.8 U | 31 | 12 | 110 | 34 | 4.4 U | 4.7 U | 200 | 69 | 15 | 9.3 |
| Total cPAH TEQ | 15 | 146 | 64 | 32 | 17 J | ND | 26 | 10.7 J | 75 | 25 | ND | 0.3 J | 153 | 52 | 8.9 J | 1.7 J |
| **PCBs (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | | |
| Aroclor 1248 | 220 | 30 U | 32 U | 31 U | 31 U | 31 U | 31 U | 30 U | 310 U | 32 U | 30 U | 31 U | 81 U | 32 U | 31 U | 32 U |
| Aroclor 1254 | 0.29 | 30 U | 32 U | 31 U | 31 U | 31 U | 120 | 54 | 990 | 49 | 30 U | 31 U | 270 | 32 U | 31 U | 32 U |
| Aroclor 1260 | 5.4 | 30 U | 32 U | 31 U | 31 U | 31 U | 25 J1 | 28 J1 | 790 | 32 U | 30 U | 31 U | 160 | 32 U | 31 U | 32 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | ND | 145 J | 82 | 1780 | 49 | ND | ND | 430 | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | 18 | 5.6 U | 6.6 | 11 | 5.3 U | 23 | 24 | 69 | 28 | 5.6 U | 6.5 U | 31 J | 26 | 12 | 10 |
| Oil-Range Organics | 2,000 | 170 | 12 | 15 | 13 U | 11 U | 100 | 65 | 220 | 71 | 11 U | 13 U | 62 | 38 | 14 | 17 |
| **NWTPH-G** | | | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 6.4 U | 6.7 U | 6.3 U | 7.7 U | 5.5 U | 5.6 U | 4.1 U | 12 | 9.2 U | 7.4 U | 7.9 U | 5.7 U | 8.2 U | 9.6 U | 7.2 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | | | | |
| Antimony | 5 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.7 | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.3 | 0.2 U | 0.2 U | 0.2 U |
| Barium | 640 | 47.9 | 46.2 | 28.1 | 45.5 | 38.8 | 60.3 | 30.1 | 154 | 58.8 | 37.9 | 41.7 | 257 | 206 | 130 | 47.3 |
| Beryllium | 160 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 | 0.2 U | 0.4 | 0.2 U | 0.2 U | 0.3 U | 0.2 | 0.8 | 0.4 | 0.2 U |
| Cadmium | 1.3 | 0.2 | 0.5 | 0.2 | 0.1 U | 0.1 U | 0.2 | 0.3 | 0.9 | 0.2 | 0.1 U | 0.1 U | 2.2 | 2.4 | 2.7 | 0.1 U |
| Chromium | 1,480 | 12.3 | 31.9 | 15.5 | 14.0 | 19.1 | 39.5 | 930 | 58 | 16.4 | 11.8 | 13.3 | 257 | 368 | 158 | 12.6 |
| Chromium VI | 3.8 | 0.434 U | 0.439 U | 0.442 U | 0.505 U | 0.411 U | 0.429 U | 0.426 U | 0.454 U | 0.499 U | 0.478 U | 0.599 U | 0.441 U | 0.457 U | 0.456 U | 0.518 U |
| Copper | 36 | 34.5 | 299 | 25.3 | 17.5 | 17.5 | 43.5 | 780 | 118 | 43.3 | 18.6 | 17.9 | 66.7 | 61.3 | 47.1 | 21.8 |
| Lead | 250 | 47.1 | 46.1 | 17.4 | 4.2 | 2.7 | 39.6 | 31.3 | 287 | 40.6 | 2.2 | 2.0 | 261 | 222 | 219 | 35.5 |
| Mercury | 1.5 | 0.04 | 0.06 | 0.03 | 0.03 | 0.02 U | 0.03 | 0.02 U | 0.08 | 0.07 | 0.03 U | 0.03 U | 0.28 | 0.06 | 0.03 | 0.03 U |
| Nickel | 210 | 13.4 | 13.9 | 12.7 | 10.1 | 25.5 | 67.4 | 4940 | 52.7 | 12.3 | 9.7 | 8.9 | 23.7 | 30.6 | 21.8 | 12.0 |
| Silver | 170 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 | 0.3 | 0.2 U | 0.2 U | 0.3 U | 0.3 | 0.4 | 0.3 | 0.2 U |
| Thallium | 0.67 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Zinc | 1,400 | 72 | 144 | 66 | 30 | 38 | 66 | 39 | 780 | 77 | 30 | 27 | 740 | 500 | 333 | 48 |

# TABLE 21
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | FILL D: 1960-1965 Slag, Construction, Demolition Debris, and Imported Soil | | | | | FILL E: 1965-1966 Imported Construction-Quality Sand Fill Material | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-PIVEXC1-B(4.2) TH64A 8/8/2011 | IT-SB-5(2-3.5) TU65L 10/31/2011 | IT-SB-5(5-6.5) TU65M 10/31/2011 | IT-SB-5(8-9.5) TU65N 10/31/2011 | IT-SB-5(16-17.5) TU65O 10/31/2011 | IT-SB-2(2-3.5) TU65H 10/31/2011 | IT-SB-2(5-6.5) TU65I 10/31/2011 | IT-SB-2(8-9.5) TU65J 10/31/2011 | IT-SB-2(14-15.5) TU65K 10/31/2011 | IT-MW-12(2-3.5) TV61A 11/03/2011 | IT-MW-12(5-6.5) TV61K 11/03/2011 | IT-MW-12(8-9.5) TV61B 11/03/2011 | IT-MW-12(13-14.5) TV61C 11/03/2011 | IT-MW-12(18-19.5) TV61D 11/03/2011 | IT-MW-12(23-24.5) TV61E 11/03/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | | |
| Methylene Chloride | 2,400 | 1.7 U | **2.0** J, J1 | 2.1 UJ | **3.4** J | **3.0** J | **2.6** J | **2.9** J | **3.0** J | **2.4** J | **2.7** | **1.9** J1 | **3.0** | **5.5** | **3.1** | **2.4** J1 |
| Acetone | 510,000 | 47 U | **95** | 5.4 UJ | **54** | 17 U | 29 U | **60** | 29 U | 21 U | **26** | **6.1** | **18** | **13** | **28** | **27** |
| Carbon Disulfide | 75,000 | **16** | **1.1** | **7.5** J | **2.4** | **5.4** | 1.1 U | **23** | 1.2 U | **1.0** J1 | 1.2 U | 1.2 U | 1.1 U | **1.4** | **7** | **6.1** |
| 1,1-Dichloroethane | 710 | 0.9 U | 1.1 U | 1.1 UJ | 1.6 U | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| cis-1,2-Dichloroethene | 2,600 | 0.9 U | **0.6** J1 | 1.1 UJ | 1.6 U | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| 2-Butanone | 430,000 | 4.3 U | **15** | 5.4 UJ | 7.8 U | 5.9 U | 5.3 U | **9.7** | 6.1 U | 5.3 U | 5.8 U | 5.9 U | 5.3 U | 6.6 U | 6.3 U | 6.2 U |
| Trichloroethene | 51 | 0.9 U | 1.1 U | 1.1 UJ | 1.6 U | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| Benzene | 93 | **0.4** J | **1.8** | 1.1 UJ | **3.3** | 1.2 U | 1.1 U | **0.7** J1 | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | **0.9** J1 | 1.2 U |
| Toluene | 100,000 | 0.9 U | **1.0** J1 | **9.1** J | **14** | 1.2 U | 1.1 U | **11** | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| Ethylbenzene | 230 | 0.9 U | 1.1 U | **21** J | **16** | 1.2 U | 1.1 U | **0.5** J1 | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| Trichlorofluoromethane | 200,000 | 0.9 U | 1.1 U | 1.1 UJ | 1.6 U | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| 1,1,2-Trichloro-1,2,2-trifuoroethane | 1,000,000,000 | 1.7 U | 2.1 U | 2.1 UJ | 3.1 U | 2.4 U | 2.1 U | 2.0 U | 2.4 U | 2.1 U | 2.3 U | 2.4 U | 2.1 U | 2.6 U | 2.5 U | 2.5 U |
| m,p-Xylene | 160,000 | 0.9 U | **0.6** J1 | **240** J | **77** | **0.9** J1 | 1.1 U | **2.1** | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| o-Xylene | 200,000 | 0.9 U | 1.1 U | **37** J | **14** | 1.2 U | 1.1 U | **1.0** J1 | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| 1,4-Dichlorobenzene | 3,500 | 0.9 U | 1.1 U | 1.1 UJ | **2.5** | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| Methyl Iodide | --- | 0.9 U | 1.1 U | 1.1 UJ | 1.6 U | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | **0.8** J1 | 1.2 U |
| 1,3,5-Trimethylbenzene | 800,000 | 0.9 U | 1.1 U | 1.1 UJ | 1.6 U | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| 1,2,4-Trimethylbenzene | 800,000 | 0.9 U | **0.6** J1 | **30** J | **8.6** | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| Isopropylbenzene | 78,000 | 0.9 U | 1.1 U | **3.6** J | **0.9** J1 | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| n-Propylbenzene | 11,000 | 0.9 U | 1.1 U | **3.3** J | **1.2** J1 | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| sec-Butylbenzene | --- | 0.9 U | 1.1 U | 1.1 UJ | **1.6** | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| 4-Isopropyltoluene | --- | 0.9 U | 1.1 U | **2.3** J | **3.9** | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| n-Butylbenzene | 27,000 | 0.9 U | 1.1 U | **1.6** J | **2.0** | 1.2 U | 1.1 U | 1.0 U | 1.2 U | 1.1 U | 1.2 U | 1.2 U | 1.1 U | 1.3 U | 1.3 U | 1.2 U |
| Naphthalene | 2,100 | 4.3 U | **1.8** J1 | **2.4** J, J1 | **6.5** J1 | 5.9 U | 5.3 U | 4.9 U | 6.1 U | 5.3 U | 5.8 U | 5.9 U | 5.3 U | 6.6 U | 6.3 U | 6.2 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | | |
| Phenol | 1,900,000 | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **35** | 19 U |
| 1,3-Dichlorobenzene | 3,840 | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | 20 U | 19 U |
| 1,4-Dichlorobenzene | 3,500 | 19 U | 19 U | 19 U | **44** | **14** J1 | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | 20 U | 19 U |
| Benzyl Alcohol | 8,000,000 | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **41** | 19 U |
| 1,2-Dichlorobenzene | 68,000 | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | 20 U | 19 U |
| 2-Methylphenol | 250,000 | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | 20 U | 19 U |
| 4-Methylphenol | 41,000 | 38 U | 39 U | **15** J1 | 37 U | 37 U | 36 U | 36 U | 35 U | 38 U | 38 U | 37 U | 37 U | 37 U | **28** J1 | **23** J1 |
| Isophorone | --- | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | 20 U | 19 U |
| 2,4-Dimethylphenol | 95,000 | 38 U | 39 U | 38 U | 37 U | 37 U | 36 U | 36 U | 35 U | 38 U | 38 UJ | 37 UJ | 37 UJ | 37 UJ | **20** J, J1 | 38 UJ |
| Benzoic Acid | 9,000 | 380 U | 390 U | 380 U | 370 U | 370 U | 360 U | 360 U | 350 U | 380 U | 380 U | 370 U | 370 U | 370 U | 390 U | 380 U |
| Naphthalene | 2,100 | 19 U | **62** | **35** | **100** | 18 U | **11** J1 | **21** | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **54** | **58** |
| 2-Methylnaphthalene | 320,000 | 19 U | **32** | **34** | **110** | 18 U | 18 U | **19** | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **54** | **26** |
| Acenaphthylene | --- | 19 U | 19 U | 19 U | **62** | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | 20 U | **13** J1 |
| Acenaphthene | 230,000 | 19 U | **27** | **12** J1 | **390** | 18 U | **21** | **36** | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **16** J1 | **12** J1 |
| Dibenzofuran | 80,000 | 19 U | **18** J1 | **15** J1 | **53** | 18 U | **11** J1 | **22** | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **22** | **9.4** J1 |
| Fluorene | 150,000 | 19 U | **33** | **20** | **430** | 18 U | **14** J1 | **29** | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **33** J | **15** J, J1 |
| N-Nitrosodiphenylamine | 204,000 | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | 20 U | 19 U |
| Phenanthrene | --- | **16** J | **250** | **120** | **3200** | **11** J1 | **12** J1 | **67** | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **140** | **55** |
| Carbazole | 50,000 | 19 U | **33** | 19 U | **72** | 18 U | 18 U | 18 U | 18 U | 19 U | 19 UJ | 19 UJ | 19 UJ | 19 UJ | 20 UJ | 19 UJ |
| Anthracene | 1,600,000 | 19 U | **45** | **18** J1 | **650** | 18 U | 18 U | **8.9** J1 | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **24** | **11** J1 |
| Di-n-Butylphthalate | 26,000 | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **18** J1 | 19 U |
| Fluoranthene | 230,000 | **13** J | **220** | **94** | **2600** | **9.2** J1 | 18 U | **40** | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **120** | **59** |
| Pyrene | 240,000 | **12** J | **240** | **120** | **3200** | 18 U | 18 U | **38** | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **140** | **80** |
| Butylbenzylphthalate | 1,700 | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | **21** M | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | 20 U | 19 U |
| Benzo(a)anthracene | --- | 19 U | **93** | **40** | **1300** | 18 U | 18 U | **15** J1 | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **52** | **19** |
| bis(2-Ethylhexyl)phthalate | 56,600 | **24** | 17 UJ2 | 49 U | 23 U | 23 U | 33 U | 38 U | 22 U | 23 U | 26 U | 23 U | 27 U | 23 U | 39 U | 26 U |
| Chrysene | --- | 19 U | **140** | **79** | **1500** | **9.2** J1 | 18 U | **50** | 18 U | 19 U | 19 U | **9.3** J1 | 19 U | 19 U | **82** | **23** |
| Di-n-Octyl phthalate | --- | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | **12** J1 | 18 U | 19 U | 19 U | **19** U | 19 U | 19 U | 20 U | 19 U |
| Benzo(a)pyrene | --- | 19 U | **140** | **58** | **1200** | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **46** | 19 U |
| Indeno(1,2,3-cd)pyrene | --- | 19 U | **88** | **36** | **590** | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **26** | 19 U |
| Dibenz(a,h)anthracene | --- | 19 U | **49** | **18** J1 | **230** | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | 20 U | 19 U |
| Benzo(g,h,i)perylene | --- | 19 U | **130** | **54** | **630** | 18 U | 18 U | 18 U | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **36** | 19 U |
| 1-Methylnaphthalene | 16,000 | **17** J | **22** | **16** J1 | **61** | 18 U | 18 U | **14** J1 | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **30** | **12** J1 |
| Total Benzofluoranthenes | --- | 12 J | **200** | **92** | **1800** | 18 U | 18 U | **22** | 18 U | 19 U | 19 U | 19 U | 19 U | 19 U | **80** | **29** |
| Total cPAH TEQ | 15 | ND | **184** | **77** J | **1607** | **0.1** J | ND | **4.2** J | ND | ND | ND | **0.093** J | ND | ND | **63** | **5** |

# TABLE 21
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

FILL D: 1960-1965 Slag, Construction, Demolition Debris, and Imported Soil

| | Preliminary Cleanup Levels | IT-PIVEXC1-B(4.2) TH64A 8/8/2011 | IT-SB-5(2-3.5) TU65L 10/31/2011 | IT-SB-5(5-6.5) TU65M 10/31/2011 | IT-SB-5(8-9.5) TU65N 10/31/2011 | IT-SB-5(16-17.5) TU65O 10/31/2011 |
|---|---|---|---|---|---|---|
| **PAHs (µg/kg)** | | | | | | |
| **Method SW8270D-SIM** | | | | | | |
| Naphthalene | 2,100 | 3.7 J | 42 | 20 | 150 | 3.2 J1 |
| 2-Methylnaphthalene | 320,000 | 39 | 27 | 25 | 220 | 3.2 J1 |
| 1-Methylnaphthalene | 16,000 | 30 | 22 | 18 | 170 | 2.5 J1 |
| Total Naphthalenes | --- | 72.7 J | 91 | 63 | 540 | 8.9 J1 |
| Acenaphthylene | --- | 4.7 U | 6.3 J1 | 8.3 J1 | 1100 | 4.2 J1 |
| Acenaphthene | 230,000 | 4.7 U | 45 | 24 | 580 | 3.7 J1 |
| Fluorene | 150,000 | 4.2 J | 41 | 20 | 890 | 5.2 |
| Phenanthrene | --- | 12 | 300 | 160 | 7800 | 23 |
| Anthracene | 1,600,000 | 4.7 U | 62 | 24 | 1900 | 4.8 |
| Fluoranthene | 230,000 | 4.9 | 340 | 160 | 7900 | 24 |
| Pyrene | 240,000 | 5.4 | 320 | 160 | 11000 | 31 |
| Benzo(a)anthracene | --- | 2.4 J | 150 | 66 | 5400 | 18 |
| Chrysene | --- | 3.3 J | 170 | 100 | 6400 | 22.0 |
| Benzo(a)pyrene | --- | 2.8 J | 110 | 72 | 6700 | 12 |
| Indeno(1,2,3-cd)pyrene | --- | 4.7 U | 94 | 44 | 2600 | 10 |
| Dibenz(a,h)anthracene | --- | 4.7 U | 32 | 20 | 1100 | 3.4 J1 |
| Benzo(g,h,i)perylene | --- | 2.6 J | 110 | 74 | 3200 | 12 |
| Dibenzofuran | 80,000 | 2.4 J | 24 | 10 | 170 | 4.7 U |
| Total Benzofluoranthenes | --- | 7 | 250 | 120 | 7200 | 26 |
| Total cPAH TEQ | 15 | 3.773 | 164 | 98 | 8394 | 18 J |
| **PCBs (µg/kg)** | | | | | | |
| **Method SW8082** | | | | | | |
| Aroclor 1248 | 220 | 33 U | 31 U | 32 U | 32 U | 32 U |
| Aroclor 1254 | 0.29 | 33 U | 31 | 32 U | 32 U | 32 U |
| Aroclor 1260 | 5.4 | 33 U | 51 | 32 U | 32 U | 32 U |
| Total PCBs | 1.8 | ND | 82 | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | |
| **NWTPH-Dx** | | | | | | |
| Diesel-Range Organics | 2,000 | 5.5 U | 86 | 140 | 130 | 16 |
| Oil-Range Organics | 2,000 | 12 | 210 | 340 | 220 | 14 |
| **NWTPH-G** | | | | | | |
| Gasoline-Range Organics | 100/30 | 5.5 U | 26 | 25 | 22 | 6.6 U |
| **TOTAL METALS (mg/kg)** | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | |
| Antimony | 5 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Barium | 640 | 44.4 | 89.7 | 69.0 | 70.4 | 17.7 |
| Beryllium | 160 | 0.2 U | 0.3 | 0.2 U | 0.2 U | 0.2 U |
| Cadmium | 1.3 | 0.1 U | 0.3 | 1.0 | 0.9 | 0.1 U |
| Chromium | 1,480 | 24 | 16.9 | 27.9 | 72.7 | 12.0 |
| Chromium VI | 3.8 | 0.448 U | 0.464 U | 0.432 U | 0.456 U | 0.489 U |
| Copper | 36 | 30 | 45.2 | 44.8 | 61.1 | 9.5 |
| Lead | 250 | 4.7 | 52.1 | 76.7 | 82.0 | 3.2 |
| Mercury | 1.5 | 0.03 U | 2.66 | 0.13 | 0.02 | 0.03 U |
| Nickel | 210 | 37.7 | 18.6 | 22.1 | 19.8 | 8.5 |
| Silver | 170 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Thallium | 0.67 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Zinc | 1,400 | 47 | 76 | 116 | 303 | 27 |

FILL E: 1965-1966 Imported Construction-Quality Sand Fill Material

| | IT-SB-2(2-3.5) TU65H 10/31/2011 | IT-SB-2(5-6.5) TU65I 10/31/2011 | IT-SB-2(8-9.5) TU65J 10/31/2011 | IT-SB-2(14-15.5) TU65K 10/31/2011 | IT-MW-12(2-3.5) TV61A 11/03/2011 | IT-MW-12(5-6.5) TV61K 11/03/2011 | IT-MW-12(8-9.5) TV61B 11/03/2011 | IT-MW-12(13-14.5) TV61C 11/03/2011 | IT-MW-12(18-19.5) TV61D 11/03/2011 | IT-MW-12(23-24.5) TV61E 11/03/2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| **PAHs (µg/kg)** | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | |
| Naphthalene | 11 | 9.8 | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 2.7 J1 | 4.7 U | 55 | 54 |
| 2-Methylnaphthalene | 12 | 11 | 4.9 U | 2.5 J1 | 2.6 J1 | 4.6 U | 3.4 J1 | 4.7 U | 51 | 4.6 U |
| 1-Methylnaphthalene | 6.8 | 9.9 | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 2.3 J1 | 4.7 U | 35 | 4.6 U |
| Total Naphthalenes | 29.8 | 30.7 | 4.9 U | 2.5 J1 | 2.6 J1 | 4.6 U | 8.4 J1 | 4.7 U | 141 | 54 |
| Acenaphthylene | 4.6 U | 8.9 U | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 4.9 U | 4.6 U |
| Acenaphthene | 25 | 24 | 4.9 U | 2.5 J1 | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 42 | 14 |
| Fluorene | 18 | 17 | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 26 | 14 |
| Phenanthrene | 20 | 39 | 4.9 U | 5.1 | 3.3 J1 | 3.4 J1 | 4.8 | 4.7 U | 130 | 48 |
| Anthracene | 3 J1 | 5.5 J1 | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 23 | 12 |
| Fluoranthene | 18 | 31 | 4.9 U | 3.6 J1 | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 120 | 65 |
| Pyrene | 13 | 24 | 4.9 U | 4.1 J1 | 4.8 U | 4.6 U | 2.7 J1 | 4.7 U | 110 | 56 |
| Benzo(a)anthracene | 2.3 J1 | 13 | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 42 | 13 |
| Chrysene | 3.2 J1 | 47.0 | 4.9 U | 7.6 | 3.7 J1 | 2.7 J1 | 7.0 | 4.7 U | 67 | 18.0 |
| Benzo(a)pyrene | 4.6 U | 8.9 | 4.9 U | 4.3 J1 | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 34 | 16 |
| Indeno(1,2,3-cd)pyrene | 4.6 U | 8.9 U | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 19 | 6.9 |
| Dibenz(a,h)anthracene | 4.6 U | 8.9 U | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 8 | 4.6 U |
| Benzo(g,h,i)perylene | 4.6 U | 14 | 4.9 U | 4.7 U | 3.4 J1 | 4.6 U | 4.6 U | 4.7 U | 27 | 9.3 |
| Dibenzofuran | 14 | 13 | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 22 | 12 |
| Total Benzofluoranthenes | 4.6 U | 21 | 4.9 U | 4.7 U | 4.8 U | 4.6 U | 4.6 U | 4.7 U | 64 | 31 |
| Total cPAH TEQ | 0.3 J | 12.8 | ND | 4.4 J | 0.04 J | 0.03 J | 0.1 | ND | 48 | 21.3 |
| **PCBs (µg/kg)** | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | |
| Aroclor 1248 | 31 U | 31 U | 31 U | 33 U | 31 U | 32 U | 32 U | 32 U | 96 U | 33 U |
| Aroclor 1254 | 31 U | 31 U | 31 U | 33 U | 31 U | 32 U | 32 U | 32 U | 210 | 40 |
| Aroclor 1260 | 31 U | 31 U | 31 U | 33 U | 31 U | 32 U | 32 U | 32 U | 82 | 33 U |
| Total PCBs | ND | ND | ND | ND | ND | ND | ND | ND | 292 | 40 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | |
| Diesel-Range Organics | 5.4 U | 32 | 5.1 U | 5.5 U | 5.4 U | 5.2 U | 5.6 U | 5.9 U | 180 | 37 |
| Oil-Range Organics | 11 U | 290 | 10 U | 11 U | 19 | 10 U | 39 | 12 U | 400 | 66 |
| **NWTPH-G** | | | | | | | | | | |
| Gasoline-Range Organics | 6.5 U | 5.4 U | 6.9 U | 6.2 U | 6.1 U | 6.8 U | 5.4 U | 6.9 U | 88 | 10 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | |
| Antimony | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Barium | 47.4 | 46.4 | 44.3 | 47.9 | 47.1 | 38.6 | 63.7 | 45 | 87.8 | 45.7 |
| Beryllium | 0.2 U | 0.2 U | 0.2 U | 0.2 | 0.2 | 0.2 U | 0.2 | 0.2 U | 0.3 | 0.3 |
| Cadmium | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 1.9 | 0.3 |
| Chromium | 25.4 | 33 | 24.4 | 33.1 | 28.1 | 23.1 | 26.4 | 25 | 91 | 16.4 |
| Chromium VI | 0.426 U | 0.427 U | 0.438 U | 0.432 U | 0.524 | 0.413 U | 0.528 | 0.475 U | 0.513 U | 0.509 U |
| Copper | 12.4 | 17.8 | 11.4 | 13.7 | 13.1 | 10.2 | 14.5 | 10.9 | 53.8 | 20 |
| Lead | 2.4 | 4.3 | 2.0 | 2.2 | 4.2 | 1.7 | 2.3 | 1.9 | 169 | 9.7 |
| Mercury | 0.03 U | 0.02 U | 0.03 U | 0.03 U | 0.02 U | 0.02 U | 0.02 U | 0.02 U | 0.22 | 0.05 |
| Nickel | 40.6 | 34.1 | 38.6 | 39.2 | 42.5 | 40.9 | 43.5 | 39.4 | 92.3 | 15.9 |
| Silver | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.6 | 0.2 U |
| Thallium | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Zinc | 31 | 33 | 29 | 30 | 35 | 28 | 36 | 29 | 630 | 67 |

**TABLE 21**
**SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS**
**FORMER SLIP 5 AREA**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| | Preliminary Cleanup Levels | **FILL E: 1965-1966 Imported Construction-Quality Sand Fill Material** IT-MW-13(2-3.5) TV61F 11/03/2011 | IT-MW-13(5-6.5) TV61G 11/03/2011 | IT-MW-13(8-9.5) TV61H 11/03/2011 | IT-MW-13(12.5-14) TV61I 11/03/2011 | IT-MW-13(15-16.5) TV61J 11/03/2011 | IT-MW-13B(2-3.5) TW45J 11/10/2011 | IT-MW-13B(5-6.5) TW45K 11/10/2011 | IT-MW-13B(6.5-8) TW89A 11/11/2011 | IT-MW-13B(8-9.5) TW89B 11/11/2011 | IT-MW-13B(12.5-13.5) TW89C 11/11/2011 | IT-TOWPATH-EXC12-B(2.7) TF71A 07/26/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **VOLATILES (µg/kg)** | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | |
| Methylene Chloride | 2,400 | **4.6** | **1.9** J1 | **2** J1 | **2.3** J1 | **1.6** J1 | **2.3** J1 | **4.2** | **4.3** | **2.0** J1 | **3.6** | 1.7 U |
| Acetone | 510,000 | **37** | **43** | **33** | **78** | **45** | **81** | **38** | **30** J | **43** J | **40** J | **23** |
| Carbon Disulfide | 75,000 | **4.1** | **3.9** | **3.8** | **2** | **4.1** | **1.1** J1 | **3.0** | **7.7** | **12** | **3.7** | **1.1** |
| 1,1-Dichloroethane | 710 | 1.4 U | 1.1 U | 1.1 U | 1.3 U | 1.0 U | 1.3 U | 1.2 U | 1.2 U | 1.6 U | 1.1 U | 0.9 U |
| cis-1,2-Dichloroethene | 2,600 | 1.4 U | 1.1 U | 1.1 U | 1.3 U | 1.0 U | 1.3 U | 1.2 U | 1.2 U | 1.6 U | 1.1 U | 0.9 U |
| 2-Butanone | 430,000 | **3.7** J1 | **6.3** | **3.7** J1 | **11** | **8.1** | **13** | **4.3** J1 | **3.6** J1 | **8.6** | **4.2** J1 | 4.3 U |
| Trichloroethene | 51 | 1.4 U | 1.1 U | 1.1 U | 1.3 U | 1.0 U | 1.3 U | 1.2 U | 1.2 U | 1.6 U | 1.1 U | 0.9 U |
| Benzene | 93 | 1.4 U | **0.7** J1 | **1.6** | **6.2** | **2.4** | 1.3 U | 1.2 U | **1.2** J1 | **1.9** | **1.0** J1 | 0.9 U |
| Toluene | 100,000 | 1.4 U | **0.7** J1 | **1.6** | **3.4** | **1.9** | 1.3 U | **0.6** J1 | **1.7** | **0.9** J1 | **0.9** J1 | 0.9 U |
| Ethylbenzene | 230 | 1.4 U | **0.8** J1 | **6.2** | **1.8** | **0.9** J1 | 1.3 U | 1.2 U | **0.6** J1 | 1.6 U | 1.1 U | 0.9 U |
| Trichlorofluoromethane | 200,000 | 1.4 U | 1.1 U | 1.1 U | 1.3 U | 1.0 U | 1.3 U | 1.2 U | 1.2 U | 1.6 U | 1.1 U | 0.9 U |
| 1,1,2-Trichloro-1,2,2-trifuoroethane | 1,000,000,000 | 2.7 U | 2.1 U | 2.1 U | 2.7 U | 2.0 U | 2.5 U | 2.3 U | 2.5 U | 3.2 U | 2.2 U | 1.7 U |
| m,p-Xylene | 160,000 | **7.4** | **0.6** J1 | **17** | **5.9** | **3.1** | 1.3 U | 1.2 U | **1.2** J1 | 1.6 U | **0.7** J1 | 0.9 U |
| o-Xylene | 200,000 | **7.3** | 1.1 U | **3.4** | **3.4** | **1.9** | 1.3 U | 1.2 U | 1.2 U | 1.6 U | 1.1 U | 0.9 U |
| 1,4-Dichlorobenzene | 3,500 | 1.4 U | 1.1 U | 1.1 U | 1.3 U | 1.0 U | 1.3 U | 1.2 U | 1.2 U | 1.6 U | 1.1 U | 0.9 U |
| Methyl Iodide | --- | 1.4 U | 1.1 U | 1.1 U | 1.3 U | 1.0 U | 1.3 U | 1.2 U | **2.3** | 1.6 U | 1.1 U | 0.9 U |
| 1,3,5-Trimethylbenzene | 800,000 | **14** | 1.1 U | **4.9** | **5.4** | **3.0** | 1.3 U | 1.2 U | **1.0** J1 | 1.6 U | 1.1 U | 0.9 U |
| 1,2,4-Trimethylbenzene | 800,000 | **16** | 1.1 U | **9.1** | **13** | **5.9** | 1.3 U | 1.2 U | **2.1** | 1.6 U | **0.9** J1 | 0.9 U |
| Isopropylbenzene | 78,000 | 1.4 U | **0.9** J1 | **1.7** | **0.8** J1 | 1.0 U | 1.3 U | 1.2 U | **0.7** J1 | 1.6 U | 1.1 U | 0.9 U |
| n-Propylbenzene | 11,000 | 1.4 U | **0.6** J1 | **3.1** | **1.0** J1 | **0.6** J1 | 1.3 U | 1.2 U | **0.9** J1 | 1.6 U | 1.1 U | 0.9 U |
| sec-Butylbenzene | --- | 1.4 U | 1.1 U | 1.1 U | **0.7** J1 | 1.0 U | 1.3 U | 1.2 U | **1.6** | 1.6 U | 1.1 U | 0.9 U |
| 4-Isopropyltoluene | --- | **1.6** J | 1.1 U | **0.7** J, J1 | 1.8 J | **1.0** J, J1 | 1.3 U | 1.2 U | **2.0** | 1.6 U | **1.6** | 0.9 U |
| n-Butylbenzene | 27,000 | 1.4 U | 1.1 U | 1.1 U | 1.3 U | 1.0 U | 1.3 U | 1.2 U | **1.0** J1 | 1.6 U | 1.1 U | 0.9 U |
| Naphthalene | 2,100 | 6.8 U | 5.4 U | **1.1** J, J1 | **7.3** J | **5.9** J | 6.3 U | **0.6** J1 | **12** | **13** | **1.7** J1 | **1300** |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | |
| Phenol | 1,900,000 | 19 U | 19 U | 18 U | 19 UJ | 19 U | 19 U | 18 U | 38 U | 19 U | 18 U | 19 U |
| 1,3-Dichlorobenzene | 3,840 | 19 U | 19 U | 18 U | **22** | 19 U | 19 U | 18 U | 38 U | 19 U | 18 U | 19 U |
| 1,4-Dichlorobenzene | 3,500 | 19 U | 19 U | 18 U | **12** J1 | 19 U | 19 U | 18 U | 38 U | 19 U | 18 U | 19 U |
| Benzyl Alcohol | 8,000,000 | 19 U | 19 U | 18 U | 19 U | 19 U | 19 U | 18 U | 38 U | 19 UJ | 18 UJ | 19 U |
| 1,2-Dichlorobenzene | 68,000 | 19 U | 19 U | 18 U | **22** | 19 U | 19 U | 18 U | 38 U | 19 U | 18 U | 19 U |
| 2-Methylphenol | 250,000 | 19 U | 19 U | 18 U | 19 UJ | 19 U | 19 U | 18 U | 38 U | 19 U | 18 U | 19 U |
| 4-Methylphenol | 41,000 | 38 U | 38 U | 37 U | **18** J, J1 | 39 U | 37 U | 35 U | 76 U | 38 U | 37 U | 39 U |
| Isophorone | --- | 19 U | 19 U | 18 U | 19 U | 19 U | 19 U | 18 U | 38 U | 19 U | 18 U | 19 U |
| 2,4-Dimethylphenol | 95,000 | 38 UJ | 38 UJ | 37 UJ | 38 UJ | 39 UJ | 37 U | 35 U | 76 U | 38 U | 37 U | 39 U |
| Benzoic Acid | 9,000 | 380 U | 380 U | 370 U | 380 UJ | 390 U | 370 U | 350 U | 760 U | 380 U | 370 U | 390 U |
| Naphthalene | 2,100 | **41** | **12** J1 | **33** | **130** | **82** | **12** J1 | **8.8** J1 | **240** | **120** | **14** J1 | **2200** |
| 2-Methylnaphthalene | 320,000 | **41** | 19 U | **23** | **120** | **86** | **15** J1 | 18 U | **420** | **110** | **9.2** J1 | **330** |
| Acenaphthylene | --- | 19 U | 19 U | 18 U | **14** J1 | 19 U | 19 U | 18 U | 38 U | 19 U | 18 U | 19 U |
| Acenaphthene | 230,000 | **35** | 19 U | **9.2** J1 | **33** | **23** | 19 U | 18 U | **130** | **120** | 18 U | **120** |
| Dibenzofuran | 80,000 | **40** | 19 U | **12** J1 | **28** | **22** | 19 U | 18 U | **340** | **120** | 18 U | 19 U |
| Fluorene | 150,000 | **78** J | 19 U | **14** J, J1 | **21** J | **28** J | 19 U | 18 U | **1000** | **170** | 18 U | **9.7** J |
| N-Nitrosodiphenylamine | 204,000 | 19 U | 19 U | 18 U | **25** | 19 U | 19 U | 18 U | **36** J1 | 19 U | 18 U | 19 U |
| Phenanthrene | --- | **240** | **13** J1 | **59** | **370** | **240** | **48** | **17** J1 | **2200** | **420** | **34** | **29** |
| Carbazole | 50,000 | **34** J | 19 UJ | 18 UJ | **42** J | **20** J | 19 U | 18 U | **4200** | **52** | 18 U | 19 U |
| Anthracene | 1,600,000 | **45** | 19 U | 18 U | **58** | **28** | 19 U | 18 U | **16000** | **140** | **10** J1 | 19 U |
| Di-n-Butylphthalate | 26,000 | 19 U | 19 U | 18 U | 19 U | 19 U | 19 U | 18 U | 38 U | 19 U | 18 U | 19 U |
| Fluoranthene | 230,000 | **140** | **16** J1 | **39** | **450** | **150** | **34** | **14** J1 | **1600** | **470** | **37** | **58** |
| Pyrene | 240,000 | **120** | **14** J1 | **41** | **420** | **160** | **29** | **15** J1 | **1500** | **410** | **35** | **46** |
| Butylbenzylphthalate | 1,700 | 19 U | 19 U | 18 U | 19 U | 19 U | 19 U | 18 U | 38 U | 19 U | 18 U | 19 U |
| Benzo(a)anthracene | --- | **52** | 19 U | **17** J1 | **230** | **59** | 19 U | 18 U | **780** | **120** | **16** J1 | **34** |
| bis(2-Ethylhexyl)phthalate | 56,600 | 47 U | 30 U | 85 U | 36 U | 24 U | 37 U | 37 U | **630** | 86 U | 44 U | 24 U |
| Chrysene | --- | **83** | **9.4** J1 | **26** | **300** | **99** | **19** | 18 U | **2200** | **160** | **32** | **35** |
| Di-n-Octyl phthalate | --- | 19 U | 19 U | 18 U | 19 U | 19 U | 19 U | 18 U | **29** J1 | **30** | 18 U | 19 U |
| Benzo(a)pyrene | --- | **53** | 19 U | **15** J1 | **160** | **48** | 19 U | 18 U | **430** | **120** | **19** | **34** |
| Indeno(1,2,3-cd)pyrene | --- | **24** | 19 U | 18 U | **69** | **20** | 19 U | 18 U | **180** | **59** | 18 U | **19** |
| Dibenz(a,h)anthracene | --- | 19 U | 19 U | 18 U | **27** | 19 U | 19 U | 18 U | **94** | **17** J1 | 18 U | 19 U |
| Benzo(g,h,i)perylene | --- | 19 U | 19 U | 18 U | **85** | **27** | 19 U | 18 U | **220** | **100** | **18** J1 | **22** |
| 1-Methylnaphthalene | 16,000 | **35** | 19 U | **12** J1 | **77** | **47** | **12** J1 | 18 U | **36** J1 | **48** | 18 U | **210** |
| Total Benzofluoranthenes | --- | **80** | 19 U | **26** | **290** | **75** | **20** | 18 U | **840** | **220** | **34** | **61** |
| Total cPAH TEQ | 15 | **69** | **0.094** J | **20** J | **225** | **64** | **2** | ND | **641** | **163** J | **24** J | **46** |

# TABLE 21
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | FILL E: 1965-1966 Imported Construction-Quality Sand Fill Material | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-13(2-3.5) TV61F 11/03/2011 | IT-MW-13(5-6.5) TV61G 11/03/2011 | IT-MW-13(8-9.5) TV61H 11/03/2011 | IT-MW-13(12.5-14) TV61I 11/03/2011 | IT-MW-13(15-16.5) TV61J 11/03/2011 | IT-MW-13B(2-3.5) TW45J 11/10/2011 | IT-MW-13B(5-6.5) TW45K 11/10/2011 | IT-MW-13B(6.5-8) TW89A 11/11/2011 | IT-MW-13B(8-9.5) TW89B 11/11/2011 | IT-MW-13B(12.5-13.5) TW89C 11/11/2011 | IT-TOWPATH-EXC12-B(2.7) TF71A 07/26/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | |
| Naphthalene | 2,100 | 42 | 11 | 33 | 96 | 100 | 22 | 8.6 | 70 | 65 | 14 | 670 |
| 2-Methylnaphthalene | 320,000 | 44 | 5.7 | 27 | 110 | 98 | 17 | 6.2 | 59 | 59 | 11 | 130 |
| 1-Methylnaphthalene | 16,000 | 39 | 4 J1 | 16 | 92 | 61 | 14 | 5 | 37 | 34 | 8 | 82 |
| Total Naphthalenes | --- | 125 | 20.7 J1 | 76 | 298 | 259 | 53 | 19.8 | 166 | 158 | 33 | 882 |
| Acenaphthylene | --- | 9.1 U | 4.6 U | 4.7 U | 9.7 U | 10 | 3.3 J1 | 4.5 U | 12 | 7.8 J1 | 4.7 U | 4.6 U |
| Acenaphthene | 230,000 | 58 | 4.6 U | 20 | 91 | 29 | 11 | 2.9 J1 | 150 | 100 | 12 | 50 |
| Fluorene | 150,000 | 89 | 3.1 J1 | 17 | 30 | 35 | 8 | 4.2 J1 | 210 | 150 | 9.6 | 5.2 |
| Phenanthrene | --- | 380 | 13 | 80 | 300 | 260 | 33 | 19 | 800 | 350 | 48 | 2.8 J |
| Anthracene | 1,600,000 | 100 | 4.6 U | 15 | 43 | 42 | 4.4 J1 | 3.2 J1 | 1500 | 170 | 12 | 4.6 U |
| Fluoranthene | 230,000 | 240 | 15 | 68 | 190 | 180 | 35 | 26 | 1200 | 710 | 55 | 2.5 J |
| Pyrene | 240,000 | 170 | 12 | 62 | 240 | 180 | 27 | 24 | 980 | 530 | 50 | 2.7 J |
| Benzo(a)anthracene | --- | 24 | 4.4 J1 | 23 | 110 | 73 | 9.6 | 8.1 | 300 | 150 | 22 | 4.6 U |
| Chrysene | --- | 44 | 9 | 36 | 170 | 100 | 17 | 26 | 570 | 190 | 44 | 4.6 U |
| Benzo(a)pyrene | --- | 13 | 6.5 | 25 | 110 | 60 | 13 | 17 | 210 | 120 | 25 | 4.6 U |
| Indeno(1,2,3-cd)pyrene | --- | 9.1 U | 4.6 U | 11 | 26 | 24 | 8.5 | 4.3 J1 | 93 | 75 | 14 | 4.6 U |
| Dibenz(a,h)anthracene | --- | 9.1 U | 4.6 U | 4.3 J1 | 15 | 14 | 3.3 J1 | 5.9 | 40 | 23 | 5.8 | 4.6 U |
| Benzo(g,h,i)perylene | --- | 14 | 5.4 | 13 | 42 | 36 | 11 | 11 | 170 | 140 | 32 | 4.6 U |
| Dibenzofuran | 80,000 | 52 | 3.5 J1 | 14 | 30 | 33 | 8.5 | 4.6 | 130 | 110 | 7.3 | 5.2 |
| Total Benzofluoranthenes | --- | 39 | 14 | 37 | 95 | 96 | 29 | 19 | 430 | 230 | 37 | 4.6 U |
| Total cPAH TEQ | 15 | 19.74 | 8.43 J | 32.89 J | 136.3 | 81.7 | 18.21 J | 20.99 J | 302 | 169.7 | 33.32 | ND |
| **PCBs (µg/kg)** | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | |
| Aroclor 1248 | 220 | 32 U | 32 U | 33 U | 32 U | 31 U | 32 U | 32 U | 4600 U | 1200 U | 320 U | 32 U |
| Aroclor 1254 | 0.29 | 32 U | 32 U | 33 U | 32 U | 31 U | 32 U | 32 U | 12,000 | 3000 | 320 U | 32 U |
| Aroclor 1260 | 5.4 | 32 U | 32 U | 33 U | 32 U | 31 U | 32 U | 32 U | 1200 U | 420 | 5200 | 32 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | ND | ND | ND | 12,000 | 3420 | 5200 | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | 55 | 8.4 | 32 | 130 | 48 | 9.8 | 38 | 380 J | 220 J | 28 J | 5.4 U |
| Oil-Range Organics | 2,000 | 200 | 50 | 87 | 380 | 140 | 32 | 50 | 650 | 830 | 140 | 11 U |
| **NWTPH-G** | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 33 | 5.9 U | 7.3 | 22 | 19 | 6.5 U | 6.6 U | 120 | 6.5 U | 6.5 U | 6.9 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | |
| Antimony | 5 | 0.2 U | 0.2 U | 0.2 U | 0.3 | 0.2 U | 0.2 U | 0.2 U | 0.2 UJ | 0.2 U | 0.2 U | 0.2 U |
| Barium | 640 | 46.4 | 45.3 | 119 | 143 | 145 | 50.8 | 43.6 | 69.8 J | 197 | 59 | 49.1 |
| Beryllium | 160 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 U | 0.2 | 0.2 U | 0.3 | 0.3 | 0.2 U | 0.2 U |
| Cadmium | 1.3 | 0.1 | 0.1 | 0.1 | 2.2 | 1 | 0.1 U | 0.1 U | 0.6 | 3.7 | 0.2 | 0.1 U |
| Chromium | 1,480 | 22 | 28 | 171 | 3430 | 1640 | 15.7 | 20.8 | 25.2 | 218 | 30.5 | 28 |
| Chromium VI | 3.8 | 0.449 U | 0.431 | 0.465 U | 0.459 U | 0.456 | 0.453 U | 0.452 U | 0.463 U | 0.439 U | 0.465 U | 0.421 U |
| Copper | 36 | 19.9 | 17.8 | 34.9 | 320 | 209 | 23.6 | 15.3 | 53.6 J | 197 | 28.1 | 12.1 |
| Lead | 250 | 6 | 4.5 | 8.7 | 570 | 421 | 7.5 | 5.5 | 51.8 | 348 | 17.3 | 2.5 |
| Mercury | 1.5 | 0.02 | 0.04 | 0.02 | 0.03 U | 0.02 U | 0.05 | 0.03 U | 0.17 | 0.11 | 0.02 | 0.02 U |
| Nickel | 210 | 29.5 | 34.6 | 37.4 | 2220 | 869 | 17.8 | 28.9 | 30.9 J | 170 | 17.3 | 34.4 |
| Silver | 170 | 0.2 U | 0.2 U | 0.2 U | 2.9 | 2.2 | 0.2 U | 0.2 U | 1.1 | 1.2 | 0.2 U | 0.2 U |
| Thallium | 0.67 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Zinc | 1,400 | 46 | 35 | 44 | 600 | 252 | 42 | 44 | 390 J | 630 | 72 | 31 |

ND = Not Detected.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
SIM = Selected Ion Monitoring
Bold = Exceedance
Box = Exceeds Preliminary Cleanup Level.

PAHs = polycylic aromatic hydrocarbons
cPAHs = carcinogenic PAHs
PCBs = polychlorinated biphenyls
TEQ = Toxic Equivalent Concentration

J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the or greater than reporting limit, but equal to the detection limit.
UJ2 = The analyted was not detected in the sample at or above the numerical value shown; the numerical value is below the reporting limit, but greater than the detection limit.
M = Estimated value for an analyte detected and confirmed by an analyst, but with low spectral match parameters. This flag is used only for GC-MS analyses.
U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.

# TABLE 22
# DETECTED ARSENIC CONCENTRATIONS IN RI AND CONSTRUCTION-RELATED SOIL SAMPLES
# SOUTH OF FORMER SLIP 5 AREA
# BOEING ISAACSON-THOMPSON SITE
# TUKWILA, WASHINGTON

| Sample ID | Sample Date | Sample Depth | Arsenic (mg/kg) |
|---|---|---|---|
| | | | PCL 7 |
| **Western Property Boundary-South of Slip 5** | | | |
| MW-7 | 10/31/11 | 2 to 3.5 | 5.6 |
| MW-7 | 10/31/11 | 5 to 6.5 | 24.5 |
| MW-7 | 11/4/11 | 8 to 9.5 | 3.0 |
| MW-7 | 11/4/11 | 13.5 to 15 | 0.9 |
| **Southern Property Boundary/Former Washdown System Collection Sumps** | | | |
| MW-5 | 11/1/11 | 2 to 3.5 | 4.3 |
| MW-5 | 11/1/11 | 5 to 6.5 | 8.1 |
| MW-5 | 11/2/11 | 8 to 9 | 4.6 |
| MW-5 | 11/2/11 | 14 to 15.5 | 2.1 |
| MW-6 | 11/1/11 | 2 to 3.5 | 2.2 |
| MW-6 | 11/1/11 | 5 to 6.5 | 2.3 |
| MW-6 | 11/2/11 | 8 to 9.5 | 7.0 |
| MW-6 | 11/2/11 | 14 to 15.5 | 1.1 |
| MW-6 | 11/2/11 | 20 to 21.5 | 1.3 |
| MW-6 | 11/2/11 | 23 to 24.5 | 1.0 |
| **Eastern Property Boundary** | | | |
| IT-Bldg-14-11Exc1-B(2.1) | 7/28/11 | 2.1 | 6.8 |
| IT-Bldg-14-11Exc2-B(2.5) | 7/28/11 | 2.5 | 4 |
| IT-Bldg-14-11Exc3-B(3.0) | 7/28/11 | 3.0 | 3.6 |
| IT-Bldg-14-11Exc4-B(2.4) | 7/28/11 | 2.4 | 3.6 |
| IT-BLDG14-11-SURF | 8/18/11 | | 2.9 |
| IT-BUILDING14-11EXC5-B(.5) | 8/18/11 | 0.5 | 3.3 |
| IT-PIVExc2-B(5.0) | 8/9/11 | 5.0 | 3.3 |
| IT-PIVExc2-SW(2.5) | 8/9/11 | 2.5 | 2.4 |
| IT-TowpathExc13-(1.3) | 8/2/11 | 1.3 | 3.4 |
| IT-MW-4 | 11/8/11 | 2 to 3.5 | 4.1 |
| IT-MW-4 | 11/8/11 | 5 to 6.5 | 4.1 |
| IT-MW-4 | 11/8/11 | 8 to 9.5 | 3.0 |
| IT-MW-4 | 11/8/11 | 13.5 to 15 | 1.9 |

# TABLE 22
# DETECTED ARSENIC CONCENTRATIONS IN RI AND CONSTRUCTION-RELATED SOIL SAMPLES
# SOUTH OF FORMER SLIP 5 AREA
# BOEING ISAACSON-THOMPSON SITE
# TUKWILA, WASHINGTON

| Sample ID | Sample Date | Sample Depth | Arsenic (mg/kg) |
|---|---|---|---|
| | | | PCL 7 |
| **Northern Portion of 14-01 Building** | | | |
| IT-BLDG1401-TRENCH-2N | 05/02/11 | | 2.9 |
| IT-BLDG1401-TRENCH-2S | 05/02/11 | | 2.7 |
| IT-BLDG1401-TRENCH-3N | 05/03/11 | | 2.3 |
| IT-BLDG1401-TRENCH-3S | 05/03/11 | | 4.0 |
| IT-BLDG1401-TRENCH-4N | 05/12/11 | | 3.1 |
| IT-BLDG1401-TRENCH-4S | 05/12/11 | | 4.5 |
| IT-BLDG1401-TRENCH-5N | 5/13/11 | | 5.3 |
| IT-BLDG1401-TRENCH-5S | 5/13/11 | | 2.3 |
| IT-Bldg1401-OuttakesExc-1 | 5/20/11 | 3.5 | 3.2 |
| IT-Bldg1401-OuttakesExc-2 | 5/20/11 | 3.7 | 3.6 |
| IT-Bldg1401-OuttakesExc-3 | 5/23/11 | 2.9 | 2.9 |
| IT-Bldg1401-OuttakesExc-4 | 5/23/11 | 3.05 | 3.4 |

mg/kg = milligrams per kilogram
PCL = Preliminary Cleanup Level
Box = Exceedance of PCL

# TABLE 23
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Western Property Boundary- South of Slip 5 | | | | Southern Property Boundary/Former Washdown System Collection Sumps | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-7(2-3.5) TU65A 10/31/2011 | IT-MW-7(5-6.5) TU65B 10/31/2011 | IT-MW-7(8-9.5) TV85A 11/04/2011 | IT-MW-7(13.5-15) TV85B 11/04/2011 | IT-MW-5(2-3.5) TU90A 11/01/2011 | IT-MW-5(5-6.5) TU90B 11/01/2011 | IT-MW-5(8-9) TV16A 11/02/2011 | IT-MW-5(14-15.5) TV16B 11/02/2011 | IT-MW-6(2-3.5) TU90C 11/01/2011 | IT-MW-6(5-6.5) TU90D 11/01/2011 | IT-MW-6(8-9.5) TV16C 11/02/2011 | IT-MW-6(14-15.5) TV16D 11/02/2011 | IT-MW-6(20-21.5) TV16E 11/02/2011 | IT-MW-6(23-24.5) TV16F 11/02/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | |
| Vinyl Chloride | 7.4 | 1.3 U | 1.4 U | 1.2 U | 1.2 U | 1.2 U | 1.4 U | 1.3 U | 1.6 U | 1.2 U | 1.2 U | 1.4 U | **2.2** | **7.2** | **1.0** J1 |
| Methylene Chloride | 2,400 | **2.8** J | **3.1** J | **1.9** J | **4.2** J | **1.7** J, J1 | **1.7** J1 | **2.1** J, J1 | **3.7** J | **3.0** | **2.9** | **2.0** J, J1 | **2.8** J | **3.1** J | **3.2** J |
| Acetone | 510,000 | 34 U | **58** | 25 U | **14** | 26 UJ | **55** J | **33** | **26** | 7.6 UJ | **7.4** UJ | 25 U | 9.3 U | 20 U | 21 U |
| Carbon Disulfide | 75,000 | 1.3 U | 1.4 U | 1.2 U | 1.2 U | 1.2 UJ | 1.4 U | 1.3 U | 1.6 U | 1.2 U | 1.2 U | 1.4 U | 1.2 U | **14** | **3.4** |
| 1,1-Dichloroethane | 710 | 1.3 U | 1.4 U | 1.2 UJ | 1.2 U | 1.2 UJ | 1.4 U | 1.3 UJ | 1.6 UJ | 1.2 U | 1.2 U | **1.1** J, J1 | 1.2 UJ | 1.1 UJ | 1.2 UJ |
| trans-1,2-Dichloroethene | 19,000 | 1.3 U | 1.4 U | 1.2 U | 1.2 U | 1.2 UJ | 1.4 U | 1.3 U | 1.6 U | 1.2 U | 1.2 U | **3.1** | 1.2 U | 1.1 U | 1.2 U |
| cis-1,2-Dichloroethene | 2,600 | 1.3 U | 1.4 U | 1.2 U | 1.2 U | 1.2 UJ | 1.4 U | 1.3 U | 1.6 U | 1.2 U | 1.2 U | **86** | **51** | **16** | **1.6** |
| 2-Butanone | 430,000 | 6.4 U | 6.8 U | 6.1 UJ | 6.0 U | 6.1 UJ | **4.3** J1 | 6.4 UJ | 7.9 UJ | 6.2 U | 6.2 U | 7.0 UJ | 6.2 UJ | 5.7 UJ | 6.0 UJ |
| 1,1,1-Trichloroethane | 1,900,000 | 1.3 U | 1.4 U | 1.2 U | 1.2 U | 1.2 UJ | **1.9** | 1.3 U | 1.6 U | 1.2 U | 1.2 U | **0.7** J1 | 1.2 U | 1.1 U | 1.2 U |
| Trichloroethene | 51 | **46** | **22** | 1.2 U | **1.4** | **1.3** J | **1.0** J1 | 1.3 U | 1.6 U | **7.7** | **8.4** | **270** | **220** | **4.3** | **2.2** |
| Benzene | 93 | **0.8** J1 | **1.9** | 1.2 U | 1.2 U | 1.2 UJ | **1.1** J1 | 1.3 U | **0.9** J1 | 1.2 U | 1.2 U | 1.4 U | 1.2 U | 1.1 U | 1.2 U |
| Tetrachloroethene | 260 | **2.7** | **4.6** | **0.9** J1 | 1.7 U | 1.2 UJ | 1.4 U | 1.3 U | 1.6 U | 1.2 U | 1.2 U | **2.5** | **2.6** | 1.1 U | 1.2 U |
| Toluene | 100,000 | **1.5** | **1.0** J1 | 1.2 U | 1.2 U | 1.2 UJ | 1.4 U | 1.3 U | 1.6 U | 1.2 U | 1.2 U | **0.9** J1 | 1.2 U | **0.7** J1 | 1.2 U |
| m,p-Xylene | 160,000 | 1.3 U | 1.4 U | 1.2 U | 1.2 U | 1.2 UJ | 1.4 U | 1.3 U | 1.6 U | 1.2 U | 1.2 U | 1.4 U | 1.2 U | **0.9** J1 | 1.2 U |
| sec-Butylbenzene | --- | 1.3 U | 1.4 U | 1.2 U | 1.2 U | 1.2 UJ | 1.4 U | 1.3 U | 1.6 U | 1.2 U | 1.2 U | 1.4 U | 1.2 U | **0.8** J1 | 1.2 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | |
| Naphthalene | 2,100 | **12** J1 | **9.7** J1 | 19 U | **11** J1 | 19 U | **29** | 18 U | 19 U | 18 U | 19 U | **85** | 20 U | 19 U | 19 U |
| 2-Methylnaphthalene | 320,000 | 19 U | 19 U | 19 U | **16** J1 | 19 U | **14** J1 | 18 U | 19 U | 18 U | 19 U | **18** J1 | 20 U | 19 U | 19 U |
| Acenaphthene | 230,000 | 19 U | 19 U | 19 U | 19 U | 19 U | 18 U | 18 U | 19 U | 18 U | 19 U | 18 U | 20 U | 19 U | **16** J1 |
| Dibenzofuran | 80,000 | 19 U | 19 U | 19 U | 19 U | 19 U | **11** J1 | 18 U | 19 U | 18 U | 19 U | **13** J1 | 20 U | 19 U | 19 U |
| Phenanthrene | --- | **18** J1 | **24** | 19 U | 19 U | **66** | **55** | **75** | 19 U | 18 U | 19 U | **66** | 20 U | 19 U | **22** |
| Anthracene | 1,600,000 | 19 U | 19 U | 19 U | 19 U | 19 U | 18 U | **11** J1 | 19 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U |
| Fluoranthene | 230,000 | **18** J1 | **16** J1 | 19 U | 19 U | 19 U | **49** | **110** | 19 U | 18 U | 19 U | **59** | 20 U | 19 U | 19 U |
| Pyrene | 240,000 | **16** J1 | **13** J1 | 19 U | 19 U | 19 U | **61** | **120** | 19 U | 18 U | 19 U | **49** | 20 U | 19 U | 19 U |
| Butylbenzylphthalate | 1,700 | **200** | **16** J1 | 19 U | 19 U | 19 U | **56** | **47** | 19 U | 18 U | 19 U | **19** | 20 U | 19 U | 19 U |
| Benzo(a)anthracene | --- | 19 U | 19 U | 19 U | 19 U | 19 U | **21** | **48** | 19 U | 18 U | 19 U | 18 U | 20 U | 19 U | 19 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | 22 UJ2 | 16 UJ2 | 36 U | 84 U | 24 U | 34 U | **91** | **24** | 23 U | 23 U | **24** | 25 U | **17** J1 | **14** J1 |
| Chrysene | --- | **19** | **14** J1 | 19 U | 19 U | 19 U | **41** | **59** | 19 U | 18 U | 19 U | **23** | 20 U | 19 U | 19 U |
| Benzo(a)pyrene | --- | 19 U | 19 U | 19 U | 19 U | 19 U | **24** | **47** | 19 U | 18 U | 19 U | **12** J1 | 20 U | 19 U | 19 U |
| Indeno(1,2,3-cd)pyrene | --- | 19 U | 19 U | 19 U | 19 U | 19 U | **20** | **25** | 19 U | 18 U | 19 U | **13** J1 | 20 U | 19 U | 19 U |
| Benzo(g,h,i)perylene | --- | **9.7** J1 | 19 U | 19 U | 19 U | 19 U | **25** | **31** | 19 U | 18 U | 19 U | **23** | 20 U | 19 U | 19 U |
| 1-Methylnaphthalene | 16,000 | 19 U | 19 U | 19 U | 19 U | 19 U | **11** J1 | 18 U | 19 U | 18 U | 19 U | **9.2** J1 | 20 U | 19 U | 19 U |
| Total Benzofluoranthenes | --- | **24** | **17** J1 | 19 U | 19 U | 19 U | **49** | **72** | 19 U | 18 U | 19 U | **30** | 20 U | 19 U | 19 U |
| Total cPAH TEQ | 15 | **3** J | **2** J | ND | ND | ND | **33** | **62** | ND | ND | ND | **17** J | ND | ND | ND |

# TABLE 23
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Western Property Boundary- South of Slip 5 | | | | Southern Property Boundary/Former Washdown System Collection Sumps | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-7(2-3.5) TU65A 10/31/2011 | IT-MW-7(5-6.5) TU65B 10/31/2011 | IT-MW-7(8-9.5) TV85A 11/04/2011 | IT-MW-7(13.5-15) TV85B 11/04/2011 | IT-MW-5(2-3.5) TU90A 11/01/2011 | IT-MW-5(5-6.5) TU90B 11/01/2011 | IT-MW-5(8-9) TV16A 11/02/2011 | IT-MW-5(14-15.5) TV16B 11/02/2011 | IT-MW-6(2-3.5) TU90C 11/01/2011 | IT-MW-6(5-6.5) TU90D 11/01/2011 | IT-MW-6(8-9.5) TV16C 11/02/2011 | IT-MW-6(14-15.5) TV16D 11/02/2011 | IT-MW-6(20-21.5) TV16E 11/02/2011 | IT-MW-6(23-24.5) TV16F 11/02/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | |
| Naphthalene | 2,100 | 17 | 7.4 | 4.6 U | 4.6 U | 4.4 J1 | 30 | 4.0 J1 | 4.7 U | 4.6 U | 20 | 49 | 4.9 U | 2.6 J1 | 4.8 U |
| 2-Methylnaphthalene | 320,000 | 13 | 9.6 | 2.3 J1 | 4.6 U | 5.0 | 13 | 4.5 J1 | 4.7 U | 4.6 U | 9.4 | 12 | 4.9 U | 3.0 J1 | 4.8 U |
| 1-Methylnaphthalene | 16,000 | 22 | 9.0 | 4.6 U | 4.6 U | 5.1 | 13 | 2.9 J1 | 4.7 U | 4.6 U | 11 | 9.9 | 4.9 U | 4.8 U | 4.8 U |
| Total Naphthalenes | --- | 52 | 26 | 2.3 J1 | 4.6 U | 14.5 J1 | 56 | 11.4 J1 | 4.7 U | 4.6 U | 40.4 | 70.9 | 4.9 U | 5.6 J1 | 4.8 U |
| Acenaphthene | 230,000 | 42 | 4.8 U | 4.6 U | 4.6 U | 4.9 U | 14 | 3.2 J1 | 4.7 U | 4.6 U | 11 | 2.4 J1 | 4.9 U | 3.9 J1 | 20 |
| Fluorene | 150,000 | 76 | 4.8 U | 4.6 U | 4.6 U | 4.9 U | 18 | 2.3 J1 | 4.7 U | 4.6 U | 13 | 4.8 U | 4.9 U | 3.5 J1 | 4.8 U |
| Phenanthrene | --- | 1100 | 29 | 4.6 | 4.6 U | 8.7 | 260 | 17 | 3.8 J1 | 2.5 J1 | 180 | 53 | 4.9 U | 11 | 26 |
| Anthracene | 1,600,000 | 130 | 4.8 U | 4.6 U | 4.6 U | 4.9 U | 35 | 3.2 J1 | 4.7 U | 4.6 U | 27 | 4.8 U | 4.9 U | 3.7 J1 | 4.8 U |
| Fluoranthene | 230,000 | 1400 | 22 | 4.6 U | 4.6 U | 5.9 | 360 | 19 | 4.7 U | 2.4 J1 | 240 | 49 | 4.9 U | 4.8 U | 4.8 U |
| Pyrene | 240,000 | 1300 | 19 | 4.6 U | 4.6 U | 6.2 | 330 | 19 | 4.7 U | 4.6 U | 220 | 38 | 4.9 U | 4.8 U | 4.8 U |
| Benzo(a)anthracene | --- | 420 | 7.6 | 4.6 U | 4.6 U | 3.4 J1 | 130 | 9.1 | 4.7 U | 4.6 U | 92 | 7.2 | 4.9 U | 4.8 U | 4.8 U |
| Chrysene | --- | 430 | 16 | 4.6 U | 4.6 U | 5.9 | 140 | 18 | 4.7 U | 4.6 U | 96 | 18 | 4.9 U | 4.8 U | 4.8 U |
| Benzo(a)pyrene | --- | 390 | 8.5 | 4.6 U | 4.6 U | 4.9 U | 150 | 13 | 4.7 U | 4.6 U | 99 | 10 | 4.9 U | 4.8 U | 4.8 U |
| Indeno(1,2,3-cd)pyrene | --- | 240 | 7.4 | 4.6 U | 4.6 U | 5.6 | 78 | 7.0 | 4.7 U | 4.6 U | 52 | 8.3 | 4.9 U | 4.8 U | 4.8 U |
| Dibenz(a,h)anthracene | --- | 70 | 4.8 U | 4.6 U | 4.6 U | 4.1 J1 | 26 | 4.2 J1 | 4.7 U | 4.6 U | 17 | 3.2 J1 | 4.9 U | 4.8 U | 4.8 U |
| Benzo(g,h,i)perylene | --- | 270 | 8.2 | 4.6 U | 4.6 U | 8.5 | 90 | 9.4 | 4.7 U | 4.6 U | 56 | 14 | 4.9 U | 4.8 U | 4.8 U |
| Dibenzofuran | 80,000 | 31 | 5.7 | 4.6 U | 4.6 U | 2.7 J1 | 13 | 4.6 U | 4.7 U | 4.6 U | 9.1 | 9.4 | 4.9 U | 4.8 U | 4.8 U |
| Total Benzofluoranthenes | --- | 700 | 18 | 4.6 U | 4.6 U | 4.9 U | 210 | 23 | 4.7 U | 4.6 U | 140 | 26 | 4.9 U | 4.8 U | 4.8 U |
| Total cPAH TEQ | 15 | 537 | 12.0 | ND | ND | 1.4 J | 196 | 18 J | ND | ND | 130 | 15 J | ND | ND | ND |
| **PCBs (µg/kg)** | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | |
| Aroclor 1254 | 0.29 | 660 | 50 | 33 U | 32 U | 30 U | 32 U | 49 | 33 U | 32 U | 30 U | 16 J1 | 32 U | 31 U | 31 U |
| Aroclor 1260 | 5.4 | 170 U | 33 U | 33 U | 32 U | 30 U | 32 U | 32 U | 33 U | 32 U | 30 U | 32 U | 32 U | 31 U | 31 U |
| Total PCBs | 1.8 | 660 | 50 | ND | ND | ND | ND | 49 | ND | ND | ND | 16 J | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | 18 | 6.8 | 5.5 U | 6.0 U | 99 J | 17 | 18 | 6.6 U | 5.0 U | 5.2 U | 14 | 6.4 U | 12 | 6.2 U |
| Oil-Range Organics | 2,000 | 27 | 28 | 11 U | 12 U | 22 | 42 | 77 | 13 U | 10 U | 10 U | 56 | 13 U | 46 | 12 U |
| **NWTPH-G** | | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 7.2 U | 7.9 U | 7.2 U | 8.3 U | 6.9 U | 8.4 U | 8.6 U | 8.5 U | 6.6 U | 6.4 U | 8.3 U | 7.8 U | 12 | 7.8 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | | | |
| Barium | 640 | 51.3 | 62.1 | 44.9 | 20.8 | 82.1 J | 75.5 | 60.8 | 57.2 | 37.8 | 36.0 | 76.3 | 41.6 | 22.4 | 23.4 |
| Beryllium | 160 | 0.2 U | 0.3 | 0.2 U | 0.2 U | 0.3 | 0.3 | 0.3 | 0.3 U | 0.2 U | 0.2 | 0.4 | 0.3 U | 0.3 U | 0.2 U |
| Cadmium | 1.3 | 0.3 | 0.4 | 0.1 U | 0.1 U | 0.1 | 0.3 | 0.1 | 0.1 U | 0.1 U | 0.1 U | 0.2 | 0.1 U | 0.1 U | 0.1 U |
| Chromium | 1,480 | 19.1 | 16.8 | 11.2 | 9.8 | 13.7 | 16.1 | 17.2 | 14.1 | 18.6 | 22.9 | 22.5 | 14.6 | 9.2 | 10.9 |
| Copper | 36 | 25.2 | 26.1 | 19.2 | 10.3 | 24.7 | 29.4 | 26.4 | 21.5 | 11.0 | 11.6 | 34.0 | 18.8 | 11.4 | 9.7 |
| Lead | 250 | 36.6 | 22.0 | 2.5 | 1.8 | 5.8 | 30.7 | 28.6 J | 2.8 | 1.6 | 1.6 | 30.4 | 2.3 | 1.1 | 1.1 |
| Mercury | 1.5 | 0.05 | 0.08 | 0.03 U | 0.02 U | 0.04 | 0.12 | 0.03 | 0.03 | 0.02 U | 0.02 U | 0.04 | 0.03 U | 0.02 U | 0.03 U |
| Nickel | 210 | 12.1 | 15.3 | 10.4 | 6.8 | 14.4 | 16.9 | 40.8 J | 10.8 | 28.9 | 29.2 | 23.1 | 9.8 | 7.9 | 7.7 |
| Zinc | 1,400 | 47 | 70 | 25 | 21 | 44 | 65 | 60 | 31 | 27 | 27 | 72 | 25 | 20 | 22 |

# TABLE 23
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Eastern Property Boundary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IT-HBE-1A-1<br>RL72A<br>09/03/2010 | IT-HBE-1A(4.5-5.5)<br>RL72C<br>09/03/2010 | IT-HBE-2-1<br>RL63B<br>09/02/2010 | IT-HBE-2(4.0-4.5)<br>RL87A<br>09/07/2010 | IT-HBE-3-1<br>RL72B<br>09/03/2010 | IT-HBE-3(4.5-5.5)<br>RL87B<br>09/07/2010 | IT-HBE-SS1<br>RL72D<br>09/03/2010 | IT-EXT1(0-1)<br>RM87A<br>09/15/2010 | IT-EXT1(4-5)<br>RM87B<br>09/15/2010 | IT-EXT2(0-1)<br>RM87C<br>09/15/2010 | IT-EXT2(3-4)<br>RM87D<br>09/15/2010 | IT-EXT3(0-1)<br>RM87E<br>09/15/2010 | IT-EXT3(3-4)<br>RM87F<br>09/15/2010 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | |
| Vinyl Chloride | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| Methylene Chloride | 1.9 U | 2.0 U | 2.4 U | 2.4 U | 2.1 U | 2.6 U | 2.1 U | 1.4 U | 1.8 U | 0.9 U | 1.0 U | 1.0 U | 1.1 U |
| Acetone | **14** J | **22** J | **16** | **75** | **14** J | **14** | **110** J | **11** | **8.4** | **32** | **24** | **18** | **17** |
| Carbon Disulfide | **2.3** | 1.0 U | 1.2 U | **2.5** | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| 1,1-Dichloroethane | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| trans-1,2-Dichloroethene | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| cis-1,2-Dichloroethene | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| 2-Butanone | 4.7 U | 4.9 U | 5.9 U | **24** | 5.2 U | 6.6 U | **11** | 3.5 U | 2.9 U | **3.7** J | **3.4** J | 2.5 U | 2.7 U |
| 1,1,1-Trichloroethane | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| Trichloroethene | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| Benzene | 0.9 U | 1.6 | 1.2 U | **2.2** | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | **0.6** | 0.5 U |
| Tetrachloroethene | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 UJ | 0.6 UJ | 0.4 UJ | 0.5 U | 0.5 UJ | 0.5 UJ |
| Toluene | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| m,p-Xylene | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| sec-Butylbenzene | 0.9 U | 1.0 U | 1.2 U | 1.2 U | 1.0 U | 1.3 U | 1.1 U | 0.7 U | 0.6 U | 0.4 U | 0.5 U | 0.5 U | 0.5 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | |
| Naphthalene | | | | | | | | | | | | | |
| 2-Methylnaphthalene | | | | | | | | | | | | | |
| Acenaphthene | | | | | | | | | | | | | |
| Dibenzofuran | | | | | | | | | | | | | |
| Phenanthrene | | | | | | | | | | | | | |
| Anthracene | | | | | | | | | | | | | |
| Fluoranthene | | | | | | | | | | | | | |
| Pyrene | | | | | | | | | | | | | |
| Butylbenzylphthalate | | | | | | | | | | | | | |
| Benzo(a)anthracene | | | | | | | | | | | | | |
| bis(2-Ethylhexyl)phthalate | | | | | | | | | | | | | |
| Chrysene | | | | | | | | | | | | | |
| Benzo(a)pyrene | | | | | | | | | | | | | |
| Indeno(1,2,3-cd)pyrene | | | | | | | | | | | | | |
| Benzo(g,h,i)perylene | | | | | | | | | | | | | |
| 1-Methylnaphthalene | | | | | | | | | | | | | |
| Total Benzofluoranthenes | | | | | | | | | | | | | |
| Total cPAH TEQ | | | | | | | | | | | | | |

# TABLE 23
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Eastern Property Boundary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IT-HBE-1A-1<br>RL72A<br>09/03/2010 | IT-HBE-1A(4.5-5.5)<br>RL72C<br>09/03/2010 | IT-HBE-2-1<br>RL63B<br>09/02/2010 | IT-HBE-2(4.0-4.5)<br>RL87A<br>09/07/2010 | IT-HBE-3-1<br>RL72B<br>09/03/2010 | IT-HBE-3(4.5-5.5)<br>RL87B<br>09/07/2010 | IT-HBE-SS1<br>RL72D<br>09/03/2010 | IT-EXT1(0-1)<br>RM87A<br>09/15/2010 | IT-EXT1(4-5)<br>RM87B<br>09/15/2010 | IT-EXT2(0-1)<br>RM87C<br>09/15/2010 | IT-EXT2(3-4)<br>RM87D<br>09/15/2010 | IT-EXT3(0-1)<br>RM87E<br>09/15/2010 | IT-EXT3(3-4)<br>RM87F<br>09/15/2010 |
| **PAHs (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Naphthalene | | | | | | | | | | | | | |
| 2-Methylnaphthalene | | | | | | | | | | | | | |
| 1-Methylnaphthalene | | | | | | | | | | | | | |
| Total Naphthalenes | | | | | | | | | | | | | |
| Acenaphthene | | | | | | | | | | | | | |
| Fluorene | | | | | | | | | | | | | |
| Phenanthrene | | | | | | | | | | | | | |
| Anthracene | | | | | | | | | | | | | |
| Fluoranthene | | | | | | | | | | | | | |
| Pyrene | | | | | | | | | | | | | |
| Benzo(a)anthracene | | | | | | | | | | | | | |
| Chrysene | | | | | | | | | | | | | |
| Benzo(a)pyrene | | | | | | | | | | | | | |
| Indeno(1,2,3-cd)pyrene | | | | | | | | | | | | | |
| Dibenz(a,h)anthracene | | | | | | | | | | | | | |
| Benzo(g,h,i)perylene | | | | | | | | | | | | | |
| Dibenzofuran | | | | | | | | | | | | | |
| Total Benzofluoranthenes | | | | | | | | | | | | | |
| Total cPAH TEQ | | | | | | | | | | | | | |
| **PCBs (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | |
| Aroclor 1254 | 32 U | 32 U | 33 U | 32 U | 31 U | 32 U | 31 U | 30 U | 32 U | 32 U | 32 U | 31 U | 32 U |
| Aroclor 1260 | 32 U | 32 U | 33 U | 32 U | 31 U | 32 U | 31 U | 30 U | 32 U | 32 U | 32 U | 31 U | 32 U |
| Total PCBs | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | |
| Diesel-Range Organics | | | | | | | | | | | | | |
| Oil-Range Organics | | | | | | | | | | | | | |
| **NWTPH-G** | | | | | | | | | | | | | |
| Gasoline-Range Organics | | | | | | | | | | | | | |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | |
| Barium | | | | | | | | | | | | | |
| Beryllium | | | | | | | | | | | | | |
| Cadmium | 0.5 U | **0.3** | **0.4** | **0.4** | **0.3** | **0.3** | **0.5** | **0.3** | **0.3** | **1.2** | **0.8** | **0.4** | **0.3** |
| Chromium | **30** | **19.1** | **15.5** | **14.6** | **18.5** | **14.1** | **25.7** | **14.2** | **11.0** | **25.4** | **37.8** | **14.8** | **14.3** |
| Copper | **35.7** | **19.1** | **12.6** | **15.3** | **13.8** | **21.8** | **44.0** | **15.2** | **11.2** | **61.4** | **52.7** | **20.1** | **41.1** |
| Lead | 5 U | **14** | **4** | **4** | **12** | **4** | **14** | **5** | **3** | **9** | **23** | **10** | **19** |
| Mercury | 0.02 U | **0.03** | **0.06** | **0.04** | 0.03 U | **0.04** | **0.14** | **0.03** | 0.02 U | 0.03 U | **0.02** | **0.08** | **0.08** |
| Nickel | | | | | | | | | | | | | |
| Zinc | **49** | **39** | **37** | **36** | **43** | **29** | **159** | **36** | **32** | **633** | **396** | **47** | **38** |

# TABLE 23
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Eastern Property Boundary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IT-Bldg-14-11Exc2-B(2.5) TG02C 7/28/2011 | IT-Bldg-14-11Exc3-B(3.0) TG02D 7/28/2011 | IT-Bldg-14-11Exc4-B(2.4) TG02E 7/28/2011 | IT-Bldg-14-11Exc1-B(2.1) TG02B 7/28/2011 | IT-BLDG14-11-SURF TJ06B 8/18/2011 | IT-BUILDING14-11EXC5-B(.5) TJ06A 8/18/2011 | IT-PIVExc2-B(5.0) TH74A 8/9/2011 | IT-PIVExc2-SW(2.5) TH74B 8/9/2011 | IT-TowpathExc13-(1.3) TG72A 8/2/2011 | IT-MW-4(2-3.5) TW27F 11/08/2011 | IT-MW-4(5-6.5) TW27G 11/08/2011 | IT-MW-4(8-9.5) TW27H 11/08/2011 | IT-MW-4(13.5-15) TW27I 11/08/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | |
| Vinyl Chloride | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| Methylene Chloride | 2.3 U | **6** | 1.9 U | 2.5 U | 1.8 U | 1.9 U | 2.3 U | 2.4 U | 2 U | **4.7** | **4.7** | **2.6** | **3.0** |
| Acetone | **270** | **67** | **25** | **47** | **19** | **18** | **47** | **31** | **65** | **11** J | **25** J | **11** J | **27** J |
| Carbon Disulfide | **1.8** | 1.2 U | 0.9 U | **1.4** | **1.7** | **2.9** | **3.3** | 1.2 U | **4.4** | 1.3 U | 1.3 U | **0.7** J1 | 1.2 U |
| 1,1-Dichloroethane | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 UJ | 1.3 UJ | 1.1 UJ | 1.2 UJ |
| trans-1,2-Dichloroethene | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| cis-1,2-Dichloroethene | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| 2-Butanone | **65** | **55** | 4.7 U | **20** | 4.4 U | 4.8 U | **8.9** | 5.9 U | **10** | 6.3 U | 6.6 U | 5.6 U | 5.8 U |
| 1,1,1-Trichloroethane | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| Trichloroethene | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| Benzene | **1.8** | 1.2 U | **1.3** | **2.6** | **0.5** J | **0.5** J | 1.2 U | 1.2 U | **1.7** | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| Tetrachloroethene | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| Toluene | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| m,p-Xylene | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| sec-Butylbenzene | 1.2 U | 1.2 U | 0.9 U | 1.2 U | 0.9 U | 1 U | 1.2 U | 1.2 U | 1 U | 1.3 U | 1.3 U | 1.1 U | 1.2 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | |
| Naphthalene | **68** | 57 U | 18 U | **37** | 19 U | 19 U | **40** | **16** J | **32** | 19 U | 20 U | 20 U | 19 U |
| 2-Methylnaphthalene | **34** | 57 U | 18 U | **21** | 19 U | **18** J | **16** J | 19 U | **13** J | 19 U | 20 U | 20 U | 19 U |
| Acenaphthene | **19** | 57 U | 18 U | **16** J | 19 U | 19 U | 18 U | 19 U | **14** J | 19 U | 20 U | 20 U | 19 U |
| Dibenzofuran | **26** | 57 U | 18 U | **30** | 19 U | 19 U | **13** J | 19 U | **14** J | 19 U | 20 U | 20 U | 19 U |
| Phenanthrene | **150** | **46** J | **15** J | **130** | **42** | **16** J | **56** | **23** | **30** | 19 U | **51** | **14** J1 | 19 U |
| Anthracene | **32** | 57 U | 18 U | **44** | **13** J | 19 U | **11** J | 19 U | **13** J | 19 U | **11** J1 | 20 U | 19 U |
| Fluoranthene | **120** | **28** J | **16** J | **92** | **240** | **10** J | **53** | **22** | **56** | 19 U | **77** | 20 U | 19 U |
| Pyrene | **94** | **28** J | **13** J | **81** | **240** | **10** J | **36** | **16** J | **39** | 19 U | **58** | **15** J1 | 19 U |
| Butylbenzylphthalate | 19 U | 57 U | 18 U | 20 U | **40** | 19 U | 18 U | 19 U | 19 U | **9.5** J1 | 20 U | 20 U | 19 U |
| Benzo(a)anthracene | **26** | 57 U | 18 U | **26** | **180** | 19 U | **13** J | 19 U | **16** J | 19 U | **39** | 20 U | 19 U |
| bis(2-Ethylhexyl)phthalate | **18** J | **54** J | **40** | **28** | **67** | 23 U | 23 U | 23 U | 23 U | **15** J1 | 24 U | **590** | **33** |
| Chrysene | **38** | 57 U | **12** J | **42** | **180** | 19 U | **24** | **11** J | **24** | 19 U | **39** | **25** | 19 U |
| Benzo(a)pyrene | **13** J | 57 U | 18 U | **17** J | **200** | 19 U | **10** J | 19 U | **9.4** J | 19 U | **35** | **13** J1 | 19 U |
| Indeno(1,2,3-cd)pyrene | 19 U | 57 U | 18 U | **13** J | **120** | 19 U | **12** J | 19 U | 19 U | 19 U | **18** J1 | 20 U | 19 U |
| Benzo(g,h,i)perylene | **14** J | 57 U | 18 U | **23** | **130** | 19 U | **17** J | 19 U | **12** J | 19 U | **20** | 20 U | 19 U |
| 1-Methylnaphthalene | **18** J | **28** J | 18 U | **34** | 19 U | **12** J | **10** J | 19 U | **11** J | 19 U | 20 U | 20 U | 19 U |
| Total Benzofluoranthenes | **42** | 57 U | **22** | **50** | **370** | **12** J | **32** | **16** J | **25** | 19 U | **64** | **14** J1 | 19 U |
| Total cPAH TEQ | **20.18** J | ND | **2.32** J | **26.32** J | **274** | **1.2** J | **15.94** J | **1.71** J | **13.74** J | ND | **47** J | **15** J | ND |

# TABLE 23
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Eastern Property Boundary | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IT-Bldg-14-11Exc2-B(2.5) TG02C 7/28/2011 | IT-Bldg-14-11Exc3-B(3.0) TG02D 7/28/2011 | IT-Bldg-14-11Exc4-B(2.4) TG02E 7/28/2011 | IT-Bldg-14-11Exc1-B(2.1) TG02B 7/28/2011 | IT-BLDG14-11-SURF TJ06B 8/18/2011 | IT-BUILDING14-11EXC5-B(.5) TJ06A 8/18/2011 | IT-PIVExc2-B(5.0) TH74A 8/9/2011 | IT-PIVExc2-SW(2.5) TH74B 8/9/2011 | IT-TowpathExc13-(1.3) TG72A 8/2/2011 | IT-MW-4(2-3.5) TW27F 11/08/2011 | IT-MW-4(5-6.5) TW27G 11/08/2011 | IT-MW-4(8-9.5) TW27H 11/08/2011 | IT-MW-4(13.5-15) TW27I 11/08/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Naphthalene | 34 | 7.6 U | 11 U | 18 U | 6 | 12 | 16 | 6.4 | 6.1 | 4.7 U | 4.7 J1 | 4.5 J1 | 4.8 U |
| 2-Methylnaphthalene | 27 | 13 | 3.6 J | 11 | 5.6 | 15 | 7.7 | 5.1 | 6.7 | 4.7 U | 7.5 | 9.7 | 4.8 U |
| 1-Methylnaphthalene | 17 | 15 | 2.5 J | 9.4 | 4.9 U | 13 | 5 | 3.7 J | 6.3 | 4.7 U | 7.1 | 7.8 | 4.8 U |
| Total Naphthalenes | 78 | 28 | 6.1 J | 20.4 | 11.6 | 40 | 28.7 | 15.2 J | 19.1 | 4.7 U | 19.3 J1 | 22 J1 | 4.8 U |
| Acenaphthene | 11 | 4.6 U | 4.6 U | 2.8 J | 4.9 U | 4.7 U | 7.1 | 4.7 U | 8.1 | 4.7 U | 4.9 U | 4.9 U | 4.8 U |
| Fluorene | 17 | 4.1 J | 4.6 U | 4.9 U | 4.9 U | 4.7 U | 8.5 | 3.2 J | 13 | 4.7 U | 4.9 U | 4.9 U | 4.8 U |
| Phenanthrene | 77 | 24 | 15 | 22 | 18 | 14 | 52 | 13 | 15 | 3.0 J1 | 13 | 10 | 4.8 U |
| Anthracene | 17 | 2.8 J | 4.6 U | 2.5 J | 4.9 U | 4.7 U | 9.5 | 4.7 U | 5.3 | 4.7 U | 4.9 U | 4.9 U | 4.8 U |
| Fluoranthene | 73 | 14 | 11 | 24 | 40 | 18 | 46 | 16 | 28 | 2.7 J1 | 7.2 | 5.1 | 4.8 U |
| Pyrene | 56 | 14 | 10 | 20 | 36 | 17 | 51 | 14 | 20 | 2.7 J1 | 7.2 | 6.8 | 4.8 U |
| Benzo(a)anthracene | 16 | 6 | 3.7 J | 9 | 28 | 11 | 23 | 5.3 | 6.7 | 4.7 U | 3.0 J1 | 5.8 | 4.8 U |
| Chrysene | 24 | 16 | 8.4 | 19 | 34 | 13 | 43 | 10 | 14 | 4.7 U | 6.6 | 19 | 4.8 U |
| Benzo(a)pyrene | 11 | 8.1 | 4.8 | 12 | 31 | 8 | 24 | 5.5 | 7.9 | 4.7 U | 3.6 J1 | 7.5 | 4.8 U |
| Indeno(1,2,3-cd)pyrene | 7.8 | 4.4 J | 3.4 J | 9.6 | 18 | 5.6 | 9.1 | 3.6 J | 3.9 J | 4.7 U | 4.9 U | 4.9 U | 4.8 U |
| Dibenz(a,h)anthracene | 2.8 J | 4.6 U | 4.6 U | 3.5 J | 6.7 | 4.7 U | 4.5 U | 4.7 U | 4.7 U | 4.7 U | 4.9 U | 4.9 U | 4.8 U |
| Benzo(g,h,i)perylene | 9.8 | 7.3 | 7.3 | 14 | 27 | 7.6 | 14 | 5.8 | 8.2 | 4.7 U | 3.1 J1 | 8.7 | 4.8 U |
| Dibenzofuran | 17 | 8.6 | 2.7 J | 6.3 | 4.9 U | 5.1 | 6.4 | 3.5 J | 7.2 | 4.7 U | 3.2 J1 | 4.9 U | 4.8 U |
| Total Benzofluoranthenes | 29 | 15 | 13 | 31 | 58 | 19 | 44 | 16 | 16 | 4.7 U | 7.0 | 8.9 | 4.8 U |
| Total cPAH TEQ | 16.8 J | 10.8 J | 6.894 J | 17.5 J | 42.41 | 11.69 | 32.04 | 8.09 J | 10.7 J | ND | 4.7 J | 9.2 | ND |
| **PCBs (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | |
| Aroclor 1254 | 31 U | 33 U | 31 U | 53 | 31 U | 32 U | 32 U | 32 U | 32 U | 32 U | 31 U | 30 U | 32 U |
| Aroclor 1260 | 31 U | 33 U | 31 U | 73 | 14 J | 32 U | 32 U | 32 U | 32 U | 32 U | 31 U | 30 U | 32 U |
| Total PCBs | ND | ND | ND | 126 | 14 J | ND | ND | ND | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | |
| Diesel-Range Organics | 9.4 | 11 | 12 | 21 | 10 | 10 | 11 | 15 | 27 | 5.2 U | 6.0 U | 23 | 5.9 U |
| Oil-Range Organics | 18 | 48 | 25 | 50 | 74 | 24 | 33 | 45 | 150 | 10 U | 12 U | 120 | 12 U |
| **NWTPH-G** | | | | | | | | | | | | | |
| Gasoline-Range Organics | 6.3 U | 6.8 U | 5.9 U | 6.6 U | 5.3 U | 5 U | 6.4 U | 5.9 U | 5.7 U | 6.8 U | 8.5 U | 8.3 | 6.6 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | |
| Barium | 57.6 | 51.4 | 45.2 | 63.7 | 57.1 | 60.8 | 60.1 | 55.9 | 53.6 | 57.5 | 49.0 | 48.0 | 18.0 |
| Beryllium | 0.2 U | 0.2 | 0.2 | 0.2 | 0.2 U | 0.2 U | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 U | 0.2 U | 0.2 U |
| Cadmium | 0.2 | 0.3 | 0.1 | 0.5 | 0.3 | 0.1 U | 0.4 | 0.2 | 0.1 | 0.1 U | 0.2 | 0.1 U | 0.1 U |
| Chromium | 16.5 | 15.9 | 18.8 | 16.3 | 18.7 | 13.2 | 21.4 | 23.4 | 14.6 | 9.9 | 13.1 | 13.5 | 9.9 |
| Copper | 24.2 | 16.9 | 24.6 | 44.6 | 61.2 | 22.5 | 27.4 | 23.9 | 23.1 | 26.0 | 14.1 | 21.5 | 6.3 |
| Lead | 22.1 | 6.1 | 15.8 | 80.8 | 18.7 | 10.5 | 42.4 | 17 | 8.5 | 4.0 | 4.1 | 3.4 | 1.1 |
| Mercury | 0.03 | 0.03 | 0.02 | 0.05 | 0.02 U | 0.02 U | 0.03 | 0.03 | 0.03 | 0.02 U | 0.04 | 0.02 U | 0.03 U |
| Nickel | 22.4 | 15.3 | 26.6 | 22.1 | 25.5 | 17.5 | 25.6 | 32.5 | 16.5 | 15.9 | 12.2 | 10.9 | 4.8 |
| Zinc | 51 | 340 | 46 | 147 | 299 | 44 | 68 | 50 | 39 | 38 | 42 | 33 | 20 |

# TABLE 23
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Northern Portion of 14-01 Building | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IT-BLDG1401-TRENCH-2N SU96A/SW32A 5/2/2011 | IT-BLDG1401-TRENCH-2S SU96B/SW32B 5/2/2011 | IT-BLDG1401-TRENCH-3N SV05A/SW32C 5/3/2011 | IT-BLDG1401-TRENCH-3S SV05B/SW32D 5/3/2011 | IT-BLDG1401-TRENCH-4N SW63A 5/12/2011 | IT-BLDG1401-TRENCH-4S (a) SW63B 5/12/2011 | IT-BLDG1401-TRENCH-5N (b) SW79A 5/13/2011 | IT-BLDG1401-TRENCH-5S SW79B 5/13/2011 | IT-Bldg1401-OuttakesExc-1 (3.5) SX84A 5/20/2011 | IT-Bldg1401-OuttakesExc-2 (3.7) SX84B 5/20/2011 | IT-Bldg1401-OuttakesExc-3 (2.9) SY11A 5/23/2011 | IT-Bldg1401-OuttakesExc-4 (3.05) SY11B 5/23/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | |
| Vinyl Chloride | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U |
| Methylene Chloride | **9.0** J | **12** J | **11** | **9.5** | **12** | **13** | **13** | **12** | **9.4** | **9.1** | **7.7** | **18** |
| Acetone | **27** | **25** | **93** | **61** | **140** | **25** | **86** | **20** | **22** | **31** | **20** | **37** |
| Carbon Disulfide | 0.9 U | 1.2 U | **0.8** J | **1.5** | 1.3 U | 1.2 U | 1.3 U | **3.0** | 1.1 U | 1.1 U | 1.3 U | 1.2 U |
| 1,1-Dichloroethane | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U |
| trans-1,2-Dichloroethene | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U |
| cis-1,2-Dichloroethene | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U |
| 2-Butanone | 4.5 U | 6.2 U | **16** | **10** | **33** | 6.0 U | **18** | 6.0 U | 5.5 U | 5.4 U | 6.4 U | 5.9 U |
| 1,1,1-Trichloroethane | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U |
| Trichloroethene | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U |
| Benzene | **0.5** J | 1.2 U | **0.5** J | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | **0.9** J | 1.1 U | 1.3 U | **0.9** J |
| Tetrachloroethene | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U |
| Toluene | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | **0.8** J |
| m,p-Xylene | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | **0.5** J | 1.3 U | 1.2 U |
| sec-Butylbenzene | 0.9 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U | 1.3 U | 1.2 U | 1.1 U | 1.1 U | 1.3 U | 1.2 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | |
| Naphthalene | 18 U | 18 U | **23** | **130** | 19 U | 18 U | **41** J | 18 U | 20 U | 58 U | 18 U | 19 U |
| 2-Methylnaphthalene | 18 U | 18 U | **32** | **60** | 19 U | 18 U | **11** J | 18 U | 20 U | 58 U | 18 U | 19 U |
| Acenaphthene | 18 U | 18 U | 19 U | 18 U | 19 U | 18 U | 19 U | 18 U | 20 U | 58 U | 18 U | 19 U |
| Dibenzofuran | 18 U | 18 U | **20** | **40** | 19 U | 18 U | **10** J | 18 U | 20 U | 58 U | 18 U | 19 U |
| Phenanthrene | **18** J | 18 U | **41** | **67** | **26** | **15** J | **52** J | **10** J | **18** J | 58 U | **9.1** J | **17** J |
| Anthracene | 18 U | 18 U | 19 U | **10** J | 19 U | 18 U | 19 U | 18 U | 20 U | 58 U | 18 U | 19 U |
| Fluoranthene | **11** J | 18 U | **31** | **40** | **26** J | **16** J | **48** J | 18 UJ | **12** J | 58 U | **10** J | **14** J |
| Pyrene | **11** J | 18 U | **31** | **51** | **24** | **14** J | **49** J | 18 U | **12** J | 58 U | 18 U | **10** J |
| Butylbenzylphthalate | 18 U | 18 U | 19 U | 18 U | 19 U | 18 U | 19 U | 18 U | 20 U | 58 U | 18 U | **18** J |
| Benzo(a)anthracene | 18 U | 18 U | **17** J | **14** J | **10** J | 18 U | 19 U | 18 U | 20 U | 58 U | 18 U | 19 U |
| bis(2-Ethylhexyl)phthalate | **9.2** J | 18 U | **10** J | 18 U | 19 U | 18 U | 19 U | 18 U | **11** J | 58 U | **16** J | **20** |
| Chrysene | 18 U | 18 U | **21** | **29** | **12** J | **13** J | **21** J | 18 U | 20 U | 58 U | 18 U | 19 U |
| Benzo(a)pyrene | 18 UJ | 18 UJ | **9.4** J | **9.6** J | 19 U | 18 U | **12** J | 18 U | 20 U | 58 U | 18 U | 19 U |
| Indeno(1,2,3-cd)pyrene | 18 U | 18 U | **12** J | 18 U | 19 U | 18 U | **12** J | 18 U | 20 U | 58 U | 18 U | 19 U |
| Benzo(g,h,i)perylene | 18 U | 18 U | **16** J | **12** J | 19 U | 18 U | **24** J | 18 U | 20 U | **29** J | 18 U | 19 U |
| 1-Methylnaphthalene | 18 U | 18 U | **20** | **39** | 19 U | 18 U | 19 U | 18 U | 20 U | 58 U | 18 U | 19 U |
| Total Benzofluoranthenes | 18 U | 18 U | **30** | **19** | **16** J | **16** J | **25** J | 18 U | **15** J | 58 U | **13** J | **13** J |
| Total cPAH TEQ | ND | ND | **15.5** J | **13.2** J | **3** J | **2** J | **16** J | ND | **2** J | ND | **1** J | **1** J |

# TABLE 23
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## SOUTH OF FORMER SLIP 5 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Northern Portion of 14-01 Building | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IT-BLDG1401-TRENCH-2N SU96A/SW32A 5/2/2011 | IT-BLDG1401-TRENCH-2S SU96B/SW32B 5/2/2011 | IT-BLDG1401-TRENCH-3N SV05A/SW32C 5/3/2011 | IT-BLDG1401-TRENCH-3S SV05B/SW32D 5/3/2011 | IT-BLDG1401-TRENCH-4N SW63A 5/12/2011 | IT-BLDG1401-TRENCH-4S (a) SW63B 5/12/2011 | IT-BLDG1401-TRENCH-5N (b) SW79A 5/13/2011 | IT-BLDG1401-TRENCH-5S SW79B 5/13/2011 | IT-Bldg1401-OuttakesExc-1 (3.5) SX84A 5/20/2011 | IT-Bldg1401-OuttakesExc-2 (3.7) SX84B 5/20/2011 | IT-Bldg1401-OuttakesExc-3 (2.9) SY11A 5/23/2011 | IT-Bldg1401-OuttakesExc-4 (3.05) SY11B 5/23/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | |
| Naphthalene | **5.4** | 4.6 U | **16** | **37** | **15** | **7.0** | **14** | 4.7 U | 5.0 U | 48 U | **8.4** | 4.8 U |
| 2-Methylnaphthalene | **5.8** | 4.6 U | **16** | **54** | **14** | **8.2** | 9.2 U | 4.7 U | 5.0 U | 48 U | **9.6** | 4.8 U |
| 1-Methylnaphthalene | **4.7** | 4.6 U | **9.0** | **33** | **12** | **7.3** | 9.2 U | 4.7 U | 5.0 U | 48 U | **8.0** | 4.8 U |
| Total Naphthalenes | **15.9** | 4.6 U | **41** | **124** | **41** | **22.5** | **14** | 4.7 U | 5.0 U | 48 U | **26** | 4.8 U |
| Acenaphthene | **2.8** J | 4.6 U | **9.8** | **26** | **8.3** | 4.6 U | 9.2 U | 4.7 U | 5.0 U | 48 U | 4.6 U | 4.8 U |
| Fluorene | 4.5 U | 4.6 U | **11** | **28** | **7.9** | 4.6 U | 9.2 U | 4.7 U | 5.0 U | 48 U | 4.6 U | 4.8 U |
| Phenanthrene | **18** | **5.9** | **40** | **74** | **40** | **19** | **30** | 4.7 U | **8.6** | 48 U | **10** | **9.0** |
| Anthracene | 4.5 U | 4.6 U | **4.4** J | **11** | **7.0** | 4.6 U | 9.2 U | 4.7 U | 5.0 U | 48 U | 4.6 U | 4.8 U |
| Fluoranthene | **8.9** | 4.6 U | **24** | **42** | **50** | **22** | **38** | 4.7 U | **7.4** | **32** J | **7.8** | **11** |
| Pyrene | **9.2** | **2.3** J | **23** | **55** | **42** | **22** | **49** | 4.7 U | **8.9** | **35** J | **8.2** | **9.4** |
| Benzo(a)anthracene | **3.2** J | 4.6 U | **8.7** | **15** | **16** | **9.9** | 9.2 U | 4.7 U | 5.0 U | 48 U | 4.6 U | 4.8 U |
| Chrysene | **5.6** | 4.6 U | **14** | **35** | **23** | **16** | **59** | 4.7 U | **7.9** | 48 U | **6.9** | **8.2** |
| Benzo(a)pyrene | 4.5 U | 4.6 U | **9.4** | **12** | 4.8 U | **12** | 9.2 U | 4.7 U | **5.0** | 48 U | 4.6 U | **6.0** |
| Indeno(1,2,3-cd)pyrene | 4.5 U | 4.6 U | **6.0** | **4.8** | **11** | **8.9** | **13** | 4.7 U | 5.0 U | 48 U | 4.6 U | **6.4** |
| Dibenz(a,h)anthracene | 4.5 U | 4.6 U | 4.7 U | 4.6 U | **5.3** | 4.6 U | 9.2 U | 4.7 U | 5.0 U | 48 U | 4.6 U | 4.8 U |
| Benzo(g,h,i)perylene | 4.5 U | 4.6 U | **11** | **8.9** | **15** | **12** | **31** | 4.7 U | 5.0 U | **30** J | **5.1** | **7.8** |
| Dibenzofuran | **5.5** | 4.6 U | **22** | **41** | **12** | **5.9** | 9.2 U | 4.7 U | 5.0 U | 48 U | 4.6 U | 4.8 U |
| Total Benzofluoranthenes | 4.5 U | 4.6 U | **16** | **24** | **32** | **24** | **58** | 4.7 U | **8.4** | 48 U | **5.9** | **14** |
| Total cPAH TEQ | **0.376** | ND | **12.61** | **16.73** | **6.66** | **16.44** | **7.69** | ND | **5.919** | ND | **0.66** | **8.12** |
| **PCBs (µg/kg)** | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | |
| Aroclor 1254 | 32 U | 31 U | **11** J | 32 U | 33 U | 31 U | 32 U | 32 U | 31 U | 33 U | 32 U | 32 U |
| Aroclor 1260 | 32 U | 31 U | **7.4** J | 32 U | 33 U | 31 U | **25** J | 32 U | 31 U | 33 U | 32 U | 32 U |
| Total PCBs | ND | ND | **18.4** J | ND | ND | ND | **25** J | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | |
| Diesel-Range Organics | 5.0 U | 5.0 U | **10** | **100** | **9.0** | **6.5** | **17** | 5.1 U | 5.4 U | **23** | **5.6** | **5.6** |
| Oil-Range Organics | **5.1** J | 10 U | **59** | **200** | **21** | **32** | **170** | 10 U | **11** | **300** | **15** | **16** |
| **NWTPH-G** | | | | | | | | | | | | |
| Gasoline-Range Organics | 5.9 U | 6.3 U | 6.7 U | 6.8 U | **12** | 7.7 U | 8.0 U | 6.2 U | 5.7 U | 6.1 U | 7.9 U | 5.8 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | |
| Barium | **32.4** | **39.8** | **36.5** | **62.5** | **40.4** | **47.9** | **43.4** | **19.5** | **47.4** | **52.5** | **40.0** | **47.6** |
| Beryllium | 0.2 U | 0.2 U | 0.2 U | **0.2** | 0.2 U | **0.2** | 0.2 U | 0.2 U | 0.2 U | 0.2 U | **0.2** | 0.2 U |
| Cadmium | **0.1** | **0.10** | 0.1 U | 0.1 U | 0.1 U | 0.1 U | **0.3** | 0.1 U | **0.1** | 0.1 U | 0.1 U | 0.1 U |
| Chromium | **13.5** | **10.3** | **12.3** | **16.5** | **12.1** | **15.0** | **12.1** | **6.8** | **16.8** | **11.5** | **13.7** | **16.5** |
| Copper | **13.9** | **10.6** | **20.6** | **24.4** | **22.8** | **19.6** | **23.6** | **8.4** | **16.5** | **30.8** | **15.8** | **17.9** |
| Lead | **2.5** | **2.59** | **5.4** | **5.6** | **3.5** | **6.4** | **11.6** | **1.3** | **4.7** | **8.4** | **5.2** | **8.4** |
| Mercury | 0.02 U | 0.02 U | **0.09** | **0.04** | **0.02** | **0.03** | **0.03** | 0.02 U | **0.04** | 0.02 U | 0.02 U | **0.07** |
| Nickel | **12.5** | **11.2** | **14.1** | **13.8** | **10.0** | **16.9** | **11.9** | **6.6** | **22.7** | **14.1** | **19.3** | **24.8** |
| Zinc | **32** | **31** | **35** | **34** | **29** | **35** | **36** | **21** | **37** | **46** | **31** | **34** |

**TABLE 23**
**SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS**
**SOUTH OF FORMER SLIP 5 AREA**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

PCBs = polychlorinated biphenyls
cPAH = carcinogenic polycyclic aromatic hydrocarbon
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
ND = Not Detected.
Bold = Exceedance
Box = Exceeds Preliminary Cleanup Level.

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
UJ2 = The analyted was not detected in the sample at or above the numerical value shown; the numerical value is below the reporting limit, but greater than the detection limit.

(a) The area limits for internal standards perylene-dl2 and di-n-octylphthalate were above the control limits for the original SVOC analysis of sample IT-Bldg1401-Trench-4S-110512. The sample was reanalyzed at a dilution with all internal standards in control. The original analysis results are reported.
(b) The area limit for laboratory internal standard perylene-dl2 was above the control limit for the original SVOC analysis of sample ITBldg1401-Trench5N-110513. The sample was reanalyzed at a dilution with all internal standards in control. The original analysis results are reported.

# TABLE 24
## ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS IN RI STORMWATER SAMPLES
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Outfall A (North) | | | | | | Outfall B (South) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | IT-MH32 UM55B/UM58B 03/14/2012 | | | IT-MH32 UR13A/UR28A 4/20/2012 | | | IT-MH80 UM55A/UM58A 03/14/2012 | | | IT-MH80 UR13B/UR28B 4/20/2012 | | |
| | | Result | Reporting Limit | Detection Limit | Result | Reporting Limit | Detection Limit | Result | Reporting Limit | Detection Limit | Result | Reporting Limit | Detection Limit |
| **VOLATILES (µg/L)** | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | |
| Acetone | 110,000 | 5.0 U | 5.0 | 2.1 | **5.5** | 5.0 | 2.1 | 5.0 U | 5.0 | 2.1 | **5.6** | 5.0 | 2.1 |
| 2-Butanone | 73,000 | 5.0 U | 5.0 | 0.81 | 5.0 U | 5.0 | 0.81 | 5.0 U | 5.0 | 0.81 | **2.8** J1 | 5.0 | 0.81 |
| Toluene | 1300 | 0.2 U | 0.2 | 0.04 | **7.5** | 0.2 | 0.04 | **24** | 0.2 | 0.04 | **16** | 0.2 | 0.04 |
| **SVOCs (µg/L)** | | | | | | | | | | | | | |
| 2-Methylphenol | 3100 | 1.0 U | 1.0 | 0.53 | 1.0 U | 1.0 | 0.53 | **0.7** J1 | 1.0 | 0.53 | **0.6** J1 | 1.0 | 0.53 |
| bis(2-Ethylhexyl)phthalate | 1.2 | **7.8** | 1.0 | 1.9 | **1.2** | 1.0 | 1.9 | **1.5** | 1.0 | 1.9 | 1.0 U | 1.0 | 1.9 |
| **cPAHs (µg/L)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Chrysene | 0.018 | **0.0083** J1 | 0.010 | 0.0046 | **0.0052** J1 | 0.010 | 0.0046 | **0.0059** J1 | 0.010 | 0.0046 | 0.010 U | 0.010 | 0.0046 |
| **TOTAL METALS** | | | | | | | | | | | | | |
| **Methods 200.8/SW7196A (µg/L)** | | | | | | | | | | | | | |
| Antimony | --- (a) | **1.1** | 0.2 | 0.010 | **0.3** | 0.2 | 0.010 | **0.8** | 0.2 | 0.010 | **0.2** | 0.2 | 0.010 |
| Arsenic | --- (a) | **0.3** | 0.2 | 0.048 | **0.4** | 0.2 | 0.048 | **0.4** | 0.2 | 0.048 | 0.2 U | 0.2 | 0.048 |
| Barium | --- (a) | **2.4** | 0.5 | 0.020 | **4.2** | 0.5 | 0.020 | **3.1** | 0.5 | 0.020 | **2.9** | 0.5 | 0.020 |
| Cadmium | --- (a) | **0.3** | 0.1 | 0.010 | 0.1 U | 0.1 | 0.010 | **0.1** | 0.1 | 0.010 | 0.1 U | 0.1 | 0.010 |
| Chromium | --- (a) | **1.0** | 0.5 | 0.045 | **0.7** | 0.5 | 0.045 | 0.5 U | 0.5 | 0.045 | 0.5 U | 0.5 | 0.045 |
| Copper | --- (a) | **2.3** | 0.5 | 0.158 | **7.5** | 0.5 | 0.158 | **3.0** | 0.5 | 0.158 | **1.8** | 0.5 | 0.158 |
| Lead | --- (a) | **2.1** | 0.1 | 0.046 | **0.7** | 0.1 | 0.046 | **1.3** | 0.1 | 0.046 | **0.4** | 0.1 | 0.046 |
| Nickel | --- (a) | **0.5** | 0.5 | 0.079 | 0.5 U | 0.5 | 0.079 | **1.4** | 0.5 | 0.079 | 0.5 U | 0.5 | 0.079 |
| Zinc | --- (a) | **81** | 4 | 0.50 | **75** | 4 | 0.50 | **26** | 4 | 0.50 | **26** | 4 | 0.50 |
| **CONVENTIONALS (mg/L)** | | | | | | | | | | | | | |
| Total Dissolved Solids (Method 160.1/SM2540C) | --- (a) | **6.0** | 5.0 | 5.00 | **13** | 5.0 | 5.00 | **14.5** | 5.0 | 5.00 | 5.0 U | 5.0 | 5.00 |
| Total Suspended Solids (Method 160.2/SM2540D) | --- (a) | **5.4** | 1.0 | 1.00 | **2.4** | 1.0 | 1.00 | **2.3** | 1.0 | 1.00 | 1.1 U | 1.1 | 1.06 |

mg/L = milligrams per liter
µg/L = micrograms per liter
SVOCs = semivolatile organic compounds
cPAHs = carcinogenic polycyclic aromatic hydrocarbons
SIM = Selected Ion Monitoring
U = Indicates the compound was undetected at the reported concentration.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
Bold = Detected compound.
Box = Exceedance of preliminary screening level.

(a) Preliminary cleanup levels apply to the dissolved fraction, not total fraction, and are presented here for information only.

# TABLE 25
# 2011 STORM DRAIN SOLIDS ANALYTICAL DATA
# BOEING ISAACSON-THOMPSON SITE
# TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) SCO/LAET (b) | CSL/2LAET (c) | IT-CB8 TL74D 09/09/2011 | IT-CB10 TL84F 09/12/2011 | IT-CB11 TL84E 09/12/2011 | IT-CB12 TL84D 09/12/2011 | IT-CB13B/14 TL53K 09/08/2011 | IT-CB17 TL74F 09/09/2011 | IT-CB20 TL74C 09/09/2011 | IT-CB24 TL74G 09/09/2011 | IT-CB25 TL74H 09/09/2011 | IT-CB26 TL74I 09/09/2011 | IT-CB27 TL74E 09/09/2011 | IT-CB28 TO80A 9/28/2011 | IT-CB29 TL29B 09/07/2011 | IT-CB30 TL29C 09/07/2011 | IT-CB34 TL84A 09/12/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | | | | |
| **EPA200.8/SW7471A** | | | | | | | | | | | | | | | | | |
| Arsenic | 7 (h) | | 14.1 | 33.9 | 17.2 | 32.4 | 9.6 | 7.9 | 9.0 | 13.1 | 11.7 | 14.1 | 10.8 | 19.3 | 58.0 | 18.3 | 5.7 |
| Cadmium | 5.1 | 6.7 | 1.9 | 0.8 | 1.3 | 2.5 | 1.6 | 2.7 | 4.3 | 25.2 | 13.8 | 17.3 | 15.5 | 23.7 | 38.1 | 9.0 | 2.1 |
| Chromium | 260 | 270 | 142 | 92.3 | 152 | 373 | 66.3 | 49.5 | 79.6 | 116 | 97.1 | 106 | 61.9 | 200 | 492 | 388 | 59 |
| Copper | 390 | 390 | 78.0 | 73.8 | 108 | 251 | 67.7 | 53.4 | 80.2 | 168 | 114 | 124 | 78.00 | 202 | 606 | 258 | 30.5 |
| Lead | 450 | 530 | 148 | 59.8 | 201 | 437 | 178 | 75.6 | 158 | 108 | 98.9 | 96.8 | 55.1 | 147 | 568 | 246 | 13.2 |
| Mercury | 0.41 | 0.59 | 0.63 | 0.07 | 0.11 | 0.15 | 0.31 | 0.04 | 0.07 | 0.11 | 0.18 | 0.12 | 0.12 | 1.57 | 0.72 | 0.23 | 0.03 U |
| Silver | 6.1 | 6.1 | 0.3 | 0.2 | 0.2 | 0.5 | 0.3 U | 0.3 U | 0.2 | 1.0 | 1.1 | 0.5 | 0.3 | 0.7 | 1.9 | 1.1 | 0.2 U |
| Zinc | 410 | 960 | 880 | 278 | 640 | 1100 | 620 | 610 | 760 | 1120 | 1000 | 1530 | 1860 | 2390 | 6640 | 2240 | 132 |
| **PAHs (µg/kg-dry wt)** | | | | | | | | | | | | | | | | | |
| **SW8270DSIM** | | | | | | | | | | | | | | | | | |
| Naphthalene | 2100 | 2100 | 87 U | 220 | 90 | 190 | 160 J | NA | 59 U | 78 | 75 | 58 U | 14 | 61 | 760 J | 110 | 46 U |
| Acenaphthylene | 1300 | 1300 | 87 U | 140 U | 25 J | 58 | 230 U | NA | 59 U | 35 | 60 U | 58 U | 14 U | 24 | 440 J | 84 | 46 U |
| Acenaphthene | 500 | 500 | 87 U | 130 J | 110 | 140 | 120 J | NA | 59 U | 66 | 45 J | 39 J | 9.0 J | 34 | 750 J | 110 | 46 U |
| Fluorene | 540 | 540 | 87 U | 140 | 120 | 190 | 140 J | NA | 59 U | 80 | 50 J | 45 J | 13 J | 59 | 1100 J | 150 | 46 U |
| Phenanthrene | 1500 | 1500 | 260 | 940 | 2000 | 1500 | 1300 | NA | 370 | 800 | 570 | 440 | 190 | 780 | 9600 | 1900 | 46 U |
| Anthracene | 960 | 960 | 87 U | 120 J | 130 | 120 | 140 J | NA | 37 J | 69 | 73 | 41 J | 19 | 74 | 1300 J | 270 | 46 U |
| 2-Methylnaphthalene | 670 | 670 | 87 U | 100 J | 33 J | 170 | 230 U | NA | 32 J | 54 | 76 | 42 J | 12 J | 39 | 460 J | 59 | 46 U |
| LPAH (d,e) | 5200 | 5200 | 260 | 1550 | 2475 | 2198 | 1860 | NA | 407 | 1128 | 813 | 565 | 245 | 1032 | 13950 J | 2624 | 46 U |
| Fluoranthene | 1700 | 2500 | 350 | 1200 | 2800 | 1900 | 1300 | NA | 700 | 1200 | 880 | 660 | 370 | 1200 | 15000 | 3000 | 29 J |
| Pyrene | 2600 | 3300 | 300 | 1200 | 2000 | 1300 | 1100 | NA | 580 | 880 | 740 | 480 | 290 | 900 | 12000 | 2600 | 26 J |
| Benzo(a)anthracene | 1300 | 1600 | 130 | 380 | 730 | 430 | 470 | NA | 220 | 310 | 290 | 170 | 120 | 350 | 3900 | 1000 | 46 U |
| Chrysene | 1400 | 2800 | 300 | 740 | 1200 | 1100 | 860 | NA | 480 | 560 | 600 | 350 | 210 | 630 | 8400 | 3400 | 100 |
| Total Benzofluoranthenes (d, f) | 3200 | 3600 | 320 | 780 | 1700 | 1400 | 810 | NA | 550 | 780 | 650 | 500 | 300 | 780 | 12000 | 4200 | 46 U |
| Benzo(a)pyrene | 1600 | 1600 | 120 | 340 | 800 | 550 | 420 | NA | 230 | 340 | 280 | 200 | 140 | 370 | 4800 | 1000 | 46 U |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | 69 J | 300 | 550 | 460 | 320 | NA | 120 | 200 | 200 | 110 | 72 | 260 | 3700 | 970 | 46 U |
| Dibenz(a,h)anthracene | 230 | 230 | 87 U | 77 J | 140 | 120 | 230 U | NA | 69 | 51 | 39 J | 58 U | 20 | 84 | 1100 J | 250 | 46 U |
| Benzo(g,h,i)perylene | 670 | 720 | 140 | 480 | 640 | 560 | 430 | NA | 220 | 260 | 280 | 160 | 99 | 300 | 3900 | 950 | 67 |
| HPAH (d, g) | 12000 | 17000 | 1729 | 5497 | 10560 | 7820 | 5710 | NA | 3169 | 4581 | 3959 | 2630 | 1621 | 4874 | 64800 | 17370 | 222 |
| Total cPAH TEQ | 150 (h) | -- | 174.9 | 501.1 | 1124 | 802 | 588.6 | NA | 330.7 | 479.7 | 403.9 | 281.5 | 193.3 | 523.7 | 6954 | 1676 | 1 |
| **SVOCs (µg/kg-dry wt)** | | | | | | | | | | | | | | | | | |
| **SW8270D** | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 35 | 50 | 110 U | 280 U | 280 U | 220 U | 470 U | NA | 94 U | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 94 U |
| 1,4-Dichlorobenzene | 110 | 110 | 110 U | 280 U | 280 U | 220 U | 470 U | NA | 94 U | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 94 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 110 U | 280 U | 280 U | 220 U | 470 U | NA | 94 U | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 94 U |
| Hexachlorobenzene | 22 | 70 | 110 U | 280 U | 280 U | 220 U | 470 U | NA | 94 U | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 94 U |
| Dimethylphthalate | 71 | 160 | 110 U | 280 U | 280 U | 220 U | 470 U | NA | 94 | 230 J | 160 J | 260 J | 160 | 290 | 1500 | 450 | 94 U |
| Diethylphthalate | 200 | 1200 | 280 U | 700 U | 710 U | 550 U | 1200 U | NA | 240 U | 710 U | 750 U | 730 U | 230 U | 580 U | 150 U | 150 U | 230 U |
| Di-n-Butylphthalate | 1400 | 5100 | 110 U | 280 U | 280 U | 430 | 470 U | NA | 410 | 360 | 510 | 600 | 380 | 800 | 610 | 110 | 94 U |
| Butylbenzylphthalate | 63 | 900 | 160 | 350 J | 280 U | 470 J | 470 U | NA | 450 | 3100 | 1500 | 1400 | 750 | 1100 | 2200 | 1100 | 94 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | 3300 | 720 | 880 | 3000 | 4700 | NA | 9800 | 6000 | 5000 | 11000 | 3700 | 3500 | 13000 | 2300 | 210 |
| Di-n-Octyl phthalate | 6200 | 6200 | 500 | 280 U | 280 U | 220 U | 470 U | NA | 3000 | 500 | 430 | 230 J | 54 J | 240 | 59 U | 59 U | 94 U |
| Dibenzofuran | 540 | 540 | 110 U | 350 | 1100 | 130 J | 470 U | NA | 94 U | 280 U | 300 U | 290 U | 90 U | 230 U | 320 | 130 | 94 U |
| Hexachlorobutadiene | 11 | 120 | 560 U | 1400 U | 1400 U | 1100 U | 2400 U | NA | 470 U | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 470 U |
| N-Nitrosodiphenylamine | 28 | 40 | 110 U | 280 U | 280 U | 220 U | 470 U | NA | 94 U | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 94 U |
| **SVOCs (µg/kg-dry wt)** | | | | | | | | | | | | | | | | | |
| **SW8270D** | | | | | | | | | | | | | | | | | |
| Phenol | 420 | 1200 | 62 | 280 U | 280 U | 300 | 470 U | NA | 120 | 280 U | 300 U | 190 J | 90 U | 170 J | 320 | 180 | 94 U |
| 2-Methylphenol | 63 | 63 | 110 U | 280 U | 280 U | 220 U | 470 U | NA | 94 U | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 94 U |
| 4-Methylphenol | 670 | 670 | 230 | 560 U | 570 U | 760 | 570 J | NA | 85 J | 260 J | 190 J | 320 J | 180 U | 990 | 500 | 140 | 190 U |
| 2,4-Dimethylphenol | 29 | 29 | 220 U | 560 U | 570 U | 440 U | 950 U | NA | 190 U | 570 U | 600 U | 580 U | 180 U | 460 U | 120 U | 120 U | 190 U |
| Pentachlorophenol | 360 | 690 | 1100 U | 2800 U | 2800 U | 2200 U | 4700 U | NA | 940 U | 2800 U | 3000 U | 2900 U | 900 U | 2300 U | 590 U | 590 U | 940 U |
| Benzyl Alcohol | 57 | 73 | 56 | 280 U | 280 U | 240 | 240 J | NA | 16000 | 840 | 520 | 550 | 110 | 310 | 150 | 130 | 94 U |
| Benzoic Acid | 650 | 650 | 2200 U | 5600 U | 5700 U | 1400 J | 9500 UJ | NA | 560 J | 5700 U | 6000 U | 5800 U | 1800 U | 4600 U | 770 J | 590 J | 1900 U |

# TABLE 25
## 2011 STORM DRAIN SOLIDS ANALYTICAL DATA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) SCO/LAET (b) | CSL/2LAET (c) | IT-CB8 TL74D 09/09/2011 | IT-CB10 TL84F 09/12/2011 | IT-CB11 TL84E 09/12/2011 | IT-CB12 TL84D 09/12/2011 | IT-CB13B/14 TL53K 09/08/2011 | IT-CB17 TL74F 09/09/2011 | IT-CB20 TL74C 09/09/2011 | IT-CB24 TL74G 09/09/2011 | IT-CB25 TL74H 09/09/2011 | IT-CB26 TL74I 09/09/2011 | IT-CB27 TL74E 09/09/2011 | IT-CB28 TO80A 9/28/2011 | IT-CB29 TL29B 09/07/2011 | IT-CB30 TL29C 09/07/2011 | IT-CB34 TL84A 09/12/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PCBs (µg/kg)** | | | | | | | | | | | | | | | | | |
| **SW8082** | | | | | | | | | | | | | | | | | |
| Aroclor 1016 | -- | -- | 18 U | 19 U | 18 U | 20 U | 39 U | 20 U | 19 U | 19 UJ | 19 U | 19 U | 20 U | 19 U | 19 U | 19 U | 19 U |
| Aroclor 1242 | -- | -- | 18 U | 19 U | 18 U | 20 U | 39 U | 20 U | 19 U | 19 UJ | 19 U | 19 U | 20 U | 19 U | 19 U | 19 U | 19 U |
| Aroclor 1248 | -- | -- | **49** | 56 U | 230 U | 250 U | **82** | **38** J | **50** | **28** J | 19 U | 19 U | **50** | **42** | 170 U | 75 U | 19 U |
| Aroclor 1254 | -- | -- | **120** | **150** | **600** | **720** | **170** | **89** J | **120** | **100** J | **44** | **43** | **170** | **90** | **480** | **180** | **12** J |
| Aroclor 1260 | -- | -- | **140** J | **140** P | **190** | **210** | **120** | **65** J | **120** J | **49** J | **64** J | **55** J | **68** J | **74** | **410** | **91** | **14** J |
| Aroclor 1221 | -- | -- | 18 U | 19 U | 18 U | 20 U | 39 U | 20 U | 19 U | 19 UJ | 19 U | 19 U | 20 U | 19 U | 19 U | 19 U | 19 U |
| Aroclor 1232 | -- | -- | 18 U | 19 U | 18 U | 20 U | 39 U | 20 U | 19 U | 19 UJ | 19 U | 19 U | 20 U | 19 U | 19 U | 19 U | 19 U |
| Total PCBs (d) | 2 (h) | | **309** J | **290** P | **790** | **930** | **372** | **192** J | **290** J | **177** J | **108** J | **98** J | **288** J | **206** | **890** | **271** | **26** J |
| **CONVENTIONALS** | -- | -- | | | | | | | | | | | | | | | |
| Total Organic Carbon (%) | | | **11.6** | **6.40** | **9.03** | **13.0** | **13.6** | **11.1** | **11.2** | **11.5** | **12.2** | **9.64** | **4.25** | **13.4** | **10.9** | **12.3** | **3.53** |

# TABLE 25
## 2011 STORM DRAIN SOLIDS ANALYTICAL DATA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) SCO/LAET (b) | Dry Weight Equivalent to SMS Criteria (a) CSL/2LAET (c) | IT-CB35 TL84B 09/12/2011 | IT-CB36 TL74B 09/09/2011 | IT-CB39/86/85 TL74A 09/09/2011 | IT-CB60/61 TL29G 09/07/2011 | IT-CB63 TL29F 09/07/2011 | IT-CB66/67 TL29I 09/07/2011 | IT-CB81/82 TL53B 09/08/2011 | IT-CB83 TL53D 09/08/2011 | IT-CB90/91 TL53C 09/08/2011 | IT-CB90B TL53J 09/08/2011 | IT-CBA TL29A 09/07/2011 | IT-CBB/62/68 TL29H 09/07/2011 | IT-CBC TL53G 09/08/2011 | IT-CBD TL53H 09/08/2011 | IT-CBE/77/77B TL53I 09/08/2011 | IT-CG72 TL53A 09/08/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | | | | | |
| **EPA200.8/SW7471A** | | | | | | | | | | | | | | | | | | |
| Arsenic | 7 (h) | | 15.2 J | 8.2 | 13.1 | 7.0 | 12.9 | 14.3 | 6.5 | 18.8 | 4.6 | 8.3 | 14.3 | 6.5 | 12.5 | 12.3 | 8.2 | 6.8 |
| Cadmium | 5.1 | 6.7 | 7.3 J | 2.1 | 13.0 | 3.0 | 5.7 | 11.7 | 6.6 | 14.7 | 4.8 | 1.3 | 17.1 | 7.2 | 117 | 154 J | 39.5 | 14.8 |
| Chromium | 260 | 270 | 207 J | 45.8 | 128 J | 107 | 165 | 128 | 61.2 | 152 | 37.7 | 77.9 | 90.5 | 100 | 170 | 158 J | 72.9 | 134 |
| Copper | 390 | 390 | 80.6 J | 50.2 | 110 | 156 | 207 | 242 | 74.4 | 233 | 99.0 | 80.1 | 117 | 76.9 | 224 | 190 | 84.4 | 208 |
| Lead | 450 | 530 | 50.1 J | 41.4 | 168 J | 261 | 393 | 299 | 51.3 | 175 | 31.1 | 125 | 119 | 370 | 308 | 245 | 96.4 | 292 |
| Mercury | 0.41 | 0.59 | 0.02 | 0.04 | 0.09 | 0.08 | 0.24 | 1.16 | 0.05 | 0.17 | 0.03 | 0.07 | 0.08 | 0.04 | 0.13 | 0.27 J | 0.17 | 0.15 |
| Silver | 6.1 | 6.1 | 0.3 U | 0.3 U | 0.5 | 0.8 | 1.3 | 2.9 | 0.3 U | 0.7 | 0.2 U | 0.3 U | 0.4 | 0.3 | 1.5 | 1.9 | 0.3 | 0.7 |
| Zinc | 410 | 960 | 384 J | 380 | 1050 | 1680 | 1240 | 2400 | 359 | 1460 | 265 | 2060 | 1370 | 960 | 2240 | 2090 | 860 | 1400 |
| **PAHs (µg/kg-dry wt)** | | | | | | | | | | | | | | | | | | |
| **SW8270DSIM** | | | | | | | | | | | | | | | | | | |
| Naphthalene | 2100 | 2100 | 47 U | 98 U | 230 | 67 | 92 | 170 | 34 | 62 | 19 J | 89 J | 51 | 49 | 100 | 190 J | 57 | 110 |
| Acenaphthylene | 1300 | 1300 | 47 U | 98 U | 140 U | 20 J | 26 J | 37 | 11 J | 22 J | 29 U | 140 U | 21 J | 28 U | 31 J | 180 J | 110 | 64 U |
| Acenaphthene | 500 | 500 | 47 U | 98 U | 85 J | 50 | 75 | 94 | 16 | 58 | 25 J | 78 J | 52 | 52 | 74 | 180 | 280 | 130 |
| Fluorene | 540 | 540 | 47 U | 98 U | 130 J | 65 | 120 | 110 | 31 | 40 | 43 | 92 J | 80 | 46 | 120 | 230 J | 290 | 190 |
| Phenanthrene | 1500 | 1500 | 140 | 180 | 1600 | 680 | 1300 | 1500 | 320 | 570 | 280 | 570 | 590 | 540 | 960 | 830 | 3200 | 1400 |
| Anthracene | 960 | 960 | 47 U | 98 U | 140 U | 86 | 110 | 150 | 28 | 72 | 36 | 140 U | 76 | 67 | 94 | 220 J | 360 | 170 |
| 2-Methylnaphthalene | 670 | 670 | 34 J | 98 U | 81 J | 38 | 64 | 120 | 33 | 43 | 17 J | 90 J | 43 | 33 | 88 | 180 | 40 | 78 |
| LPAH (d,e) | 5200 | 5200 | 140 | 180 | 2045 | 968 | 1723 | 2061 | 440 | 824 | 403 | 829 | 870 | 754 | 1379 | 1830 | 4297 | 2000 |
| Fluoranthene | 1700 | 2500 | 170 | 210 | 1900 | 1200 | 2100 | 2700 | 440 | 870 | 410 | 920 | 790 | 1000 | 1600 | 1200 | 5800 | 2000 |
| Pyrene | 2600 | 3300 | 170 | 240 | 1400 | 880 | 1600 | 2300 | 320 | 610 | 320 | 700 | 570 | 810 | 1200 | 890 | 4400 | 1400 |
| Benzo(a)anthracene | 1300 | 1600 | 40 J | 120 | 280 | 340 | 550 | 760 | 120 | 210 | 140 | 270 | 260 | 390 | 400 | 420 | 2200 | 560 |
| Chrysene | 1400 | 2800 | 250 | 330 | 910 | 650 | 1100 | 1600 | 240 | 520 | 220 | 650 | 460 | 720 | 820 | 700 | 2500 | 980 |
| Total Benzofluoranthenes (d, f) | 3200 | 3600 | 150 | 280 | 940 | 920 | 1500 | 2600 | 310 | 590 | 270 | 730 | 580 | 760 | 1100 | 960 | 4200 | 1200 |
| Benzo(a)pyrene | 1600 | 1600 | 75 | 140 | 410 | 400 | 620 | 1100 | 130 | 240 | 120 | 280 | 260 | 390 | 390 | 420 | 2200 | 530 |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | 56 | 98 U | 250 | 290 | 430 | 730 | 96 | 150 | 68 | 180 | 180 | 250 | 320 | 260 J | 970 | 320 |
| Dibenz(a,h)anthracene | 230 | 230 | 52 | 98 U | 140 J | 80 | 140 | 190 | 36 | 39 | 23 J | 110 J | 56 | 71 | 110 | 160 | 260 | 78 |
| Benzo(g,h,i)perylene | 670 | 720 | 120 | 130 | 420 | 370 | 530 | 840 | 140 | 160 | 89 | 340 | 310 | 300 | 500 | 290 | 900 | 340 |
| HPAH (d, g) | 12000 | 17000 | 1083 | 1450 | 6650 | 5130 | 8570 | 12820 | 1832 | 3389 | 1660 | 4180 | 3466 | 4691 | 6440 | 5300 | 23430 | 7408 |
| Total cPAH TEQ | 150 (h) | -- | 107.3 | 183.3 | 580.1 | 569.5 | 893 | 1544 | 188.6 | 344.1 | 172.3 | 415.5 | 372.2 | 544.3 | 591.2 | 607 | 2988 | 755.6 |
| **SVOCs (µg/kg-dry wt)** | | | | | | | | | | | | | | | | | | |
| **SW8270D** | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 35 | 50 | 180 U | 120 U | 180 U | 290 U | 300 U | 58 U | 290 U | 290 U | 78 U | 500 U | 56 U | 170 U | 290 U | 240 U | 170 U | 130 U |
| 1,4-Dichlorobenzene | 110 | 110 | 180 U | 120 U | 180 U | 290 U | 300 U | 58 U | 290 U | 290 U | 78 U | 500 U | 56 U | 170 U | 290 U | 240 U | 170 U | 130 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 180 U | 120 U | 180 U | 290 U | 300 U | 58 U | 290 U | 290 U | 78 U | 500 U | 56 U | 170 U | 290 U | 240 U | 170 U | 130 U |
| Hexachlorobenzene | 22 | 70 | 180 U | 120 U | 180 U | 290 U | 300 U | 58 U | 290 U | 290 U | 78 U | 500 U | 56 U | 170 U | 290 U | 240 U | 170 U | 130 U |
| Dimethylphthalate | 71 | 160 | 180 U | 120 U | 150 J | 610 | 300 U | 520 | 290 U | 320 | 39 J | 500 U | 260 | 170 U | 460 | 240 | 170 U | 170 |
| Diethylphthalate | 200 | 1200 | 460 U | 300 U | 460 U | 720 U | 740 U | 140 U | 730 U | 720 U | 200 U | 1300 U | 140 U | 420 U | 740 U | 590 U | 420 U | 340 U |
| Di-n-Butylphthalate | 1400 | 5100 | 180 U | 120 U | 290 | 1300 | 280 J | 740 | 15000 | 200 J | 320 | 500 U | 1100 | 180 | 1000 | 500 J | 190 | 500 |
| Butylbenzylphthalate | 63 | 900 | 310 J | 120 U | 670 | 7900 | 270 J | 340 | 1500 | 950 | 390 | 330 J | 980 | 160 J | 4000 | 1400 J | 530 | 400 |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | 3000 | 1200 | 4500 | 16000 | 6600 | 9000 | 1800 | 4500 | 4000 | 3800 | 12000 | 2800 | 23000 | 22000 J | 4600 | 10000 |
| Di-n-Octyl phthalate | 6200 | 6200 | 130 J | 120 U | 100 J | 2900 | 330 | 2300 | 570 | 290 U | 280 | 500 U | 190 | 900 | 3800 J | 2100 | 180 | 320 |
| Dibenzofuran | 540 | 540 | 180 U | 120 U | 830 | 290 U | 300 U | 78 | 290 U | 290 U | 78 U | 500 U | 28 J | 170 U | 290 U | 240 U | 170 U | 120 J |
| Hexachlorobutadiene | 11 | 120 | 910 U | 610 U | 920 U | 1400 U | 1500 U | 290 U | 1500 U | 1400 U | 390 U | 2500 U | 280 U | 840 U | 1500 U | 1200 U | 840 U | 670 U |
| N-Nitrosodiphenylamine | 28 | 40 | 180 U | 120 U | 180 U | 290 U | 300 U | 37 J | 290 U | 290 U | 78 U | 500 U | 56 U | 170 U | 290 U | 240 U | 170 U | 130 U |
| **SVOCs (µg/kg-dry wt)** | | | | | | | | | | | | | | | | | | |
| **SW8270D** | | | | | | | | | | | | | | | | | | |
| Phenol | 420 | 1200 | 120 J | 120 U | 200 | 290 U | 280 J | 470 | 290 U | 160 J | 82 | 250 J | 150 | 110 J | 440 | 220 J | 100 J | 270 |
| 2-Methylphenol | 63 | 63 | 180 U | 120 U | 180 U | 290 U | 300 U | 58 U | 290 U | 290 U | 78 U | 500 U | 56 U | 170 U | 290 U | 240 U | 170 U | 130 U |
| 4-Methylphenol | 670 | 670 | 410 | 67 J | 540 | 200 J | 330 J | 220 | 580 U | 580 U | 82 J | 3100 | 110 | 330 U | 190 J | 220 J | 110 J | 200 J |
| 2,4-Dimethylphenol | 29 | 29 | 360 U | 240 U | 370 U | 580 U | 590 U | 120 U | 580 U | 580 U | 160 U | 1000 U | 110 U | 330 U | 590 U | 470 U | 330 U | 270 U |
| Pentachlorophenol | 360 | 690 | 1800 U | 1200 U | 1800 U | 2900 U | 3000 U | 580 U | 2900 U | 1600 J | 780 U | 5000 U | 560 U | 1700 U | 2900 U | 2400 U | 1700 U | 1300 U |
| Benzyl Alcohol | 57 | 73 | 140 J | 120 U | 180 U | 6500 | 1000 | 790 | 290 U | 290 U | 78 U | 500 U | 210 | 280 | 2500 | 3500 | 1900 | 390 |
| Benzoic Acid | 650 | 650 | 1600 J | 2400 U | 1400 J | 5800 UJ | 5900 UJ | 1200 UJ | 5800 UJ | 5800 UJ | 1600 UJ | 10000 UJ | 330 J | 3300 UJ | 5900 UJ | 4700 UJ | 3300 UJ | 2700 UJ |

# TABLE 25
# 2011 STORM DRAIN SOLIDS ANALYTICAL DATA
# BOEING ISAACSON-THOMPSON SITE
# TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) SCO/LAET (b) | Dry Weight Equivalent to SMS Criteria (a) CSL/2LAET (c) | IT-CB35 TL84B 09/12/2011 | IT-CB36 TL74B 09/09/2011 | IT-CB39/86/85 TL74A 09/09/2011 | IT-CB60/61 TL29G 09/07/2011 | IT-CB63 TL29F 09/07/2011 | IT-CB66/67 TL29I 09/07/2011 | IT-CB81/82 TL53B 09/08/2011 | IT-CB83 TL53D 09/08/2011 | IT-CB90/91 TL53C 09/08/2011 | IT-CB90B TL53J 09/08/2011 | IT-CBA TL29A 09/07/2011 | IT-CBB/62/68 TL29H 09/07/2011 | IT-CBC TL53G 09/08/2011 | IT-CBD TL53H 09/08/2011 | IT-CBE/77/77B TL53I 09/08/2011 | IT-CG72 TL53A 09/08/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PCBs (µg/kg)** | | | | | | | | | | | | | | | | | | |
| **SW8082** | | | | | | | | | | | | | | | | | | |
| Aroclor 1016 | -- | -- | 19 U | 20 U | 92 U | 20 U | 20 U | 19 U | 19 U | 14 U | 20 U | 19 U | 20 U | 19 U | 20 U | 20 U | 19 U | 19 U |
| Aroclor 1242 | -- | -- | 19 U | 20 U | 92 U | 20 U | 20 U | 19 U | 19 U | 14 U | 20 U | 19 U | 20 U | 19 U | 20 U | 20 U | 19 U | 19 U |
| Aroclor 1248 | -- | -- | **23** | **22** | 92 U | 20 U | 36 U | **36** | 19 U | 56 U | 20 U | **40** | 58 U | **26** | 53 U | 40 U | 19 U | 91 U |
| Aroclor 1254 | -- | -- | **42** | **49** | **190** | **39** | **77** | **77** | **52** J | **180** J | **45** J | **100** | **160** | **68** | **100** J | **170** J | **44** | **300** J |
| Aroclor 1260 | -- | -- | **42** | **69** J | **180** J | **43** | **86** | **120** | **53** | **110** | **38** | **87** | **92** | **54** | **140** | **140** P | **44** | **330** |
| Aroclor 1221 | -- | -- | 19 U | 20 U | 92 U | 20 U | 20 U | 19 U | 19 U | 14 U | 20 U | 19 U | 20 U | 19 U | 20 U | 20 U | 19 U | 19 U |
| Aroclor 1232 | -- | -- | 19 U | 20 U | 92 U | 20 U | 20 U | 19 U | 19 U | 14 U | 20 U | 19 U | 20 U | 19 U | 20 U | 20 U | 19 U | 19 U |
| Total PCBs (d) | 2 (h) | | **107** | **140** J | **370** J | **82** | **163** | **233** | **105** J | **290** J | **83** J | **227** | **252** | **148** | **240** J | **310** JP | **88** | **630** J |
| | | | | | | | | | | | | | | | | | | |
| **CONVENTIONALS** | -- | -- | | | | | | | | | | | | | | | | |
| Total Organic Carbon (%) | | | **5.03** | **12.2** | **16.3** | **9.26** | **13.0** | **21.6** | **8.95** | **11.3** | **5.48** | **12.5** | **7.91** | **5.95** | **20.9** | **11.4** | **6.45** | **16.3** |

# TABLE 25
## 2011 STORM DRAIN SOLIDS ANALYTICAL DATA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | IT-CG74 | IT-OWS23 | IT-OWS79 | IT-VTVE | IT-VTVW |
|---|---|---|---|---|---|---|---|
| | SCO/LAET (b) | CSL/2LAET (c) | TL29D 09/07/2011 | TL53L 09/08/2011 | TL53E 09/08/2011 | TL84C 09/12/2011 | TL29E 09/07/2011 |
| **TOTAL METALS (mg/kg)** | | | | | | | |
| **EPA200.8/SW7471A** | | | | | | | |
| Arsenic | 7 (h) | | 9.6 | 18.4 | 20.0 | 38.8 | 38.3 |
| Cadmium | 5.1 | 6.7 | 18.4 | 7.2 | 38.8 | 2.4 | 23.7 |
| Chromium | 260 | 270 | 198 | 284 | 200 | 290 | 821 |
| Copper | 390 | 390 | 218 | 312 | 315 | 245 | 205 |
| Lead | 450 | 530 | 377 | 268 | 296 | 378 | 182 |
| Mercury | 0.41 | 0.59 | 0.20 | 0.22 | 0.35 | 0.19 | 0.16 |
| Silver | 6.1 | 6.1 | 0.8 | 0.6 | 1.4 | 0.6 | 0.6 |
| Zinc | 410 | 960 | 1650 | 3390 | 3490 | 990 | 830 |
| **PAHs (µg/kg-dry wt)** | | | | | | | |
| **SW8270DSIM** | | | | | | | |
| Naphthalene | 2100 | 2100 | 270 | 220 | 300 | 180 | 140 |
| Acenaphthylene | 1300 | 1300 | 50 J | 200 U | 44 J | 94 | 40 J |
| Acenaphthene | 500 | 500 | 280 | 140 J | 480 | 220 | 110 |
| Fluorene | 540 | 540 | 370 | 190 J | 560 | 150 | 140 |
| Phenanthrene | 1500 | 1500 | 2500 | 1400 | 3600 | 1400 | 780 |
| Anthracene | 960 | 960 | 410 | 160 J | 670 | 120 | 83 |
| 2-Methylnaphthalene | 670 | 670 | 120 | 130 J | 200 | 230 | 160 |
| LPAH (d,e) | 5200 | 5200 | 3880 | 2110 | 5654 | 2164 | 1293 |
| Fluoranthene | 1700 | 2500 | 2800 | 2100 | 4500 | 2100 | 890 |
| Pyrene | 2600 | 3300 | 2100 | 1600 | 3500 | 1600 | 660 |
| Benzo(a)anthracene | 1300 | 1600 | 890 | 590 | 1500 | 540 | 250 |
| Chrysene | 1400 | 2800 | 1200 | 1500 | 1900 | 1400 | 670 |
| Total Benzofluoranthenes (d, f) | 3200 | 3600 | 1600 | 1600 | 2600 | 1600 | 590 |
| Benzo(a)pyrene | 1600 | 1600 | 780 | 600 | 1200 | 660 | 260 |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | 440 | 450 | 530 | 560 | 190 |
| Dibenz(a,h)anthracene | 230 | 230 | 160 | 130 J | 170 | 140 | 58 J |
| Benzo(g,h,i)perylene | 670 | 720 | 600 | 760 | 610 | 760 | 280 |
| HPAH (d, g) | 12000 | 17000 | 10570 | 9330 | 16510 | 9360 | 3848 |
| Total cPAH TEQ | 150 (h) | -- | 1101 | 892 | 1699 | 958 | 375.5 |
| **SVOCs (µg/kg-dry wt)** | | | | | | | |
| **SW8270D** | | | | | | | |
| 1,2-Dichlorobenzene | 35 | 50 | 300 U | 500 U | 360 U | 240 U | 410 U |
| 1,4-Dichlorobenzene | 110 | 110 | 300 U | 500 U | 360 U | 240 U | 410 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 300 U | 500 U | 360 U | 240 U | 410 U |
| Hexachlorobenzene | 22 | 70 | 300 U | 500 U | 360 U | 240 U | 410 U |
| Dimethylphthalate | 71 | 160 | 300 U | 500 U | 320 J | 240 U | 410 U |
| Diethylphthalate | 200 | 1200 | 760 U | 1200 U | 890 U | 590 U | 1000 U |
| Di-n-Butylphthalate | 1400 | 5100 | 460 | 350 J | 600 | 240 U | 430 |
| Butylbenzylphthalate | 63 | 900 | 350 | 900 | 1400 | 370 J | 370 J |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | 4100 | 15000 | 22000 | 3300 | 4400 |
| Di-n-Octyl phthalate | 6200 | 6200 | 1000 | 2000 | 1800 | 130 J | 410 U |
| Dibenzofuran | 540 | 540 | 300 U | 500 U | 230 J | 240 U | 410 U |
| Hexachlorobutadiene | 11 | 120 | 1500 U | 2500 U | 1800 U | 1200 U | 2000 U |
| N-Nitrosodiphenylamine | 28 | 40 | 300 U | 500 U | 360 U | 240 U | 410 U |
| **SVOCs (µg/kg-dry wt)** | | | | | | | |
| **SW8270D** | | | | | | | |
| Phenol | 420 | 1200 | 210 J | 500 | 460 | 260 | 390 J |
| 2-Methylphenol | 63 | 63 | 300 U | 500 U | 360 U | 240 U | 410 U |
| 4-Methylphenol | 670 | 670 | 180 J | 11000 | 510 J | 590 | 370 J |
| 2,4-Dimethylphenol | 29 | 29 | 610 U | 1000 U | 710 U | 480 U | 820 U |
| Pentachlorophenol | 360 | 690 | 3000 U | 5000 U | 3600 U | 2400 U | 4100 U |
| Benzyl Alcohol | 57 | 73 | 860 | 7200 | 6500 | 210 J | 410 U |
| Benzoic Acid | 650 | 650 | 6100 UJ | 10000 UJ | 7100 UJ | 1200 J | 8200 UJ |

# TABLE 25
## 2011 STORM DRAIN SOLIDS ANALYTICAL DATA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) SCO/LAET (b) | CSL/2LAET (c) | IT-CG74 TL29D 09/07/2011 | IT-OWS23 TL53L 09/08/2011 | IT-OWS79 TL53E 09/08/2011 | IT-VTVE TL84C 09/12/2011 | IT-VTVW TL29E 09/07/2011 |
|---|---|---|---|---|---|---|---|
| **PCBs (µg/kg)** | | | | | | | |
| **SW8082** | | | | | | | |
| Aroclor 1016 | -- | -- | 19 U | 39 U | 19 U | 39 U | 19 U |
| Aroclor 1242 | -- | -- | 19 U | 39 U | 19 U | 39 U | 19 U |
| Aroclor 1248 | -- | -- | 140 U | **94** | 75 U | 190 U | 81 U |
| Aroclor 1254 | -- | -- | **280** | **210** | **180** J | **570** | **130** |
| Aroclor 1260 | -- | -- | **99** | **160** | **180** | **200** | **100** |
| Aroclor 1221 | -- | -- | 19 U | 39 U | 19 U | 39 U | 19 U |
| Aroclor 1232 | -- | -- | 19 U | 39 U | 19 U | 39 U | 19 U |
| Total PCBs (d) | 2 (h) | | 379 | 464 | 360 J | 770 | 230 |
| **CONVENTIONALS** | -- | -- | | | | | |
| Total Organic Carbon (%) | | | **16.4** | **21.5** | **14.1** | **12.0** | **10.5** |

mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
NA = Not Analyzed
HPAH = high molecular weight polycyclic aromatic hydrocarbons
LPAH = low molecular weight polycyclic aromatic hydrocarbons
PCBs - polychlorinated biphenyls
PAHs =polcyclic aromatic hydrocarbons
SVOCs = semivolatile organic compounds
EPA = U.S. Environmental Protection Agency
SIM= Selected Ion Monitoring
PRG = Preliminary Remediation Goal

SCO = Sediment Cleanup Objectives
CSL = Cleanup Screening Level
RPD = Relative Percent Difference
SMS = Sediment Management Standards

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

[Yellow box] Indicates concentration exceeds SCO but less than the CSL or the dry weight equivalent values [Lowest Apparent Effects Threshold (LAET) and 2LAET, respectively]
[Gray box] Indicates concentration exceeds the SCO and CSL or dry weight equivalent criteria or PRG.
Bold = Detected compound.

(a) Dry weight equivalent criteria are based on the Puget Sound Apparent Effects Threshold Values (Barrick et al. 1988)
(b) SMS Sediment Cleanup Objective /Lowest Apparent Effects Threshold
(c) SMS Cleanup Screening Level / Second Lowest Apparent Effects Threshold
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
(i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compound/isomers.
(ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.
(e) The LPAH criterion represents the sum of the following "low molecular weight polycyclic aromatic hydrocarbon" compounds: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene. The LPAH criterion is not the sum of the criteria values for the individual LPAH compounds listed.
(f) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(g) The HPAH criterion represents the sum of the following "high molecular weight polynuclear aromatic hydrocarbon" compounds: fluoranthene, pyrene, benzo(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene. The HPAH criterion is not the sum the criteria values for the individual HPAH compounds listed.
(h) Lower Duwamish Waterway PRG.

# TABLE 26
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 SOUTH AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | 2012 Source Material | |
|---|---|---|---|---|---|---|
| | | | IT-CG72 | IT-CG74 | IT-CG-72 | IT-CG-74 |
| | | | TL53A | TL29D | 6607158 | 6607157 |
| | | | TL53 | TL29 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/08/2011 | 09/07/2011 | 04/04/2012 | 04/04/2012 |
| **SEMIVOLATILES (µg/kg)** | | | | | | |
| **Method SW8270D** | | | | | | |
| Benzoic Acid | 650 | 650 | 2700 UJ | 6100 UJ | 58,000 U | 84,000 U |
| Benzyl Alcohol | 57 | 73 | **390** | **860** | **27,000** | 17,000 U |
| 4-Bromophenyl-phenylether | | | 130 U | 300 U | 5800 U | 8400 U |
| Butylbenzylphthalate | 63 | 900 | **400** | **350** | 23,000 U | 34,000 U |
| Di-n-Butylphthalate | 1400 | 5100 | **500** | **460** | 23,000 U | 34,000 U |
| Carbazole | | | **300** | **260** J1 | 5800 U | 8400 U |
| 4-Chloro-3-methylphenol | | | 670 U | 1500 U | 5800 U | 8400 U |
| 4-Chloroaniline | | | 1800 U | 4100 U | 5800 U | 8400 U |
| bis(2-Chloroethoxy) Methane | | | 130 U | 300 U | 5800 U | 8400 U |
| Bis-(2-Chloroethyl) Ether | | | 130 U | 300 U | 5800 U | 8400 U |
| 2-Chloronaphthalene | | | 130 U | 300 U | 2400 U | 3500 U |
| 2-Chlorophenol | | | 130 U | 300 U | 5800 U | 8400 U |
| 4-Chlorophenyl-phenylether | | | 130 UJ | 300 UJ | 5800 U | 8400 U |
| 2,2'-Oxybis(1-Chloropropane) | | | 130 U | 300 U | 5800 U | 8400 U |
| 1,2-Dichlorobenzene | 35 | 50 | 130 U | 300 U | 5800 U | 8400 U |
| 1,3-Dichlorobenzene | | | 130 U | 300 U | 5800 U | 8400 U |
| 1,4-Dichlorobenzene | 110 | 110 | 130 U | 300 U | 5800 U | 8400 U |
| 3,3'-Dichlorobenzidine | | | 1000 U | 2300 U | 35,000 U | 51,000 U |
| 2,4-Dichlorophenol | | | 1300 U | 3000 U | 5800 U | 8400 U |
| Diethylphthalate | 200 | 1200 | 340 U | 760 U | 23,000 U | 34,000 U |
| 2,4-Dimethylphenol | 29 | 29 | 270 U | 610 U | 3500 U | 5100 U |
| Dimethylphthalate | 71 | 160 | **170** | 300 U | 23,000 U | 34,000 U |
| 4,6-Dinitro-2-Methylphenol | | | 1300 U | 3000 U | 58,000 U | 84,000 U |
| 2,4-Dinitrophenol | | | 5700 U | 13000 U | 100,000 U | 150,000 U |
| 2,4-Dinitrotoluene | | | 670 U | 1500 U | 23,000 U | 34,000 U |
| 2,6-Dinitrotoluene | | | 670 U | 1500 U | 5800 U | 8400 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | **10000** | **4100** | **75,000** | **41,000** J1 |
| Hexachlorobenzene | 22 | 70 | 130 U | 300 U | 1200 U | 1700 U |
| Hexachlorobutadiene | 11 | 120 | 670 U | 1500 U | 3500 U | 5100 U |
| Hexachlorocyclopentadiene | | | 2700 U | 6100 U | 58,000 U | 84,000 U |
| Hexachloroethane | | | 130 U | 300 U | 12,000 U | 17,000 U |
| Isophorone | | | 130 U | 300 U | 5800 U | 8400 U |
| 1-Methylnaphthalene | | | 130 U | 300 U | 1200 U | 1700 U |
| 2-Methylphenol | 63 | 63 | 130 U | 300 U | 3500 U | 5100 U |
| 4-Methylphenol | 670 | 670 | **200** J1 | **180** J1 | **6400** J1 | **9200** J1 |
| 2-Nitroaniline | | | 670 U | 1500 U | 5800 U | 8400 U |
| 3-Nitroaniline | | | 670 U | 1500 U | 23,000 U | 34,000 U |
| 4-Nitroaniline | | | 670 U | 1500 U | 23,000 U | 34,000 U |
| Nitrobenzene | | | 130 U | 300 U | 5800 U | 8400 U |
| 2-Nitrophenol | | | 670 U | 1500 U | 5800 U | 8400 U |
| 4-Nitrophenol | | | 670 U | 1500 U | 58,000 U | 84,000 U |
| N-Nitroso-Di-N-Propylamine | | | 130 U | 300 U | 5800 U | 8400 U |
| N-Nitrosodiphenylamine | 28 | 40 | 130 U | 300 U | 3500 U | 5100 U |
| Di-n-Octyl phthalate | 6200 | 6200 | **320** | **1000** | 23,000 U | 34,000 U |
| Pentachlorophenol | 360 | 690 | 1300 U | 3000 U | 12,000 U | 17,000 U |
| Phenol | 420 | 1200 | **270** | **210** J1 | 5800 U | 8400 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 130 U | 300 U | 5800 U | 8400 U |
| 2,4,5-Trichlorophenol | | | 670 U | 1500 U | 5800 U | 8400 U |
| 2,4,6-Trichlorophenol | | | 670 U | 1500 U | 5800 U | 8400 U |
| **PAHs (µg/kg)** | | | | | | |
| **Method SW8270D-SIM** | | | | | | |
| Acenaphthene | 500 | 500 | **130** | **280** | **880** J | **770** |
| Acenaphthylene | 1300 | 1300 | 64 U | **50** J1 | **96** J, J1 | **150** J1 |
| Anthracene | 960 | 960 | **170** | **410** | **1300** J | **1500** |
| Benzo(a)anthracene | 1300 | 1600 | **560** | **890** | **3200** J | **5500** |
| Benzo(a)pyrene | 1600 | 1600 | **530** | **780** | **3000** J | **5200** |
| Benzo(b)fluoranthene | | | NA | NA | **5000** J | **9200** |
| Benzo(g,h,i)perylene | 670 | 720 | **340** | **600** | **1700** | **2300** |
| Benzo(k)fluoranthene | | | NA | NA | **1800** | **4200** |
| Total Benzofluoranthenes (d, e) | 3200 | 3600 | **1200** | **1600** | NA | NA |
| Chrysene | 1400 | 2800 | **980** | **1200** | **4000** J | **7000** |
| Dibenz(a,h)anthracene | 230 | 230 | **78** | **160** | **330** | **690** |

# TABLE 26
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 SOUTH AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | 2012 Source Material | |
|---|---|---|---|---|---|---|
| | | | IT-CG72 | IT-CG74 | IT-CG-72 | IT-CG-74 |
| | | | TL53A | TL29D | 6607158 | 6607157 |
| | | | TL53 | TL29 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/08/2011 | 09/07/2011 | 04/04/2012 | 04/04/2012 |
| Dibenzofuran | | | **110** | **200** | **530** | **530** J1 |
| Fluoranthene | 1700 | 2500 | **2000** | **2800** | **9100** | **16,000** |
| Fluorene | 540 | 540 | **190** | **370** | **860** J | **830** |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | **320** | **440** | **1400** | **2300** |
| 2-Methylnaphthalene | 670 | 670 | **78** | **120** | **280** J | **260** J1 |
| Naphthalene | 2100 | 2100 | **110** | **270** | **450** J | **550** J1 |
| Total Naphthalenes | | | **188** | **390** | **730** J | **810** J |
| Phenanthrene | 1500 | 1500 | **1400** | **2500** | **7300** J | **8600** |
| Pyrene | 2600 | 3300 | **1400** | **2100** | **7100** J | **10,000** |
| cPAH TEQ | 150 (f) | | **756** | **1101** | **4213** J | **7459** |
| **PCBs (µg/kg)** | | | | | | |
| **Method SW8082** | | | | | | |
| Aroclor 1016 | | | 19 U | 19 U | 18 U | 24 U |
| Aroclor 1221 | | | 19 U | 19 U | 22 U | 31 U |
| Aroclor 1232 | | | 19 U | 19 U | 39 U | 54 U |
| Aroclor 1242 | | | 19 U | 19 U | 16 U | 22 U |
| Aroclor 1248 | | | 91 U | 140 U | 16 U | 22 U |
| Aroclor 1254 | | | **300** J | **280** | **250** J | **260** J |
| Aroclor 1260 | | | **330** | **99** | **150** J | **190** J |
| Total PCBs (d) | 2 (f) | | **630** J | **379** | **400** J | **450** J |
| **TOTAL METALS (mg/kg)** | | | | | | |
| **Methods 6010B/6020** | | | | | | |
| Antimony | | | 0.4 U | **0.7** | **2.91** | **8.87** |
| Arsenic | 7 (f) | | **6.8** | **9.6** | **8.88** | **11.5** |
| Barium | | | **140** | **175** | **120** | **147** |
| Beryllium | | | **0.5** | 0.6 U | **0.152** J1 | **0.229** J1 |
| Cadmium | 5.1 | 6.7 | **14.8** | **18.4** | **4.59** | **8.61** |
| Chromium | 260 | 270 | **134** | **198** | **78.6** | **148** |
| Copper | 390 | 390 | **208** | **218** | **98.6** | **174** |
| Lead | 450 | 530 | **292** | **377** | **98.3** | **169** |
| Nickel | | | **64.9** | **101** | **41.8** | **75.8** |
| Selenium | | | 0.9 U | 1 U | 1.66 U | 2.22 U |
| Silver | 6.1 | 6.1 | **0.7** | **0.8** | **1.11** J1 | **1.84** |
| Zinc | 410 | 960 | **1400** | **1650** | **691** | **1150** |
| **Method SW7199** | | | | | | |
| Chromium VI | | | **1.09** | 1.08 U | **3.5** | **1.1** J1 |
| **Method SW7471A** | | | | | | |
| Mercury | 0.41 | 0.59 | **0.15** | **0.20** | **0.0866** J1 | **0.142** J1 |
| **DIOXIN/FURAN (pg/g)** | | | | | | |
| **EPA 1613B** | | | | | | |
| 1,2,3,4,6,7,8-HpCDD | | | NA | **874** | NA | NA |
| 1,2,3,4,6,7,8-HpCDF | | | NA | **265** | NA | NA |
| 1,2,3,4,7,8,9-HpCDF | | | NA | **20.7** | NA | NA |
| 1,2,3,4,7,8-HxCDD | | | NA | **25.5** | NA | NA |
| 1,2,3,4,7,8-HxCDF | | | NA | **24.6** | NA | NA |
| 1,2,3,6,7,8-HxCDD | | | NA | **44.6** | NA | NA |
| 1,2,3,6,7,8-HxCDF | | | NA | **19.2** | NA | NA |
| 1,2,3,7,8,9-HxCDD | | | NA | **39.8** | NA | NA |
| 1,2,3,7,8,9-HxCDF | | | NA | **7.39** | NA | NA |
| 1,2,3,7,8-PeCDD | | | NA | **19.2** | NA | NA |
| 1,2,3,7,8-PeCDF | | | NA | **7.90** | NA | NA |
| 2,3,4,6,7,8-HxCDF | | | NA | **22.1** | NA | NA |
| 2,3,4,7,8-PeCDF | | | NA | **11.5** | NA | NA |
| 2,3,7,8-TCDD | | | NA | 3.81 U | NA | NA |
| 2,3,7,8-TCDF | | | NA | **25.1** | NA | NA |
| OCDD | | | NA | **7210** | NA | NA |
| OCDF | | | NA | **750** | NA | NA |
| Total HpCDD | | | NA | **1680** | NA | NA |
| Total HpCDF | | | NA | **711** | NA | NA |
| Total HxCDD | | | NA | **402** | NA | NA |
| Total HxCDF | | | NA | **430** | NA | NA |
| Total PeCDD | | | NA | **112** | NA | NA |
| Total PeCDF | | | NA | **228** | NA | NA |

# TABLE 26
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 SOUTH AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | 2012 Source Material | |
|---|---|---|---|---|---|---|
| | | | IT-CG72 | IT-CG74 | IT-CG-72 | IT-CG-74 |
| | | | TL53A | TL29D | 6607158 | 6607157 |
| | | | TL53 | TL29 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/08/2011 | 09/07/2011 | 04/04/2012 | 04/04/2012 |
| Total TCDD | | | NA | **35.0** | NA | NA |
| Total TCDF | | | NA | **180** | NA | NA |
| D/F TEQ | 2000 (f) | | NA | **57.7** | NA | NA |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
pg/g = picogram per gram
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
NA = Not Analyzed
PRG = Preliminary Remediation Goal

SMS = Sediment Management Standards
CSL = Cleanup Screening Level
SCO = Sediment Cleanup Objective
LAET = Lowest Apparent Effects Threshold
TEQ = Toxic Equivalent Concentration

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

[yellow] Indicates concentration exceeds SCO, but is less than the CSL or the dry weight equivalent values (LAET and 2LAET, respectively)
[gray] Indicates concentration exceeds the SCO and CSL or dry weight equivalent criteria or PRG.

Bold = Detected compound.

(a) Dry weight equivalent criteria are based on the Puget Sound Apparent Effects Threshold Values (Barrick et al. 1988)
(b) SMS SCO/LAET
(c) SMS CSL/2LAET
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
   (i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compound/isomers.
   (ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.
(e) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(f) Lower Duwamish Waterway Preliminary Remediation Goal (PRG)

# TABLE 27
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 EAST AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | | 2012 Source Material |
|---|---|---|---|---|---|---|---|
| | | | IT-CB60/61 | IT-CB63 | IT-CB66/67 | IT-CBB/62/68 | IT-CB-66/67 |
| | | | TL29G | TL29F | TL29I | TL29H | 6607151 |
| | | | TL29 | TL29 | TL29 | TL29 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/07/2011 | 09/07/2011 | 09/07/2011 | 09/07/2011 | 04/03/2012 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | |
| **Method SW8270D** | | | | | | | |
| Benzoic Acid | 650 | 650 | 5800 UJ | 5900 UJ | 1200 UJ | 3300 UJ | 20,000 U |
| Benzyl Alcohol | 57 | 73 | **6500** | **1000** | **790** | **280** | 4000 U |
| 4-Bromophenyl-phenylether | | | 290 U | 300 U | 58 U | 170 U | 2000 U |
| Butylbenzylphthalate | 63 | 900 | **7900** | **270** J1 | **340** | **160** J1 | 8000 U |
| Di-n-Butylphthalate | 1400 | 5100 | **1300** | **280** J1 | **740** | **180** | 8000 U |
| Carbazole | | | **170** J1 | **240** J1 | **200** | 170 U | **6000** |
| 4-Chloro-3-methylphenol | | | 1400 U | 1500 U | 290 U | 840 U | 2000 U |
| 4-Chloroaniline | | | 3900 U | 4000 U | 780 U | 2300 U | 2000 U |
| bis(2-Chloroethoxy) Methane | | | 290 U | 300 U | 58 U | 170 U | 2000 U |
| Bis-(2-Chloroethyl) Ether | | | 290 U | 300 U | 58 U | 170 U | 2000 U |
| 2-Chloronaphthalene | | | 290 U | 300 U | 58 U | 170 U | 840 U |
| 2-Chlorophenol | | | 290 U | 300 U | 58 U | 170 U | 2000 U |
| 4-Chlorophenyl-phenylether | | | 290 UJ | 300 UJ | 58 UJ | 170 UJ | 2000 U |
| 2,2'-Oxybis(1-Chloropropane) | | | 290 U | 300 U | 58 U | 170 U | 2000 U |
| 1,2-Dichlorobenzene | 35 | 50 | 290 U | 300 U | 58 U | 170 U | 2000 U |
| 1,3-Dichlorobenzene | | | 290 U | 300 U | 58 U | 170 U | 2000 U |
| 1,4-Dichlorobenzene | 110 | 110 | 290 U | 300 U | 58 U | 170 U | 2000 U |
| 3,3'-Dichlorobenzidine | | | 2200 U | 2200 U | 430 U | 1200 U | 12,000 U |
| 2,4-Dichlorophenol | | | 2900 U | 3000 U | 580 U | 1700 U | 2000 U |
| Diethylphthalate | 200 | 1200 | 720 U | 740 U | 140 U | 420 U | 8000 U |
| 2,4-Dimethylphenol | 29 | 29 | 580 U | 590 U | 120 U | 330 U | 1200 U |
| Dimethylphthalate | 71 | 160 | **610** | 300 U | **520** | 170 U | 8000 U |
| 4,6-Dinitro-2-Methylphenol | | | 2900 U | 3000 U | 580 U | 1700 U | 20,000 U |
| 2,4-Dinitrophenol | | | 12000 U | 13000 U | 2400 U | 7100 U | 36,000 U |
| 2,4-Dinitrotoluene | | | 1400 U | 1500 U | 290 U | 840 U | 8000 U |
| 2,6-Dinitrotoluene | | | 1400 U | 1500 U | 290 U | 840 U | 2000 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | **16000** | **6600** | **9000** | **2800** | **71,000** |
| Hexachlorobenzene | 22 | 70 | 290 U | 300 U | 58 U | 170 U | 400 U |
| Hexachlorobutadiene | 11 | 120 | 1400 U | 1500 U | 290 U | 840 U | 1200 U |
| Hexachlorocyclopentadiene | | | 5800 U | 5900 U | 1200 U | 3300 U | 20,000 U |
| Hexachloroethane | | | 290 U | 300 U | 58 U | 170 U | 4000 U |
| Isophorone | | | 290 U | 300 U | **34** J1 | 170 U | 2000 U |
| 1-Methylnaphthalene | | | 290 U | 300 U | **37** J1 | 170 U | **1000** J1 |
| 2-Methylphenol | 63 | 63 | 290 U | 300 U | 58 U | 170 U | 1200 U |
| 4-Methylphenol | 670 | 670 | **200** J1 | **330** J1 | **220** | 330 U | **18,000** |
| 2-Nitroaniline | | | 1400 U | 1500 U | 290 U | 840 U | 2000 U |
| 3-Nitroaniline | | | 1400 U | 1500 U | 290 U | 840 U | 8000 U |
| 4-Nitroaniline | | | 1400 U | 1500 U | 290 U | 840 U | 8000 U |
| Nitrobenzene | | | 290 U | 300 U | 58 U | 170 U | 2000 U |
| 2-Nitrophenol | | | 1400 U | 1500 U | 290 U | 840 U | 2000 U |
| 4-Nitrophenol | | | 1400 U | 1500 U | 290 U | 840 U | 20,000 U |
| N-Nitroso-Di-N-Propylamine | | | 290 U | 300 U | 58 U | 170 U | 2000 U |
| N-Nitrosodiphenylamine | 28 | 40 | 290 U | 300 U | **37** J1 | 170 U | 1200 U |
| Di-n-Octyl phthalate | 6200 | 6200 | **2900** | **330** | **2300** | **900** | 8000 U |
| Pentachlorophenol | 360 | 690 | 2900 U | 3000 U | 580 U | 1700 U | 4000 U |
| Phenol | 420 | 1200 | 290 U | **280** J1 | **470** | **110** J1 | 2000 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 290 U | 300 U | 58 U | 170 U | 2000 U |
| 2,4,5-Trichlorophenol | | | 1400 U | 1500 U | 290 U | 840 U | 2000 U |
| 2,4,6-Trichlorophenol | | | 1400 U | 1500 U | 290 U | 840 U | 2000 U |
| | | | | | | | |
| **PAHs (µg/kg)** | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | |
| Acenaphthene | 500 | 500 | **50** | **75** | **94** | **52** | **4000** |
| Acenaphthylene | 1300 | 1300 | **20** J1 | **26** J1 | **37** | 28 U | **650** J1 |
| Anthracene | 960 | 960 | **86** | **110** | **150** | **67** | **7200** |
| Benzo(a)anthracene | 1300 | 1600 | **340** | **550** | **760** | **390** | **12,000** |
| Benzo(a)pyrene | 1600 | 1600 | **400** | **620** | **1100** | **390** | **12,000** |
| Benzo(b)fluoranthene | | | NA | NA | NA | NA | **21,000** |
| Benzo(g,h,i)perylene | 670 | 720 | **370** | **530** | **840** | **300** | **3500** |
| Benzo(k)fluoranthene | | | NA | NA | NA | NA | **9500** |
| Total Benzofluoranthenes (d, e) | 3200 | 3600 | **920** | **1500** | **2600** | **760** | NA |

# TABLE 27
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 EAST AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | | 2012 Source Material |
|---|---|---|---|---|---|---|---|
| | | | IT-CB60/61 | IT-CB63 | IT-CB66/67 | IT-CBB/62/68 | IT-CB-66/67 |
| | | | TL29G | TL29F | TL29I | TL29H | 6607151 |
| | | | TL29 | TL29 | TL29 | TL29 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/07/2011 | 09/07/2011 | 09/07/2011 | 09/07/2011 | 04/03/2012 |
| Chrysene | 1400 | 2800 | **650** | **1100** | **1600** | **720** | **15,000** |
| Dibenz(a,h)anthracene | 230 | 230 | **80** | **140** | **190** | **71** | **1100** |
| Dibenzofuran | | | **50** | **98** | **110** | **41** | **2900** |
| Fluoranthene | 1700 | 2500 | **1200** | **2100** | **2700** | **1000** | **38,000** |
| Fluorene | 540 | 540 | **65** | **120** | **110** | **46** | **4600** |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | **290** | **430** | **730** | **250** | **3800** |
| 2-Methylnaphthalene | 670 | 670 | **38** | **64** | **120** | **33** | **1600** |
| Naphthalene | 2100 | 2100 | **67** | **92** | **170** | **49** | **3500** |
| Total Naphthalenes | | | **105** | **156** | **290** | **82** | **5100** |
| Phenanthrene | 1500 | 1500 | **680** | **1300** | **1500** | **540** | **33,000** |
| Pyrene | 2600 | 3300 | **880** | **1600** | **2300** | **810** | **30,000** |
| cPAH TEQ | 150 (f) | | **570** | **893** | **1544** | **544** | **16,890** |
| **PCBs (µg/kg)** | | | | | | | |
| **Method SW8082** | | | | | | | |
| Aroclor 1016 | | | 20 U | 20 U | 19 U | 19 U | 31 U |
| Aroclor 1221 | | | 20 U | 20 U | 19 U | 19 U | 39 U |
| Aroclor 1232 | | | 20 U | 20 U | 19 U | 19 U | 68 U |
| Aroclor 1242 | | | 20 U | 20 U | 19 U | 19 U | 28 U |
| Aroclor 1248 | | | 20 U | 36 U | **36** | **26** | 28 U |
| Aroclor 1254 | | | **39** | **77** | **77** | **68** | **190** J |
| Aroclor 1260 | | | **43** | **86** | **120** | **54** | **130** J, J1 |
| Total PCBs (d) | 2 (f) | | **82** | **163** | **233** | **148** | **320** J |
| **TOTAL METALS (mg/kg)** | | | | | | | |
| **Methods 6010B/6020** | | | | | | | |
| Antimony | | | 0.3 U | 0.5 U | 0.4 U | 0.3 U | **12.5** |
| Arsenic | 7 (f) | | **7.0** | **12.9** | **14.3** | **6.5** | **30.8** |
| Barium | | | **125** | **169** | **229** | **90.8** | **229** |
| Beryllium | | | 0.3 U | 0.5 U | **0.4** | 0.3 U | **0.259** J1 |
| Cadmium | 5.1 | 6.7 | **3.0** | **5.7** | **11.7** | **7.2** | **13.4** |
| Chromium | 260 | 270 | **107** | **165** | **128** | **100** | **168** |
| Copper | 390 | 390 | **156** | **207** | **242** | **76.9** | **268** |
| Lead | 450 | 530 | **261** | **393** | **299** | **370** | **294** |
| Nickel | | | **53.9** | **87** | **87** | **40.3** | **78.8** |
| Selenium | | | 0.8 U | 1 U | 1 U | 0.7 U | 2.84 U |
| Silver | 6.1 | 6.1 | **0.8** | **1.3** | **2.9** | **0.3** | **1.94** J1 |
| Zinc | 410 | 960 | **1680** | **1240** | **2400** | **960** | **2260** |
| **Method SW7199** | | | | | | | |
| Chromium VI | | | 0.698 U | 1.01 U | 0.879 U | 0.595 U | **11.1** |
| **Method SW7471A** | | | | | | | |
| Mercury | 0.41 | 0.59 | **0.08** | **0.24** | **1.16** | **0.04** | **0.168** J1 |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs polycilic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
SIM = Selected Ion Monitoring
PRG = Preliminary Remediation Goal
TEQ = Toxic Equivalent Concentration
NA = Not Analyzed
SMS = Sediment Management Standards
CSL = Cleanup Screening Level
SCO = Sediment Cleanup Objective
LAET = Lowest Apparent Effects Threshold
U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

[Yellow] Indicates concentration exceeds SCO, but is less than the CSL or the dry weight equivalent values (LAET and 2LAET, respectively)
[Gray] Indicates concentration exceeds the SCO and CSL or dry weight equivalent criteria or PRG.
Bold = Detected compound.

(a) Dry weight equivalent criteria are based on the Puget Sound Apparent Effects Threshold Values (Barrick et al. 1988)
(b) SMS SCO/LAET
(c) SMS CSL/2LAET
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
  (i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compound/isomers.
  (ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.
(e) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(f) Lower Duwamish Waterway Preliminary Remediation Goal (PRG)

# TABLE 28
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 WEST AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | 2012 Source Material | |
|---|---|---|---|---|---|---|---|
| | | | IT-CBC | IT-CBD | IT-CBE/77/77B | IT-CB-77/77B/77E | IT-CB-C/D |
| | | | TL53G | TL53H | TL53I | 6607152 | 6607153 |
| | | | TL53 | TL53 | TL53 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/08/2011 | 09/08/2011 | 09/08/2011 | 04/03/2012 | 04/03/2012 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | |
| **Method SW8270D** | | | | | | | |
| Benzoic Acid | 650 | 650 | 5900 UJ | 4700 | 3300 UJ | 81,000 U | 100,000 U |
| Benzyl Alcohol | 57 | 73 | 2500 | 3500 | 1900 | 16,000 U | 20,000 U |
| 4-Bromophenyl-phenylether | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| Butylbenzylphthalate | 63 | 900 | 4000 | 1400 | 530 | 32,000 U | 41,000 U |
| Di-n-Butylphthalate | 1400 | 5100 | 1000 | 500 | 190 | 32,000 U | 41,000 U |
| Carbazole | | | 150 J | 240 | 110 J | 8100 U | 10,000 U |
| 4-Chloro-3-methylphenol | | | 1500 U | 1200 | 840 U | 8100 U | 10,000 U |
| 4-Chloroaniline | | | 4000 U | 3200 | 2300 U | 8100 U | 10,000 U |
| bis(2-Chloroethoxy) Methane | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| Bis-(2-Chloroethyl) Ether | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 2-Chloronaphthalene | | | 290 U | 240 | 170 U | 3400 U | 4300 U |
| 2-Chlorophenol | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 4-Chlorophenyl-phenylether | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 2,2'-Oxybis(1-Chloropropane) | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 1,2-Dichlorobenzene | 35 | 50 | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 1,3-Dichlorobenzene | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 1,4-Dichlorobenzene | 110 | 110 | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 3,3'-Dichlorobenzidine | | | 2200 U | 1800 | 1200 U | 48,000 U | 61,000 U |
| 2,4-Dichlorophenol | | | 2900 U | 2400 | 1700 U | 8100 U | 10,000 U |
| Diethylphthalate | 200 | 1200 | 740 U | 590 | 420 U | 32,000 U | 41,000 U |
| 2,4-Dimethylphenol | 29 | 29 | 590 U | 470 | 330 U | 4800 U | 6100 U |
| Dimethylphthalate | 71 | 160 | 460 | 240 | 170 U | 32,000 U | 41,000 U |
| 4,6-Dinitro-2-Methylphenol | | | 2900 U | 2400 | 1700 U | 81,000 U | 100,000 U |
| 2,4-Dinitrophenol | | | 12000 U | 10000 | 7100 U | 150,000 U | 180,000 U |
| 2,4-Dinitrotoluene | | | 1500 U | 1200 | 840 U | 32,000 U | 41,000 U |
| 2,6-Dinitrotoluene | | | 1500 U | 1200 | 840 U | 8100 U | 10,000 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | 23000 | 22000 | 4600 | 32,000 U | 41,000 U |
| Hexachlorobenzene | 22 | 70 | 290 U | 240 | 170 U | 1600 U | 2000 U |
| Hexachlorobutadiene | 11 | 120 | 1500 U | 1200 | 840 U | 4800 U | 6100 U |
| Hexachlorocyclopentadiene | | | 5900 U | 4700 | 3300 U | 81,000 U | 100,000 U |
| Hexachloroethane | | | 290 U | 240 | 170 U | 16,000 U | 20,000 U |
| Isophorone | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 1-Methylnaphthalene | | | 290 U | 240 | 170 U | 1600 U | 2000 U |
| 2-Methylphenol | 63 | 63 | 290 U | 240 | 170 U | 4800 U | 6100 U |
| 4-Methylphenol | 670 | 670 | 190 J | 220 | 110 J | 8200 J1 | 10,000 U |
| 2-Nitroaniline | | | 1500 U | 1200 | 840 U | 8100 U | 10,000 U |
| 3-Nitroaniline | | | 1500 U | 1200 | 840 U | 32,000 U | 41,000 U |
| 4-Nitroaniline | | | 1500 U | 1200 | 840 U | 32,000 U | 41,000 U |
| Nitrobenzene | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 2-Nitrophenol | | | 1500 U | 1200 | 840 U | 8100 U | 10,000 U |
| 4-Nitrophenol | | | 1500 U | 1200 | 840 U | 81,000 U | 100,000 U |
| N-Nitroso-Di-N-Propylamine | | | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| N-Nitrosodiphenylamine | 28 | 40 | 290 U | 240 | 170 U | 4800 U | 6100 U |
| Di-n-Octyl phthalate | 6200 | 6200 | 3800 | 2100 | 180 | 32,000 U | 41,000 U |
| Pentachlorophenol | 360 | 690 | 2900 U | 2400 | 1700 U | 16,000 U | 20,000 U |
| Phenol | 420 | 1200 | 440 | 220 | 100 J | 8100 U | 10,000 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 290 U | 240 | 170 U | 8100 U | 10,000 U |
| 2,4,5-Trichlorophenol | | | 1500 U | 1200 | 840 U | 8100 U | 10,000 U |
| 2,4,6-Trichlorophenol | | | 1500 U | 1200 | 840 U | 8100 U | 10,000 U |
| | | | | | | | |
| **PAHs (µg/kg)** | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | |
| Acenaphthene | 500 | 500 | 74 | 180 | 280 | 530 J. J1 | 420 J1 |
| Acenaphthylene | 1300 | 1300 | 31 J | 180 | 110 | 210 J. J1 | 140 U |
| Anthracene | 960 | 960 | 94 | 220 | 360 | 1800 J | 670 J1 |
| Benzo(a)anthracene | 1300 | 1600 | 400 | 420 | 2200 | 3900 J | 2000 |
| Benzo(a)pyrene | 1600 | 1600 | 390 | 420 | 2200 | 3200 J | 2300 |
| Benzo(b)fluoranthene | | | | | | 5500 J | 5000 |
| Benzo(g,h,i)perylene | 670 | 720 | 500 | 290 | 900 | 1400 J | 940 |
| Benzo(k)fluoranthene | | | | | | 2700 J | 1900 |
| Total Benzofluoranthenes (d, e) | 3200 | 3600 | 1100 | 960 | 4200 | | |
| Chrysene | 1400 | 2800 | 820 | 700 | 2500 | 5400 J | 3500 |
| Dibenz(a,h)anthracene | 230 | 230 | 110 | 160 | 260 | 400 J. J1 | 270 U |
| Dibenzofuran | | | 78 | 180 | 140 | 430 J. J1 | 290 J1 |
| Fluoranthene | 1700 | 2500 | 1600 | 1200 | 5800 | 11,000 J | 6800 |
| Fluorene | 540 | 540 | 120 | 230 | 290 | 660 J | 480 J1 |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | 320 | 260 | 970 | 1200 J | 810 |
| 2-Methylnaphthalene | 670 | 670 | 88 | 180 | 40 | 300 J. J1 | 270 U |
| Naphthalene | 2100 | 2100 | 100 | 190 | 57 | 700 J | 500 J1 |
| Total Naphthalenes | | | | | | 1000 J | 500 J |
| Phenanthrene | 1500 | 1500 | 960 | 830 | 3200 | 8200 J | 4500 |
| Pyrene | 2600 | 3300 | 1200 | 890 | 4400 | 13,000 J | 5100 |
| cPAH TEQ | 150 (f) | | 47150 | 42640 | 169160 | 4624 J | 3306 |

**TABLE 28**
**STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 WEST AREA**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | 2012 Source Material | |
|---|---|---|---|---|---|---|---|
| | | | IT-CBC | IT-CBD | IT-CBE/77/77B | IT-CB-77/77B/77E | IT-CB-C/D |
| | | | TL53G | TL53H | TL53I | 6607152 | 6607153 |
| | | | TL53 | TL53 | TL53 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/08/2011 | 09/08/2011 | 09/08/2011 | 04/03/2012 | 04/03/2012 |
| **PCBs (µg/kg)** | | | | | | | |
| **Method SW8082** | | | | | | | |
| Aroclor 1016 | | | 20 U | 20 | 19 U | 23 U | 29 U |
| Aroclor 1221 | | | 20 U | 20 | 19 U | 30 U | 38 U |
| Aroclor 1232 | | | 20 U | 20 | 19 U | 52 U | 65 U |
| Aroclor 1242 | | | 20 U | 20 | 19 U | 21 U | 27 U |
| Aroclor 1248 | | | 53 U | 40 | 19 U | 21 U | 27 U |
| Aroclor 1254 | | | **100** J | **170** | **44** | **92** J, J1 | **270** J |
| Aroclor 1260 | | | **140** | **140** | **44** | **110** J | 40 U |
| Total PCBs (d) | 2 (f) | | **240** J | **310** | **88** | **202** J | **270** J |
| **TOTAL METALS (mg/kg)** | | | | | | | |
| **Methods 6010B/6020** | | | | | | | |
| Antimony | | | **0.7** | **1.0** | 0.3 U | **3.06** | **5.30** |
| Arsenic | 7 (f) | | **12.5** | **12.3** | **8.2** | **14.8** | **22.7** |
| Barium | | | **185** | **140** | **152** | **221** | **313** |
| Beryllium | | | 0.3 U | 0.5 | 0.3 U | **0.262** J1 | **0.327** J1 |
| Cadmium | 5.1 | 6.7 | **117** | **154** | **39.5** | **10.1** | **69.2** |
| Chromium | 260 | 270 | **170** | **158** | **72.9** | **156** | **178** |
| Copper | 390 | 390 | **224** | **190** | **84.4** | **180** | **265** |
| Lead | 450 | 530 | **308** | **245** | **96.4** | **92.9** | **137** |
| Nickel | | | **92.9** | **145** | **65.8** | **64.8** | **94.9** |
| Selenium | | | 0.8 U | 1 | 0.7 U | 2.15 U | 2.75 U |
| Silver | 6.1 | 6.1 | **1.5** | **1.9** | **0.3** | **2.00** | **2.68** |
| Zinc | 410 | 960 | **2240** | **2090** | **860** | **1050** | **1660** |
| **Method SW7199** | | | | | | | |
| Chromium VI | | | 0.712 U | 0.834 | 0.557 U | 0.65 U | **10.1** |
| **Method SW7471A** | | | | | | | |
| Mercury | 0.41 | 0.59 | **0.13** | **0.27** | **0.17** | **0.769** | **0.183** J1 |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
SIM = Selected Ion Monitoring
PRG = Preliminary Remediation Goal
TEQ = Toxic Equivalent Concentration
NA = Not Analyzed
SMS = Sediment Management Standards
CSL = Cleanup Screening Level
SCO = Sediment Cleanup Objective
LAET = Lowest Apparent Effects Threshold

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
P = The analyte was detected on both chromatographic columns but the quantified values differ by 40% RPD with no obvious chromatographic interference. The higher of the two values is reported by the laboratory.

[Yellow box] Indicates concentration exceeds SCO, but less than the CSL or the dry weight equivalent values (LAET and 2LAET, respectively)
[Gray box] Indicates concentration exceeds the SCO and CSL or dry weight equivalent criteria or PRG.
Bold = Detected compound.

(a) Dry weight equivalent criteria are based on the Puget Sound Apparent Effects Threshold Values (Barrick et al. 1988)
(b) SMS SCO/LAET
(c) SMS CSL/2LAET
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
  (i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compound/isomers.
  (ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.
(e) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(f) Lower Duwamish Waterway Preliminary Remediation Goal (PRG)

# TABLE 29
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 NORTH AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | | | 2012 Source Material | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-CB8 | IT-CB13B/14 | IT-CB17 | IT-CB20 | IT-CB90B | IT-SURFACE-14 | IT-SURFACE-15 | IT-SURFACE-16 |
| | | | TL74D | TL53K | TL74F | TL74C | TL53J | 6607155 | 6607156 | 6612545 |
| | | | TL74 | TL53 | TL74 | TL74 | TL53 | 1300346 | 1300346 | 1301439 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/09/2011 | 09/08/2011 | 09/09/2011 | 09/09/2011 | 09/08/2011 | 04/04/2012 | 04/04/2012 | 04/10/2012 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | |
| Benzoic Acid | 650 | 650 | 2200 U | 9500 UJ | NA | **560** J1 | 10000 UJ | 5500 U | 11,000 U | **18,000** J1 |
| Benzyl Alcohol | 57 | 73 | **56** J1 | **240** J1 | NA | **16000** | 500 U | 1100 U | 2300 U | 1600 U |
| 4-Bromophenyl-phenylether | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| Butylbenzylphthalate | 63 | 900 | **160** | 470 U | NA | **450** | **330** J1 | 2200 U | 4500 U | 3300 U |
| Di-n-Butylphthalate | 1400 | 5100 | 110 U | 470 U | NA | **410** | 500 U | 2200 U | **4800** J1 | 3300 U |
| Carbazole | | | 110 U | **330** J1 | NA | **66** J1 | 500 U | 550 U | 1100 U | 820 U |
| 4-Chloro-3-methylphenol | | | 560 U | 2400 U | NA | 470 U | 2500 U | 550 U | 1100 U | 820 U |
| 4-Chloroaniline | | | 1500 U | 6400 U | NA | 1300 U | 6800 U | 550 U | 1100 U | 820 U |
| bis(2-Chloroethoxy) Methane | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| Bis-(2-Chloroethyl) Ether | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 2-Chloronaphthalene | | | 110 U | 470 U | NA | 94 U | 500 U | 230 U | 470 U | 350 U |
| 2-Chlorophenol | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 4-Chlorophenyl-phenylether | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 2,2'-Oxybis(1-Chloropropane) | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 1,2-Dichlorobenzene | 35 | 50 | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 1,3-Dichlorobenzene | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 1,4-Dichlorobenzene | 110 | 110 | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 3,3'-Dichlorobenzidine | | | 850 U | 3600 U | NA | 710 U | 3800 U | 3300 U | 6800 U | 4900 U |
| 2,4-Dichlorophenol | | | 1100 U | 4700 U | NA | 940 U | 5000 U | 550 U | 1100 U | 820 U |
| Diethylphthalate | 200 | 1200 | 280 U | 1200 U | NA | 240 U | 1300 U | 2200 U | 4500 U | 3300 U |
| 2,4-Dimethylphenol | 29 | 29 | 220 U | 950 U | NA | 190 U | 1000 U | 330 U | 680 U | 490 U |
| Dimethylphthalate | 71 | 160 | 110 U | 470 U | NA | **94** | 500 U | 2200 U | 4500 U | 3300 U |
| 4,6-Dinitro-2-Methylphenol | | | 1100 U | 4700 U | NA | 940 U | 5000 U | 5500 U | 11,000 U | 8200 U |
| 2,4-Dinitrophenol | | | 4800 U | 20000 U | NA | 4000 U | 21000 U | 9900 U | 20,000 U | 15,000 U |
| 2,4-Dinitrotoluene | | | 560 U | 2400 U | NA | 470 U | 2500 U | 2200 U | 4500 U | 3300 U |
| 2,6-Dinitrotoluene | | | 560 U | 2400 U | NA | 470 U | 2500 U | 550 U | 1100 U | 820 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | **3300** | **4700** | NA | **9800** | **3800** | **3900** J1 | **5400** J1 | 3300 U |
| Hexachlorobenzene | 22 | 70 | 110 U | 470 U | NA | 94 U | 500 U | 110 U | 230 U | 160 U |
| Hexachlorobutadiene | 11 | 120 | 560 U | 2400 U | NA | 470 U | 2500 U | 330 U | 680 U | 490 U |
| Hexachlorocyclopentadiene | | | 2200 U | 9500 U | NA | 1900 U | 10000 U | 5500 U | 11,000 U | 8200 U |
| Hexachloroethane | | | 110 U | 470 U | NA | 94 U | 500 U | 1100 U | 2300 U | 1600 U |
| Isophorone | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 1-Methylnaphthalene | | | 110 U | 470 U | NA | 94 U | 500 U | 110 U | 230 U | 160 U |
| 2-Methylphenol | 63 | 63 | 110 U | 470 U | NA | 94 U | 500 U | 330 U | 680 U | 490 U |
| 4-Methylphenol | 670 | 670 | **230** | **570** J1 | NA | **85** J1 | **3100** | 550 U | 1100 U | 820 U |
| 2-Nitroaniline | | | 560 U | 2400 U | NA | 470 U | 2500 U | 550 U | 1100 U | 820 U |
| 3-Nitroaniline | | | 560 U | 2400 U | NA | 470 U | 2500 U | 2200 U | 4500 U | 3300 U |
| 4-Nitroaniline | | | 560 U | 2400 U | NA | 470 U | 2500 U | 2200 U | 4500 U | 3300 U |
| Nitrobenzene | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 2-Nitrophenol | | | 560 U | 2400 U | NA | 470 U | 2500 U | 550 U | 1100 U | 820 U |
| 4-Nitrophenol | | | 560 U | 2400 U | NA | 470 U | 2500 U | 5500 U | 11,000 U | 8200 U |
| N-Nitroso-Di-N-Propylamine | | | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| N-Nitrosodiphenylamine | 28 | 40 | 110 U | 470 U | NA | 94 U | 500 U | 330 U | 680 U | 490 U |
| Di-n-Octyl phthalate | 6200 | 6200 | **500** | 470 U | NA | **3000** | 500 U | 2200 U | 4500 U | **16,000** |
| Pentachlorophenol | 360 | 690 | 1100 U | 4700 U | NA | 940 U | 5000 U | 1100 U | 2300 U | 1600 U |
| Phenol | 420 | 1200 | **62** J1 | 470 U | NA | **120** | **250** J1 | 550 U | 1100 U | 820 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 110 U | 470 U | NA | 94 U | 500 U | 550 U | 1100 U | 820 U |
| 2,4,5-Trichlorophenol | | | 560 U | 2400 U | NA | 470 U | 2500 U | 550 U | 1100 U | 820 U |
| 2,4,6-Trichlorophenol | | | 560 U | 2400 U | NA | 470 U | 2500 U | 550 U | 1100 U | 820 U |

# TABLE 29
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 NORTH AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | | | 2012 Source Material | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-CB8 | IT-CB13B/14 | IT-CB17 | IT-CB20 | IT-CB90B | IT-SURFACE-14 | IT-SURFACE-15 | IT-SURFACE-16 |
| | | | TL74D | TL53K | TL74F | TL74C | TL53J | 6607155 | 6607156 | 6612545 |
| | | | TL74 | TL53 | TL74 | TL74 | TL53 | 1300346 | 1300346 | 1301439 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/09/2011 | 09/08/2011 | 09/09/2011 | 09/09/2011 | 09/08/2011 | 04/04/2012 | 04/04/2012 | 04/10/2012 |
| **PAHs (µg/kg)** | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | |
| Acenaphthene | 500 | 500 | 87 U | 120 J1 | NA | 59 U | 78 J1 | 78 J1 | 110 J1 | 34 U |
| Acenaphthylene | 1300 | 1300 | 87 U | 230 U | NA | 59 U | 140 U | 23 J1 | 45 U | 17 U |
| Anthracene | 960 | 960 | 87 U | 140 J1 | NA | 37 J1 | 140 U | 130 | 190 J1 | 24 J1 |
| Benzo(a)anthracene | 1300 | 1600 | 130 | 470 | NA | 220 | 270 | 530 | 580 | 78 J1 |
| Benzo(a)pyrene | 1600 | 1600 | 120 | 420 | NA | 230 | 280 | 550 | 620 | 190 |
| Benzo(b)fluoranthene | | | NA | NA | NA | NA | NA | 1100 | 1300 | 430 |
| Benzo(g,h,i)perylene | 670 | 720 | 140 | 430 | NA | 220 | 340 | 340 | 330 | 69 J1 |
| Benzo(k)fluoranthene | | | NA | NA | NA | NA | NA | 350 | 440 | 34 U |
| Total Benzofluoranthenes (d, e) | 3200 | 3600 | 320 | 810 | NA | 550 | 730 | NA | NA | NA |
| Chrysene | 1400 | 2800 | 300 | 860 | NA | 480 | 650 | 900 | 1000 | 340 |
| Dibenz(a,h)anthracene | 230 | 230 | 87 U | 230 U | NA | 69 | 110 J1 | 86 J1 | 90 J1 | 34 U |
| Dibenzofuran | | | 87 U | 230 U | NA | 59 U | 140 U | 62 J1 | 90 J1 | 34 U |
| Fluoranthene | 1700 | 2500 | 350 | 1300 | NA | 700 | 920 | 1700 | 1800 | 210 |
| Fluorene | 540 | 540 | 87 U | 140 J1 | NA | 59 U | 92 J1 | 77 J1 | 120 J1 | 34 U |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | 69 J1 | 320 | NA | 120 | 180 | 270 | 250 | 41 J1 |
| 2-Methylnaphthalene | 670 | 670 | 87 U | 230 U | NA | 32 J1 | 90 J1 | 44 U | 90 U | 34 U |
| Naphthalene | 2100 | 2100 | 87 U | 160 J1 | NA | 59 U | 89 J1 | 100 J1 | 190 J1 | 48 J1 |
| Total Naphthalenes | | | NA | 160 J | NA | 32 J1 | 179 J | 100 J | 190 J | 48 J |
| Phenanthrene | 1500 | 1500 | 260 | 1300 | NA | 370 | 570 | 1000 | 1200 | 170 |
| Pyrene | 2600 | 3300 | 300 | 1100 | NA | 580 | 700 | 1100 | 1200 | 180 |
| cPAH TEQ | 150 (f) | | 175 J | 589 | NA | 331 | 416 J | 793 J | 896 J | 248 J |
| **PCBs (µg/kg)** | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | |
| Aroclor 1016 | | | 18 U | 39 U | 20 U | 19 U | 19 U | 9.5 U | 9.6 U | 72 U |
| Aroclor 1221 | | | 18 U | 39 U | 20 U | 19 U | 19 U | 12 U | 12 U | 92 U |
| Aroclor 1232 | | | 18 U | 39 U | 20 U | 19 U | 19 U | 21 U | 21 U | 160 U |
| Aroclor 1242 | | | 18 U | 39 U | 20 U | 19 U | 19 U | 8.7 U | 8.8 U | 66 U |
| Aroclor 1248 | | | 49 | 82 | 38 J | 50 | 40 | 8.7 U | 8.8 U | 66 U |
| Aroclor 1254 | | | 120 | 170 | 89 J | 120 | 100 | 61 J | 100 J | 1600 |
| Aroclor 1260 | | | 140 J | 120 | 65 J | 120 J | 87 | 13 U | 13 U | 99 U |
| Total PCBs (d) | 2 (f) | | 309 J | 372 | 192 J | 290 J | 227 | 61 J | 100 J | 1600 |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | |
| **Methods 6010B/6020** | | | | | | | | | | |
| Antimony | | | 0.3 U | 0.5 | 0.3 U | 0.2 U | 0.3 U | 0.678 | 2.55 | 0.416 |
| Arsenic | 7 (f) | | 14.1 | 9.6 | 7.9 | 9.0 | 8.3 | 0.723 U | 10.6 | 6.93 |
| Barium | | | 122 | 139 | 83.1 | 104 | 122 | 132 | 172 | 96.1 |
| Beryllium | | | 0.3 | 0.3 | 0.3 U | 0.3 | 0.3 | 0.238 J1 | 0.309 J1 | 0.197 J1 |
| Cadmium | 5.1 | 6.7 | 1.9 | 1.6 | 2.7 | 4.3 | 1.3 | 1.96 | 1.47 | 3.35 |
| Chromium | 260 | 270 | 142 | 66.3 | 49.5 | 79.6 | 77.9 | 94.8 | 97.7 | 22.3 |
| Copper | 390 | 390 | 78.0 | 67.7 | 53.4 | 80.2 | 80.1 | 77.1 | 84.2 | 36.3 |
| Lead | 450 | 530 | 148 | 178 | 75.6 | 158 | 125 | 53.7 | 201 | 45.4 |
| Nickel | | | 76.4 | 55.4 | 48.8 | 59.8 | 71.8 | 63.0 | 59.9 | 36.1 |
| Selenium | | | 0.8 | 0.7 | 0.7 U | 0.6 | 0.8 U | 4.47 U | 0.917 U | 1.70 J1 |
| Silver | 6.1 | 6.1 | 0.3 U | 0.3 U | 0.3 U | 0.2 | 0.3 U | 0.946 | 0.467 J1 | 0.535 |
| Zinc | 410 | 960 | 880 | 620 | 610 | 760 | 2060 | 320 | 343 | 348 |
| **Method SW7199** | | | | | | | | | | |
| Chromium VI | | | 0.551 U | 0.567 U | 0.544 U | 0.423 U | 1.24 | 2.5 | 8.3 | 1.3 |
| **Method SW7471A** | | | | | | | | | | |
| Mercury | 0.41 | 0.59 | 0.63 | 0.31 | 0.04 | 0.07 | 0.07 | 0.0453 J1 | 0.0736 J1 | 0.375 |

# TABLE 29
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-01 NORTH AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
NA = Not Applicable
SMS = Sediment Management Standards
CSL = Cleanup Screening Level
SCO = Sediment Cleanup Objective
LAET = Lowest Apparent Effects Threshold
PRG = Preliminary Remediation Goal

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate
and less than the reporting limit, but equal to or greater than the detection limit.

(yellow) Indicates concentration exceeds SCO, but less than the CSL or the dry weight equivalent values [Lower Apparent Effects Threshold (LAET) and 2LAET, respectively]
(gray) Indicates concentration exceeds the SCO and CSL or dry weight equivalent criteria or PRG.
Bold = Detected compound.

(a) Dry weight equivalent criteria are based on the Puget Sound Apparent Effects Threshold Values (Barrick et al. 1988)
(b) SMS Sediment Cleanup Objective /Lower Apparent Effects Threshold
(c) SMS Cleanup Screening Level / Second Lower Apparent Effects Threshold
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
(i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compound/isomers.
(ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.
(e) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(f) Lower Duwamish Waterway Preliminary Remediation Goal (PRG)

# TABLE 30
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-13 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | | 2012 Source Material | |
|---|---|---|---|---|---|---|---|---|
| | SCO/LAET (b) | CSL/2LAET (c) | IT-CB81/82<br>TL53B<br>TL53<br>09/08/2011 | IT-CB83<br>TL53D<br>TL53<br>09/08/2011 | IT-CB90/91<br>TL53C<br>TL53<br>09/08/2011 | IT-OWS79<br>TL53E<br>TL53<br>09/08/2011 | IT-PAINT-06<br>6612544<br>1301439<br>04/10/2012 | IT-SURFACE-04<br>6607142<br>1300346<br>04/03/2012 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | |
| **Method SW8270D** | | | | | | | | |
| Benzoic Acid | 650 | 650 | 5800 UJ | 5800 UJ | 1600 UJ | 7100 UJ | **35000** | 11,000 U |
| Benzyl Alcohol | 57 | 73 | 290 U | 290 U | 78 U | **6500** | 2000 U | 2200 U |
| 4-Bromophenyl-phenylether | | | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| Butylbenzylphthalate | 63 | 900 | **1500** | **950** | **390** | **1400** | 4000 U | 4400 U |
| Di-n-Butylphthalate | 1400 | 5100 | **15000** | **200** J1 | **320** | **600** | 4000 U | 4400 U |
| Carbazole | | | 290 U | 290 U | **39** J1 | **410** | 1000 U | 1100 U |
| 4-Chloro-3-methylphenol | | | 1500 U | 1400 U | 390 U | 1800 U | 1000 U | 1100 U |
| 4-Chloroaniline | | | 4000 U | 3900 U | 1000 U | 4800 U | 1000 U | 1100 U |
| bis(2-Chloroethoxy) Methane | | | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| Bis-(2-Chloroethyl) Ether | | | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 2-Chloronaphthalene | | | 290 U | 290 U | 78 U | 360 U | 420 U | 460 U |
| 2-Chlorophenol | | | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 4-Chlorophenyl-phenylether | | | 290 UJ | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 2,2'-Oxybis(1-Chloropropane) | | | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 1,2-Dichlorobenzene | 35 | 50 | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 1,3-Dichlorobenzene | | | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 1,4-Dichlorobenzene | 110 | 110 | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 3,3'-Dichlorobenzidine | | | 2200 U | 2200 U | 580 U | 2700 U | 6000 U | 6600 U |
| 2,4-Dichlorophenol | | | 2900 U | 2900 U | 780 U | 3600 U | 1000 U | 1100 U |
| Diethylphthalate | 200 | 1200 | 730 U | 720 U | 200 U | 890 U | 4000 U | 4400 U |
| 2,4-Dimethylphenol | 29 | 29 | 580 U | 580 U | 160 U | 710 U | 600 U | 660 U |
| Dimethylphthalate | 71 | 160 | 290 U | **320** | **39** J1 | **320** J1 | 4000 U | 4400 U |
| 4,6-Dinitro-2-Methylphenol | | | 2900 U | 2900 U | 780 U | 3600 U | 10,000 U | 11,000 U |
| 2,4-Dinitrophenol | | | 12000 U | 12000 U | 3300 U | 15000 U | 18,000 U | 20,000 U |
| 2,4-Dinitrotoluene | | | 1500 U | 1400 U | 390 U | 1800 U | 4000 U | 4400 U |
| 2,6-Dinitrotoluene | | | 1500 U | 1400 U | 390 U | 1800 U | 1000 U | 1100 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | **1800** | **4500** | **4000** | **22000** | 4000 U | **9000** J1 |
| Hexachlorobenzene | 22 | 70 | 290 U | 290 U | 78 U | 360 U | 200 U | 220 U |
| Hexachlorobutadiene | 11 | 120 | 1500 U | 1400 U | 390 U | 1800 U | 600 U | 660 U |
| Hexachlorocyclopentadiene | | | 5800 U | 5800 U | 1600 U | 7100 U | 10,000 U | 11,000 U |
| Hexachloroethane | | | 290 U | 290 U | 78 U | 360 U | 2000 U | 2200 U |
| Isophorone | | | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 1-Methylnaphthalene | | | 290 U | 290 U | 78 U | 360 U | 200 U | 220 U |
| 2-Methylphenol | 63 | 63 | 290 U | 290 U | 78 U | 360 U | 600 U | 660 U |
| 4-Methylphenol | 670 | 670 | 580 U | 580 U | **82** J1 | **510** J1 | 1000 U | 1100 U |
| 2-Nitroaniline | | | 1500 U | 1400 U | 390 U | 1800 U | 1000 U | 1100 U |
| 3-Nitroaniline | | | 1500 U | 1400 U | 390 U | 1800 U | 4000 U | 4400 U |
| 4-Nitroaniline | | | 1500 U | 1400 U | 390 U | 1800 U | 4000 U | 4400 U |
| Nitrobenzene | | | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 2-Nitrophenol | | | 1500 U | 1400 U | 390 U | 1800 U | 1000 U | 1100 U |
| 4-Nitrophenol | | | 1500 U | 1400 U | 390 U | 1800 U | 10,000 U | 11,000 U |
| N-Nitroso-Di-N-Propylamine | | | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| N-Nitrosodiphenylamine | 28 | 40 | 290 U | 290 U | 78 U | 360 U | 600 U | 660 U |
| Di-n-Octyl phthalate | 6200 | 6200 | **570** | 290 U | **280** | **1800** | 4000 U | 4400 U |
| Pentachlorophenol | 360 | 690 | 2900 U | **1600** J1 | 780 U | 3600 U | 2000 U | **15000** |
| Phenol | 420 | 1200 | 290 U | **160** J1 | **82** | **460** | 1000 U | 1100 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 290 U | 290 U | 78 U | 360 U | 1000 U | 1100 U |
| 2,4,5-Trichlorophenol | | | 1500 U | 1400 U | 390 U | 1800 U | 1000 U | 1100 U |
| 2,4,6-Trichlorophenol | | | 1500 U | 1400 U | 390 U | 1800 U | 1000 U | 1100 U |

# TABLE 30
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-13 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | | 2012 Source Material | |
|---|---|---|---|---|---|---|---|---|
| | | | IT-CB81/82 | IT-CB83 | IT-CB90/91 | IT-OWS79 | IT-PAINT-06 | IT-SURFACE-04 |
| | | | TL53B | TL53D | TL53C | TL53E | 6612544 | 6607142 |
| | | | TL53 | TL53 | TL53 | TL53 | 1301439 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/08/2011 | 09/08/2011 | 09/08/2011 | 09/08/2011 | 04/10/2012 | 04/03/2012 |
| **PAHs (µg/kg)** | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | |
| Acenaphthene | 500 | 500 | 16 | 58 | 25 J1 | 480 | 400 U | 88 U |
| Acenaphthylene | 1300 | 1300 | 11 J1 | 22 J1 | 29 U | 44 J1 | 200 U | 44 U |
| Anthracene | 960 | 960 | 28 | 72 | 36 | 670 | 200 U | 130 J1 |
| Benzo(a)anthracene | 1300 | 1600 | 120 | 210 | 140 | 1500 | 400 U | 290 |
| Benzo(a)pyrene | 1600 | 1600 | 130 | 240 | 120 | 1200 | 400 U | 400 |
| Benzo(b)fluoranthene | | | NA | NA | NA | NA | 400 U | 1000 |
| Benzo(g,h,i)perylene | 670 | 720 | 140 | 160 | 89 | 610 | 400 U | 210 J1 |
| Benzo(k)fluoranthene | | | NA | NA | NA | NA | 400 U | 330 |
| Total Benzofluoranthenes (d, e) | 3200 | 3600 | 310 | 590 | 270 | 2600 | NA | NA |
| Chrysene | 1400 | 2800 | 240 | 520 | 220 | 1900 | 200 U | 980 |
| Dibenz(a,h)anthracene | 230 | 230 | 36 | 39 | 23 J1 | 170 | 400 U | 88 U |
| Dibenzofuran | | | 28 | 50 | 20 J1 | 300 | 400 U | 88 U |
| Fluoranthene | 1700 | 2500 | 440 | 870 | 410 | 4500 | 400 U | 1300 |
| Fluorene | 540 | 540 | 31 | 40 | 43 | 560 | 400 U | 89 J1 |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | 96 | 150 | 68 | 530 | 400 U | 180 J1 |
| 2-Methylnaphthalene | 670 | 670 | 33 | 43 | 17 J1 | 200 | 400 U | 89 J1 |
| Naphthalene | 2100 | 2100 | 34 | 62 | 19 J1 | 300 | 470 J1 | 180 J1 |
| Total Naphthalenes | | | 67 | 105 | 36 J | 500 | 470 J | 269 J |
| Phenanthrene | 1500 | 1500 | 320 | 570 | 280 | 3600 | 400 U | 1000 |
| Pyrene | 2600 | 3300 | 320 | 610 | 320 | 3500 | 400 U | 1000 |
| cPAH TEQ | 150 (f) | | 189 | 344 | 172 J | 1699 | ND | 590 J |
| **PCBs (µg/kg)** | | | | | | | | |
| **Method SW8082** | | | | | | | | |
| Aroclor 1016 | | | 19 U | 14 U | 20 U | 19 U | 360 U | 95 U |
| Aroclor 1221 | | | 19 U | 14 U | 20 U | 19 U | 460 U | 120 U |
| Aroclor 1232 | | | 19 U | 14 U | 20 U | 19 U | 800 U | 210 U |
| Aroclor 1242 | | | 19 U | 14 U | 20 U | 19 U | 330 U | 87 U |
| Aroclor 1248 | | | 19 U | 56 U | 20 U | 75 U | 330 U | 87 U |
| Aroclor 1254 | | | 52 J | 180 J | 45 J | 180 J | 5000 | 920 |
| Aroclor 1260 | | | 53 | 110 | 38 | 180 | 490 U | 130 U |
| Total PCBs (d) | 2 (f) | | 105 J | 290 J | 83 J | 360 J | 5000 | 920 |
| **TOTAL METALS (mg/kg)** | | | | | | | | |
| **Methods 6010B/6020** | | | | | | | | |
| Antimony | | | 0.3 U | 0.5 U | 0.2 U | 0.6 | 0.181 J1 | 2.12 |
| Arsenic | 7 (f) | | 6.5 | 18.8 | 4.6 | 20.0 | 2.86 | 31.4 |
| Barium | | | 118 | 157 | 125 | 298 | 3170 | 222 |
| Beryllium | | | 0.3 U | 0.5 | 0.2 U | 0.5 U | 0.0853 J1 | 0.265 J1 |
| Cadmium | 5.1 | 6.7 | 6.6 | 14.7 | 4.8 | 38.8 | 1.25 | 4.37 |
| Chromium | 260 | 270 | 61.2 | 152 | 37.7 | 200 | 36.0 | 172 |
| Copper | 390 | 390 | 74.4 | 233 | 99.0 | 315 | 46.2 | 189 |
| Lead | 450 | 530 | 51.3 | 175 | 31.1 | 296 | 112 | 236 |
| Nickel | | | 47.6 | 86 | 45.1 | 100 | 13.2 | 82.4 |
| Selenium | | | 0.7 U | 1 | 0.6 U | 2 | 1.34 J1 | 1.75 U |
| Silver | 6.1 | 6.1 | 0.3 U | 0.7 | 0.2 U | 1.4 | 0.190 J1 | 0.888 J1 |
| Zinc | 410 | 960 | 359 | 1460 | 265 | 3490 | 1580 | 1330 |
| **Method SW7199** | | | | | | | | |
| Chromium VI | | | 0.599 U | 0.929 U | 0.525 U | 1.25 | 3.3 | 0.52 U |
| **Method SW7471A** | | | | | | | | |
| Mercury | 0.41 | 0.59 | 0.05 | 0.17 | 0.03 | 0.35 | 45.2 | 0.546 |

# TABLE 30
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - BUILDING 14-13 AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
NA = Not Analyzed
SMS = Sediment Management Standards
CSL = Cleanup Screening Level
SCO = Sediment Cleanup Objective
LAET = Lowest Apparent Effects Threshold
NA = Not Analyzed
PRG = Preliminary Remediation Goal

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

[Yellow box] Indicates concentration exceeds SCO, but less than the CSL or the dry weight equivalent values (LAET and 2LAET, respectively)
[Gray box] Indicates concentration exceeds the SCO and CSL or dry weight equivalent criteria or PRG.
Bold = Detected compound.

(a) Dry weight equivalent criteria are based on the Puget Sound Apparent Effects Threshold Values (Barrick et al. 1988)
(b) SMS SCO/LAET
(c) SMS CSL/2LAET
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
- (i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compound/isomers.
- (ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.

(e) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(f) Lower Duwamish Waterway Preliminary Remediation Goal (PRG)

# TABLE 31
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA
## BUILDING 14-02/14-03 AREA
## BOEING ISAACSON-THOMPSON
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-CB24 | IT-CB25 | IT-CB26 | IT-CB27 | IT-CB28 | IT-CB29 | IT-CB30 | IT-CB36 | IT-CB39/86/85 | IT-CBA | IT-OWS23 |
| | | | TL74G | TL74H | TL74I | TL74E | TO80A | TL29B | TL29C | TL74B | TL74A | TL29A | TL53L |
| | | | TL74 | TL74 | TL74 | TL74 | TO80 | TL29 | TL29 | TL74 | TL74 | TL29 | TL53 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/09/2011 | 09/09/2011 | 09/09/2011 | 09/09/2011 | 9/28/2011 | 09/07/2011 | 09/07/2011 | 09/09/2011 | 09/09/2011 | 09/07/2011 | 09/08/2011 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | |
| Benzoic Acid | 650 | 650 | 5700 U | 6000 U | 5800 U | 1800 U | 4600 U | **770** J | **590** J | 2400 U | **1400** J1 | **330** J | 10000 UJ |
| Benzyl Alcohol | 57 | 73 | **840** | **520** | **550** | **110** | **310** | **150** | **130** | 120 U | 180 U | **210** | **7200** |
| 4-Bromophenyl-phenylether | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| Butylbenzylphthalate | 63 | 900 | **3100** | **1500** | **1400** | **750** | **1100** | **2200** | **1100** | 120 U | **670** | **980** | **900** |
| Di-n-Butylphthalate | 1400 | 5100 | **360** | **510** | **600** | **380** | **800** | **610** | **110** | 120 U | **290** | **1100** | **350** J1 |
| Carbazole | | | 280 U | 300 U | 290 U | 90 U | **140** J1 | **1200** | **500** | 120 U | **2800** | **56** | 500 U |
| 4-Chloro-3-methylphenol | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| 4-Chloroaniline | | | 3800 U | 4000 U | 3900 U | 1200 U | 3100 U | 800 U | 800 U | 1600 U | 2500 U | 760 U | 6800 U |
| bis(2-Chloroethoxy) Methane | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| Bis-(2-Chloroethyl) Ether | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 2-Chloronaphthalene | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 2-Chlorophenol | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 4-Chlorophenyl-phenylether | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 UJ | 59 UJ | 120 U | 180 U | 56 UJ | 500 U |
| 2,2'-Oxybis(1-Chloropropane) | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 1,2-Dichlorobenzene | 35 | 50 | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 1,3-Dichlorobenzene | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 1,4-Dichlorobenzene | 110 | 110 | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 3,3'-Dichlorobenzidine | | | 2100 U | 2200 U | 2200 U | 680 U | 1700 U | 450 U | 440 U | 910 U | 1400 U | 420 U | 3800 U |
| 2,4-Dichlorophenol | | | 2800 U | 3000 U | 2900 U | 900 U | 2300 U | 590 U | 590 U | 1200 U | 1800 U | 560 U | 5000 U |
| Diethylphthalate | 200 | 1200 | 710 U | 750 U | 730 U | 230 U | 580 U | 150 U | 150 U | 300 U | 460 U | 140 U | 1200 U |
| 2,4-Dimethylphenol | 29 | 29 | 570 U | 600 U | 580 U | 180 U | 460 U | 120 U | 120 U | 240 U | 370 U | 110 U | 1000 U |
| Dimethylphthalate | 71 | 160 | **230** J1 | **160** J1 | **260** J1 | **160** | **290** | **1500** | **450** | 120 U | **150** J1 | **260** | 500 U |
| 4,6-Dinitro-2-Methylphenol | | | 2800 U | 3000 U | 2900 U | 900 U | 2300 U | 590 U | 590 U | 1200 U | 1800 U | 560 U | 5000 U |
| 2,4-Dinitrophenol | | | 12000 U | 13000 U | 12000 U | 3800 U | 9800 U | 2500 U | 2500 U | 5200 U | 7800 U | 2400 U | 21000 U |
| 2,4-Dinitrotoluene | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| 2,6-Dinitrotoluene | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | **6000** | **5000** | **11000** | **3700** | **3500** | **13000** | **2300** | **1200** | **4500** | **12000** | **15000** |
| Hexachlorobenzene | 22 | 70 | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| Hexachlorobutadiene | 11 | 120 | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| Hexachlorocyclopentadiene | | | 5700 U | 6000 U | 5800 U | 1800 U | 4600 U | 1200 U | 1200 U | 2400 U | 3700 U | 1100 U | 10000 U |
| Hexachloroethane | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| Isophorone | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 1-Methylnaphthalene | | | 280 U | 300 U | 290 U | 90 U | 230 U | **110** | **41** J1 | 120 U | **160** J1 | 56 U | 500 U |
| 2-Methylphenol | 63 | 63 | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 4-Methylphenol | 670 | 670 | **260** J1 | **190** J1 | **320** J1 | 180 U | **990** | **500** | **140** | **67** J1 | **540** | **110** | **11000** |
| 2-Nitroaniline | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| 3-Nitroaniline | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| 4-Nitroaniline | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| Nitrobenzene | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 2-Nitrophenol | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| 4-Nitrophenol | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| N-Nitroso-Di-N-Propylamine | | | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| N-Nitrosodiphenylamine | 28 | 40 | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| Di-n-Octyl phthalate | 6200 | 6200 | **500** | **430** | **230** J1 | **54** J1 | **240** | 59 U | 59 U | 120 U | **100** J1 | **190** | **2000** |
| Pentachlorophenol | 360 | 690 | 2800 U | 3000 U | 2900 U | 900 U | 2300 U | 590 U | 590 U | 1200 U | 1800 U | 560 U | 5000 U |
| Phenol | 420 | 1200 | 280 U | 300 U | **190** J1 | 90 U | **170** J1 | **320** | **180** | 120 U | **200** | **150** | **500** |
| 1,2,4-Trichlorobenzene | 31 | 51 | 280 U | 300 U | 290 U | 90 U | 230 U | 59 U | 59 U | 120 U | 180 U | 56 U | 500 U |
| 2,4,5-Trichlorophenol | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |
| 2,4,6-Trichlorophenol | | | 1400 U | 1500 U | 1500 U | 450 U | 1200 U | 300 U | 300 U | 610 U | 920 U | 280 U | 2500 U |

# TABLE 31
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA
## BUILDING 14-02/14-03 AREA
## BOEING ISAACSON-THOMPSON
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) SCO/LAET (b) | CSL/2LAET (c) | 2011 Storm Drain Solids IT-CB24 TL74G TL74 09/09/2011 | IT-CB25 TL74H TL74 09/09/2011 | IT-CB26 TL74I TL74 09/09/2011 | IT-CB27 TL74E TL74 09/09/2011 | IT-CB28 TO80A TO80 9/28/2011 | IT-CB29 TL29B TL29 09/07/2011 | IT-CB30 TL29C TL29 09/07/2011 | IT-CB36 TL74B TL74 09/09/2011 | IT-CB39/86/85 TL74A TL74 09/09/2011 | IT-CBA TL29A TL29 09/07/2011 | IT-OWS23 TL53L TL53 09/08/2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PAHs (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Acenaphthene | 500 | 500 | **66** | **45** J1 | **39** J1 | **9.0** J1 | **34** | **750** J | **110** | 98 U | **85** J1 | **52** | **140** J1 |
| Acenaphthylene | 1300 | 1300 | **35** | 60 U | 58 U | 14 U | **24** | **440** J | **84** | 98 U | 140 U | **21** J1 | 200 U |
| Anthracene | 960 | 960 | **69** | **73** | **41** J1 | **19** | **74** | **1300** J | **270** | 98 U | 140 U | **76** | **160** J1 |
| Benzo(a)anthracene | 1300 | 1600 | **310** | **290** | **170** | **120** | **350** | **3900** | **1000** | **120** | **280** | **260** | **590** |
| Benzo(a)pyrene | 1600 | 1600 | **340** | **280** | **200** | **140** | **370** | **4800** | **1000** | **140** | **410** | **260** | **600** |
| Benzo(b)fluoranthene | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Benzo(g,h,i)perylene | 670 | 720 | **260** | **280** | **160** | **99** | **300** | **3900** | **950** | **130** | **420** | **310** | **760** |
| Benzo(k)fluoranthene | | | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Total Benzofluoranthenes (d, e) | 3200 | 3600 | **780** | **650** | **500** | **300** | **780** | **12000** | **4200** | **280** | **940** | **580** | **1600** |
| Chrysene | 1400 | 2800 | **560** | **600** | **350** | **210** | **630** | **8400** | **3400** | **330** | **910** | **460** | **1500** |
| Dibenz(a,h)anthracene | 230 | 230 | **51** | **39** J1 | 58 U | **20** | **84** | **1100** J | **250** | 98 U | **140** J1 | **56** | **130** J1 |
| Dibenzofuran | | | **67** | **50** J1 | **47** J1 | **12** J1 | **65** | **760** J | **120** | 98 U | **150** | **46** | **130** J1 |
| Fluoranthene | 1700 | 2500 | **1200** | **880** | **660** | **370** | **1200** | **15000** | **3000** | **210** | **1900** | **790** | **2100** |
| Fluorene | 540 | 540 | **80** | **50** J1 | **45** J1 | **13** J1 | **59** | **1100** J | **150** | 98 U | **130** J1 | **80** | **190** J1 |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | **200** | **200** | **110** | **72** | **260** | **3700** | **970** | 98 U | **250** | **180** | **450** |
| 2-Methylnaphthalene | 670 | 670 | **54** | **76** | **42** J1 | **12** J1 | **39** | **460** J | **59** | 98 U | **81** J1 | **43** | **130** J1 |
| Naphthalene | 2100 | 2100 | **78** | **75** | 58 U | **14** | **61** | **760** J | **110** | 98 U | **230** | **51** | **220** |
| Total Naphthalenes | | | **132** | **151** | **42** J | **26** J | **100** | **1220** J | **169** | NA | **311** J | **94** | **350** J |
| Phenanthrene | 1500 | 1500 | **800** | **570** | **440** | **190** | **780** | **9600** | **1900** | **180** | **1600** | **590** | **1400** |
| Pyrene | 2600 | 3300 | **880** | **740** | **480** | **290** | **900** | **12000** | **2600** | **240** | **1400** | **570** | **1600** |
| cPAH TEQ | 150 (f) | | **480** | **404** J | **282** | **193** | **524** | **6954** J | **1676** | **183** | **580** J | **372** | **892** J |
| **PCBs (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | |
| Aroclor 1016 | | | 19 UJ | 19 U | 19 U | 20 U | 19 U | 19 U | 19 U | 20 U | 92 U | 20 U | 39 U |
| Aroclor 1221 | | | 19 UJ | 19 U | 19 U | 20 U | 19 U | 19 U | 19 U | 20 U | 92 U | 20 U | 39 U |
| Aroclor 1232 | | | 19 UJ | 19 U | 19 U | 20 U | 19 U | 19 U | 19 U | 20 U | 92 U | 20 U | 39 U |
| Aroclor 1242 | | | 19 UJ | 19 U | 19 U | 20 U | 19 U | 19 U | 19 U | 20 U | 92 U | 20 U | 39 U |
| Aroclor 1248 | | | **28** J | 19 U | 19 U | **50** | **42** | 170 U | 75 U | **22** | 92 U | 58 U | **94** |
| Aroclor 1254 | | | **100** J | **44** | **43** | **170** | **90** | **480** | **180** | **49** | **190** | **160** | **210** |
| Aroclor 1260 | | | **49** J | **64** J | **55** J | **68** J | **74** | **410** | **91** | **69** J | **180** J | **92** | **160** |
| Total PCBs (d) | 2 (f) | | **177** J | **108** J | **98** J | **288** J | **206** | **890** | **271** | **140** J | **370** J | **252** | **464** |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | |
| **Methods 6010B/6020** | | | | | | | | | | | | | |
| Antimony | | | **1.1** | 0.4 U | **0.9** | **0.2** | **2.0** | **3.0** | **1.2** | 0.3 U | 0.4 UJ | **0.7** | **0.7** |
| Arsenic | 7 (f) | | **13.1** | **11.7** | **14.1** | **10.8** | **19.3** | **58.0** | **18.3** | **8.2** | **13.1** | **14.3** | **18.4** |
| Barium | | | **169** | **138** | **179** | **164** | **122** | **197** | **224** | **150** | **119** | **181** | **545** |
| Beryllium | | | **0.6** | 0.4 U | 0.4 U | **0.3** | 0.5 U | **0.5** | 0.5 U | **0.3** | 0.4 U | **0.3** | 0.5 U |
| Cadmium | 5.1 | 6.7 | **25.2** | **13.8** | **17.3** | **15.5** | **23.7** | **38.1** | **9.0** | **2.1** | **13.0** | **17.1** | **7.2** |
| Chromium | 260 | 270 | **116** | **97.1** | **106** | **61.9** | **200** | **492** | **388** | **45.8** | **128** J | **90.5** | **284** |
| Copper | 390 | 390 | **168** | **114** | **124** | **78.00** | **202** | **606** | **258** | **50.2** | **110** | **117** | **312** |
| Lead | 450 | 530 | **108** | **98.9** | **96.8** | **55.1** | **147** | **568** | **246** | **41.4** | **168** J | **119** | **268** |
| Nickel | | | **65** | **61.7** | **69** | **51.3** | **122** | **226** | **147** | **54.4** | **87** | **67.5** | **127** |
| Selenium | | | **1** | 0.9 U | 1 U | 0.5 U | 1 U | **3** | **2** | **0.7** | **1** | 0.7 | **2** |
| Silver | 6.1 | 6.1 | **1.0** | **1.1** | **0.5** | **0.3** | **0.7** | **1.9** | **1.1** | 0.3 U | **0.5** | **0.4** | **0.6** |
| Zinc | 410 | 960 | **1120** | **1000** | **1530** | **1860** | **2390** | **6640** | **2240** | **380** | **1050** | **1370** | **3390** |
| **Method SW7199** | | | | | | | | | | | | | |
| Chromium VI | | | 0.837 U | 0.713 U | 0.817 U | 0.399 U | 1.08 U | 0.915 U | 0.824 U | 0.539 U | **0.951** | 0.574 U | 1.04 U |
| **Method SW7471A** | | | | | | | | | | | | | |
| Mercury | 0.41 | 0.59 | **0.11** | **0.18** | **0.12** | **0.12** | **1.57** | **0.72** | **0.23** | **0.04** | **0.09** | **0.08** | **0.22** |

# TABLE 31
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA
## BUILDING 14-02/14-03 AREA
## BOEING ISAACSON-THOMPSON
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2012 Source Material | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-PAINT-01-120410 | IT-PAINT-02 | IT-PAINT-03 | IT-PAINT-04 | IT-PAINT-05 | IT-SURFACE-01 | IT-SURFACE-02 | IT-SURFACE-03 | IT-SURFACE-13 |
| | | | 6612539 | 6612540 | 6612541 | 6612542 | 6612543 | 6607139 | 6607140 | 6607141 | 6607154 |
| | | | 1301439 | 1301439 | 1301439 | 1301439 | 1301439 | 1300346 | 1300346 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 04/10/2012 | 04/10/2012 | 04/10/2012 | 04/10/2012 | 04/10/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 | 04/04/2012 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | |
| Benzoic Acid | 650 | 650 | **1900** J1 | **37,000** | **70,000** | **35,000** | **59,000** | 5500 U | 6300 U | 4900 UJ | 6800 U |
| Benzyl Alcohol | 57 | 73 | 200 U | 2000 U | 2000 U | 2000 U | 2000 U | 1100 U | 1300 U | 980 U | 1400 U |
| 4-Bromophenyl-phenylether | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| Butylbenzylphthalate | 63 | 900 | 400 U | 4000 U | 4000 U | 4000 U | 4000 U | 2200 U | 2500 U | 2000 U | 2700 U |
| Di-n-Butylphthalate | 1400 | 5100 | **1700** | 4000 U | 4000 U | 4000 U | 4000 U | **20,000** | 2500 U | 2000 UJ | 2700 U |
| Carbazole | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 4-Chloro-3-methylphenol | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 4-Chloroaniline | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| bis(2-Chloroethoxy) Methane | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| Bis-(2-Chloroethyl) Ether | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 2-Chloronaphthalene | | | 42 U | 420 U | 420 U | 420 U | 420 U | 230 U | 270 U | 210 U | 290 U |
| 2-Chlorophenol | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 4-Chlorophenyl-phenylether | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 2,2'-Oxybis(1-Chloropropane) | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 1,2-Dichlorobenzene | 35 | 50 | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 1,3-Dichlorobenzene | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 1,4-Dichlorobenzene | 110 | 110 | 100 U | 1000 U | **6400** | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 3,3'-Dichlorobenzidine | | | 600 U | 6000 U | 6000 U | 6000 U | 6000 U | 3300 U | 3800 U | 2900 UJ | 4100 U |
| 2,4-Dichlorophenol | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| Diethylphthalate | 200 | 1200 | 400 U | 4000 U | 4000 U | 4000 U | 4000 U | 2200 U | 2500 U | 2000 UJ | 2700 U |
| 2,4-Dimethylphenol | 29 | 29 | 60 U | 600 U | 600 U | 600 U | 600 U | 330 U | 380 U | 290 U | 410 U |
| Dimethylphthalate | 71 | 160 | 400 U | 4000 U | 4000 U | **33,000** | 4000 U | 2200 U | 2500 U | 2000 UJ | 2700 U |
| 4,6-Dinitro-2-Methylphenol | | | 1000 U | 10,000 U | 10,000 U | 10,000 U | 10,000 U | 5500 U | 6300 U | 4900 UJ | 6800 U |
| 2,4-Dinitrophenol | | | 1800 U | 18,000 U | 18,000 U | 18,000 U | 18,000 U | 9800 U | 11,000 U | 8800 UJ | 12,000 U |
| 2,4-Dinitrotoluene | | | 400 U | 4000 U | 4000 U | 4000 U | 4000 U | 2200 U | 2500 U | 2000 UJ | 2700 U |
| 2,6-Dinitrotoluene | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | **670,000** | **1,100,000** | **3,800,000** | **79,000** | 4000 U | **36,000** | **2900** J1 | **5800** | **9100** |
| Hexachlorobenzene | 22 | 70 | 20 U | 200 U | 200 U | 200 U | 200 U | 110 U | 130 U | 98 U | 140 U |
| Hexachlorobutadiene | 11 | 120 | 60 U | 600 U | 600 U | 600 U | 600 U | 330 U | 380 U | 290 U | 410 U |
| Hexachlorocyclopentadiene | | | 1000 U | 10,000 U | 10,000 U | 10,000 U | 10,000 U | 5500 U | 6300 U | 4900 UJ | 6800 U |
| Hexachloroethane | | | 200 U | 2000 U | 2000 U | 2000 U | 2000 U | 1100 U | 1300 U | 980 U | 1400 U |
| Isophorone | | | 100 U | 1000 U | 1000 U | **20,000** | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 1-Methylnaphthalene | | | 20 U | 200 U | 200 U | 200 U | 200 U | 110 U | 130 U | 98 U | 140 U |
| 2-Methylphenol | 63 | 63 | 60 U | 600 U | 600 U | 600 U | 600 U | 330 U | 380 U | 290 U | 410 U |
| 4-Methylphenol | 670 | 670 | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 2-Nitroaniline | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 3-Nitroaniline | | | 400 U | 4000 U | 4000 U | 4000 U | 4000 U | 2200 U | 2500 U | 2000 UJ | 2700 U |
| 4-Nitroaniline | | | 400 U | 4000 U | 4000 U | 4000 U | 4000 U | 2200 U | 2500 U | 2000 UJ | 2700 U |
| Nitrobenzene | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 2-Nitrophenol | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 4-Nitrophenol | | | 1000 U | 10,000 U | 10,000 U | 10,000 U | 10,000 U | 5500 U | 6300 U | 4900 UJ | 6800 U |
| N-Nitroso-Di-N-Propylamine | | | 100 U | 1000 U | 1000 U | **3000** | 1000 U | 550 U | 630 U | 490 U | 680 U |
| N-Nitrosodiphenylamine | 28 | 40 | 60 U | 600 U | 600 U | 600 U | 600 U | 330 U | 380 U | 290 U | 410 U |
| Di-n-Octyl phthalate | 6200 | 6200 | 400 U | 4000 U | 4000 U | 4000 U | 4000 U | 2200 U | 2500 U | 2000 UJ | 2700 U |
| Pentachlorophenol | 360 | 690 | 200 U | 2000 U | 2000 U | 2000 U | 2000 U | 1100 U | 1300 U | 980 U | 1400 U |
| Phenol | 420 | 1200 | 100 U | 1000 U | 1000 U | **2100** | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 2,4,5-Trichlorophenol | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |
| 2,4,6-Trichlorophenol | | | 100 U | 1000 U | 1000 U | 1000 U | 1000 U | 550 U | 630 U | 490 U | 680 U |

# TABLE 31
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA
## BUILDING 14-02/14-03 AREA
## BOEING ISAACSON-THOMPSON
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2012 Source Material | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-PAINT-01-120410 | IT-PAINT-02 | IT-PAINT-03 | IT-PAINT-04 | IT-PAINT-05 | IT-SURFACE-01 | IT-SURFACE-02 | IT-SURFACE-03 | IT-SURFACE-13 |
| | | | 6612539 | 6612540 | 6612541 | 6612542 | 6612543 | 6607139 | 6607140 | 6607141 | 6607154 |
| | | | 1301439 | 1301439 | 1301439 | 1301439 | 1301439 | 1300346 | 1300346 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 04/10/2012 | 04/10/2012 | 04/10/2012 | 04/10/2012 | 04/10/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 | 04/04/2012 |
| **PAHs (µg/kg)** | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | |
| Acenaphthene | 500 | 500 | 400 U | 400 U | 200 U | 400 U | 200 U | 44 U | 100 UJ | **71** J1 | **240** |
| Acenaphthylene | 1300 | 1300 | 200 U | 200 U | 100 U | 200 U | 100 U | **59** J1 | **57** J, J1 | **71** J1 | **65** J1 |
| Anthracene | 960 | 960 | 200 U | 200 U | 100 U | 200 U | 100 U | **120** | **130** J, J1 | **160** | **350** |
| Benzo(a)anthracene | 1300 | 1600 | 400 U | 400 U | 200 U | 400 U | 200 U | **380** | **200** J, J1 | **520** | **750** |
| Benzo(a)pyrene | 1600 | 1600 | 400 U | 400 U | 200 U | 400 U | 200 U | **520** | **260** J | **740** | **780** |
| Benzo(b)fluoranthene | | | 400 U | 400 U | 200 U | 400 U | 200 U | **1300** | **990** J | **1800** | **1600** |
| Benzo(g,h,i)perylene | 670 | 720 | 400 U | 400 U | 200 U | 400 U | 200 U | **290** | **170** J, J1 | **370** | **260** |
| Benzo(k)fluoranthene | | | 400 U | 400 U | 200 U | 400 U | 200 U | **460** | **860** J | **650** | **650** |
| Total Benzofluoranthenes (d, e) | 3200 | 3600 | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| Chrysene | 1400 | 2800 | 200 U | 200 U | 100 U | 200 U | 100 U | **1000** | **1200** J | **1500** | **1100** |
| Dibenz(a,h)anthracene | 230 | 230 | 400 U | 400 U | 200 U | 400 U | 200 U | **76** J1 | 100 UJ | **99** J1 | **77** J1 |
| Dibenzofuran | | | 400 U | 400 U | 200 U | 400 U | 200 U | **59** J1 | **200** J, J1 | **100** | **170** |
| Fluoranthene | 1700 | 2500 | 400 U | 400 U | **300** J1 | 400 U | 200 U | **1500** | **2500** J | **2400** | **2700** |
| Fluorene | 540 | 540 | 400 U | 400 U | 200 U | 400 U | 200 U | **54** J1 | **130** J, J1 | **96** J1 | **270** |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | 400 U | 400 U | 200 U | 400 U | 200 U | **280** | **170** J, J1 | **380** | **250** |
| 2-Methylnaphthalene | 670 | 670 | 400 U | 400 U | 200 U | 400 U | 200 U | **53** J1 | **110** J, J1 | **58** J1 | **110** J1 |
| Naphthalene | 2100 | 2100 | **520** J1 | **470** J1 | 200 U | **610** J1 | 200 U | **120** | **220** J, J1 | **140** | **190** |
| Total Naphthalenes | | | **520** J | **470** J | NA | **610** J | NA | **173** J | **330** J | **198** J | **300** J |
| Phenanthrene | 1500 | 1500 | **890** J1 | **890** J1 | **290** J1 | **950** J1 | 200 U | **820** | **2000** J | **1300** | **2100** |
| Pyrene | 2600 | 3300 | 400 U | 400 U | **220** J1 | 400 U | 200 U | **1000** | **1300** J | **1500** | **2000** |
| cPAH TEQ | 150 (f) | | ND | ND | ND | ND | ND | **780** J | **494** J | **1100** | **1124** J |
| | | | | | | | | | | | |
| **PCBs (µg/kg)** | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | |
| Aroclor 1016 | | | 72 U | 72 U | 72 U | 72 U | 360 U | 9.5 U | 11 U | 8.5 U | 12 U |
| Aroclor 1221 | | | 92 U | 92 U | 92 U | 92 U | 460 U | 12 U | 14 U | 11 U | 15 U |
| Aroclor 1232 | | | 160 U | 160 U | 160 U | 160 U | 800 U | 21 U | 25 U | 19 U | 26 U |
| Aroclor 1242 | | | 66 U | 66 U | 66 U | 66 U | 330 U | 8.7 U | 10 U | 7.8 U | 11 U |
| Aroclor 1248 | | | 66 U | **470** | **430** | 66 U | 330 U | 8.7 U | 10 U | 7.8 U | 11 U |
| Aroclor 1254 | | | **120** J1 | **440** | **190** J1 | **1400** | **11,000** | **130** J | 10 U | 7.8 U | **50** J, J1 |
| Aroclor 1260 | | | 98 U | **200** J1 | 98 U | 98 U | 490 U | **110** J | **51** J1 | **130** J | 16 U |
| Total PCBs (d) | 2 (f) | | **120** J | **1110** | **620** J | **1400** | **11,000** | **240** J | **51** J | **130** J | **50** J |
| | | | | | | | | | | | |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | |
| **Methods 6010B/6020** | | | | | | | | | | | |
| Antimony | | | **0.263** | **5.54** | **58.8** | **0.900** | **0.373** | **6.55** J | **8.88** | **2.77** | **2.49** |
| Arsenic | 7 (f) | | **4.49** J1 | **20.5** J1 | **20.5** | **0.875** J1 | **4.54** | **9.30** | **41.7** | **14.9** | **14.8** |
| Barium | | | **2160** | **6030** | **310** | **250** | **2950** | **143** J | **204** | **144** | **209** |
| Beryllium | | | **0.137** J1 | **0.0210** J1 | 0.0264 U | **0.0186** J1 | **0.0570** J1 | **0.180** J1 | **0.257** J1 | **0.308** J1 | **0.326** J1 |
| Cadmium | 5.1 | 6.7 | **2.00** | **3.31** | **7.94** | **147** | **4.51** | **10.9** | **46.7** | **13.0** | **6.66** |
| Chromium | 260 | 270 | **4200** | **17,800** | **1580** | **76.6** | **16.6** | **161** | **154** | **199** | **112** |
| Copper | 390 | 390 | **31.5** | **42.3** | **231** | **12.4** | **30.9** | **156** | **128** | **197** | **109** |
| Lead | 450 | 530 | **16,300** | **71,300** | **14,600** | **1740** | **395** | **371** J | **235** | **288** | **65.6** |
| Nickel | | | **18.2** | **38.6** | **60.1** | **8.71** | **7.47** | **87.6** | **95.8** | **97.7** | **59.1** |
| Selenium | | | 3.27 U | **12.6** | **9.33** J1 | **10.4** | **1.20** J1 | 4.44 U | 1.01 U | 3.98 U | 1.11 U |
| Silver | 6.1 | 6.1 | **0.769** J1 | **2.56** | **5.61** | 0.160 U | **0.344** J1 | **8.01** J | **1.03** | **1.27** | **0.869** |
| Zinc | 410 | 960 | **1480** | **242** | **81,100** | **2110** | **8140** | **4270** | **1830** | **2030** | **1030** |
| | | | | | | | | | | | |
| **Method SW7199** | | | | | | | | | | | |
| Chromium VI | | | **386** | **9380** | **118** | **0.47** J1 | **0.49** J1 | 0.26 U | 0.31 U | 0.25 U | **2.9** J |
| | | | | | | | | | | | |
| **Method SW7471A** | | | | | | | | | | | |
| Mercury | 0.41 | 0.59 | **0.159** | **0.100** | **0.0300** J1 | **0.115** | **37.0** | **0.107** J1 | **0.0720** J1 | **0.137** | **0.144** J1 |

**TABLE 31**
**STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA**
**BUILDING 14-02/14-03 AREA**
**BOEING ISAACSON-THOMPSON**
**TUKWILA, WASHINGTON**

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
NA = Not Analyzed
ND = Not Detected
SMS = Sediment Management Standards
CSL = Cleanup Screening Level
SCO = Sediment Cleanup Objective
LAET = Lowest Apparent Effects Threshold
PRG = Preliminary Remediation Goal

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

Bold = Detected compound.

(a) Dry weight equivalent criteria are based on the Puget Sound Apparent Effects Threshold Values (Barrick et al. 1988)
(b) SMS SCO/LAET
(c) SMS CSL/2LAET
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
(i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compound/isomers.
(ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.
(e) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(f) Lower Duwamish Waterway Preliminary Remediation Goal (PRG)

# TABLE 32
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - ISAACSON EAST AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | | 2012 Source Material | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-CB10 | IT-CB11 | IT-CB12 | IT-VTVE | IT-CJM-08 | IT-SURFACE-05 | IT-SURFACE-06 | IT-SURFACE-07 | IT-SURFACE-08 |
| | | | TL84F | TL84E | TL84D | TL84C | 6612538 | 6607143 | 6607144 | 6607145 | 6607146 |
| | | | TL84 | TL84 | TL84 | TL84 | 1301439 | 1300346 | 1300346 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/12/2011 | 09/12/2011 | 09/12/2011 | 09/12/2011 | 04/10/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | |
| Benzoic Acid | 650 | 650 | 5600 U | 5700 U | **1400** J1 | **1200** J1 | 25,000 U | 6600 U | 5100 U | 5000 U | 6600 U |
| Benzyl Alcohol | 57 | 73 | 280 U | 280 U | **240** | **210** J1 | 5000 U | 1300 U | 1000 U | 1000 U | 1300 U |
| 4-Bromophenyl-phenylether | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| Butylbenzylphthalate | 63 | 900 | **350** J | 280 U | **470** J | **370** J | 10,000 U | 2600 U | 2100 U | 2000 U | 2700 U |
| Di-n-Butylphthalate | 1400 | 5100 | 280 U | 280 U | **430** | 240 U | 10,000 U | 2600 U | 2100 U | 2000 U | 2700 U |
| Carbazole | | | **450** | **1000** | **210** J1 | **200** J1 | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 4-Chloro-3-methylphenol | | | 1400 U | 1400 U | 1100 U | 1200 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 4-Chloroaniline | | | 3800 U | 3800 U | 3000 U | 3200 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| bis(2-Chloroethoxy) Methane | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| Bis-(2-Chloroethyl) Ether | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 2-Chloronaphthalene | | | 280 U | 280 U | 220 U | 240 U | 1100 U | 280 U | 220 U | 210 U | 280 U |
| 2-Chlorophenol | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 4-Chlorophenyl-phenylether | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 2,2'-Oxybis(1-Chloropropane) | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 1,2-Dichlorobenzene | 35 | 50 | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 1,3-Dichlorobenzene | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 1,4-Dichlorobenzene | 110 | 110 | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 3,3'-Dichlorobenzidine | | | 2100 U | 2100 U | 1600 U | 1800 U | 15,000 U | 4000 U | 3100 U | 3000 U | 4000 U |
| 2,4-Dichlorophenol | | | 2800 U | 2800 U | 2200 U | 2400 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| Diethylphthalate | 200 | 1200 | 700 U | 710 U | 550 U | 590 U | 10,000 U | 2600 U | 2100 U | 2000 U | 2700 U |
| 2,4-Dimethylphenol | 29 | 29 | 560 U | 570 U | 440 U | 480 U | 1500 U | 400 U | 310 U | 300 U | 400 U |
| Dimethylphthalate | 71 | 160 | 280 U | 280 U | 220 U | 240 U | 10,000 U | 2600 U | 2100 U | 2000 U | 2700 U |
| 4,6-Dinitro-2-Methylphenol | | | 2800 U | 2800 U | 2200 U | 2400 U | 25,000 U | 6600 U | 5100 U | 5000 U | 6600 U |
| 2,4-Dinitrophenol | | | 12000 U | 12000 U | 9300 U | 10000 U | 45,000 U | 12,000 U | 9200 U | 9000 U | 12,000 U |
| 2,4-Dinitrotoluene | | | 1400 U | 1400 U | 1100 U | 1200 U | 10,000 U | 2600 U | 2100 U | 2000 U | 2700 U |
| 2,6-Dinitrotoluene | | | 1400 U | 1400 U | 1100 U | 1200 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | **720** | **880** | **3000** | **3300** | **24,000** J1 | 2600 U | 2100 U | 2000 U | **6600** J1 |
| Hexachlorobenzene | 22 | 70 | 280 U | 280 U | 220 U | 240 U | 500 U | 130 U | 100 U | 100 U | 130 U |
| Hexachlorobutadiene | 11 | 120 | 1400 U | 1400 U | 1100 U | 1200 U | 1500 U | 400 U | 310 U | 300 U | 400 U |
| Hexachlorocyclopentadiene | | | 5600 U | 5700 U | 4400 U | 4800 U | 25,000 U | 6600 U | 5100 U | 5000 U | 6600 U |
| Hexachloroethane | | | 280 U | 280 U | 220 U | 240 U | 5000 U | 1300 U | 1000 U | 1000 U | 1300 U |
| Isophorone | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 1-Methylnaphthalene | | | 280 U | **440** | 220 U | 240 U | 500 U | 130 U | 100 U | 100 U | 130 U |
| 2-Methylphenol | 63 | 63 | 280 U | 280 U | 220 U | 240 U | 1500 U | 400 U | 310 U | 300 U | 400 U |
| 4-Methylphenol | 670 | 670 | 560 U | 570 U | **760** | **590** | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 2-Nitroaniline | | | 1400 U | 1400 U | 1100 U | 1200 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 3-Nitroaniline | | | 1400 U | 1400 U | 1100 U | 1200 U | 10,000 U | 2600 U | 2100 U | 2000 U | 2700 U |
| 4-Nitroaniline | | | 1400 U | 1400 U | 1100 U | 1200 U | 10,000 U | 2600 U | 2100 U | 2000 U | 2700 U |
| Nitrobenzene | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 2-Nitrophenol | | | 1400 U | 1400 U | 1100 U | 1200 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 4-Nitrophenol | | | 1400 U | 1400 U | 1100 U | 1200 U | 25,000 U | 6600 U | 5100 U | 5000 U | 6600 U |
| N-Nitroso-Di-N-Propylamine | | | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| N-Nitrosodiphenylamine | 28 | 40 | 280 U | 280 U | 220 U | 240 U | 1500 U | 400 U | 310 U | 300 U | 400 U |
| Di-n-Octyl phthalate | 6200 | 6200 | 280 U | 280 U | 220 U | **130** J1 | 10,000 U | 2600 U | 2100 U | 2000 U | 2700 U |
| Pentachlorophenol | 360 | 690 | 2800 U | 2800 U | 2200 U | 2400 U | 5000 U | 1300 U | 1000 U | 1000 U | 1300 U |
| Phenol | 420 | 1200 | 280 U | 280 U | **300** | **260** | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 280 U | 280 U | 220 U | 240 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 2,4,5-Trichlorophenol | | | 1400 U | 1400 U | 1100 U | 1200 U | 2500 U | 660 U | 510 U | 500 U | 660 U |
| 2,4,6-Trichlorophenol | | | 1400 U | 1400 U | 1100 U | 1200 U | 2500 U | 660 U | 510 U | 500 U | 660 U |

# TABLE 32
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - ISAACSON EAST AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | | 2012 Source Material | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-CB10 | IT-CB11 | IT-CB12 | IT-VTVE | IT-CJM-08 | IT-SURFACE-05 | IT-SURFACE-06 | IT-SURFACE-07 | IT-SURFACE-08 |
| | | | TL84F | TL84E | TL84D | TL84C | 6612538 | 6607143 | 6607144 | 6607145 | 6607146 |
| | | | TL84 | TL84 | TL84 | TL84 | 1301439 | 1300346 | 1300346 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/12/2011 | 09/12/2011 | 09/12/2011 | 09/12/2011 | 04/10/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 |
| **PAHs (µg/kg)** | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | |
| Acenaphthene | 500 | 500 | 130 J1 | 110 | 140 | 220 | 200 U | 58 J1 | 41 U | 16 U | 21 U |
| Acenaphthylene | 1300 | 1300 | 140 U | 25 J1 | 58 | 94 | 100 U | 27 U | 20 U | 8.0 U | 11 U |
| Anthracene | 960 | 960 | 120 J1 | 130 | 120 | 120 | 300 J, J1 | 120 J1 | 24 J1 | 9.7 J1 | 19 J1 |
| Benzo(a)anthracene | 1300 | 1600 | 380 | 730 | 430 | 540 | 8200 | 430 | 100 J1 | 36 J1 | 73 |
| Benzo(a)pyrene | 1600 | 1600 | 340 | 800 | 550 | 660 | 8000 | 570 | 140 | 53 | 110 |
| Benzo(b)fluoranthene | | | NA | NA | NA | NA | 22,000 | 1300 | 250 | 140 | 270 |
| Benzo(g,h,i)perylene | 670 | 720 | 480 | 640 | 560 | 760 | 1500 | 270 | 110 | 35 J1 | 46 J1 |
| Benzo(k)fluoranthene | | | NA | NA | NA | NA | 6700 | 440 | 81 J1 | 43 | 120 |
| Total Benzofluoranthenes (d, e) | 3200 | 3600 | 780 | 1700 | 1400 | 1600 | NA | NA | NA | NA | NA |
| Chrysene | 1400 | 2800 | 740 | 1200 | 1100 | 1400 | 13,000 | 910 | 240 | 110 | 220 |
| Dibenz(a,h)anthracene | 230 | 230 | 77 J1 | 140 | 120 | 140 | 780 | 70 J1 | 41 U | 16 U | 21 U |
| Dibenzofuran | | | 120 J1 | 69 | 160 | 110 | 200 U | 93 J1 | 41 U | 16 U | 30 J1 |
| Fluoranthene | 1700 | 2500 | 1200 | 2800 | 1900 | 2100 | 10,000 | 1600 | 260 | 130 | 290 |
| Fluorene | 540 | 540 | 140 | 120 | 190 | 150 | 200 U | 84 J1 | 41 U | 16 U | 21 U |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | 300 | 550 | 460 | 560 | 1800 | 260 | 85 J1 | 25 J1 | 37 J1 |
| 2-Methylnaphthalene | 670 | 670 | 100 J1 | 33 J1 | 170 | 230 | 200 U | 79 J1 | 41 U | 21 J1 | 37 J1 |
| Naphthalene | 2100 | 2100 | 220 | 90 | 190 | 180 | 200 U | 170 | 72 J1 | 34 J1 | 79 |
| Total Naphthalenes | | | 320 J | 123 J1 | 360 | 410 | NA | 249 J | 72 J | 55 J | 116 J |
| Phenanthrene | 1500 | 1500 | 940 | 2000 | 1500 | 1400 | 870 | 950 | 150 | 80 | 200 |
| Pyrene | 2600 | 3300 | 1200 | 2000 | 1300 | 1600 | 18,000 J | 1100 | 230 | 95 | 210 |
| cPAH TEQ | 150 (f) | | 501 J | 1124 | 802 | 958 | 12,078 | 829 J | 194 J | 79 J | 162 J |
| **PCBs (µg/kg)** | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | |
| Aroclor 1016 | | | 19 U | 18 U | 20 U | 39 U | 7200 U | 57 U | 8.8 U | 8.6 U | 11 U |
| Aroclor 1221 | | | 19 U | 18 U | 20 U | 39 U | 9200 U | 73 U | 11 U | 11 U | 15 U |
| Aroclor 1232 | | | 19 U | 18 U | 20 U | 39 U | 16,000 U | 130 U | 20 U | 19 U | 25 U |
| Aroclor 1242 | | | 19 U | 18 U | 20 U | 39 U | 6600 U | 52 U | 8.1 U | 7.9 U | 10 U |
| Aroclor 1248 | | | 56 U | 230 U | 250 U | 190 U | 6600 U | 52 U | 8.1 U | 7.9 U | 10 U |
| Aroclor 1254 | | | 150 | 600 | 720 | 570 | 79,000 J | 570 | 38 J, J1 | 130 | 160 |
| Aroclor 1260 | | | 140 P | 190 | 210 | 200 | 9800 U | 78 U | 73 J | 82 | 100 |
| Total PCBs (d) | 2 (f) | | 290 P | 790 | 930 | 770 | 79,000 J | 570 | 111 J | 212 | 260 |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | |
| **Methods 6010B/6020** | | | | | | | | | | | |
| Antimony | | | 0.2 U | 0.2 U | 0.4 | 0.5 | NA | 2.73 | 0.798 | 0.376 U | 1.15 |
| Arsenic | 7 (f) | | 33.9 | 17.2 | 32.4 | 38.8 | NA | 17.4 | 16.8 | 7.12 | 6.92 |
| Barium | | | 65.4 | 66.4 | 95 | 74 | NA | 164 | 84.9 | 86.5 | 84.8 |
| Beryllium | | | 0.2 U | 0.3 | 0.4 U | 0.4 U | NA | 0.242 J1 | 0.241 J1 | 0.337 J1 | 0.217 J1 |
| Cadmium | 5.1 | 6.7 | 0.8 | 1.3 | 2.5 | 2.4 | NA | 1.11 | 1.08 | 0.639 | 2.33 |
| Chromium | 260 | 270 | 92.3 | 152 | 373 | 290 | NA | 338 | 204 | 52.3 | 1570 |
| Copper | 390 | 390 | 73.8 | 108 | 251 | 245 | NA | 132 | 100 | 48.7 | 306 |
| Lead | 450 | 530 | 59.8 | 201 | 437 | 378 | NA | 263 | 72.5 | 12.8 | 140 |
| Nickel | | | 66.4 | 109 | 271 | 236 | NA | 180 | 129 | 38.8 | 856 |
| Selenium | | | 0.6 U | 0.5 U | 1 | 1 | NA | 1.05 U | 4.18 U | 0.797 U | 5.35 U |
| Silver | 6.1 | 6.1 | 0.2 | 0.2 | 0.5 | 0.6 | NA | 0.681 J1 | 0.691 | 0.437 J1 | 1.52 |
| Zinc | 410 | 960 | 278 | 640 | 1100 | 990 | NA | 544 | 568 | 170 | 971 |
| **Method SW7199** | | | | | | | | | | | |
| Chromium VI | | | 0.482 U | 0.408 U | 0.894 U | 0.859 U | NA | 4.2 | 0.47 J1 | 1.5 | 0.31 U |
| **Method SW7471A** | | | | | | | | | | | |
| Mercury | 0.41 | 0.59 | 0.07 | 0.11 | 0.15 | 0.19 | NA | 0.0586 J1 | 0.0174 J1 | 0.0677 J1 | 0.0273 J1 |

**TABLE 32**
**STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - ISAACSON EAST AREA**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
NA = Not Analyzed
SMS = Sediment Management Standards
CSL = Cleanup Screening Level
SCO = Sediment Cleanup Objective
LAET = Lowest Apparent Effects Threshold
PRG = Preliminary Remediation Goal

U = Indicates the compound was not detected at or above the reporting limit.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
P = The analyte was detected on both chromatographic columns but the quantified values differ by 40% RPD with no obvious chromatographic interference. The higher of the two values is reported by the laboratory.

[Yellow box] Indicates concentration exceeds SCO but less than the CSL or the dry weight equivalent values (LAET and 2LAET, respectively)
[Gray box] Indicates concentration exceeds the SCO and CSL or dry weight equivalent criteria or PRG.
**Bold** = Detected compound.

(a) Dry weight equivalent criteria are based on the Puget Sound Apparent Effect Threshold Values (Barrick et al. 1988)
(b) SMS SCO /LAET
(c) SMS CSL / 2LAET
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
- (i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compound/isomers.
- (ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.

(e) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(f) Lower Duwamish Waterway Preliminary Remediation Goal (PRG)

# TABLE 33
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - ISAACSON WEST AREA
## BOEING ISAACSON-THOMPSON
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | 2012 Source Material | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-CB34 | IT-CB35 | IT-VTVW | IT-CJM-07 | IT-SURFACE-09 | IT-SURFACE-10 | IT-SURFACE-11 | IT-SURFACE-12 |
| | | | TL84A | TL84B | TL29E/TO31A | 6612537 | 6607147 | 6607148 | 6607149 | 6607150 |
| | | | TL84 | TL84 | TL29/TO31 | 1301439 | 1300346 | 1300346 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/12/2011 | 09/12/2011 | 09/07/2011 | 04/10/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | |
| Benzoic Acid | 650 | 650 | 1900 U | **1600** J | 8200 UJ | 25,000 UJ | 1400 U | 2400 U | 11,000 U | 7500 U |
| Benzyl Alcohol | 57 | 73 | 94 U | **140** J | 410 U | 5000 U | 280 U | 490 U | 2300 U | 1500 U |
| 4-Bromophenyl-phenylether | | | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| Butylbenzylphthalate | 63 | 900 | 94 U | **310** J | **370** J | 10,000 U | 560 U | 980 U | 4600 U | 3000 U |
| Di-n-Butylphthalate | 1400 | 5100 | 94 U | 180 U | **430** | 10,000 UJ | 560 U | 980 U | 4600 U | 3000 U |
| Carbazole | | | 94 U | **130** J | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 4-Chloro-3-methylphenol | | | 470 U | 910 U | 2000 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 4-Chloroaniline | | | 1300 U | 2500 U | 5500 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| bis(2-Chloroethoxy) Methane | | | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| Bis-(2-Chloroethyl) Ether | | | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 2-Chloronaphthalene | | | 94 U | 180 U | 410 U | 1100 U | 59 U | 100 U | 480 U | 310 U |
| 2-Chlorophenol | | | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 4-Chlorophenyl-phenylether | | | 94 U | 180 U | 410 UJ | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 2,2'-Oxybis(1-Chloropropane) | | | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 1,2-Dichlorobenzene | 35 | 50 | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 1,3-Dichlorobenzene | | | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 1,4-Dichlorobenzene | 110 | 110 | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 3,3'-Dichlorobenzidine | | | 700 U | 1400 U | 3100 U | 15,000 UJ | 840 U | 1500 U | 6800 U | 4500 U |
| 2,4-Dichlorophenol | | | 940 U | 1800 U | 4100 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| Diethylphthalate | 200 | 1200 | 230 U | 460 U | 1000 U | 10,000 UJ | 560 U | 980 U | 4600 U | 3000 U |
| 2,4-Dimethylphenol | 29 | 29 | 190 U | 360 U | 820 U | 1500 U | 84 U | 150 U | 680 U | 450 U |
| Dimethylphthalate | 71 | 160 | 94 U | 180 U | 410 U | 10,000 UJ | 560 U | 980 U | 4600 U | 3000 U |
| 4,6-Dinitro-2-Methylphenol | | | 940 U | 1800 UJ | 4100 U | 25,000 UJ | 1400 U | 2400 U | 11,000 U | 7500 U |
| 2,4-Dinitrophenol | | | 4000 U | 7800 U | 17000 U | 45,000 UJ | 2500 U | 4400 U | 20,000 U | 13,000 U |
| 2,4-Dinitrotoluene | | | 470 U | 910 U | 2000 U | 10,000 UJ | 560 U | 980 U | 4600 U | 3000 U |
| 2,6-Dinitrotoluene | | | 470 U | 910 U | 2000 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| bis(2-Ethylhexyl)phthalate | 1300 | 3100 | **210** | **3000** | **4400** | 10,000 U | **580** J1 | **2900** | 4600 U | 3000 U |
| Hexachlorobenzene | 22 | 70 | 94 U | 180 U | 410 U | 500 U | 28 U | 49 U | 230 U | 150 U |
| Hexachlorobutadiene | 11 | 120 | 470 U | 910 U | 2000 U | 1500 U | 84 U | 150 U | 680 U | 450 U |
| Hexachlorocyclopentadiene | | | 1900 U | 3600 U | 8200 U | 25,000 UJ | 1400 U | 2400 U | 11,000 U | 7500 U |
| Hexachloroethane | | | 94 U | 180 U | 410 U | 5000 U | 280 U | 490 U | 2300 U | 1500 U |
| Isophorone | | | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 1-Methylnaphthalene | | | 94 U | 180 U | 410 U | 500 U | 28 U | 49 U | 230 U | 150 U |
| 2-Methylphenol | 63 | 63 | 94 U | 180 U | 410 U | 1500 U | 84 U | 150 U | 680 U | 450 U |
| 4-Methylphenol | 670 | 670 | 190 U | **410** | **370** J | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 2-Nitroaniline | | | 470 U | 910 U | 2000 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 3-Nitroaniline | | | 470 U | 910 U | 2000 U | 10,000 UJ | 560 U | 980 U | 4600 U | 3000 U |
| 4-Nitroaniline | | | 470 U | 910 U | 2000 U | 10,000 UJ | 560 U | 980 U | 4600 U | 3000 U |
| Nitrobenzene | | | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 2-Nitrophenol | | | 470 U | 910 U | 2000 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 4-Nitrophenol | | | 470 U | 910 U | 2000 U | 25,000 UJ | 1400 U | 2400 U | 11,000 U | 7500 U |
| N-Nitroso-Di-N-Propylamine | | | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| N-Nitrosodiphenylamine | 28 | 40 | 94 U | 180 U | 410 U | 1500 U | 84 U | 150 U | 680 U | 450 U |
| Di-n-Octyl phthalate | 6200 | 6200 | 94 U | **130** J | 410 U | 10,000 U | 560 U | 980 U | 4600 U | 3000 U |
| Pentachlorophenol | 360 | 690 | 940 U | 1800 U | 4100 U | 5000 U | 280 U | 490 U | 2300 U | 1500 U |
| Phenol | 420 | 1200 | 94 U | **120** J | **390** J | 2500 U | 140 U | **1300** | 1100 U | 750 U |
| 1,2,4-Trichlorobenzene | 31 | 51 | 94 U | 180 U | 410 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 2,4,5-Trichlorophenol | | | 470 U | 910 U | 2000 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |
| 2,4,6-Trichlorophenol | | | 470 U | 910 U | 2000 U | 2500 U | 140 U | 240 U | 1100 U | 750 U |

# TABLE 33
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - ISAACSON WEST AREA
## BOEING ISAACSON-THOMPSON
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | 2012 Source Material | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-CB34 | IT-CB35 | IT-VTVW | IT-CJM-07 | IT-SURFACE-09 | IT-SURFACE-10 | IT-SURFACE-11 | IT-SURFACE-12 |
| | | | TL84A | TL84B | TL29E/TO31A | 6612537 | 6607147 | 6607148 | 6607149 | 6607150 |
| | | | TL84 | TL84 | TL29/TO31 | 1301439 | 1300346 | 1300346 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/12/2011 | 09/12/2011 | 09/07/2011 | 04/10/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 |
| **PAHs (µg/kg)** | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | |
| Acenaphthene | 500 | 500 | 46 U | 47 U | **110** | 200 U | **23** J1 | **49** J1 | 37 U | 24 U |
| Acenaphthylene | 1300 | 1300 | 46 U | 47 U | **40** J | 100 U | **15** J1 | **25** J1 | 18 U | 12 U |
| Anthracene | 960 | 960 | 46 U | 47 U | **83** | 100 U | **26** J1 | **77** J1 | **72** J1 | **20** J1 |
| Benzo(a)anthracene | 1300 | 1600 | 46 U | **40** J | **250** | **610** | **86** | **150** | **270** | **68** |
| Benzo(a)pyrene | 1600 | 1600 | 46 U | **75** | **260** | **1800** | **130** | **190** | **300** | **110** |
| Benzo(b)fluoranthene | | | NA | NA | NA | **1000** | **360** | **440** | **610** | **270** |
| Benzo(g,h,i)perylene | 670 | 720 | **67** | **120** | **280** | **690** | **66** | **78** J1 | **160** | **65** |
| Benzo(k)fluoranthene | | | NA | NA | NA | **210** J1 | **120** | **170** | **260** | **110** |
| Total Benzofluoranthenes (d, e) | 3200 | 3600 | 46 U | **150** | **590** | NA | NA | NA | NA | NA |
| Chrysene | 1400 | 2800 | **100** | **250** | **670** | **1500** | **250** | **310** | **470** | **240** |
| Dibenz(a,h)anthracene | 230 | 230 | 46 U | **52** | **58** J | **480** J1 | 22 U | 38 U | **39** J1 | 24 U |
| Dibenzofuran | | | 46 U | 47 U | **98** | 200 UJ | **53** J1 | **84** J1 | **46** J1 | **26** J1 |
| Fluoranthene | 1700 | 2500 | **29** J | **170** | **890** | **520** J | **420** | **600** | **920** | **340** |
| Fluorene | 540 | 540 | 46 U | 47 U | **140** | 200 U | 22 U | **85** J1 | **42** J1 | 24 U |
| Indeno(1,2,3-cd)pyrene | 600 | 690 | 46 U | **56** | **190** | **430** J1 | **63** | **72** J1 | **130** | **54** J1 |
| 2-Methylnaphthalene | 670 | 670 | 46 U | **34** J | **160** | 200 U | **61** | **90** J1 | **41** J1 | **31** J1 |
| Naphthalene | 2100 | 2100 | 46 U | 47 U | **140** | 200 U | **130** | **170** | **100** | **63** |
| Total Naphthalenes | | | NA | **34** J | **300** | NA | **191** | **260** J | **141** J | **94** J |
| Phenanthrene | 1500 | 1500 | 46 U | **140** | **780** | 200 U | **300** | **530** | **550** | **200** |
| Pyrene | 2600 | 3300 | **26** J | **170** | **660** | **7000** J | **320** | **410** | **620** | **230** |
| cPAH TEQ | 150 (f) | | **1.0** | **107** J | **376** J | **2088** J | **195** | **276** J | **436** J | **163** J |
| | | | | | | | | | | |
| **PCBs (µg/kg)** | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | |
| Aroclor 1016 | | | 19 U | 19 U | 19 U | 72 U | 12 U | 21 U | 19 U | 13 U |
| Aroclor 1221 | | | 19 U | 19 U | 19 U | 92 U | 15 U | 27 U | 25 U | 17 U |
| Aroclor 1232 | | | 19 U | 19 U | 19 U | 160 U | 27 U | 46 U | 43 U | 29 U |
| Aroclor 1242 | | | 19 U | 19 U | 19 U | 66 U | 11 U | 19 U | 18 U | 12 U |
| Aroclor 1248 | | | 19 U | **23** | 81 U | 66 U | 11 U | 19 U | 18 U | 12 U |
| Aroclor 1254 | | | **12** J | **42** | **130** | **620** | **42** J, J1 | **540** J | **88** J, J1 | **34** J, J1 |
| Aroclor 1260 | | | **14** J | **42** | **100** | 98 U | **60** J | 28 U | **53** J, J1 | **32** J, J1 |
| Total PCBs (d) | 2 (f) | | **26** J | **107** | **230** | **620** | **102** J | **540** J | **141** J | **66** J |
| | | | | | | | | | | |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | |
| **Methods 6010B/6020** | | | | | | | | | | |
| Antimony | | | 0.2 U | 0.3 UJ | 0.4 U | NA | **3.18** | **5.96** | **1.33** | **1.76** |
| Arsenic | 7 (f) | | **5.7** | **15.2** J | **38.3** | NA | **5.83** J1 | **33.2** | **8.79** | **40.4** |
| Barium | | | **44.5** | **347** J | **113** | NA | **102** | **184** | **112** | **183** |
| Beryllium | | | 0.2 U | 0.3 U | 0.4 U | NA | **0.179** J1 | **0.322** J1 | **0.145** J1 | **0.290** J1 |
| Cadmium | 5.1 | 6.7 | **2.1** | **7.3** J | **23.7** | NA | **6.81** | **21.1** | **2.28** | **7.61** |
| Chromium | 260 | 270 | **59** | **207** J | **821** | NA | **11,100** | **647** | **243** | **395** |
| Copper | 390 | 390 | **30.5** | **80.6** J | **205** | NA | **598** | **368** | **83.5** | **130** |
| Lead | 450 | 530 | **13.2** | **50.1** J | **182** | NA | **317** | **900** | **90.7** | **101** |
| Nickel | | | **19.9** | **79.6** J | **225** | NA | **1720** | **242** | **93.4** | **124** |
| Selenium | | | 0.6 U | **0.9** | **4** | NA | 5.58 U | 9.78 U | 1.86 U | 1.20 U |
| Silver | 6.1 | 6.1 | 0.2 U | 0.3 U | **0.6** | NA | **4.67** | **3.34** | **0.655** J1 | **1.06** |
| Zinc | 410 | 960 | **132** | **384** J | **830** | NA | **2670** | **3260** | **1690** | **564** |
| | | | | | | | | | | |
| **Method SW7199** | | | | | | | | | | |
| Chromium VI | | | 0.488 U | 0.531 UJ | 0.875 U | NA | **0.88** J1 | 0.61 U | 0.57 U | **2.5** |
| | | | | | | | | | | |
| **Method SW7471A** | | | | | | | | | | |
| Mercury | 0.41 | 0.59 | 0.03 U | **0.02** | **0.16** | NA | **0.0463** J1 | **0.169** J1 | **0.0898** J1 | **0.104** J1 |
| | | | | | | | | | | |
| **DIOXIN/FURAN (pg/g)** | | | | | | | | | | |
| **EPA 1613B** | | | | | | | | | | |

# TABLE 33
## STORM DRAIN SOURCE EVALUATION ANALYTICAL DATA - ISAACSON WEST AREA
## BOEING ISAACSON-THOMPSON
## TUKWILA, WASHINGTON

| | Dry Weight Equivalent to SMS Criteria (a) | | 2011 Storm Drain Solids | | | 2012 Source Material | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | IT-CB34 | IT-CB35 | IT-VTVW | IT-CJM-07 | IT-SURFACE-09 | IT-SURFACE-10 | IT-SURFACE-11 | IT-SURFACE-12 |
| | | | TL84A | TL84B | TL29E/TO31A | 6612537 | 6607147 | 6607148 | 6607149 | 6607150 |
| | | | TL84 | TL84 | TL29/TO31 | 1301439 | 1300346 | 1300346 | 1300346 | 1300346 |
| | SCO/LAET (b) | CSL/2LAET (c) | 09/12/2011 | 09/12/2011 | 09/07/2011 | 04/10/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 | 04/03/2012 |
| 1,2,3,4,6,7,8-HpCDD | | | NA | NA | **448** | NA | NA | NA | NA | NA |
| 1,2,3,4,6,7,8-HpCDF | | | NA | NA | **83.2** | NA | NA | NA | NA | NA |
| 1,2,3,4,7,8,9-HpCDF | | | NA | NA | **6.35** | NA | NA | NA | NA | NA |
| 1,2,3,4,7,8-HxCDD | | | NA | NA | **11.8** | NA | NA | NA | NA | NA |
| 1,2,3,4,7,8-HxCDF | | | NA | NA | **11.3** | NA | NA | NA | NA | NA |
| 1,2,3,6,7,8-HxCDD | | | NA | NA | **25.6** | NA | NA | NA | NA | NA |
| 1,2,3,6,7,8-HxCDF | | | NA | NA | **10.3** | NA | NA | NA | NA | NA |
| 1,2,3,7,8,9-HxCDD | | | NA | NA | **24.3** | NA | NA | NA | NA | NA |
| 1,2,3,7,8,9-HxCDF | | | NA | NA | **3.25** | NA | NA | NA | NA | NA |
| 1,2,3,7,8-PeCDD | | | NA | NA | **12.2** | NA | NA | NA | NA | NA |
| 1,2,3,7,8-PeCDF | | | NA | NA | **6.43** | NA | NA | NA | NA | NA |
| 2,3,4,6,7,8-HxCDF | | | NA | NA | **13.9** | NA | NA | NA | NA | NA |
| 2,3,4,7,8-PeCDF | | | NA | NA | **10.9** | NA | NA | NA | NA | NA |
| 2,3,7,8-TCDD | | | NA | NA | **2.27** | NA | NA | NA | NA | NA |
| 2,3,7,8-TCDF | | | NA | NA | **23.8** | NA | NA | NA | NA | NA |
| OCDD | | | NA | NA | **2900** | NA | NA | NA | NA | NA |
| OCDF | | | NA | NA | **150** | NA | NA | NA | NA | NA |
| Total HpCDD | | | NA | NA | **1120** | NA | NA | NA | NA | NA |
| Total HpCDF | | | NA | NA | **205** | NA | NA | NA | NA | NA |
| Total HxCDD | | | NA | NA | **297** | NA | NA | NA | NA | NA |
| Total HxCDF | | | NA | NA | **197** | NA | NA | NA | NA | NA |
| Total PeCDD | | | NA | NA | **96.8** | NA | NA | NA | NA | NA |
| Total PeCDF | | | NA | NA | **273** | NA | NA | NA | NA | NA |
| Total TCDD | | | NA | NA | **41.7** | NA | NA | NA | NA | NA |
| Total TCDF | | | NA | NA | **226** | NA | NA | NA | NA | NA |
| D/F TEQ | 2000 (f) | | NA | NA | **36.6** | NA | NA | NA | NA | NA |

μg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs polycylic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
NA = Not Analyzed
SMS = Sediment Management Standards
CSL = Cleanup Screening Level
SCO = Sediment Cleanup Objective
LAET = Lowest Apparent Effects Threshold
PRG = Preliminary Remediation Goal

[Yellow] Indicates concentration exceeds SCO but less than the CSL or the dry weight equivalent values (LAET and 2LAET, respectively)
[Gray] Indicates concentration exceeds the SCO and CSL or dry weight equivalent criteria or PRG.

(a) Dry weight equivalent criteria are based on the Puget Sound Apparent Effect Threshold Values (Barrick et al. 1988)
(b) SMS SCO /LAET
(c) SMS CSL / 2LAET
(d) Where chemical criteria in this table represent the sum of individual compounds or isomers, the following methods shall be applied:
(i) Where chemical analyses identify an undetected value for every individual compound/isomer, then the single highest detection limit shall represent the sum of the respective compound/isomers.
(ii) Where chemical analyses detect one or more individual compounds/isomers, only the detected concentrations will be added to represent the group sum.
(e) The total benzofluoranthenes criterion represents the sum of the concentrations of the "B," "J," and "K" isomers.
(f) Lower Duwamish Waterway Preliminary Remediation Goal (PRG)

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
Bold = Detected compound.

# TABLE 34
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## BOEING THOMPSON PROPERTY WOODEN BULKHEAD
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | SMS SCO dry weight for metals, LAET for organics | IT-WB-1 UM06A 03/12/2012 | IT-WB-2 UM06B 03/12/2012 | IT-WB-3-120312 UM06C 03/12/2012 |
|---|---|---|---|---|
| **VOLATILES (µg/kg)** | | | | |
| **Method SW8260C** | | | | |
| Chloromethane | | **0.6** J1 | **0.6** J1 | 0.8 U |
| Bromomethane | | **0.4** J1 | **0.7** J1 | 0.8 U |
| Methylene Chloride | | **1.7** | **2.3** | **1.1** J1 |
| Acetone | | **50** | **46** | **58** |
| Carbon Disulfide | | **1.9** J | **0.8** J | **0.9** J |
| 2-Butanone | | **5.0** | **3.7** | **5.9** |
| Trichloroethene | | **0.4** J1 | 0.7 U | 0.8 U |
| Benzene | | **0.4** J1 | **0.3** J1 | **0.7** J1 |
| Toluene | | **0.7** J1 | **0.6** J1 | **0.8** J1 |
| Acrolein | | **2.9** J1 | **4.2** J1 | **7.6** J1 |
| Methyl Iodide | | 0.7 U | **0.9** | 0.8 U |
| | | | | |
| **SEMIVOLATILES (µg/kg)** | | | | |
| **Method SW8270D** | | | | |
| 2,4,6-Trichlorophenol | | 98 U | 96 U | **33** J1 |
| Phenanthrene | 1,500 | **25** | **12** J1 | **41** |
| Di-n-Butylphthalate | 1,400 | 20 U | 19 U | **11** J1 |
| Fluoranthene | 1,700 | **53** | **53** | **23** |
| Pyrene | 2,600 | **47** | **34** | **20** |
| Butylbenzylphthalate | 63 | **13** J1 | 19 U | **13** J1 |
| Benzo(a)anthracene | 1,300 | **17** J1 | 19 U | **16** J1 |
| bis(2-Ethylhexyl)phthalate | 1,300 | **21** J1 | 24 U | **16** J1 |
| Chrysene | 1,400 | **27** | **28** | **35** |
| Benzo(a)pyrene | 1,600 | **20** | 19 U | **12** J1 |
| Indeno(1,2,3-cd)pyrene | 600 | **18** J1 | 19 U | **13** J1 |
| Benzo(g,h,i)perylene | 670 | **29** | **12** J1 | **14** J1 |
| Total Benzofluoranthenes | 3,200 | **48** | **49** | **37** |
| cPAH TEQ | 150 (c) | **29** J | **5** J | **19** J1 |
| | | | | |
| **PAHs (µg/kg)** | | | | |
| **Method SW8270D-SIM** | | | | |
| Naphthalene | 2,100 | **12** J | **4.2** J1 | **13** |
| 2-Methylnaphthalene | 670 | **9.8** J | **3.7** J1 | **11** |
| 1-Methylnaphthalene | | **9.3** | **3.8** J1 | **11** |
| Total Naphthalenes | | **31.1** J | **11.7** J | **35** |
| Acenaphthylene | 1,300 | **3.3** J1 | 4.8 U | **3.6** J1 |
| Acenaphthene | 500 | 4.8 U | 4.8 U | **5.7** |
| Fluorene | 540 | 4.8 U | 4.8 U | **3.4** J1 |
| Phenanthrene | 1,500 | **18** | **16** | **34** |
| Anthracene | 960 | **3.7** J1 | **4.7** J1 | **6.3** |
| Fluoranthene | 1,700 | **36** | **56** | **42** |
| Pyrene | 2,600 | **30** | **35** | **36** |
| Benzo(a)anthracene | 1,300 | **18** | **9.2** | **18** |
| Chrysene | 1,400 | **27** | **32** | **32** |
| Benzo(a)pyrene | 1,600 | **43** | **14** | **22** |
| Indeno(1,2,3-cd)pyrene | 600 | **33** | **8.9** | **16** |
| Dibenz(a,h)anthracene | 230 | **20** | **4.3** J1 | **4.8** |
| Benzo(g,h,i)perylene | 670 | **57** | **10** | **18** |
| Dibenzofuran | 540 | **4.4** J1 | 3.3 U | **6.7** |
| Total Benzofluoranthenes | 3,200 | **70** | **58** | **59** |
| Total cPAH TEQ | 150 (c) | **57** | **22.4** J | **32** |
| | | | | |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | |
| **NWTPH-Dx** | | | | |
| Diesel-Range Organics | | **160** | 6.2 U | 7.3 U |

# TABLE 34
# SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
# BOEING THOMPSON PROPERTY WOODEN BULKHEAD
# BOEING THOMPSON-ISAACSON SITE
# TUKWILA, WASHINGTON

| | SMS SCO dry weight for metals, LAET for organics | IT-WB-1 UM06A 03/12/2012 | IT-WB-2 UM06B 03/12/2012 | IT-WB-3-120312 UM06C 03/12/2012 |
|---|---|---|---|---|
| Motor Oil-Range Organics | | **1400** | **15** | **15** |
| **TOTAL METALS (mg/kg)** | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | |
| Arsenic | 7 (c) | **5.6** | **5.5** | **7.6** |
| Barium | | **31.1** | **33.1** | **40.7** |
| Beryllium | | 0.3 U | 0.3 U | **0.3** |
| Chromium | 260 | **19** | **24.2** | **17.4** |
| Copper | 390 | **26.7** | **25.2** | **19.8** |
| Lead | 450 | **32.3** | **82.7** | **11.6** |
| Mercury | 0.41 | **0.04** | **0.03** | **0.06** |
| Nickel | | **21.7** | **19.1** | **14.7** |
| Zinc | 410 | **55** | **55** | **53** |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
SIM = Selected Ion Monitoring
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SCO = Sediment Cleanup Objective
PRG = Preliminary Remediation Goal

U = Indicates the compound was not detected at or above the the reporting limit.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
Bold = Detected compound.
Box = Exceedance of cleanup level.

(a) = Value for unrestricted sites, no safe concentration established for industrial.
(b) = No safe concentration yet established.
(c) = Lower Duwamish Waterway Preliminary Remediation Goal (PRG)

## TABLE 35
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER PAINT STORAGE AREA AND FORMER DIESEL AND GASOLINE TANK AREA
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | | Former Paint Storage Area | | | | | | | | | | | | Former Diesel and Gasoline Tanks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-SB-9(2-3.5) TX02E 11/14/2011 | IT-SB-9(5-6.5) TX02F 11/14/2011 | IT-SB-9(8-8.5) TX02G 11/14/2011 | IT-SB-9(14-15.5) TX02H 11/14/2011 | IT-SB-10(2-3.5) TU90P 11/01/2011 | IT-SB-10(5-6.5) TU90Q 11/01/2011 | IT-SB-10(8-9.5) TU90T 11/01/2011 | IT-SB-10(13.5-15) TU90S 11/01/2011 | IT-SB-11(2-3.5) TX02A 11/14/2011 | IT-SB-11(5-6.5) TX02B 11/14/2011 | IT-SB-11(8-9) TX02C 11/14/2011 | IT-SB-11(14-15.5) TX02D 11/14/2011 | IT-TP-109-SWS(9-10) TT67A 10/25/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | |
| Methylene Chloride | 2,400 | 2.5 U | **1.1** J1 | **1.6** J1 | **1.4** J1 | **1.6** J, J1 | **2.2** J, J1 | **2.2** J, J1 | **2.1** J, J1 | **0.9** J1 | **1.0** J1 | **1.3** J1 | **0.9** J1 | **3.1** |
| Acetone | 510,000 | **43** J | **58** J | **30** J | **28** J | **43** J | **23** J | **21** J | **27** J | **40** J | **52** J | **22** J | **9.0** J | **11** |
| Carbon Disulfide | 75,000 | 1.3 U | 1.3 U | 1.3 U | **2.8** | 1.4 U | 1.1 U | 1.5 U | 1.6 U | **0.8** J1 | **2.8** | 1.2 U | 1.2 U | 1.3 U |
| 2-Butanone | 430,000 | 6.4 U | **3.7** J1 | 6.4 U | 7.3 U | 7.2 U | **3.3** J1 | 7.3 U | 8.0 U | **3.1** J1 | **8.7** | 6.2 U | 5.9 U | 6.4 U |
| Trichloroethene | 51 | **0.6** J1 | **1.3** | **2.1** | **1.5** | 1.4 U | 1.1 U | 1.5 U | 1.6 U | **1.0** J1 | **1.5** | **1.9** | **1.2** | 1.3 U |
| Benzene | 93 | 1.3 U | **0.7** J1 | 1.3 U | 1.5 U | 1.4 U | 1.1 U | 1.5 U | 1.6 U | **0.7** J1 | **1.5** | 1.2 U | **0.7** J1 | 1.3 U |
| Toluene | 100,000 | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.4 U | 1.1 U | 1.5 U | 1.6 U | 1.1 U | **2.1** | 1.2 U | 1.2 U | 1.3 U |
| Ethylbenzene | 230 | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.4 U | 1.1 U | 1.5 U | 1.6 U | 1.1 U | **1.1** J1 | 1.2 U | 1.2 U | 1.3 U |
| Trichlorofluoromethane | 200,000 | **1.0** J1 | **0.8** J1 | **1.7** | 1.5 U | 1.4 U | 1.1 U | 1.5 U | 1.6 U | **1.0** J1 | **0.7** J1 | **0.8** J1 | **0.8** J1 | 1.3 U |
| m,p-Xylene | 160,000 | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.4 U | 1.1 U | 1.5 U | 1.6 U | 1.1 U | **5.0** | 1.2 U | 1.2 U | 1.3 U |
| o-Xylene | 200,000 | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.4 U | 1.1 U | 1.5 U | 1.6 U | 1.1 U | **2.3** | 1.2 U | 1.2 U | 1.3 U |
| 1,2,4-Trimethylbenzene | 800,000 | 1.3 U | 1.3 U | 1.3 U | 1.5 U | 1.4 U | 1.1 U | 1.5 U | 1.6 U | 1.1 U | **0.7** J1 | 1.2 U | 1.2 U | 1.3 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | |
| Benzyl Alcohol | 8,000,000 | 19 U | 19 U | 19 U | **79** | 110 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 20 U | 19 U |
| Naphthalene | 2,100 | **9.5** J1 | 19 U | 19 U | 19 U | 110 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 20 U | 19 U |
| 2-Methylnaphthalene | 320,000 | 19 U | 19 U | 19 U | 19 U | **120** | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 20 U | 19 U |
| Phenanthrene | --- | **30** | **13** J1 | 19 U | 19 U | **120** | **14** J1 | 19 U | 19 U | **10** J1 | 20 U | 19 U | 20 U | 19 U |
| Di-n-Butylphthalate | 26,000 | **11** J1 | **18** J1 | 19 U | 19 U | 110 U | 18 U | 19 U | 19 U | **13** J1 | **13** J1 | **10** J1 | **17** J1 | 19 U |
| Fluoranthene | 230,000 | **39** | **12** J1 | 19 U | 19 U | 110 U | 18 U | 19 U | 19 U | **11** J1 | 20 U | 19 U | 20 U | 19 U |
| Pyrene | 240,000 | **56** J | **18** J, J1 | 19 U | 19 U | **83** J1 | 18 U | 19 U | 19 U | **12** J, J1 | 20 U | 19 U | 20 U | 19 U |
| Benzo(a)anthracene | --- | **25** | 19 U | 19 U | 19 U | 110 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 20 U | 19 U |
| Chrysene | --- | **29** | **15** J1 | 19 U | 19 U | **150** | **22** | 19 U | 19 U | **10** J1 | 20 U | 19 U | 20 U | 19 U |
| Benzo(a)pyrene | --- | **24** | **11** J1 | 19 U | 19 U | **72** J1 | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 20 U | 19 U |
| Indeno(1,2,3-cd)pyrene | --- | **18** J1 | 19 U | 19 U | 19 U | 110 U | 18 U | 19 U | 19 U | **11** J1 | 20 U | 19 U | 20 U | 19 U |
| Benzo(g,h,i)perylene | --- | **18** J1 | 19 U | 19 U | 19 U | 110 U | 18 U | 19 U | 19 U | 18 U | 20 U | 19 U | 20 U | 19 U |
| Total Benzofluoranthenes | --- | **40** | **21** | 19 U | 19 U | 110 U | 18 U | 19 U | 19 U | **18** | 20 U | 19 U | 20 U | 19 U |
| Total cPAH TEQ | 15 | **33** J | **13** J | ND | ND | **74** J | **0.22** | ND | ND | **3** J | ND | ND | ND | ND |
| **PAHs (µg/kg)** | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | |
| Naphthalene | 2,100 | **11** | **6.4** | 4.8 U | **3.0** J1 | **26** | 4.4 U | 4.6 U | **2.5** J1 | **4.8** | 4.8 U | 4.9 U | **3.0** J1 | 4.6 U |
| 2-Methylnaphthalene | 320,000 | **6.6** | **7.1** | 4.8 U | **3.7** J1 | **52** | **2.9** J1 | 4.6 U | 4.7 U | **4.3** J1 | 4.8 U | 4.9 U | **3.6** J1 | 4.6 U |
| 1-Methylnaphthalene | 16,000 | **6.0** | **6.6** | 4.8 U | **3.1** J1 | **39** | **2.2** J1 | 4.6 U | 4.7 U | **3.7** J1 | 4.8 U | **2.7** J1 | **3.3** J1 | 4.6 U |
| Total Naphthalenes | --- | **23.6** | **20.1** | 4.8 U | **9.8** J1 | **117** | **5.1** J1 | 4.6 U | **2.5** J1 | **12.8** J1 | 4.8 U | **2.7** J1 | **9.9** J1 | 4.6 U |
| Acenaphthylene | --- | **6.9** | 4.7 U | 4.8 U | 4.7 U | **9.7** J1 | 4.4 U | 4.6 U | 4.7 U | 4.6 U | 4.8 U | 4.9 U | 4.7 U | 4.6 U |
| Acenaphthene | 230,000 | **2.9** J1 | **8.9** | 4.8 U | 4.7 U | 13 U | 4.4 U | 4.6 U | 4.7 U | 4.6 U | 4.8 U | 4.9 U | 4.7 U | 4.6 U |
| Fluorene | 150,000 | **3.9** J1 | **5.4** | 4.8 U | 4.7 U | **9.9** J1 | 4.4 U | 4.6 U | 4.7 U | 4.6 U | 4.8 U | 4.9 U | 4.7 U | 4.6 U |
| Phenanthrene | --- | **83** | **73** | 4.8 U | **5.6** | **91** | **8.4** | **3.4** J1 | **3.8** J1 | **12** | **6.1** | **2.6** J1 | **7.8** | 4.6 U |
| Anthracene | 1,600,000 | **4.7** | **15** | 4.8 U | 4.7 U | **24** | 4.4 U | 4.6 U | 4.7 U | 4.6 U | 4.8 U | 4.9 U | 4.7 U | 4.6 U |
| Fluoranthene | 230,000 | **99** | **79** | 4.8 U | 4.7 U | **74** | **3.6** J1 | 4.6 U | 4.7 U | **20** | **2.8** J1 | 4.9 U | **4.1** J1 | 4.6 U |
| Pyrene | 240,000 | **95** | **66** | 4.8 U | 4.7 U | **71** | **4.1** J1 | 4.6 U | **2.4** J1 | **18** | **3.9** J1 | 4.9 U | **4.6** J1 | 4.6 U |
| Benzo(a)anthracene | --- | **26** | **32** | 4.8 U | 4.7 U | **26** | **2.8** J1 | 4.6 U | 4.7 U | **10** | **2.7** J1 | 4.9 U | 4.7 U | 4.6 U |
| Chrysene | --- | **51** | **38** | 4.8 U | 4.7 U | **120** | **14** | 4.6 U | 4.7 U | **16** | **14** | 4.9 U | **7.6** | 4.6 U |
| Benzo(a)pyrene | --- | **41** | **34** | 4.8 U | 4.7 U | **45** | **10** | 4.6 U | 4.7 U | **15** | **3.7** J1 | 4.9 U | **3.7** J1 | 4.6 U |
| Indeno(1,2,3-cd)pyrene | --- | **30** | **22** | 4.8 U | 4.7 U | **34** | 4.4 U | 4.6 U | 4.7 U | **11** | 4.8 U | 4.9 U | 4.7 U | 4.6 U |
| Dibenz(a,h)anthracene | --- | **8.0** | **6.7** | 4.8 U | 4.7 U | **14** | 4.4 U | 4.6 U | 4.7 U | **4.4** J1 | 4.8 U | 4.9 U | 4.7 U | 4.6 U |
| Benzo(g,h,i)perylene | --- | **33** | **27** | 4.8 U | 4.7 U | **100** | **4.6** | 4.6 U | 4.7 U | **14** | **5.4** | 4.9 U | **4.9** | 4.6 U |
| Dibenzofuran | 120,000 | **5.6** | **5.1** | 4.8 U | 4.7 U | **12** J1 | 4.4 U | 4.6 U | 4.7 U | **2.4** J1 | 4.8 U | 4.9 U | 4.7 U | 4.6 U |
| Total Benzofluoranthenes | --- | **76** | **58** | 4.8 U | 4.7 U | **70** | 4.4 U | 4.6 U | 4.7 U | **28** | 4.8 U | 4.9 U | 4.7 U | 4.6 U |
| Total cPAH TEQ | 15 | **56** | **46** | ND | ND | **61** | **10.4** J | ND | ND | **21** J | **4.1** J | ND | **3.8** J | ND |

# TABLE 35
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER PAINT STORAGE AREA AND FORMER DIESEL AND GASOLINE TANK AREA
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | | Former Paint Storage Area | | | | | | | | | | | | Former Diesel and Gasoline Tanks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-SB-9(2-3.5) TX02E 11/14/2011 | IT-SB-9(5-6.5) TX02F 11/14/2011 | IT-SB-9(8-8.5) TX02G 11/14/2011 | IT-SB-9(14-15.5) TX02H 11/14/2011 | IT-SB-10(2-3.5) TU90P 11/01/2011 | IT-SB-10(5-6.5) TU90Q 11/01/2011 | IT-SB-10(8-9.5) TU90T 11/01/2011 | IT-SB-10(13.5-15) TU90S 11/01/2011 | IT-SB-11(2-3.5) TX02A 11/14/2011 | IT-SB-11(5-6.5) TX02B 11/14/2011 | IT-SB-11(8-9) TX02C 11/14/2011 | IT-SB-11(14-15.5) TX02D 11/14/2011 | IT-TP-109-SWS(9-10) TT67A 10/25/2011 |
| **PCBs (µg/kg)** | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | |
| Aroclor 1254 | 0.29 | 33 U | **43** | 33 U | 32 U | 150 U | 30 U | 33 U | 31 U | 32 U | 30 U | 31 U | 32 U | 26 U |
| Total PCBs | 1.8 | ND | **43** | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | 5.7 U | 5.6 U | 5.2 U | 6.2 U | **400** | **7.5** | 5.7 U | 6.7 U | 5.8 U | 5.4 U | 5.4 U | 6.0 U | 5.2 U |
| Oil-Range Organics | 2,000 | 11 U | 11 U | 10 U | **13** | **770** | **47** | 11 U | 13 U | 12 U | **30** | 11 U | **26** | 10 U |
| **NWTPH-G** | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 6.9 U | 6.7 U | 7.1 U | 8.3 U | 6.1 U | 5.6 U | 8.4 U | 9.3 U | 8.2 U | 7.0 U | 6.6 U | 7.4 U | **17** |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | | |
| Arsenic | 7 | **3.7** | **3.4** | **2.0** | **2.2** | **25.9** | **2.7** | **2.1** | **187** | **501** | **209** | **15.4** | **43.5** | **2.3** |
| Barium | 640 | **47.8** | **48.6** | **25.8** | **45.1** | **150** | **35.0** | **36.1** | **47.0** | **58.2** J | **28.4** | **30.7** | **55.3** | **21.3** J |
| Beryllium | 160 | 0.2 U | 0.2 U | 0.2 U | 0.3 U | **0.3** | 0.2 U | 0.2 U | 0.3 U | **0.2** | 0.2 U | 0.2 U | 0.3 U | 0.2 U |
| Cadmium | 1.3 | 0.1 U | 0.1 U | 0.1 U | 0.1 U | **0.1** | 0.1 U | 0.1 U | 0.1 U | **0.3** | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Chromium | 1,480 | **11.2** | **14.7** | **9.0** | **14.0** | **20.7** | **9.3** | **10.5** | **12.6** | **16.0** | **8.6** | **8.6** | **15.0** | **9.3** |
| Chromium VI | 3.8 | 0.443 U | 0.447 U | 0.421 U | 0.536 U | 0.445 U | **0.429** | 0.436 U | 0.536 U | 0.464 UJ | 0.427 U | 0.429 U | 0.499 U | 0.414 U |
| Copper | 36 | **16.8** | **18.0** | **10.6** | **17.9** | **45.9** | **12.9** | **14.8** | **490** | **1170** | **51.8** | **11.1** | **63.2** | **10.5** |
| Lead | 250 | **11.8** | **19.7** | **1.3** | **2.1** | **29.3** | **1.9** | **1.6** | **2.3** | **14.4** | **1.6** | **1.4** | **3.7** | **1.4** |
| Mercury | 1.5 | **0.04** | 0.03 U | 0.02 U | 0.03 U | **0.06** | 0.03 U | 0.02 U | 0.03 U | **0.08** J | 0.02 U | 0.02 U | **0.03** | 0.02 U |
| Nickel | 210 | **9.2** | **17.2** | **8.0** | **11.0** | **31.6** | **8.5** | **9.0** | **9.4** | **20.6** | **8.3** | **7.6** | **12.0** | **8.8** |
| Silver | 170 | 0.2 U | **0.6** | 0.2 U | 0.3 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U |
| Zinc | 1,400 | **40** | **55** | **20** | **32** | **93** | **24** | **23** | **272** | **195** | **268** | **81** | **62** | **25** |

ND = Not Detected.
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
Bold = Exceedance
Box = Exceeds Preliminary Cleanup Level.

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

# TABLE 36
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## OBSERVED TAR-LIKE SUBSTANCE AREA
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | | Observed Tar-Like Substance Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-TP-107-B(11-12) TU01F 10/26/2011 | IT-TP-107-SWN(1-2) TU01A 10/26/2011 | IT-TP-107-SWN(2-3) TU01E 10/26/2011 | IT-TP-107-SWS(1-2) TU01C 10/26/2011 | IT-TP-107-SWE(1-2) TU01B 10/26/2011 | IT-TP-107-SWW(1-2) TU01D 10/26/2011 | IT-TP-108-B(11-12) TU01L 10/26/2011 | IT-TP-108-SWN(1-2) TU01G 10/26/2011 | IT-TP-108-SWN(2-3) TU01K 10/26/2011 | IT-TP-108-SWS(1-2) TU01H 10/26/2011 | IT-TP-108-SWE(1-2) TU01I 10/26/2011 | IT-TP-108-SWW(1-2) TU01J 10/26/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | |
| Chloromethane | 1,600 | 1.3 U | 1.2 U | 1.3 U | 1.1 U | 1.7 U | 1.0 U | 1.4 U | 1.4 U | 1.3 U | 1.2 U | 1.5 U | **1.0** J1 |
| Methylene Chloride | 2,400 | **3.2** J | 2.4 U | **2.6** J, J1 | **2.9** J | 3.5 U | **1.5** J, J1 | **3.0** J | 2.9 U | **3.5** J | **1.9** J, J1 | 3.0 U | 3.6 U |
| Acetone | 510,000 | **44** J | **130** J | **25** J | **45** J | **230** J | **51** J | **28** J | **65** J | **17** J | **140** J | **140** J | **82** J |
| Carbon Disulfide | 75,000 | 1.3 U | 1.2 U | 1.3 U | 1.1 U | **1.7** | 1.0 U | 1.4 U | 1.4 U | 1.3 U | **1.0** J1 | 1.5 U | **1.0** J1 |
| 2-Butanone | 430,000 | 6.6 U | **14** | 6.6 U | **3.9** J1 | **17** | **2.9** J1 | 6.8 U | **6.4** J1 | 6.6 U | **21** | **17** | **15** |
| Benzene | 93 | **1.1** J1 | **0.7** J1 | 1.3 U | **1.3** | **0.9** J1 | 1.0 U | 1.4 U | 1.4 U | 1.3 U | **1.3** | **4.4** | **2.0** |
| Toluene | 100,000 | 1.3 U | **1.9** | 1.3 U | **0.7** J1 | **5.3** | **1.0** J1 | 1.4 U | 1.4 U | 1.3 U | **0.8** J1 | **2.0** | **2.0** |
| m,p-Xylene | 160,000 | 1.3 U | **0.6** J1 | 1.3 U | 1.1 U | 1.7 U | 1.0 U | 1.4 U | 1.4 U | 1.3 U | 1.2 U | **1.0** J1 | **1.8** J1 |
| o-Xylene | 200,000 | 1.3 U | 1.2 U | 1.3 U | 1.1 U | 1.7 U | 1.0 U | 1.4 U | 1.4 U | 1.3 U | 1.2 U | **0.8** J1 | **1.6** J1 |
| 1,3-Dichlorobenzene | 3,840 | 1.3 U | **0.6** J1 | 1.3 U | 1.1 U | 1.7 U | 1.0 U | 1.4 U | 1.4 U | 1.3 U | 1.2 U | 1.5 U | 1.8 U |
| 1,4-Dichlorobenzene | 3,500 | 1.3 U | **0.7** J1 | 1.3 U | 1.1 U | 1.7 U | 1.0 U | 1.4 U | 1.4 U | 1.3 U | 1.2 U | 1.5 U | 1.8 U |
| 1,3,5-Trimethylbenzene | 800,000 | 1.3 U | 1.2 U | 1.3 U | 1.1 U | **2.0** | 1.0 U | 1.4 U | 1.4 U | 1.3 U | 1.2 U | 1.5 U | **1.8** |
| 1,2,4-Trimethylbenzene | 800,000 | 1.3 U | **1.3** | 1.3 U | 1.1 U | **3.7** | 1.0 U | 1.4 U | 1.4 U | 1.3 U | 1.2 U | **1.2** J1 | **4.0** |
| 4-Isopropyltoluene | --- | 1.3 U | **3.2** | 1.3 U | 1.1 U | **6.3** | 1.0 U | 1.4 U | 1.4 U | 1.3 U | **0.9** J1 | **0.8** J1 | **1.6** J1 |
| n-Butylbenzene | 27,000 | 1.3 U | **0.6** J1 | 1.3 U | 1.1 U | 1.7 U | 1.0 U | 1.4 U | 1.4 U | 1.3 U | 1.2 U | 1.5 U | 1.8 U |
| Naphthalene | 2,100 | 6.6 U | **2.6** J1 | 6.6 U | 5.5 U | 8.6 U | 5.1 U | 6.8 U | 7.2 U | 6.6 U | 6.0 U | **2.0** J1 | **6.3** J, J1 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | |
| 4-Methylphenol | 41,000 | 39 U | 580 U | 39 U | 39 UJ | 200 UJ | 36 UJ | 38 U | 250 U | 38 U | **78** J1 | 190 U | 560 U |
| Naphthalene | 2,100 | 20 U | **280** J1 | 20 U | 20 U | **190** | **18** | 19 U | **220** | 19 U | **1700** | **190** | 280 U |
| 2-Methylnaphthalene | 320,000 | 20 U | **230** J1 | **12** J1 | 20 U | **170** | **14** J1 | 19 U | **290** | 19 U | **880** | **250** | **200** J1 |
| Acenaphthylene | --- | 20 U | 290 U | 20 U | **11** J1 | 97 U | **24** | 19 U | **69** J1 | 19 U | **59** J1 | 94 U | 280 U |
| Acenaphthene | 230,000 | 20 U | 290 U | 20 U | 20 U | **130** | 18 U | 19 U | 120 U | 19 U | **1600** | 94 U | 280 U |
| Dibenzofuran | 80,000 | 20 U | 290 U | 20 U | 20 U | **73** J1 | 18 U | 19 U | 120 U | 19 U | **690** | 94 U | 280 U |
| Fluorene | 150,000 | 20 U | 290 U | 20 U | 20 U | **160** | 18 U | 19 U | **75** J1 | 19 U | **1500** | **52** J1 | 280 U |
| Phenanthrene | --- | 20 U | **890** | **12** J1 | **68** | **1600** | **56** | 19 U | **480** | 19 U | **7500** | **330** | **1200** |
| Carbazole | 50,000 | 20 U | 290 U | 20 U | 20 U | **68** J1 | 18 U | 19 U | 120 U | 19 U | **2600** | 94 U | 280 U |
| Anthracene | 1,600,000 | 20 U | **320** | 20 U | **12** J1 | **410** | **12** J1 | 19 U | **130** | 19 U | **1800** | **70** J1 | **220** J1 |
| Di-n-Butylphthalate | 26,000 | 20 U | 290 U | 20 U | **12** J1 | 97 U | 18 U | 19 U | 120 U | 19 U | 98 U | **66** J1 | 280 U |
| Fluoranthene | 230,000 | 20 U | **940** | 20 U | **130** | **1600** | **61** | 19 U | **370** | 19 U | **6600** | **210** | **400** |
| Pyrene | 240,000 | 20 U | **1900** | **13** J1 | **190** | **2200** | **110** | 19 U | **1100** | 19 U | **6000** | **560** | **2100** |
| Benzo(a)anthracene | --- | 20 U | **640** | 20 U | **85** | **840** | **60** | 19 U | **220** | 19 U | **2800** | **220** | **850** |
| bis(2-Ethylhexyl)phthalate | 56,600 | 24 U | 360 U | **21** J1 | 25 U | 120 U | 23 U | 24 U | 160 U | 24 U | 120 U | 120 U | 350 U |
| Chrysene | --- | 20 U | **1200** | 20 U | **110** | **1100** | **81** | 19 U | **390** | 19 U | **3400** | **540** | **2000** |
| Benzo(a)pyrene | --- | 20 U | **1000** | 20 U | **100** | **1100** | **100** | 19 U | **260** | 19 U | **1800** | **170** | **560** |
| Indeno(1,2,3-cd)pyrene | --- | 20 U | **570** | 20 U | **63** | **640** | **66** | 19 U | **120** | 19 U | **630** | **94** | **140** J1 |
| Dibenz(a,h)anthracene | --- | 20 U | 290 U | 20 U | **19** J1 | **200** | **24** | 19 U | 120 U | 19 U | **300** | 94 U | 280 U |
| Benzo(g,h,i)perylene | --- | 20 U | **850** | **20** | **89** | **850** | **97** | 19 U | **240** | 19 U | **810** | **190** | **320** |
| 1-Methylnaphthalene | 16,000 | 20 U | 290 U | 20 U | 20 U | **88** J1 | 18 U | 19 U | **110** J1 | 19 U | **440** | **120** | 280 U |
| Total Benzofluoranthenes | --- | 20 U | **1100** | **16** J1 | **160** | **1400** | **140** | 19 U | **320** | 19 U | **3400** | **220** | **530** |
| Total cPAHs TEQ | 15 | ND | **1243** | **2** J | **134** J | **1419** | **130** | ND | **330** | ND | **2547** | **229** | **732** J |

# TABLE 36
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## OBSERVED TAR-LIKE SUBSTANCE AREA
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Observed Tar-Like Substance Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | IT-TP-107-B(11-12) TU01F 10/26/2011 | IT-TP-107-SWN(1-2) TU01A 10/26/2011 | IT-TP-107-SWN(2-3) TU01E 10/26/2011 | IT-TP-107-SWS(1-2) TU01C 10/26/2011 | IT-TP-107-SWE(1-2) TU01B 10/26/2011 | IT-TP-107-SWW(1-2) TU01D 10/26/2011 | IT-TP-108-B(11-12) TU01L 10/26/2011 | IT-TP-108-SWN(1-2) TU01G 10/26/2011 | IT-TP-108-SWN(2-3) TU01K 10/26/2011 | IT-TP-108-SWS(1-2) TU01H 10/26/2011 | IT-TP-108-SWE(1-2) TU01I 10/26/2011 | IT-TP-108-SWW(1-2) TU01J 10/26/2011 |
| **PAHs (µg/kg)** | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | |
| Naphthalene | 2,100 | 4.8 U | **450** | **6.3** | **5.7** | **170** | **10** | 4.7 U | **190** | 4.7 U | **1400** | **140** | **95** |
| 2-Methylnaphthalene | 320,000 | 4.8 U | **380** | **9.9** | **4.8** J1 | **170** | **9.7** | 4.7 U | **330** | 4.7 U | **760** | **220** | **230** |
| 1-Methylnaphthalene | 16,000 | 4.8 U | **310** | **8.0** | **3.8** J1 | **110** | **7.1** | 4.7 U | **150** | 4.7 U | **410** | **120** | **170** |
| Total Naphthalenes | --- | 4.8 U | **1140** | **24.2** | **14.3** J1 | **450** | **26.8** | 4.7 U | **670** | 4.7 U | **2570** | **480** | **495** |
| Acenaphthylene | --- | 4.8 U | **57** | 5.0 U | **3.9** J1 | **46** | **7.1** | 4.7 U | 26 U | 4.7 U | **45** | **31** | **82** |
| Acenaphthene | 230,000 | 4.8 U | **740** | 5.0 U | 5.0 U | **160** | **6.7** | 4.7 U | **210** | 4.7 U | **1600** | **66** | 44 U |
| Fluorene | 150,000 | 4.8 U | **530** | 5.0 U | **2.6** J1 | **120** | **5.0** | 4.7 U | **180** | 4.7 U | **1800** | **50** | **150** |
| Phenanthrene | --- | **6.6** | **4400** | **11** | **25** | **1200** | **57** | 4.7 U | **450** | 4.7 U | **11000** | **400** | **1600** |
| Anthracene | 1,600,000 | 4.8 U | **1300** | 5.0 U | **5.0** | **280** | **11** | 4.7 U | **140** | **2.6** J1 | **2500** | **93** | **360** |
| Fluoranthene | 230,000 | 4.8 U | **5400** | **7.9** | **39** | **1300** | **71** | 4.7 U | **450** | 4.7 U | **9600** | **360** | **750** |
| Pyrene | 240,000 | 4.8 U | **5900** | **9.5** | **43** | **1600** | **84** | 4.7 U | **1200** | 4.7 U | **7400** | **590** | **2800** |
| Benzo(a)anthracene | --- | 4.8 U | **3400** | **5.7** | **22** | **730** | **39** | 4.7 U | **200** | 4.7 U | **3100** | **240** | **920** |
| Chrysene | --- | 4.8 U | **4200** | **8.0** | **28** | **1200** | **48** | 4.7 U | **470** | 4.7 U | **2800** | **520** | **2700** |
| Benzo(a)pyrene | --- | 4.8 U | **5200** | **8.7** | **28** | **970** | **48** | 4.7 U | **250** | 4.7 U | **1400** | **240** | **700** |
| Indeno(1,2,3-cd)pyrene | --- | 4.8 U | **2900** | **5.7** | **24** | **440** | **38** | 4.7 U | **160** | 4.7 U | **500** | **99** | **190** |
| Dibenz(a,h)anthracene | --- | 4.8 U | **810** | 5.0 U | **7.0** | **200** | **13** | 4.7 U | **69** | 4.7 U | **250** | **39** | **110** |
| Benzo(g,h,i)perylene | --- | 4.8 U | **3400** | **6.9** | **33** | **650** | **51** | 4.7 U | **240** | 4.7 U | **680** | **180** | **480** |
| Dibenzofuran | 80,000 | 4.8 U | **320** | **3.1** J1 | 5.0 U | **76** | **3.8** J1 | 4.7 U | 26 U | 4.7 U | **810** | **33** | **37** J1 |
| Total Benzofluoranthenes | --- | 4.8 U | **6400** | **15** | **44** | **1200** | **72** | 4.7 U | **330** | 4.7 U | **2700** | **290** | **650** |
| Total cPAH TEQ | 15 | ND | **6593** | **11** | **14** | **1239** | **65** | ND | **331** | ND | **2083** | **312** | **914** |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | 6.8 U | **280** | 5.4 U | **6.4** | **200** | **11** | 6.1 U | **2500** | 5.2 U | **1100** | **500** | **1400** |
| Oil-Range Organics | 2,000 | 14 U | **800** | 11 U | **32** | **500** | **51** | 12 U | **2000** | 10 U | **1500** | **1400** | **3100** |
| **NWTPH-G** | | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 8.3 U | **14** | 7.9 U | 7.1 U | 13 U | 7.1 U | 8.0 U | 8.0 U | 7.7 U | 7.0 U | **36** | **24** |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | |
| Arsenic | 7 | **4.5** | **85.3** J | **7.0** | **65.0** | **73.8** | **215** | **1.9** | **35.4** | **1.5** | **75.0** | **34.4** | **86.3** |
| Barium | 640 | **71.9** | **169** | **38.9** | **70.3** | **153** | **57.1** | **30.7** | **165** | **22.7** | **79.6** | **77.7** | **71.4** |
| Beryllium | 160 | 0.3 U | 0.2 U | 0.2 U | **0.2** | 0.2 U | 0.2 U | 0.2 U | **0.3** | 0.2 U | 0.2 U | 0.2 U | **0.3** |
| Cadmium | 1.3 | 0.1 U | **0.3** | 0.1 U | **0.2** | **0.3** | **0.2** | 0.1 U | **0.3** | 0.1 U | **0.3** | **0.3** | **0.2** |
| Chromium | 1480 | **14.8** | **13.3** | **12** | **14.5** | **14.1** | **16.9** | **8.0** | **20** | **6.7** | **14.1** | **11.2** | **17.1** |
| Chromium VI | 3.8 | 0.534 U | 0.469 UJ | 0.434 U | 0.423 U | 0.481 U | 0.439 U | 0.484 U | 0.444 U | 0.417 U | 0.471 U | **0.558** | 0.478 U |
| Copper | 36 | **20.9** | **205** | **17.5** | **82.0** | **196** | **129** | **10.9** | **87.7** | **8.8** | **131** | **42.5** | **107** |
| Lead | 250 | **2.8** | **81.4** J | **7.7** | **20.0** | **82.3** | **26.6** | **1.5** | **91.3** | **1.2** | **52.8** | **43.6** | **52.1** |
| Mercury | 1.5 | **0.03** | **1.14** | **0.02** | **0.08** | **1.35** | **0.24** | 0.02 U | **0.32** | 0.02 U | **0.51** | **0.51** | **0.21** |
| Nickel | 210 | **11.8** | **14.6** | **10.6** | **14.3** | **15.4** | **19.2** | **7.3** | **22.3** | **6.3** | **18.9** | **12.1** | **22.1** |
| Zinc | 1,400 | **82** | **157** | **59** | **88** | **193** | **148** | **21** | **139** | **18** | **118** | **92** | **145** |

ND = Not Detected
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs = polycylic aromatic hydrocarbons
cPAHs = carcinogenic PAHs
Bold = Exceedance
Box = Exceeds Preliminary Cleanup Level.

TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring

U = Indicates the compound was not detected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

# TABLE 37
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 OUTFALL AREA
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Former Slip 5 Outfall Area | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | IT-MW-14(2-3.5) TW27J 11/08/2011 | IT-MW-14(5-6.5) TW27K 11/08/2011 | IT-MW-14(8-9.5) TW27L 11/08/2011 | IT-MW-14(13-14.5) TW27M 11/08/2011 | IT-SB-6(2-3.5) TU90H 11/01/2011 | IT-SB-6(5-6.5) TU90I 11/01/2011 | IT-SB-6(8-9.5) TU90J 11/01/2011 | IT-SB-6(13.5-15) TU90K 11/01/2011 | IT-SB-7(2-3.5) TU90L 11/01/2011 | IT-SB-7(5-6.5) TU90M 11/01/2011 | IT-SB-7(8-9.5) TU90N 11/01/2011 | IT-SB-7(13-14.5) TU90O 11/01/2011 | IT-SB-8(2-3.5) TX01F 11/14/2011 | IT-SB-8(5-6.5) TX01G 11/14/2011 | IT-SB-8(8-9.5) TX01H 11/14/2011 | IT-SB-8(14-15.5) TX01I 11/14/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | | | |
| Methylene Chloride | 2,400 | 2.6 | 2.7 | 2.9 | 4.5 | 2.7 | 3.0 | 3.5 | 2.6 J | 3.0 J | 1.7 J, J1 | 4.1 J | 2.8 J | 2.9 UJ | 4.9 J | 1.3 J, J1 | 1.6 J, J1 |
| Acetone | 510,000 | 15 J | 65 J | 25 J | 23 J | 64 J | 60 J | 19 UJ | 11 J | 12 J | 45 J | 20 J | 13 J | 37 J | 63 J | 34 J | 8.9 J |
| Carbon Disulfide | 75,000 | 1.7 | 1.2 U | 1.3 U | 12 | 1.2 U | 1.3 | 1.5 U | 1.1 U | 1.3 U | 1.0 J1 | 1.6 U | 1.2 U | 1.7 | 1.3 U | 1.2 U | 1.3 U |
| 2-Butanone | 430,000 | 5.0 U | 3.3 J1 | 6.3 U | 7.4 U | 5.2 J1 | 8.7 | 7.3 U | 5.5 U | 6.5 U | 6.5 | 7.8 U | 5.9 U | 7.2 U | 6.4 U | 5.9 U | 6.6 U |
| Trichloroethene | 51 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.2 U | 1.5 U | 1.1 U | 1.3 U | 1.0 U | 1.6 U | 1.2 U | 1.0 J1 | 1.3 U | 1.2 J1 | 2.0 |
| Benzene | 93 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.3 | 0.9 J1 | 1.5 U | 0.6 J1 | 1.3 U | 0.7 J1 | 1.6 U | 1.2 U | 1.4 U | 1.3 U | 1.2 U | 1.3 U |
| Toluene | 100,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.3 | 4.8 | 1.5 U | 1.1 U | 1.3 U | 0.8 J1 | 1.6 U | 1.2 U | 1.4 U | 1.3 U | 1.2 U | 1.3 U |
| Trichlorofluoromethane | 200,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.2 U | 1.5 U | 1.1 U | 1.3 U | 1.0 U | 1.6 U | 1.2 U | 1.4 U | 2.4 J | 1.9 J | 5.9 J |
| m,p-Xylene | 160,000 | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 0.8 J1 | 1.5 U | 1.1 U | 1.3 U | 1.0 U | 1.6 U | 1.2 U | 1.4 U | 1.3 U | 1.2 U | 1.3 U |
| Methyl Iodide | --- | 1.0 U | 1.2 U | 1.3 U | 1.5 U | 1.2 U | 1.2 U | 1.5 U | 1.1 U | 1.3 U | 1.0 U | 1.6 U | 1.2 U | 1.4 U | 0.7 J1 | 1.2 U | 1.3 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | | | |
| Phenol | 1,900,000 | 57 U | 55 U | 56 U | 20 U | 19 U | 18 U | 18 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | 18 U | 280 | 19 U |
| 4-Methylphenol | 41,000 | 110 U | 110 U | 110 U | 39 U | 38 U | 36 U | 37 U | 38 U | 36 U | 36 U | 38 U | 38 U | 38 U | 35 U | 20 J1 | 37 U |
| Naphthalene | 2,100 | 57 U | 55 U | 56 U | 20 U | 20 | 12 J1 | 18 U | 19 U | 15 J1 | 18 U | 19 U | 19 U | 19 U | 18 U | 18 U | 19 U |
| 2-Methylnaphthalene | 320,000 | 57 U | 55 U | 56 U | 20 U | 16 J1 | 18 U | 18 U | 19 U | 14 J1 | 18 U | 19 U | 19 U | 19 U | 18 U | 18 U | 19 U |
| Acenaphthylene | --- | 57 U | 55 U | 56 U | 20 U | 26 | 18 U | 18 U | 19 U | 9.0 J1 | 18 U | 19 U | 19 U | 16 J1 | 18 U | 18 U | 19 U |
| Acenaphthene | 230,000 | 57 U | 55 U | 56 U | 20 U | 9.4 J1 | 18 U | 18 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | 18 U | 18 U | 19 U |
| Phenanthrene | --- | 31 J1 | 53 J1 | 39 J1 | 20 U | 90 | 35 | 18 U | 19 U | 44 | 23 | 19 U | 19 U | 98 | 28 | 13 J1 | 19 U |
| Anthracene | 1,600,000 | 57 U | 55 U | 56 U | 20 U | 20 | 18 U | 18 U | 19 U | 12 J1 | 18 U | 19 U | 19 U | 19 U | 18 U | 18 U | 19 U |
| Di-n-Butylphthalate | 26,000 | 57 U | 55 U | 56 U | 20 U | 200 | 18 | 18 U | 19 U | 18 U | 24 | 19 U | 19 U | 52 | 18 U | 18 U | 19 U |
| Fluoranthene | 230,000 | 57 U | 50 J1 | 28 J1 | 20 U | 120 | 31 | 18 U | 19 U | 50 | 19 | 19 U | 19 U | 110 | 14 J1 | 18 U | 19 U |
| Pyrene | 240,000 | 34 J1 | 78 | 31 J1 | 20 U | 130 | 42 | 18 U | 19 U | 63 | 24 | 19 U | 19 U | 120 | 22 | 18 U | 19 U |
| Benzo(a)anthracene | --- | 57 U | 39 J1 | 34 J1 | 20 U | 64 | 19 | 18 U | 19 U | 26 | 12 J1 | 19 U | 19 U | 40 | 12 J1 | 18 U | 19 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | 71 U | 58 J1 | 56 J1 | 23 J1 | 33 U | 33 U | 23 U | 26 U | 23 U | 24 U | 24 U | 24 U | 24 U | 15 J1 | 58 | 17 J1 |
| Chrysene | --- | 71 | 86 | 65 | 20 U | 81 | 30 | 18 U | 19 U | 40 | 16 J1 | 19 U | 19 U | 74 | 35 | 18 U | 19 U |
| Benzo(a)pyrene | --- | 57 U | 42 J1 | 56 U | 20 U | 86 | 31 | 18 U | 19 U | 34 | 21 | 19 U | 19 U | 96 | 16 J1 | 18 U | 19 U |
| Indeno(1,2,3-cd)pyrene | --- | 57 U | 55 U | 56 U | 20 U | 64 | 19 | 18 U | 19 U | 25 | 18 | 19 U | 19 U | 130 | 18 U | 18 U | 19 U |
| Dibenz(a,h)anthracene | --- | 57 U | 55 U | 56 U | 20 U | 17 J1 | 18 U | 18 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 | 18 U | 18 U | 19 U |
| Benzo(g,h,i)perylene | --- | 57 U | 55 U | 56 U | 20 U | 100 | 30 | 18 U | 19 U | 42 | 26 | 19 U | 19 U | 280 | 26 | 18 U | 19 U |
| 1-Methylnaphthalene | 16,000 | 57 U | 55 U | 56 U | 20 U | 13 J1 | 18 U | 18 U | 19 U | 18 U | 18 U | 19 U | 19 U | 19 U | 18 U | 18 U | 19 U |
| Total Benzofluoranthenes | --- | 57 U | 69 | 37 J1 | 20 U | 130 | 46 | 18 U | 19 U | 56 | 29 | 19 U | 19 U | 150 | 26 | 9.2 J1 | 19 U |
| Total cPAH TEQ | 15 | 0.71 | 91 J | 65 J | ND | 114 J | 40 | ND | ND | 45 | 27 J | ND | ND | 131 | 20 J | 0.92 J | ND |
| **PAHs (µg/kg)** | | | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | | | |
| Naphthalene | 2,100 | 14 U | 9.0 J1 | 10 J1 | 2.7 J1 | 20 | 5.9 | 4.8 U | 4.6 U | 14 | 4.9 | 4.6 U | 2.7 J1 | 210 | 9.2 | 4.5 U | 4.6 U |
| 2-Methylnaphthalene | 320,000 | 14 U | 14 J1 | 12 J1 | 2.6 J1 | 19 | 6.2 | 4.8 U | 4.6 U | 12 | 5.2 | 4.6 U | 2.4 J1 | 180 | 13 | 4.5 U | 2.6 J1 |
| 1-Methylnaphthalene | 16,000 | 14 U | 13 J1 | 10 J1 | 4.9 U | 15 | 4.9 | 4.8 U | 4.6 U | 8.2 | 3.2 J1 | 4.6 U | 4.5 U | 220 | 9.2 | 4.5 U | 4.6 U |
| Total Naphthalenes | --- | 14 U | 36.0 J1 | 32 J1 | 5.3 J1 | 54 | 17 | 4.8 U | 4.6 U | 34.2 | 13.3 J1 | 4.6 U | 5.1 J1 | 610 | 31.4 | 4.5 U | 2.6 J1 |
| Acenaphthylene | --- | 14 U | 14 U | 12 U | 4.9 U | 28 | 6.3 | 4.8 U | 4.6 U | 8.8 | 4.5 U | 4.6 U | 4.5 U | 620 | 6.2 | 4.5 U | 4.6 U |
| Acenaphthene | 230,000 | 14 U | 14 U | 12 U | 4.9 U | 7.8 | 4.6 | 4.8 U | 4.6 U | 9.4 | 2.3 J1 | 4.6 U | 4.5 U | 110 | 8.4 | 4.5 U | 4.6 U |
| Fluorene | 150,000 | 14 U | 11 J1 | 12 U | 4.9 U | 8.8 | 4.4 J1 | 4.8 U | 4.6 U | 7.7 | 4.5 U | 4.6 U | 4.5 U | 560 | 3.7 J1 | 4.5 U | 4.6 U |
| Phenanthrene | --- | 12 J1 | 40 | 28 | 2.8 J1 | 120 | 51 | 4.8 U | 4.6 U | 83 | 15 | 2.4 J1 | 4.8 | 5700 | 86 | 4.5 U | 4.2 J1 |
| Anthracene | 1,600,000 | 14 U | 12 J1 | 12 U | 4.9 U | 20 | 8.4 | 4.8 U | 4.6 U | 14 | 2.9 J1 | 4.6 U | 4.5 U | 370 | 8.8 | 4.5 U | 4.6 U |
| Fluoranthene | 230,000 | 8.2 J1 | 30 | 16 | 4.9 U | 140 | 54 | 4.8 U | 4.6 U | 87 | 24 | 4.6 U | 4.5 U | 4900 | 60 | 4.5 U | 3.4 J1 |
| Pyrene | 240,000 | 10 J1 | 40 | 19 | 4.9 U | 150 | 59 | 4.8 U | 4.6 U | 100 | 23 | 4.6 U | 4.5 U | 4700 | 63 | 4.5 U | 3.5 J1 |
| Benzo(a)anthracene | --- | 14 U | 34 | 13 | 4.9 U | 65 | 27 | 4.8 U | 4.6 U | 48 | 16 | 4.6 U | 4.5 U | 1400 | 28 | 4.5 U | 2.4 J1 |
| Chrysene | --- | 22 | 120 | 39 | 2.4 J1 | 86 | 32 | 4.8 U | 4.6 U | 60 | 18 | 4.6 U | 4.5 U | 2000 | 51 | 4.5 U | 3.3 J1 |
| Benzo(a)pyrene | --- | 9.6 J1 | 26 | 15 | 4.9 U | 100 | 40 | 4.8 U | 4.6 U | 85 | 17 | 4.6 U | 4.5 U | 1900 | 37 | 4.5 U | 4.6 U |
| Indeno(1,2,3-cd)pyrene | --- | 14 U | 14 J1 | 12 U | 4.9 U | 67 | 23 | 4.8 U | 4.6 U | 52 | 8.8 | 4.6 U | 4.5 U | 1100 | 40 | 4.5 U | 4.6 U |
| Dibenz(a,h)anthracene | --- | 14 U | 19 | 12 U | 4.9 U | 24 | 9.6 | 4.8 U | 4.6 U | 17 | 4.5 U | 4.6 U | 4.5 U | 300 | 11 | 4.5 U | 4.6 U |
| Benzo(g,h,i)perylene | --- | 14 U | 26 | 17 | 4.9 U | 100 | 32 | 4.8 U | 4.6 U | 73 | 10 | 4.6 U | 4.5 U | 1400 | 82 | 4.5 U | 4.6 U |
| Dibenzofuran | 80,000 | 14 U | 14 U | 12 U | 4.9 U | 8.4 | 4.5 U | 4.8 U | 4.6 U | 4.5 J1 | 4.5 U | 4.6 U | 4.5 U | 270 | 3.8 J1 | 4.5 U | 4.6 U |
| Total Benzofluoranthenes | --- | 14 U | 41 | 24 | 4.9 U | 140 | 56 | 4.8 U | 4.6 U | 110 | 29 | 4.6 U | 4.5 U | 2800 | 51 | 4.5 U | 4.6 U |
| Total cPAH TEQ | 15 | 9.8 | 38 | 19 | 0.024 | 130 | 52 | ND | ND | 108 | 23 | ND | ND | 2480 | 51 | ND | 0.3 J |
| **PCBs (µg/kg)** | | | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | | | |
| Aroclor 1260 | 5.4 | 32 U | 32 U | 33 U | 31 U | 56 P | 32 U | 32 U | 32 U | 31 U | 31 U | 30 U | 33 U | 31 U | 31 U | 32 U | 31 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | 56 P | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

# TABLE 37
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER SLIP 5 OUTFALL AREA
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Former Slip 5 Outfall Area | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | IT-MW-14(2-3.5) TW27J 11/08/2011 | IT-MW-14(5-6.5) TW27K 11/08/2011 | IT-MW-14(8-9.5) TW27L 11/08/2011 | IT-MW-14(13-14.5) TW27M 11/08/2011 | IT-SB-6(2-3.5) TU90H 11/01/2011 | IT-SB-6(5-6.5) TU90I 11/01/2011 | IT-SB-6(8-9.5) TU90J 11/01/2011 | IT-SB-6(13.5-15) TU90K 11/01/2011 | IT-SB-7(2-3.5) TU90L 11/01/2011 | IT-SB-7(5-6.5) TU90M 11/01/2011 | IT-SB-7(8-9.5) TU90N 11/01/2011 | IT-SB-7(13-14.5) TU90O 11/01/2011 | IT-SB-8(2-3.5) TX01F 11/14/2011 | IT-SB-8(5-6.5) TX01G 11/14/2011 | IT-SB-8(8-9.5) TX01H 11/14/2011 | IT-SB-8(14-15.5) TX01I 11/14/2011 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | **38** | **76** | **52** | 6.2 U | **35** | **10** | 5.8 U | 6.2 U | **21** | **6.7** | 5.8 U | 6.6 U | **13** | **23** | 5.7 U | 6.4 U |
| Oil-Range Organics | 2,000 | **290** | **460** | **250** | 12 U | **90** | **29** | 12 U | 12 U | **41** | **14** | 12 U | 13 U | **34** | **170** | 12 U | 13 U |
| **NWTPH-G** | | | | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 5.7 U | 7.0 U | 8.0 U | 9.0 U | 7.3 U | 7.4 U | 8.6 U | 7.4 U | 7.0 U | 6.0 U | 7.6 U | 8.5 U | 7.2 U | **20** | 6.7 U | 8.0 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | | | | | |
| Arsenic | 7 | **2.4** | **4.7** | **7.2** | **1.6** | **54.5** | **11.9** | **2.6** | **2.6** | **10.6** | **4.1** | **1.8** | **4.0** | **7.9** | **3.9** | **3.1** | **2.4** |
| Barium | 640 | **42.3** | **50.6** | **60.5** | **26.4** | **54.3** | **40.1** | **48.7** | **32.1** | **54.2** | **46.6** | **34.0** | **60.7** | **104** | **46.1** | **41.6** | **46.5** |
| Beryllium | 160 | 0.2 U | 0.2 U | 0.2 U | 0.3 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.3 U | **0.2** | 0.2 U | 0.2 U | 0.2 U |
| Cadmium | 1.3 | **0.1** | **0.2** | **0.1** | **0.7** | **0.4** | **1.9** | 0.1 U | 0.1 U | 0.1 U | **0.2** | 0.1 U | 0.1 U | **0.3** | 0.1 U | 0.1 U | 0.1 U |
| Chromium | 1480 | **20.0** | **14.7** | **16.1** | **18.9** | **14.6** | **13.1** | **11.9** | **15.1** | **12.5** | **14.5** | **10.0** | **16.2** | **18.6** | **12.8** | **12.7** | **15.5** |
| Copper | 36 | **37.1** | **23.7** | **29.0** | **42.8** | **53.9** | **23.2** | **17.7** | **9.6** | **29.7** | **19.4** | **12.0** | **17.5** | **30.0** | **17.4** | **12.1** | **16.7** |
| Lead | 250 | **7.3** | **11.6** | **23.6** | **8.5** | **53.9** | **15.3** | **2.1** | **12.0** | **16.7** | **14.7** | **1.5** | **2.7** | **153** | **5.1** | **6.2** | **2.1** |
| Mercury | 1.5 | 0.02 U | **0.05** | **0.05** | 0.02 U | **0.17** | **0.04** | **0.02** | 0.03 U | **0.08** | **0.13** | 0.02 U | **0.03** | **0.09** | **0.03** | 0.02 U | **0.03** |
| Nickel | 210 | **30.0** | **16.0** | **13.6** | **5.7** | **73.3** | **20.2** | **9.6** | **7.8** | **11.3** | **10.8** | **8.2** | **11.8** | **12.2** | **11.6** | **9.3** | **8.1** |
| Zinc | 1,400 | **48** | **59** | **94** | **80** | **231** | **57** | **52** | **73** | **59** | **61** | **22** | **52** | **90** | **45** | **101** | **48** |

RPD = Relative Percent Difference
ND = Not Detected.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
Bold = Exceedance
Box = Exceeds Preliminary Cleanup Level.

J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the or greater than reporting limit, but equal to the detection limit.
UJ2 = The analyted was not detected in the sample at or above the numerical value shown; the numerical value is below the reporting limit, but greater than the detection limit.
U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
P = The analyte was detected on both chromatographic columns but the quantified values differ by 40 percent RPD with no obvious chromatographic interference. The higher of the two values is reported by the laboratory.

# TABLE 38
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER HYDRAULIC TEST PAD AREA
## BOEING ISAACSON-THOMPSON
## REMEDIAL INVESTIGATION

| | | Former Hydraulic Test Pad Area | | | |
|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-11(2-3.5) TU65F 10/31/2011 | IT-MW-11(5-6.5) TU65G 10/31/2011 | IT-MW-11(8-9.5) TV99D 11/07/2011 | IT-MW-11(13.5-15) TV99E 11/07/2011 |
| **VOLATILES (µg/kg)** | | | | | |
| **Method SW8260C** | | | | | |
| Methylene Chloride | 2,400 | **2.0** J | **3.4** J | **1.3** J1 | **1.4** J1 |
| Acetone | 510,000 | 31 U | 14 U | **40** J | **28** |
| Carbon Disulfide | 75,000 | **0.5** J1 | 1.2 U | **2.0** J | **18** |
| 1,1-Dichloroethane | 710 | **0.6** J1 | 1.2 U | 1.0 UJ | 1.1 U |
| 2-Butanone | 430,000 | **3.4** J1 | 5.8 U | **5.6** | **4.5** J1 |
| Benzene | 93 | 1.0 U | 1.2 U | **0.6** J1 | **0.9** J1 |
| Toluene | 100,000 | 1.0 U | 1.2 U | **0.9** J, J1 | **0.8** J1 |
| 1,1,2-Trichloro-1,2,2-trifuoroethane | 1,000,000,000 | **0.8** J1 | 2.3 U | **1.5** J, J1 | **5.5** |
| Naphthalene | 2,100 | 4.8 U | 5.8 U | **2.3** J, J1 | **1.4** J, J1 |
| **SEMIVOLATILES (µg/kg)** | | | | | |
| **Method SW8270D** | | | | | |
| Naphthalene | 2,100 | 19 U | 19 U | **96** | **32** |
| 2-Methylnaphthalene | 320,000 | 19 U | 19 U | **59** | **39** |
| Acenaphthene | 230,000 | 19 U | 19 U | **57** | **27** |
| Dibenzofuran | 80,000 | **9.7** J1 | 19 U | **58** | **32** |
| Fluorene | 150,000 | 19 U | 19 U | **74** J | **32** J |
| Phenanthrene | --- | **32** | 19 U | **220** | **65** |
| Carbazole | 50,000 | 19 U | 19 U | **23** | 19 U |
| Anthracene | 1,600,000 | 19 U | 19 U | **31** | **16** J1 |
| Fluoranthene | 230,000 | **25** | 19 U | **160** | **56** |
| Pyrene | 240,000 | **24** | 19 U | **170** J | **68** J |
| Benzo(a)anthracene | --- | 19 U | 19 U | **54** | **16** J1 |
| Chrysene | --- | **12** J1 | 19 U | **63** | **23** |
| Benzo(a)pyrene | --- | 19 U | 19 U | **48** | **18** J1 |
| Indeno(1,2,3-cd)pyrene | --- | 19 U | 19 U | **22** | 19 U |
| Benzo(g,h,i)perylene | --- | 19 U | 19 U | **31** | 19 U |
| 1-Methylnaphthalene | 16,000 | 19 U | 19 U | **29** | **36** |
| Total Benzofluoranthenes | --- | **12** J1 | 19 U | **79** | **23** |
| Total cPAH TEQ | 15 | **1.3** J | ND | **64** | **22** J |
| **PAHs (µg/kg)** | | | | | |
| **Method SW8270D-SIM** | | | | | |
| Naphthalene | 2,100 | **20** | 4.8 U | **66** | **25** |
| 2-Methylnaphthalene | 320,000 | **10** | 4.8 U | **45** | **21** |
| 1-Methylnaphthalene | 16,000 | **5.6** | 4.8 U | **24** | **18** |
| Total Naphthalenes | --- | **35.6** | 4.8 U | **135** | **64** |
| Acenaphthene | 230,000 | **5.5** | 4.8 U | **57** | **24** |
| Fluorene | 150,000 | **3.9** J1 | 4.8 U | **61** | **30** |
| Phenanthrene | --- | **18** | **2.5** J1 | **170** | **66** |
| Anthracene | 1,600,000 | **2.7** J1 | 4.8 U | **31** | **18** |
| Fluoranthene | 230,000 | **16** | **2.7** J1 | **130** | **64** |
| Pyrene | 240,000 | **14** | **3.4** J1 | **100** | **50** |
| Benzo(a)anthracene | --- | **5.8** | 4.8 U | **40** | **17** |
| Chrysene | --- | **7.3** | 4.8 U | **48.0** | **22.0** |
| Benzo(a)pyrene | --- | **5.6** | 4.8 U | **37** | **20** |
| Indeno(1,2,3-cd)pyrene | --- | **3.9** J1 | 4.8 U | **18** | **8.3** |
| Dibenz(a,h)anthracene | --- | 4.8 U | 4.8 U | **7.2** | **3.4** J1 |
| Benzo(g,h,i)perylene | --- | **4.8** J1 | 4.8 U | **22** | **11** |
| Dibenzofuran | 80,000 | **6.3** | 4.8 U | **55** | **27** |
| Total Benzofluoranthenes | --- | **11** | 4.8 U | **61** | **26** |
| Total cPAH TEQ | 15 | **7.7** J | ND | **50.1** | **25.7** J |

# TABLE 38
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER HYDRAULIC TEST PAD AREA
## BOEING ISAACSON-THOMPSON
## REMEDIAL INVESTIGATION

| | | Former Hydraulic Test Pad Area | | | |
|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-11(2-3.5) TU65F 10/31/2011 | IT-MW-11(5-6.5) TU65G 10/31/2011 | IT-MW-11(8-9.5) TV99D 11/07/2011 | IT-MW-11(13.5-15) TV99E 11/07/2011 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | |
| **NWTPH-Dx** | | | | | |
| Diesel-Range Organics | 2,000 | **6.2** | 5.2 U | **14** | **13** |
| Oil-Range Organics | 2,000 | **17** | 10 U | **42** | **26** |
| **NWTPH-G** | | | | | |
| Gasoline-Range Organics | 100/30 | 5.5 U | 5.1 U | **11** | 7.3 U |
| **TOTAL METALS (mg/kg)** | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | |
| Arsenic | 7 | **6.6** | **2.9** | **7.8** | **3.7** |
| Barium | 640 | **52.5** | **51.4** | **51.4** | **47.6** |
| Beryllium | 160 | **0.2** | **0.2** | **0.2** | 0.2 U |
| Cadmium | 1.3 | **0.1** | 0.1 U | **0.2** | **0.2** |
| Chromium | 1,480 | **21.3** | **18.9** | **17.3** | **13.3** |
| Copper | 36 | **22.5** | **15.2** | **39.3** | **17.6** |
| Lead | 250 | **7.5** | **2.5** | **11.4** | **4.2** |
| Mercury | 1.5 | **0.07** | 0.02 U | **0.14** | **0.04** |
| Nickel | 210 | **28.7** | **26.4** | **24.0** | **13.2** |
| Zinc | 1,400 | **45** | **34** | **63** | **39** |

ND = Not Detected
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
PAHs = polycyclic aromatic hydrocarbons
SIM = Selectd Ion Monitoring
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
Bold = Detected compound.
Box = Exceeds Preliminary Cleanup Level

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

# TABLE 39
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## VICINITY OF WELLS I-205(s) AND I-206(s)
## BOEING ISAACSON-THOMPSON
## REMEDIAL INVESTIGATION

| | | Vicinity of I-206(s) | | | | | Vicinity of I-205(s) and I-206(s) | |
|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-TP-101-B(12-13) TT59A 10/24/2011 | IT-TP-102-B(13-14) TT67B 10/25/2011 | IT-TP-103-SWE(5-6) TT67C 10/25/2011 | IT-TP-103-SWE(6-7) TT67D 10/25/2011 | IT-TP-103-SWE(12-13) TT67E 10/25/2011 | IT-TP-104-B(12-13) TU13A 10/27/2011 | IT-TP-105B-B(11-12) TU13B 10/27/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | |
| **Method SW8260C** | | | | | | | | |
| Methylene Chloride | 2400 | **2.6** | 2.7 U | 2.6 U | 2.8 U | 2.6 U | 2.6 U | 2.7 U |
| Acetone | 510,000 | **25** | **22** | **45** | **72** | **18** | **30** J | **36** J |
| Carbon Disulfide | 75,000 | 1.3 UJ | 1.3 U | 1.3 U | 1.4 U | 1.3 U | **4.7** | **4.2** |
| Benzene | 93 | 1.3 UJ | 1.3 U | **2.1** | **1.6** | 1.3 U | 1.3 U | 1.3 U |
| Toluene | 100,000 | 1.3 UJ | 1.3 U | 1.3 U | **1.5** | 1.3 U | 1.3 U | 1.3 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | |
| **Method SW8270D** | | | | | | | | |
| Phenol | 1,900,000 | 19 U | 19 U | 18 U | 19 U | **12** J1 | 19 U | 20 U |
| Naphthalene | 2,100 | 19 U | 19 U | **60** | **64** | 20 U | 19 U | 20 U |
| 2-Methylnaphthalene | 320,000 | 19 U | 19 U | **15** J1 | **44** | 20 U | 19 U | 20 U |
| Dibenzofuran | 80,000 | 19 U | 19 U | **12** J1 | **16** J1 | 20 U | 19 U | 20 U |
| Phenanthrene | --- | 19 U | 19 U | **66** | **77** | 20 U | 11 J1 | 20 U |
| Fluoranthene | 230,000 | 19 U | 19 U | **73** | **69** | 20 U | 19 U | 20 U |
| Pyrene | 240,000 | 19 U | 19 U | **72** | **68** | 20 U | 19 U | 20 U |
| Benzo(a)anthracene | --- | 19 U | 19 U | **25** | **21** | 20 U | 19 U | 20 U |
| Chrysene | --- | 19 U | 19 U | **54** | **46** | 20 U | 19 U | 20 U |
| Benzo(a)pyrene | --- | 19 U | 19 U | **54** | **23** | 20 U | 19 U | 20 U |
| Indeno(1,2,3-cd)pyrene | --- | 19 U | 19 U | **110** | **26** | 20 U | 19 U | 20 U |
| Dibenz(a,h)anthracene | --- | 19 U | 19 U | **14** J1 | 19 U | 20 U | 19 U | 20 U |
| Benzo(g,h,i)perylene | --- | 19 U | 19 U | **240** | **47** | 20 U | 19 U | 20 U |
| 1-Methylnaphthalene | 16,000 | 19 U | 19 U | **11** J1 | **28** | 20 U | 19 U | 20 U |
| Total Benzofluoranthenes | --- | 19 U | 19 U | **140** | **61** | 20 U | 19 U | 20 U |
| Total cPAH TEQ | 15 | ND | ND | **82** J | **34** | ND | ND | ND |

# TABLE 39
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## VICINITY OF WELLS I-205(s) AND I-206(s)
## BOEING ISAACSON-THOMPSON
## REMEDIAL INVESTIGATION

| | | Vicinity of I-206(s) | | | | | Vicinity of I-205(s) and I-206(s) | |
|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-TP-101-B(12-13) TT59A 10/24/2011 | IT-TP-102-B(13-14) TT67B 10/25/2011 | IT-TP-103-SWE(5-6) TT67C 10/25/2011 | IT-TP-103-SWE(6-7) TT67D 10/25/2011 | IT-TP-103-SWE(12-13) TT67E 10/25/2011 | IT-TP-104-B(12-13) TU13A 10/27/2011 | IT-TP-105B-B(11-12) TU13B 10/27/2011 |
| **PAHs (µg/kg)** | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | |
| Naphthalene | 2,100 | **2.6** J1 | **3.2** J1 | **55** | **110** | **2.7** J1 | **3.6** J1 | **5.3** |
| 2-Methylnaphthalene | 320,000 | 4.7 U | 4.6 U | **14** | **94** | 4.8 U | **3.8** J1 | 4.6 U |
| 1-Methylnaphthalene | 16,000 | 4.7 U | 4.6 U | **9.9** | **72** | 4.8 U | **3.7** J1 | 4.6 U |
| Total Naphthalenes | --- | **2.6** | **3.2** J1 | **78.9** | **276** | **2.7** J1 | **11.1** J1 | **5.3** |
| Acenaphthene | 230,000 | 4.7 U | 4.6 U | **3.5** J1 | **19** | 4.8 U | **4.1** J1 | **2.5** J1 |
| Fluorene | 150,000 | 4.7 U | 4.6 U | **2.6** J1 | **4.8** | 4.8 U | 4.8 U | 4.6 U |
| Phenanthrene | --- | **5.0** | **4.4** J1 | **69** | **120** | **4.6** J1 | **7.7** | **3.8** J1 |
| Anthracene | 1,600,000 | 4.7 U | 4.6 U | **71** | **120** | 4.8 U | 4.8 U | 4.6 U |
| Fluoranthene | 230,000 | **3.0** J1 | 4.6 U | **83** | **110** | 4.8 U | **5** | **4.8** |
| Pyrene | 240,000 | **3.3** J1 | 4.6 U | **70** | **95** | 4.8 U | **6.2** | **4.4** J1 |
| Benzo(a)anthracene | --- | 4.7 U | 4.6 U | **26** | **35** | 4.8 U | 4.8 U | 4.6 U |
| Chrysene | --- | 4.7 U | 4.6 U | **53** | **69** | 4.8 U | **3.0** J1 | 4.6 U |
| Benzo(a)pyrene | --- | 4.7 U | 4.6 U | **40** | **34** | 4.8 U | 4.8 U | 4.6 U |
| Indeno(1,2,3-cd)pyrene | --- | 4.7 U | 4.6 U | **70** | **40** | 4.8 U | 4.8 U | 4.6 U |
| Dibenz(a,h)anthracene | --- | 4.7 U | 4.6 U | **17** | **12** | 4.8 U | 4.8 U | 4.6 U |
| Benzo(g,h,i)perylene | --- | 4.7 U | 4.6 U | **130** | **67** | 4.8 U | 4.8 U | 4.6 U |
| Dibenzofuran | 80,000 | 4.7 U | 4.6 U | **12** | **30** | 4.8 U | **2.6** J1 | 4.6 U |
| Total Benzofluoranthenes | --- | 4.7 U | 4.6 U | **100** | **90** | 4.8 U | 4.8 U | 4.6 U |
| Total cPAH TEQ | 15 | ND | ND | **62** | **52** | ND | **0.5** J | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | |
| Diesel-Range Organics | 2,000 | 6.5 U | 6.8 U | **11** | **15** | 6.8 U | 5.8 U | 5.8 U |
| Oil-Range Organics | 2,000 | 13 U | 14 U | **58** | **57** | 14 U | 12 U | 12 U |

# TABLE 39
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## VICINITY OF WELLS I-205(s) AND I-206(s)
## BOEING ISAACSON-THOMPSON
## REMEDIAL INVESTIGATION

| | | Vicinity of I-206(s) | | | | | Vicinity of I-205(s) and I-206(s) | |
|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-TP-101-B(12-13) TT59A 10/24/2011 | IT-TP-102-B(13-14) TT67B 10/25/2011 | IT-TP-103-SWE(5-6) TT67C 10/25/2011 | IT-TP-103-SWE(6-7) TT67D 10/25/2011 | IT-TP-103-SWE(12-13) TT67E 10/25/2011 | IT-TP-104-B(12-13) TU13A 10/27/2011 | IT-TP-105B-B(11-12) TU13B 10/27/2011 |
| **TOTAL METALS (mg/kg)** | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | |
| Arsenic | 7 | **2.4** | **1.2** | **7.1** | **5.1** | **1.5** | **2.0** | **2.3** |
| Barium | 640 | **37.4** | **31** | **202** | **158** | **27.0** | **35.6** J | **27.6** |
| Beryllium | 160 | 0.3 U | 0.3 U | 0.2 U | **0.3** | 0.3 U | 0.2 U | 0.2 U |
| Cadmium | 1.3 | 0.1 U | 0.1 U | **0.4** | **0.2** | 0.1 U | **0.1** | 0.1 U |
| Chromium | 1,480 | **12.0** | **11.7** | **14.3** | **13.3** | **9.4** | **11** | **12** |
| Copper | 36 | **18.9** | **14.1** | **48.4** | **62.8** | **16.8** | **11.9** | **9.9** |
| Lead | 250 | **2.3** | **1.7** | **90.5** | **49.9** | **1.7** | **2.9** | **2.1** |
| Mercury | 1.5 | 0.02 U | 0.03 U | **0.05** | **0.10** | 0.03 U | 0.02 U | 0.03 U |
| Nickel | 210 | **9.0** | **7.9** | **15.2** | **15.1** | **6.0** | **13.7** | **10.3** |
| Zinc | 1,400 | **25** | **25** | **150** | **99** | **22** | **37** | **31** |

ND = Not Detected
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
PAHs = polycyclic aromatic hydrocarbons
SIM = Selectd Ion Monitoring
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
Bold = Exceedance
Box = Exceeds Preliminary Cleanup Level.

U = Indicates the compound was not detected at the reported concentration.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

# TABLE 40
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER WASHDOWN/AQUEOUS DEGREASER AREA
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | | Former Washdown/Aqueous Degreaser Area | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-MW-1 (3-4) ST77A 04/25/2011 | IT-MW-1 (5-6) ST77B 04/25/2011 | IT-MW-1 (8-9) ST77C 04/25/2011 | IT-MW-2 (2-3) SU07A 04/26/2011 | IT-MW-2 (5-6) SU07B 04/26/2011 | IT-MW-2 (8-9) SU07C 04/26/2011 | IT-MW-3 (2-3) SU07D 04/26/2011 | IT-MW-3 (5-6) SU07E 04/26/2011 | IT-MW-3 (9-10) SU07F 04/26/2011 | IT-SB-1 (2-3) ST77D 04/25/2011 | IT-SB-1 (5-6) ST77E 04/25/2011 | IT-SB-1 (8-9) ST77F 04/25/2011 | IT-Bldg1401-FootingExc1-SW(4.0) TB91C 06/23/2011 | IT-Bldg1401-FootingExc1-B(6.0) TB91D 06/23/2011 | IT-Bldg1401-FootingExc1-B(7.5) TC25A 6/27/2011 | IT-Bldg1401-FootingExc3-B(4.0) TB68B 06/22/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | | | | | | | |
| Methylene Chloride | 2,400 | **11** J | **16** J | **14** J | **11** | **13** | **15** | **14** | **13** | **19** | **10** J | **12** J | **11** J | **21** | **29** | **14** | **21** |
| Acetone | 510,000 | **76** J | **34** J | **36** J | **26** | **88** | **93** | **34** | **26** J | **85** J | **20** J | **39** J | **100** J | **24** | **19** | **53** | **97** |
| Carbon Disulfide | 75,000 | 1.4 UJ | 1.4 UJ | 1.3 UJ | 1.1 U | 1.2 U | **8.7** | 1.2 U | 1.1 U | **2.0** | 1.0 UJ | 1.2 UJ | **7.1** J | 1.2 U | 1.5 U | **1.8** | **4.8** |
| 2-Butanone | 430,000 | 7.0 UJ | 6.8 UJ | 6.4 UJ | 5.3 U | **7.1** | **14** | 6.2 U | 5.4 U | **9.0** | 4.9 UJ | 5.8 UJ | **14** J | 5.8 U | 7.3 U | 5.4 U | **15** |
| Trichloroethene | 51 | 1.4 UJ | 1.4 UJ | 1.3 UJ | 1.1 U | 1.2 U | 1.9 U | 1.2 U | 1.1 U | 1.5 U | 1.0 UJ | 1.2 UJ | 1.9 UJ | 1.2 U | 1.5 U | 1.1 U | 1.2 U |
| Benzene | 93 | 1.4 UJ | 1.4 UJ | 1.3 UJ | 1.1 U | 1.2 U | 1.9 U | 1.2 U | 1.1 U | 1.5 U | 1.0 UJ | 1.2 UJ | 1.9 UJ | **0.6** J | 1.5 U | **0.6** J | 1.2 U |
| Tetrachloroethene | 260 | 1.4 UJ | 1.4 UJ | 1.3 UJ | 1.1 U | 1.2 U | 1.9 U | 1.2 U | 1.1 U | 1.5 U | 1.0 UJ | 1.2 UJ | 1.9 UJ | 1.2 U | 1.5 U | 1.1 U | 1.2 U |
| Toluene | 100,000 | 1.4 UJ | 1.4 UJ | 1.3 UJ | 1.1 U | 1.2 U | 1.9 U | 1.2 U | 1.1 U | 1.5 U | 1.0 UJ | 1.2 UJ | 1.9 UJ | **0.6** J | **0.9** J | **0.6** J | **0.7** J |
| 1,2,4-Trimethylbenzene | 800,000 | 1.4 UJ | 1.4 UJ | 1.3 UJ | 1.1 U | 1.2 U | 1.9 U | **1.4** | 1.1 U | 1.5 U | 1.0 UJ | 1.2 UJ | 1.9 UJ | 1.2 U | 1.5 U | 1.1 U | 1.2 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | | | | | | | |
| Phenol | 1,900,000 | 20 U | 19 U | 19 U | 18 U | 19 U | **56** | 19 U | 18 U | **15** J | 18 U | 18 U | **62** | 58 U | 19 U | 19 U | 20 U |
| Benzyl Alcohol | 8,000,000 | 20 UJ | 19 UJ | 19 UJ | 18 U | 19 U | **160** | 19 U | 18 U | **68** | 18 UJ | 18 UJ | 19 UJ | 58 U | 19 U | 19 U | 20 U |
| 4-Methylphenol | 41,000 | 20 U | 19 U | 19 U | 18 U | 19 U | **65** | 19 U | 18 U | **10** J | 18 U | 18 U | **160** | 120 U | 37 U | **78** | 39 U |
| Benzoic Acid | 9,000 | **120** J | 190 U | 190 U | 180 U | 190 U | **530** | 190 U | 180 U | **210** | 180 U | 180 U | **470** | 1200 U | 370 U | 390 U | 390 U |
| Naphthalene | 2,100 | **17** J | **10** J | 19 U | 18 U | 19 U | **62** | 19 U | 18 U | **12** J | 18 U | 18 U | **60** | 58 U | 19 U | **150** | **22** |
| 2-Methylnaphthalene | 320,000 | **16** J | 19 U | 19 U | 18 U | 19 U | **29** | 19 U | 18 U | 18 U | 18 U | 18 U | **45** | 58 U | 19 U | **30** | **31** |
| Acenaphthene | 230,000 | 20 U | 19 U | 19 U | 18 U | 19 U | **11** J | 19 U | 18 U | 18 U | 18 U | 18 U | **14** J | 58 U | 19 U | **13** J | **18** J |
| Dibenzofuran | 80,000 | **17** J | 19 U | 19 U | 18 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | **32** | 58 U | 19 U | **23** | **25** |
| Fluorene | 150,000 | **17** J | 19 U | 19 U | 18 U | 19 U | **20** | 19 U | 18 U | 18 U | 18 U | 18 U | **22** | 58 U | 19 U | 19 U | **34** |
| Phenanthrene | --- | **48** J | **12** J | 19 UJ | 18 U | **11** J | **64** | **10** J | 18 U | **10** J | **11** J | 18 UJ | **110** J | 58 U | 19 U | **110** | **54** |
| Anthracene | 1,600,000 | **14** J | 19 U | 19 U | 18 U | 19 U | **16** J | 19 U | 18 U | 18 U | 18 U | 18 U | **22** | 58 U | 19 U | **13** J | **11** J |
| Fluoranthene | 230,000 | **64** | **15** J | 19 U | 18 U | 19 U | **60** J | 19 U | 18 U | 18 U | **21** | 18 U | **91** | 58 U | 19 U | **120** | **43** |
| Pyrene | 240,000 | **69** | **14** J | 19 U | 18 U | 19 U | **53** | 19 U | 18 U | 18 U | **13** J | 18 U | **98** | 58 U | 19 U | **120** | **35** |
| Benzo(a)anthracene | --- | **29** | 19 U | 19 U | 18 U | 19 U | **16** J | 19 U | 18 U | 18 U | 18 U | 18 U | **32** | 58 U | 19 U | **27** | 20 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | **14** J | **38** | **26** | **14** J | **14** J | **29** | **10** J | **10** J | **33** | **19** | **15** J | **39** | 73 U | 23 U | 24 U | **18** J |
| Chrysene | --- | **45** J | **10** J | 19 U | 18 U | **20** J | **26** | 19 U | 18 U | 18 U | **12** J | 18 U | **48** J | 58 U | 19 U | **61** | **27** |
| Benzo(a)pyrene | --- | 20 U | 19 U | 19 U | 18 U | 19 U | **11** J | 19 U | 18 U | 18 U | 18 U | 18 U | 19 U | 58 U | 19 U | **24** | **11** J |
| Indeno(1,2,3-cd)pyrene | --- | **20** | 19 U | 19 U | 18 U | 19 U | 19 U | 19 U | 18 U | 18 U | 18 U | 18 U | **15** J | 58 U | 19 U | **16** J | 20 U |
| Benzo(g,h,i)perylene | --- | **28** | 19 U | 19 U | 18 U | **16** J | **12** J | **12** J | 18 U | 18 U | 18 U | 18 U | **20** | 58 U | 19 U | **21** | **13** J |
| 1-Methylnaphthalene | 16,000 | **14** J | 19 U | 19 U | 18 U | 19 U | **22** | 19 U | 18 U | 18 U | 18 U | 18 U | **30** | 58 U | 19 U | **17** J | **15** J |
| Total Benzofluoranthenes | --- | **55** | **11** J | 19 U | 18 U | 19 U | **36** | 19 U | 18 U | 18 U | **13** J | 18 U | **58** | 58 U | 19 U | **81** | **20** |
| Total cPAH TEQ | 15 | **11** | **1** J | ND | ND | **0.2** J | 16 J | ND | ND | ND | **1** J | ND | **11** J | ND | ND | 37 J | **13** J |
| **PAHs (µg/kg)** | | | | | | | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | | | | | | | |
| Naphthalene | 2,100 | **14** | **3.6** J | **2.7** J | 4.8 U | 4.6 U | **57** | 4.8 U | 4.6 U | **14** | **4.3** J | 4.7 U | **23** | **3.4** J | 4.7 U | **56** | **26** |
| 2-Methylnaphthalene | 320,000 | **14** | **3.3** J | 4.6 U | 4.8 U | **7.2** | **45** | 4.8 U | 4.6 U | 4.7 U | **6.0** | **2.9** J | **27** | **4.1** J | 4.7 U | **12** | **30** |
| 1-Methylnaphthalene | 16,000 | **13** | 4.8 U | 4.6 U | 4.8 U | **6.6** | **36** | 4.8 U | 4.6 U | 4.7 U | **5.0** | **2.6** J | **22** | **2.9** J | 4.7 U | **8.5** | **24** |
| Total Naphthalenes | --- | **41** | **6.9** J | **2.7** J | ND | **13.8** | **138** | ND | ND | **14** | **15.3** J | **5.5** J | **72** | **10.4** J | ND | **76.5** | **80** |
| Acenaphthene | 230,000 | **9.1** | 4.8 U | 4.6 U | 4.8 U | 4.6 U | **27** | 4.8 U | 4.6 U | 4.7 U | 4.6 U | 4.7 U | **14** | 4.9 U | 4.7 U | **7.5** | **25** |
| Fluorene | 150,000 | **13** | 4.8 U | 4.6 U | 4.8 U | 4.6 U | **25** | 4.8 U | 4.6 U | 4.7 U | 4.6 U | 4.7 U | **13** | 4.9 U | 4.7 U | 4.8 U | **30** |
| Phenanthrene | --- | **50** | **11** | **2.6** J | 4.8 U | **8.9** | **96** | **11** | **6.3** | **13** | **24** | **7.5** | **55** | **12** | **6.0** | **57** | **59** |
| Anthracene | 1,600,000 | **10** | 4.8 U | 4.6 U | 4.8 U | 4.6 U | **19** | 4.8 U | 4.6 U | 4.7 U | 4.6 U | 4.7 U | **11** | 4.9 U | 4.7 U | **6.5** | **12** |
| Fluoranthene | 230,000 | **64** | **8.8** | 4.6 U | 4.8 U | **6.0** | **90** | **6.4** | 4.6 U | **7.0** | **33** | **4.5** J | **51** | **8.5** | **2.6** J | **58** | **46** |
| Pyrene | 240,000 | **53** | **8.4** | 4.6 U | 4.8 U | **5.8** | **97** | **10** | **5.0** | **7.2** | **20** | **5.2** | **53** | **9.1** | **3.0** J | **65** | **44** |
| Benzo(a)anthracene | --- | **20** | **3.5** J | 4.6 U | 4.8 U | 4.6 U | **29** | **7.5** | 4.6 U | 4.7 U | **8.6** | 4.7 U | **19** | **4.0** J | 4.7 U | **17** | **16** |
| Chrysene | --- | **28** | **6.7** | 4.6 U | 4.8 U | **13** | **40** | **23** | **5.9** | **4.7** | **19** | **3.6** J | **25** | **10** | **2.8** J | **40** | **27** |
| Benzo(a)pyrene | --- | 4.8 U | 4.8 U | 4.6 U | 4.8 U | **5.2** | 4.8 U | **11** | 4.6 U | 4.7 U | 6.6 U | 4.7 U | 4.7 U | **3.6** J | 4.7 U | **19** | **11** |
| Indeno(1,2,3-cd)pyrene | --- | 14 U | 4.8 U | 4.6 U | 4.8 U | 4.6 U | **9.2** | 4.8 U | 4.6 U | 4.7 U | 5.4 U | 4.7 U | 7.5 U | **5.0** | 4.7 U | **14** | **6.4** |
| Dibenz(a,h)anthracene | --- | **5.1** | 4.8 U | 4.6 U | 4.8 U | 4.6 U | 4.8 U | 4.8 U | 4.6 U | 4.7 U | 4.6 U | 4.7 U | **2.8** J | 4.9 U | 4.7 U | 3.8 U | **10** |
| Benzo(g,h,i)perylene | --- | 20 U | 10 U | 4.6 U | 4.8 U | **17** | **14** | **13** | **4.9** | 4.7 U | 8.0 U | 4.7 U | 11 U | **14** | **3.3** J | **18** | **12** |
| Dibenzofuran | 80,000 | **14** | 4.8 U | 4.6 U | 4.8 U | 4.6 U | **26** | 4.8 U | 4.6 U | 4.7 U | **6.9** | 4.7 U | **15** | **2.9** J | 4.7 U | **8.9** | **26** |
| Total Benzofluoranthenes | --- | **44** | **7.6** | 4.6 U | 4.8 U | 4.6 U | **51** | **20** | 4.6 U | 4.7 U | **20** | 4.7 U | **34** | **9.9** | 4.7 U | **54** | **23** |
| Total cPAH TEQ | 15 | **7.19** | **1.177** | ND | ND | **5.33** | **9.32** | **13.98** | **0.059** | **0.047** | **3.05** | **0.036** | **5.83** | **5.59** | **0.028** | 28 | 16.8 |

# TABLE 40
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER WASHDOWN/AQUEOUS DEGREASER AREA
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Former Washdown/Aqueous Degreaser Area | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | IT-MW-1 (3-4) ST77A 04/25/2011 | IT-MW-1 (5-6) ST77B 04/25/2011 | IT-MW-1 (8-9) ST77C 04/25/2011 | IT-MW-2 (2-3) SU07A 04/26/2011 | IT-MW-2 (5-6) SU07B 04/26/2011 | IT-MW-2 (8-9) SU07C 04/26/2011 | IT-MW-3 (2-3) SU07D 04/26/2011 | IT-MW-3 (5-6) SU07E 04/26/2011 | IT-MW-3 (9-10) SU07F 04/26/2011 | IT-SB-1 (2-3) ST77D 04/25/2011 | IT-SB-1 (5-6) ST77E 04/25/2011 | IT-SB-1 (8-9) ST77F 04/25/2011 | IT-Bldg1401-FootingExc1-SW(4.0) TB91C 06/23/2011 | IT-Bldg1401-FootingExc1-B(6.0) TB91D 06/23/2011 | IT-Bldg1401-FootingExc1-B(7.5) TC25A 6/27/2011 | IT-Bldg1401-FootingExc3-B(4.0) TB68B 06/22/2011 |
| **PCBs (µg/kg)** | | | | | | | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | | | | | | | |
| Aroclor 1254 | 0.29 | 31 U | 30 U | 31 U | 31 U | 32 UJ | 32 UJ | 30 U | 32 U | 31 U | 31 U | 31 U | **39** | 33 U | 32 U | 32 U | 31 U |
| Aroclor 1260 | 5.4 | 31 U | 30 U | 31 U | 31 U | 32 UJ | 32 UJ | 30 U | 32 U | 31 U | 31 U | 31 U | **36** | 33 U | 32 U | 32 U | 31 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | **75** | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | **13** | **5.9** | 5.3 U | 5.4 U | **22** | **15** | **15** | **6.0** | 6.6 U | **8.1** | **4.4** J | **51** | **27** | **7.2** | **38** | **42** |
| Oil-Range Organics | 2,000 | **34** | **27** | 11 U | 11 U | **230** | **40** | **150** | **42** | 13 U | **80** | **9.7** J | **130** | **110** | **18** | **60** | **92** |
| **NWTPH-G** | | | | | | | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 8.8 U | 6.1 U | 6.9 U | **9.7** | 6.0 U | 13 U | 7.4 U | 6.1 U | 10 U | 6.1 U | 7.2 U | 11 U | 7.0 U | 7.4 U | 7.8 U | 6.6 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | | | | | | | |
| Arsenic | 7 | **5.5** | **3.1** | **1.7** | **2.5** | **4.6** | **11.4** | **2.8** | **3.4** | **5.5** | **2.9** | **3.2** | **11.2** | **2.9** | **3.2** | **6.5** | **3.2** |
| Barium | 640 | **51.7** | **3.2** | **28.2** | **57.6** | **51.5** | **81.6** | **48.6** | **44.0** | **81.8** | **43.2** | **46.8** | **85.0** | **47.2** | **39.6** | **50.1** | **58.3** |
| Beryllium | 160 | **0.3** | 0.2 U | 0.2 U | 0.2 U | 0.2 U | **0.5** | 0.2 U | 0.2 U | **0.3** | 0.2 U | 0.2 U | **0.5** | 0.2 U | 0.2 U | **0.2** | 0.2 U |
| Cadmium | 1.3 | **0.1** | 0.1 U | 0.1 U | 0.1 U | 0.1 U | **0.9** | 0.1 U | **0.1** | **0.1** | 0.1 U | 0.1 U | **0.8** | 0.1 U | **0.1** | **0.2** | 0.1 U |
| Chromium | 1,480 | **15.1** | **9.3** | **8.8** | **22.3** | **12.0** | **24.6** | **12.2** | **11.3** | **18.7** | **18.8** | **13.0** | **30** | **13.6** | **10.8** | **14** | **13.5** |
| Copper | 36 | **34.2** | **15.7** | **12.5** | **15.7** | **16.4** | **42.5** | **21.1** | **14.9** | **28.3** | **18.1** | **19.6** | **43.0** | **17.7** | **12.6** | **38.2** | **20** |
| Lead | 250 | **7.9** | **4.7** | **1.5** | **5.8** | **3.8** | **15.3** | **6.7** | **3.5** | **5.0** | **4.0** | **5.6** | **16.7** | **5.9** | **4.2** | **12.6** | **5.8** |
| Mercury | 1.5 | **0.04** | **0.03** | 0.02 U | 0.02 U | **0.05** | **0.16** | **0.02** | **0.02** | **0.08** | **0.02** | **0.03** | **0.25** | **0.02** | **0.02** | **0.06** | **0.03** |
| Nickel | 210 | **14.8** | **9.6** | **8.1** | **39.5** | **13.7** | **23.1** | **13.7** | **14.6** | **19.3** | **29.2** | **14.2** | **22.5** | **17.5** | **11.0** | **14.2** | **17.1** |
| Zinc | 1,400 | **55** | **33** | **22** | **35** | **38** | **94** | **36** | **40** | **69** | **34** | **41** | **97** | **33** | **35** | **49** | **36** |

**TABLE 40**
**SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS**
**FORMER WASHDOWN/AQUEOUS DEGREASER AREA**
**BOEING THOMPSON-ISAACSON SITE**
**TUKWILA, WASHINGTON**

| | | Former Washdown/Degreaser Area | | | | | |
|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-Bldg1401-FootingExc5-SW(4.0) TB91B 06/23/2011 | IT-Bldg1401-FootingExc5-B(6.0) TB91A 06/23/2011 | IT-Bldg1401-Footing Exc8-B(2.5) TB68C 06/22/2011 | IT-Bldg1401-FootingExc10-B(1.5) TC19A 06/24/2011 | IT-Bldg1401-FootingExc14-B(4.0) TB68D 06/22/2011 | IT-Bldg1401-FootingExc15-B(4.0) TB68A 06/22/2011 |
| **VOLATILES (µg/kg)** | | | | | | | |
| **Method SW8260C** | | | | | | | |
| Methylene Chloride | 2,400 | **20** | **26** | **22** | **17** | **25** | **25** |
| Acetone | 510,000 | **28** | **16** | **33** | **13** | **42** | **16** |
| Carbon Disulfide | 75,000 | 1.1 U | 1.4 U | 1.0 U | 1.2 U | 1.3 U | 1.2 U |
| 2-Butanone | 430,000 | 5.7 U | 7.2 U | 5.1 U | 6.0 U | 6.3 U | 5.9 U |
| Trichloroethene | 51 | 1.1 U | 1.4 U | 1.0 U | 1.2 U | **93** | **24** |
| Benzene | 93 | 1.1 U | 1.4 U | 1.0 U | 1.2 U | **0.7** J | 1.2 U |
| Tetrachloroethene | 260 | 1.1 U | 1.4 U | 1.0 U | 1.2 U | **4.6** | **2.6** |
| Toluene | 100,000 | 1.1 U | **0.8** J | **0.7** J | 1.2 U | **0.8** J | **0.8** J |
| 1,2,4-Trimethylbenzene | 800,000 | 1.1 U | 1.4 U | 1.0 U | 1.2 U | 1.3 U | 1.2 U |
| **SEMIVOLATILES (µg/kg)** | | | | | | | |
| **Method SW8270D** | | | | | | | |
| Phenol | 1,900,000 | 58 U | 19 U | 19 U | 19 U | 19 U | 20 U |
| Benzyl Alcohol | 8,000,000 | 58 U | 19 U | 19 U | 19 U | 19 U | 20 U |
| 4-Methylphenol | 41,000 | 120 U | 38 U | 38 U | 38 U | 39 U | 39 U |
| Benzoic Acid | 9,000 | 1200 U | 380 U | 380 U | 380 U | 390 U | 390 U |
| Naphthalene | 2,100 | 58 U | 19 U | 19 U | **19** | **13** J | 20 U |
| 2-Methylnaphthalene | 320,000 | 58 U | 19 U | 19 U | **22** | **20** | 20 U |
| Acenaphthene | 230,000 | 58 U | 19 U | 19 U | **120** | 19 U | 20 U |
| Dibenzofuran | 80,000 | 58 U | 19 U | 19 U | **210** | 19 U | 20 U |
| Fluorene | 150,000 | 58 U | 19 U | 19 U | **110** | 19 U | 20 U |
| Phenanthrene | --- | **38** J | 19 U | 19 U | **140** | **27** | **9.8** J |
| Anthracene | 1,600,000 | 58 U | 19 U | 19 U | **15** J | 19 U | 20 U |
| Fluoranthene | 230,000 | 58 U | 19 U | 19 U | **28** | **13** J | 20 U |
| Pyrene | 240,000 | 58 U | 19 U | 19 U | **22** | **9.7** J | 20 U |
| Benzo(a)anthracene | --- | 58 U | 19 U | 19 U | 19 U | 19 U | 20 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | 72 U | 24 U | 24 U | 24 U | 24 U | 24 U |
| Chrysene | --- | 58 U | 19 U | 19 U | 19 U | 19 U | 20 U |
| Benzo(a)pyrene | --- | 58 U | 19 U | 19 U | 19 U | 19 U | 20 U |
| Indeno(1,2,3-cd)pyrene | --- | 58 U | 19 U | 19 U | 19 U | 19 U | 20 U |
| Benzo(g,h,i)perylene | --- | 58 U | 19 U | 19 U | 19 U | 19 U | 20 U |
| 1-Methylnaphthalene | 16,000 | 58 U | 19 U | 19 U | 10 J | **18** J | 20 U |
| Total Benzofluoranthenes | --- | 58 U | 19 U | 19 U | 19 U | 19 U | 20 U |
| Total cPAH TEQ | 15 | ND | ND | ND | ND | ND | ND |
| **PAHs (µg/kg)** | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | |
| Naphthalene | 2,100 | 28 U | 4.5 U | **3.0** J | **8.2** | **15** | **11** |
| 2-Methylnaphthalene | 320,000 | 28 U | 4.5 U | 4.6 U | **9.7** | **19** | **27** |
| 1-Methylnaphthalene | 16,000 | 28 U | 4.5 U | 4.6 U | **5.1** | **19** | **19** |
| Total Naphthalenes | --- | ND | ND | **3.0** J | **23** | **53** | **57** |
| Acenaphthene | 230,000 | 28 U | 4.5 U | 2.5 U | **82** | 4.8 U | 4.9 U |
| Fluorene | 150,000 | 28 U | 4.5 U | 4.6 U | **74** | 4.8 U | 4.9 U |
| Phenanthrene | --- | **26** J | **5.0** | **6.4** | **110** | **26** | **480** |
| Anthracene | 1,600,000 | 28 U | 4.5 U | 4.6 U | **12** | 4.8 U | **15** |
| Fluoranthene | 230,000 | **23** J | **3.5** J | **5.9** | **27** | **14** | **190** |
| Pyrene | 240,000 | **48** | **4.3** J | **5.6** | **21** | **14** | **130** |
| Benzo(a)anthracene | --- | **22** J | 4.5 U | 4.6 U | **4.4** J | **6.0** | **12** |
| Chrysene | --- | **100** | **3.4** J | **2.6** J | **5.9** | **11** | **18** |
| Benzo(a)pyrene | --- | **29** | 4.5 U | 4.6 U | 4.7 U | 4.8 U | **8.1** |
| Indeno(1,2,3-cd)pyrene | --- | 28 U | 4.5 U | 4.6 U | 4.7 U | **3.9** J | **5.2** |
| Dibenz(a,h)anthracene | --- | 28 U | 4.5 U | 4.6 U | 4.7 U | 4.8 U | 4.9 U |
| Benzo(g,h,i)perylene | --- | **84** | 4.5 U | 4.6 U | 4.7 U | **4.1** J | **9.0** |
| Dibenzofuran | 80,000 | 28 U | 4.5 U | 4.6 U | **140** | **9.3** | **24** |
| Total Benzofluoranthenes | --- | 28 U | **2.8** J | 4.6 U | **7.2** | **10** | **16** |
| Total cPAH TEQ | 15 | **32.2** | **0.314** | **0.026** | **1.219** | **2.1** | **11.6** |

# TABLE 40
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER WASHDOWN/AQUEOUS DEGREASER AREA
## BOEING THOMPSON-ISAACSON SITE
## TUKWILA, WASHINGTON

| | | Former Washdown/Degreaser Area | | | | | |
|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-Bldg1401-FootingExc5-SW(4.0) TB91B 06/23/2011 | IT-Bldg1401-FootingExc5-B(6.0) TB91A 06/23/2011 | IT-Bldg1401-Footing Exc8-B(2.5) TB68C 06/22/2011 | IT-Bldg1401-FootingExc10-B(1.5) TC19A 06/24/2011 | IT-Bldg1401-FootingExc14-B(4.0) TB68D 06/22/2011 | IT-Bldg1401-FootingExc15-B(4.0) TB68A 06/22/2011 |
| **PCBs (µg/kg)** | | | | | | | |
| **Method SW8082** | | | | | | | |
| Aroclor 1254 | 0.29 | 32 U | 32 U | 32 U | 32 U | 31 U | 31 U |
| Aroclor 1260 | 5.4 | 32 U | 32 U | 32 U | 32 U | 31 U | 31 U |
| Total PCBs | 1.8 | ND | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | |
| **NWTPH-Dx** | | | | | | | |
| Diesel-Range Organics | 2,000 | **29** | **5.6** | **6.0** | 5.3 U | **10** | **6.9** |
| Oil-Range Organics | 2,000 | **95** | 10 U | 10 U | 11 U | 11 U | **12** |
| **NWTPH-G** | | | | | | | |
| Gasoline-Range Organics | 100/30 | **150** | 7.3 U | 5.7 U | 5.5 U | 7.0 U | 6.1 U |
| **TOTAL METALS (mg/kg)** | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | |
| Arsenic | 7 | **2.7** | **2.5** | **1.7** | **1.6** | **3.2** | **2.8** |
| Barium | 640 | **48.6** | **34.7** | **42.0** | **38.0** | **35.7** | **33.0** |
| Beryllium | 160 | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Cadmium | 1.3 | 0.1 U | **0.2** | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Chromium | 1,480 | **10.5** | **9.8** | **23.5** | **22** | **10.0** | **10.9** |
| Copper | 36 | **22.6** | **10.3** | **12.9** | **14.4** | **13.3** | **13.7** |
| Lead | 250 | **5.6** | **2.8** | **2.2** | **2.0** | **3.2** | **3.8** |
| Mercury | 1.5 | 0.02 U | 0.02 U | 0.03 U | 0.02 U | 0.03 U | 0.02 U |
| Nickel | 210 | **11.4** | **10.4** | **40.4** | **39.7** | **10.0** | **9.0** |
| Zinc | 1,400 | **33** | **32** | **31** | **29** | **25** | **28** |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
ND = Not Detected
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
Bold = Exceedance
Box = Exceeds Preliminary Cleanup Level.

U = Indicates the compound was not detected at or above the reporting limit.
UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

# TABLE 41
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER WASHDOWN SYSTEM COLLECTION TANKS/LOADING DOCK AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | Preliminary Cleanup Levels | Former Washdown System Collection Tanks/Loading Dock Area | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | IT-TOWPATHEXC2-B(.7) TE72A 07/19/2011 | IT-TOWPATHEXC3-B(.7) TE72B 07/19/2011 | IT-TOWPATHEXC4-B(.7) TE72C 07/19/2011 | IT-TOWPATHEXC5-B(.7) TE72D 07/19/2011 | IT-TOWPATHEXC6-B(.7) TE72E 07/19/2011 | IT-TOWPATHEXC7-B(.7) TE72F 07/19/2011 | IT-MW-8(2-3.5) TV99A 11/07/2011 | IT-MW-8(5-6.5) TV99B 11/07/2011 | IT-MW-8(8-9.5) TV99C 11/07/2011 | IT-MW-8(14-15.5) TV99F 11/07/2011 |
| **VOLATILES (µg/kg)** | | | | | | | | | | | |
| **Method SW8260C** | | | | | | | | | | | |
| Chloromethane | 1,600 | 1.0 U | 1.0 U | 1.1 U | 0.9 U | 1.1 U | 1.0 U | 1.2 U | **0.7** J1 | **0.7** J1 | 1.4 U |
| Methylene Chloride | 2,400 | **16** | **15** | **17** | **12** | **16** | **6.1** | **2.4** J1 | **2.9** | **2.8** | **2.5** J1 |
| Acetone | 510,000 | **37** | **44** | **46** | **29** | **72** | **47** | **9.9** | 6.9 U | **47** | **41** |
| Carbon Disulfide | 75,000 | 1.0 U | **4.0** | **1.9** | **4.7** | **2.9** | 1.0 U | 1.2 U | 1.4 U | 1.4 U | 1.4 U |
| 2-Butanone | 430,000 | 4.8 U | 5.2 U | 5.5 U | 4.7 U | **7.2** | 5.0 U | 6.1 U | 6.9 U | 6.8 U | 6.8 U |
| Benzene | 93 | **0.6** J | **0.6** J | **0.6** J | **0.9** J | 1.1 U | **1.3** | 1.2 U | 1.4 U | 1.4 U | 1.4 U |
| Tetrachloroethene | 260 | 1.0 U | **5.6** | **9.1** | **1.1** | 1.1 U | 1.0 U | 1.2 U | 1.4 U | 1.4 U | 1.4 U |
| Toluene | 100,000 | **0.5** J | **1.0** J | **0.7** J | **0.7** J | **0.7** J | **0.6** J | 1.2 U | 1.4 U | 1.4 U | 1.4 U |
| Methyl Iodide | --- | 1.0 U | 1.0 U | 1.1 U | 0.9 U | 1.1 U | 1.0 U | 1.2 U | **1.5** | **1.8** | **0.7** J1 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | | | | |
| **Method SW8270D** | | | | | | | | | | | |
| Phenol | 1,900,000 | 18 U | 19 U | 18 U | 19 U | **10** J | 19 U | 19 U | 18 U | 19 U | 20 U |
| Benzyl Alcohol | 8,000,000 | 18 U | **67** | 18 U | 19 U | 18 U | 19 U | 19 U | 18 U | 19 U | 20 U |
| Naphthalene | 2,100 | 18 U | **10** J | 18 U | **12** J | 18 U | 19 U | 19 U | 18 U | 19 U | 20 U |
| 2-Methylnaphthalene | 320,000 | 18 U | 19 U | **16** J | 19 U | **9.2** J | 19 U | 19 U | 18 U | 19 U | 20 U |
| Dibenzofuran | 80,000 | 18 U | 19 U | **12** J | 19 U | 18 U | 19 U | 19 U | 18 U | 19 U | 20 U |
| Anthracene | 1,600,000 | 18 U | 19 U | 18 U | 19 U | **18** | 19 U | 19 U | 18 U | 19 U | 20 U |
| Fluoranthene | 230,000 | 18 U | **49** | **85** | **28** | **160** | **16** J | 19 U | 18 U | 19 U | 20 U |
| Pyrene | 240,000 | 18 U | **49** | **84** | **32** | **190** | **14** J | 19 U | 18 U | 19 U | 20 U |
| Butylbenzylphthalate | 1,700 | 18 U | 19 U | 18 U | 19 U | **21** | 19 U | 19 U | 18 U | 19 U | 20 U |
| Benzo(a)anthracene | --- | 18 U | **26** | **38** | **14** J | **74** | 19 U | 19 U | 18 U | 19 U | 20 U |
| bis(2-Ethylhexyl)phthalate | 56,600 | **16** J | **170** | **34** | **21** J | **45** | **15** J | 31 U | 140 U | 74 U | 22 UJ2 |
| Chrysene | --- | 18 U | **38** | **75** | **22** | **120** | **12** J | 19 U | 18 U | 19 U | 20 U |
| Benzo(a)pyrene | --- | 18 U | **34** | **50** | **19** | **100** | **9.5** J | 19 U | 18 U | 19 U | 20 U |
| Indeno(1,2,3-cd)pyrene | --- | 18 U | **18** J | **19** | **11** J | **34** | 19 U | 19 U | 18 U | 19 U | 20 U |
| Benzo(g,h,i)perylene | --- | 18 U | **26** | **23** | **15** J | **47** | 19 U | 19 U | **11** J1 | 19 U | 20 U |
| 1-Methylnaphthalene | 16,000 | 18 U | 19 U | **11** J | 19 U | 18 U | 19 U | 19 U | 18 U | 19 U | 20 U |
| Total Benzofluoranthenes | --- | 18 U | **62** | **84** | **34** | **160** | **16** J | 19 U | **14** J1 | 19 U | 20 U |
| Total cPAH TEQ | 15 | ND | 45 J | 65 | 25 J | 128 | **11** J | ND | **1.4** J | ND | ND |
| **PAHs (µg/kg)** | | | | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | | | | |
| Naphthalene | 2,100 | **2.5** J | **5.8** | **11** | **14** | **16** | **7.7** | **2.6** J1 | **3.2** J1 | **2.8** J1 | **3.0** J1 |
| 2-Methylnaphthalene | 320,000 | **3.2** J | **6.1** | **15** | **14** | **25** | **5.2** | 4.8 U | **2.5** J1 | 4.8 U | **3.0** J1 |
| 1-Methylnaphthalene | 16,000 | **2.5** J | **3.8** J | **11** | **10** | **16** | **4.6** J | 4.8 U | **2.4** J1 | 4.8 U | **3.6** J1 |
| Total Naphthalenes | --- | **8.2** J | **15.7** J | **37** | **38** | **57** | **17.5** J | **2.6** J1 | **8.1** J1 | **2.8** J1 | **9.6** J1 |
| Acenaphthene | 230,000 | 4.6 U | 4.7 U | **18** | **16** | **31** | 4.8 U | 4.8 U | 4.7 U | 4.8 U | 5.0 U |
| Fluorene | 150,000 | 4.6 U | 4.7 U | **12** | **18** | **23** | 4.8 U | 4.8 U | 4.7 U | 4.8 U | 5.0 U |
| Phenanthrene | --- | 4.8 U | **24** | **79** | **230** | **150** | 20 U | **3.4** J1 | **5.4** | **3.3** J1 | **5.5** |
| Anthracene | 1,600,000 | 4.6 U | **3.9** J | **18** | **92** | **28** | 4.8 U | 4.8 U | 4.7 U | 4.8 U | 5.0 U |
| Fluoranthene | 230,000 | **3.0** J | **49** | **200** | **350** | **180** | **21** | **3.1** J1 | **4.5** J1 | **2.9** J1 | 5.0 U |
| Pyrene | 240,000 | **2.6** J | **38** | **140** | **230** | **150** | **15** | **2.7** J1 | **3.8** J1 | 4.8 U | 5.0 U |
| Benzo(a)anthracene | --- | 4.6 U | **25** | **88** | **150** | **71** | **5.8** | 4.8 U | 4.7 U | 4.8 U | 5.0 U |
| Chrysene | --- | 4.6 U | **38** | **120** | **150** | **110** | **11** | **2.9** J1 | **4.4** J1 | 4.8 U | 5.0 U |
| Benzo(a)pyrene | --- | 4.6 U | **39** | **100** | **160** | **96** | **6.9** | **4.0** J1 | **4.0** J1 | 4.8 U | 5.0 U |
| Indeno(1,2,3-cd)pyrene | --- | 4.6 U | **19** | **31** | **40** | **28** | **3.6** J | **4.2** J1 | **4.5** J1 | 4.8 U | 5.0 U |
| Dibenz(a,h)anthracene | --- | 4.6 U | **6.8** | **13** | **15** | **9.9** J | 4.8 U | **3.2** J1 | 4.7 U | 4.8 U | 5.0 U |
| Benzo(g,h,i)perylene | --- | 4.6 U | **27** | **36** | **42** | **41** | **4.8** | **6.0** | **7.5** | 4.8 U | 5.0 U |
| Dibenzofuran | 80,000 | 4.6 U | **5.3** | **14** | **16** | **13** J | **4.4** J | 4.8 U | 4.7 U | 4.8 U | 5.0 U |
| Total Benzofluoranthenes | --- | 4.6 U | **70** | **220** | **290** | **180** | **19** | **3.4** J1 | 4.7 U | 4.8 U | 5.0 U |
| Total cPAH TEQ | 15 | ND | 51 | 136 | 211 | 126 | **9.9** | **5.1** J | **4.5** J | ND | ND |

# TABLE 41
## SUMMARY OF SOIL ANALYTICAL RESULTS FOR DETECTED CONSTITUENTS
## FORMER WASHDOWN SYSTEM COLLECTION TANKS/LOADING DOCK AREA
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | Former Washdown System Collection Tanks/Loading Dock Area | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Preliminary Cleanup Levels | IT-TOWPATHEXC2-B(.7) TE72A 07/19/2011 | IT-TOWPATHEXC3-B(.7) TE72B 07/19/2011 | IT-TOWPATHEXC4-B(.7) TE72C 07/19/2011 | IT-TOWPATHEXC5-B(.7) TE72D 07/19/2011 | IT-TOWPATHEXC6-B(.7) TE72E 07/19/2011 | IT-TOWPATHEXC7-B(.7) TE72F 07/19/2011 | IT-MW-8(2-3.5) TV99A 11/07/2011 | IT-MW-8(5-6.5) TV99B 11/07/2011 | IT-MW-8(8-9.5) TV99C 11/07/2011 | IT-MW-8(14-15.5) TV99F 11/07/2011 |
| **PCBs (µg/kg)** | | | | | | | | | | | |
| **Method SW8082** | | | | | | | | | | | |
| Aroclor 1254 | 0.29 | 31 U | **28** J | **88** | 32 U | **53** | 33 U | 33 U | 31 U | 32 U | 32 U |
| Total PCBs | 1.8 | ND | **28** J | **88** | ND | **53** | ND | ND | ND | ND | ND |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | | | | |
| **NWTPH-Dx** | | | | | | | | | | | |
| Diesel-Range Organics | 2,000 | 5.5 U | **24** | **53** | **19** | **85** | **7.9** | 5.2 U | 5.4 U | 5.7 U | 6.0 U |
| Oil-Range Organics | 2,000 | 11 U | **150** | **300** | **89** | **510** | **15** | **13** | **13** | 11 U | 12 U |
| **NWTPH-G** | | | | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 5.5 U | 6.1 U | 5.6 U | 6.2 U | 8.8 U | 5.7 U | **24** | **6.9** | 6.3 U | 8.3 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | | | | |
| Arsenic | 7 | **2.2** | **5.8** | **5.7** | **3.9** | **6.1** | **3.8** | **3.2** | **3.8** | **2.9** | **2.0** |
| Barium | 640 | **33.3** | **52.0** | **55.0** | **62.0** | **63.7** | **45.2** | **26.8** | **45.8** | **41.4** | **36.6** |
| Beryllium | 160 | 0.2 U | **0.2** | **0.2** | **0.2** U | **0.2** | **0.3** | 0.2 U | 0.2 U | 0.2 U | 0.3 U |
| Cadmium | 1.3 | 0.1 U | **0.1** | **0.2** | **0.2** | **0.2** | 0.1 U | 0.1 U | 0.1 U | 0.1 U | 0.1 U |
| Chromium | 1,480 | **11.2** | **16.0** | **17.9** | **21.4** | **16.4** | **13.4** | **8.9** | **12.5** | **11.8** | **13.9** |
| Copper | 36 | **13.9** | **22.8** | **24.6** | **18.5** | **24.6** | **18.4** | **14.8** | **22.1** | **17.4** | **14.9** |
| Lead | 250 | **2.1** | **9.8** | **12.8** | **7.6** | **12.2** | **5.8** | **3.5** | **4.4** | **2.3** | **1.8** |
| Mercury | 1.5 | 0.02 U | **0.03** | **0.04** | **0.03** | **0.03** | **0.04** | 0.02 U | 0.02 U | 0.02 U | 0.02 U |
| Nickel | 210 | **13** | **24.2** | **27.5** | **23.0** | **22.4** | **16.5** | **9.0** | **11.6** | **10.3** | **8.6** |
| Zinc | 1,400 | **25** | **48** | **55** | **44** | **58** | **32** | **26** | **36** | **70** | **27** |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
PAHs polyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls
cPAHs = carcinogenic PAHs
TEQ = Toxic Equivalent Concentration
SIM = Selected Ion Monitoring
ND = Not Detected
Bold = Exceedance
Box = Exceeds Preliminary Cleanup Level.

U = Indicates the compound was not detected at or above the reporting limit.
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.
UJ2 = The analyted was not detected in the sample at or above the numerical value shown; the numerical value is below the reporting limit, but greater than the detection limit.
ND = Not Detected.

(a) The area limits for internal standards perylene-dl2 and di-n-octylphthalate were above the control limits for the original SVOC analysis of sample IT-Bldg1401-Trench-4S-110512. The sample was reanalyzed at a dilution with all internal standards in control. The original analysis results are reported.
(b) The area limit for laboratory internal standard perylene-dl2 was above the control limit for the original SVOC analysis of sample ITBldg1401-Trench5N-110513. The sample was reanalyzed at a dilution with all internal standards in control. The original analysis results are reported.

# TABLE 42
# SUB-SLAB SOIL VAPOR ANALYTICAL RESULTS
# BUILDING 14-01
# BOEING ISAACSON-THOMPSON

| | Sub-Slab Soil Vapor Screening Levels (a) | IT-SV-1 1104474-01A 04/20/2011 | IT-SV-2 1104474-02A 04/20/2011 | IT-SV-3 1104474-03A 04/20/2011 | IT-SV-4 1104474-04A 04/20/2011 | IT-SV-5 1104474-05A 04/20/2011 |
|---|---|---|---|---|---|---|
| **VOLATILES (ug/m3)** | | | | | | |
| **MODIFIED EPA METHOD TO-15** | | | | | | |
| 1,1,1-Trichloroethane | 77,000 | 0.86 U | 0.81 U | 0.84 U | 0.81 U | 0.86 U |
| 1,1,2,2-Tetrachloroethane | 1.4 | 1.1 U | 1.0 U | 1.1 U | 1.0 U | 1.1 U |
| 1,1,2-Trichloroethane | 5.3 | 0.86 U | 0.81 U | 0.84 U | 0.81 U | 0.86 U |
| 1,1-Dichloroethane | 50 | 0.64 U | 0.6 U | 0.63 U | 0.6 U | 0.64 U |
| 1,1-Dichloroethene | 3000 | 0.63 U | 0.59 U | 0.61 U | 0.59 U | 0.63 U |
| 1,2,4-Trichlorobenzene | -- | 5.9 U | 5.5 U | 5.8 U | 5.5 U | 5.9 U |
| **1,2,4-Trimethylbenzene** | 110 | **12** | **8.9** | **9.8** | **14** | **9.8** |
| 1,2-Dibromoethane (EDB) | -- | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.2 U |
| 1,2-Dichlorobenzene | 3,000 | 0.95 U | 0.90 U | 0.93 U | 0.90 U | 0.95 U |
| 1,2-Dichloroethane | 3.3 | 0.64 U | 0.60 U | 0.63 U | 0.60 U | 0.64 U |
| 1,2-Dichloropropane | 60 | 0.73 U | 0.69 U | 0.72 U | 0.69 U | 0.73 U |
| **1,3,5-Trimethylbenzene** | -- | **2.4** | **1.6** | **2.0** | **2.5** | **2.2** |
| 1,3-Butadiene | -- | 0.35 U | 0.33 U | 0.34 U | 0.33 U | 0.35 U |
| 1,3-Dichlorobenzene | -- | 0.95 U | 0.9 U | 0.93 U | 0.90 U | 0.95 U |
| 1,4-Dichlorobenzene | 12,000 | 0.95 U | 0.9 U | 0.93 U | 0.90 U | 0.95 U |
| **1,4-Dioxane** | -- | 0.57 U | 0.54 U | **0.59** | **1.6** | 0.57 U |
| 2,2,4-Trimethylpentane | -- | 3.7 U | 3.5 U | 3.6 U | 3.5 U | 3.7 U |
| **2-Butanone (Methyl Ethyl Ketone)** | 77,000 | **26** | **6.0** | **14** | **12** | **12** |
| 2-Hexanone | 1,000 | 3.2 U | 3.0 U | 3.2 U | 3.0 U | 3.2 U |
| **2-Propanol** | -- | **26** | **17** | **25** | **24** | **34** |
| 3-Chloropropene | -- | 2.5 U | 2.3 U | 2.4 U | 2.3 U | 2.5 U |
| **4-Ethyltoluene** | -- | **8.9** | **5.0** | **7.0** | **8.1** | **8.1** |
| **4-Methyl-2-pentanone** | 47000 | 0.65 U | **3.2** | **9.8** | **3.5** | 0.65 U |
| **Acetone** | 1,100,000 | **280** E | **57** | **120** | **72** | **160** E |
| alpha-Chlorotoluene | -- | 0.82 U | 0.77 U | 0.80 U | 0.77 U | 0.82 U |
| **Benzene** | 11 | **0.71** | **0.57** | **0.79** | **0.93** | **0.65** |
| Bromodichloromethane | -- | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Bromoform | -- | 1.6 U | 1.5 U | 1.6 U | 1.5 U | 1.6 U |
| Bromomethane | -- | 0.61 U | 0.58 U | 0.60 U | 0.58 U | 0.61 U |
| Carbon Disulfide | 11,000 | 2.5 U | 2.3 U | 2.4 U | 2.3 U | 2.5 U |
| Carbon Tetrachloride | 14 | 0.99 U | 0.94 U | 0.98 U | 0.94 U | 0.99 U |
| Chlorobenzene | 770 | 0.73 U | 0.68 U | 0.71 U | 0.68 U | 0.73 U |
| Chloroethane | 150,000 | 2.1 U | 2.0 U | 2.0 U | 2.0 U | 2.1 U |
| Chloroform | 3.7 | 0.77 U | 0.73 U | 0.76 U | 0.73 U | 0.77 U |
| **Chloromethane** | 1,400 | **0.82** | **1.0** | **0.39** | **0.56** | 0.33 U |
| cis-1,2-Dichloroethene | -- | 0.63 U | 0.59 U | 0.61 U | 0.59 U | 0.63 U |
| cis-1,3-Dichloropropene | -- | 0.72 U | 0.68 U | 0.70 U | 0.68 U | 0.72 U |
| Cumene | -- | 0.78 U | 0.73 U | 0.76 U | 0.73 U | 0.78 U |
| **Cyclohexane** | 90000 | **0.72** | 0.51 U | 0.53 U | 0.51 U | 0.54 U |
| Dibromochloromethane | -- | 1.3 U | 1.3 U | 1.3 U | 1.3 U | 1.3 U |
| **Ethanol** | -- | **94** | **43** | **61** | **82** | **67** |
| **Ethyl Benzene** | 15000 | **11** | **2.8** | **9.9** | **2.5** | **15** |
| **Freon 11** | 11000 | **5.9** | **3.1** | **4.1** | **4.0** | **5.1** |
| Freon 113 | -- | 1.2 U | 1.1 U | 1.2 U | 1.1 U | 1.2 U |
| Freon 114 | -- | 1.1 U | 1.0 U | 1.1 U | 1.0 U | 1.1 U |
| **Freon 12** | 3000 | **2.3** | **22** | **50** | **2.8** | **93** |
| **Heptane** | -- | **1.2** | 0.61 U | **1.0** | 0.61 U | 0.65 U |
| Hexachlorobutadiene | -- | 8.4 U | 7.9 U | 8.3 U | 7.9 U | 8.4 U |
| **Hexane** | 11000 | **4.8** | **9.2** | **6.5** | **3.2** | **2.4** |
| **m,p-Xylene** | see total xylenes | **47** | **13** | **44** | **14** | **69** |
| **o-Xylene** | see total xylenes | **12** | **3.2** | **11** | **3.7** | **18** |
| **Total Xylenes** | 1500 | **59** | **16.2** | **55** | **17.7** | **87** |
| Methyl tert-butyl ether | -- | 0.57 U | 0.54 U | 0.56 U | 0.54 U | 0.57 U |
| Methylene Chloride | 180 | 1.1 U | 1.0 U | 1.1 U | 1.0 U | 1.1 U |
| **Propylbenzene** | 15000 | **1.7** | **0.83** | **1.2** | **1.3** | **1.4** |
| Styrene | 15000 | 0.67 U | 0.63 U | 0.66 U | 0.63 U | 0.67 U |
| **Tetrachloroethene** | 320 | 1.1 U | **9.8** | **1.5** | 1.0 U | **1.6** |
| **Tetrahydrofuran** | -- | **14** | **5.2** | **9.3** | **8.9** | **7.5** |
| **Toluene** | 77000 | **11** | **7.8** | **14** | **7.4** | **22** |
| trans-1,2-Dichloroethene | -- | 0.63 U | 0.59 U | 0.61 U | 0.59 U | 0.63 U |
| trans-1,3-Dichloropropene | -- | 0.72 U | 0.68 U | 0.70 U | 0.68 U | 0.72 U |
| **Trichloroethene** | 12 | 0.85 U | **1.0** | **2.9** | **0.80** | 0.85 U |
| Vinyl Chloride | 9.3 | 0.40 U | 0.38 U | 0.40 U | 0.38 U | 0.40 U |

U = Indicates the compound was undetected at the reported concentration.
E = Exceeds instrument calibration range.
Bold = Detected compound.
-- = No applicable cleanup level

(a) See Table 7.

**Note: The samples were collected from beneath the Building 14-01 floor slab and are not indoor air samples.**

TABLE 43

RESULTS FROM RI SURFACE SEDIMENT GRAB SAMPLES
BOEING ISAACSON-THOMPSON SITE
TUKWILA, WASHINGTON

| | RAO 1: Human Seafood Consumption | RAO 2: Human Direct Contact | | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | Elev. |
|---|---|---|---|---|---|---|---|
| **Analyte** | **Site-wide** | **Site-wide** | **Clamming areas** | **SCO [1]** | **LAET [2]** | **CSL [3]** | |
| **Conventionals** | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | — | — | — | |
| Total Solids (Percent) | — | — | — | — | — | — | |
| **Metals** | | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | |
| Arsenic | NC | 7 | 7 | 57 | 57 | 93 | |
| Cadmium | — | — | — | 5.1 | 5.1 | 6.7 | |
| Chromium | — | — | — | 260 | 260 | 270 | |
| Copper | — | — | — | 390 | 390 | 390 | |
| Lead | — | — | — | 450 | 450 | 530 | |
| Mercury | — | — | — | 0.41 | 0.41 | 0.59 | |
| Silver | — | — | — | 6.1 | 6.1 | 6.1 | |
| Zinc | — | — | — | 410 | 410 | 960 | |
| **Nonionizable Organic Compounds** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | |
| *Total LPAH* | — | — | — | 370 | 5,200 | 780 | |
| Naphthalene | — | — | — | 99 | 2,100 | 170 | |
| Acenaphthylene | — | — | — | 66 | 1,300 | 66 | |
| Acenaphthene | — | — | — | 16 | 500 | 57 | |
| Fluorene | — | — | — | 23 | 540 | 79 | |
| Phenanthrene | — | — | — | 100 | 1,500 | 480 | |
| Anthracene | — | — | — | 220 | 960 | 1,200 | |
| 2-Methylnaphthalene | — | — | — | 38 | 670 | 64 | |
| *Total HPAH* | — | — | — | 960 | 12,000 | 5,300 | |
| Fluoranthene | — | — | — | 160 | 1,700 | 1,200 | |
| Pyrene | — | — | — | 1,000 | 2,600 | 1,400 | |
| Benz[a]anthracene | — | — | — | 110 | 1,300 | 270 | |
| Chrysene | — | — | — | 110 | 1,400 | 460 | |
| Total benzofluoranthenes | — | — | — | 230 | 3,200 | 450 | |
| Benzo[a]pyrene | — | — | — | 99 | 1,600 | 210 | |
| Indeno[1,2,3-c,d]pyrene | — | — | — | 34 | 600 | 88 | |
| Dibenzo[a,h]anthracene | — | — | — | 12 | 230 | 33 | |
| Benzo[g,h,i]perylene | — | — | — | 31 | 670 | 78 | |
| cPAH (µg TEQ/kg dw) | NC | 380 | 150 | — | — | — | |
| **Chlorinated Benzenes** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | |
| 1,2-Dichlorobenzene | — | — | — | 2.3 | 35 | 2.3 | |
| 1,4-Dichlorobenzene | — | — | — | 3.1 | 110 | 9 | |
| 1,2,4-Trichlorobenzene | — | — | — | 0.81 | 31 | 1.8 | |
| Hexachlorobenzene | — | — | — | 0.38 | 22 | 2.3 | |
| **Phthalate Esters** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | |
| Dimethyl phthalate | — | — | — | 53 | 71 | 53 | |
| Diethyl phthalate | — | — | — | 61 | 200 | 110 | |
| Di-n-butyl phthalate | — | — | — | 220 | 1,400 | 1,700 | |
| Butyl benzyl phthalate | — | — | — | 4.9 | 63 | 64 | |
| Bis[2-ethylhexyl]phthalate | — | — | — | 47 | 1,300 | 78 | |
| Di-n-octyl phthalate | — | — | — | 58 | 6,200 | 4,500 | |
| **Miscellaneous** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | |
| Dibenzofuran | — | — | — | 15 | 540 | 58 | |
| Hexachlorobutadiene | — | — | — | 3.9 | 11 | 6.2 | |
| N-nitrosodiphenylamine | — | — | — | 11 | 28 | 11 | |
| Carbazole | — | — | — | — | — | — | |
| **Pesticides and PCBs** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | |
| Aroclor 1016 | — | — | — | — | — | — | |
| Aroclor 1242 | — | — | — | — | — | — | |
| Aroclor 1248 | — | — | — | — | — | — | |
| Aroclor 1254 | — | — | — | — | — | — | |
| Aroclor 1260 | — | — | — | — | — | — | |
| Aroclor 1221 | — | — | — | — | — | — | |
| Aroclor 1232 | — | — | — | — | — | — | |
| Aroclor 1262 | — | — | — | — | — | — | |
| Aroclor 1268 | — | — | — | — | — | — | |
| Total PCBs | 2 | 1,300 | 500 | 12 | 130 | 65 | |
| **Ionizable Organic Compounds** | | | | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | |
| Phenol | — | — | — | 420 | 420 | 1,200 | |
| 2-Methylphenol | — | — | — | 63 | 63 | 63 | |
| 4-Methylphenol | — | — | — | 670 | 670 | 670 | |
| 2,4-Dimethylphenol | — | — | — | 29 | 29 | 29 | |
| Pentachlorophenol | — | — | — | 360 | 360 | 690 | |
| Benzyl alcohol | — | — | — | 57 | 57 | 73 | |
| Benzoic acid | — | — | — | 650 | 650 | 650 | |

| | SD-501G | | | | | SD-502G | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | -12.4 ft MLLW | | | | | -2.8 ft MLLW | | | | |
| **Analyte** | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | |
| **Conventionals** | | | | | | | | | | |
| Total Organic Carbon (Percent) | 1.71 | | | — | — | 1.47 | | | — | — |
| Total Solids (Percent) | 48 | | | — | — | 61.4 | | | — | — |
| **Metals** | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 12 | | | — | — | 33.4 | | | — | — |
| Cadmium | 0.5 | | | — | — | 0.4 | | | — | — |
| Chromium | 25 | | | — | — | 51.2 | | | — | — |
| Copper | 34.6 | | | — | — | 45 | | | — | — |
| Lead | 14 | | | — | — | 81 | | | — | — |
| Mercury | 0.08 | | | — | — | 0.08 | | | — | — |
| Silver | 0.6 | U | U | — | — | 0.5 | U | U | — | — |
| Zinc | 76 | | | — | — | 114 | | | — | — |
| **Nonionizable Organic Compounds** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | |
| *Total LPAH* | 88 | | | 5.15 | | 628 | | | 42.72 | |
| Naphthalene | 20 | U | U | 1.17 | U | 19 | | | 1.29 | |
| Acenaphthylene | 20 | U | U | 1.17 | U | 19 | U | U | 1.29 | U |
| Acenaphthene | 20 | U | U | 1.17 | U | 40 | | | 2.72 | |
| Fluorene | 20 | U | U | 1.17 | U | 41 | | | 2.79 | |
| Phenanthrene | 74 | | | 4.33 | | 440 | | | 29.93 | |
| Anthracene | 14 | J | J1 | 0.82 | J | 88 | | | 5.99 | |
| 2-Methylnaphthalene | 20 | U | U | 1.17 | U | 12 | J | J1 | 0.82 | J |
| *Total HPAH* | 988 | | | 57.78 | | 3,973 | | | 270.27 | |
| Fluoranthene | 180 | | | 10.53 | | 810 | | | 55.10 | |
| Pyrene | 160 | | | 9.36 | | 700 | | | 47.62 | |
| Benz[a]anthracene | 74 | | | 4.33 | | 320 | | | 21.77 | |
| Chrysene | 110 | | | 6.43 | | 460 | | | 31.29 | |
| Total benzofluoranthenes | 200 | | | 11.70 | | 710 | | | 48.30 | |
| Benzo[a]pyrene | 97 | | | 5.67 | | 390 | | | 26.53 | |
| Indeno[1,2,3-c,d]pyrene | 64 | | | 3.74 | | 240 | | | 16.33 | |
| Dibenzo[a,h]anthracene | 30 | | | 1.75 | | 93 | | | 6.33 | |
| Benzo[g,h,i]perylene | 73 | | | 4.27 | | 250 | | | 17.01 | |
| cPAH (µg TEQ/kg dw) | 143.9 | | | | | 558.8 | | | | |
| **Chlorinated Benzenes** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| 1,2-Dichlorobenzene | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.32 | U |
| 1,4-Dichlorobenzene | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.32 | U |
| 1,2,4-Trichlorobenzene | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.32 | U |
| Hexachlorobenzene | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.32 | U |
| **Phthalate Esters** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Dimethyl phthalate | 4.7 | J | J1 | 0.27 | J | 3.8 | J | J1 | 0.26 | J |
| Diethyl phthalate | 49 | U | U | 2.87 | U | 47 | U | U | 3.20 | U |
| Di-n-butyl phthalate | 12 | J | J1 | 0.70 | J | 93 | | | 6.33 | |
| Butyl benzyl phthalate | 12 | | | 0.70 | | 26 | | | 1.77 | |
| Bis[2-ethylhexyl]phthalate | 140 | B | U | 8.19 | B | 150 | B | U | 10.20 | B |
| Di-n-octyl phthalate | 20 | U | U | 1.17 | U | 19 | U | U | 1.29 | U |
| **Miscellaneous** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Dibenzofuran | 20 | U | U | 1.17 | U | 22 | | | 1.50 | |
| Hexachlorobutadiene | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.32 | U |
| N-nitrosodiphenylamine | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.32 | U |
| Carbazole | 15 | J | J1 | | | 66 | | | | |
| **Pesticides and PCBs** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Aroclor 1016 | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1242 | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1248 | 33 | Y | U | | | 100 | | | | |
| Aroclor 1254 | 47 | | | | | 220 | | | | |
| Aroclor 1260 | 34 | | | | | 94 | | | | |
| Aroclor 1221 | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1232 | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1262 | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1268 | 20 | U | U | | | 19 | U | U | | |
| Total PCBs | 81 | | | 4.74 | | 414 | | | 28.16 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 16 | J | J1 | — | — | 33 | | | — | — |
| 2-Methylphenol | 2.7 | J | J1 | — | — | 2.6 | J | J1 | — | — |
| 4-Methylphenol | 11 | J | J1 | — | — | 38 | U | U | — | — |
| 2,4-Dimethylphenol | 4.9 | U | U | — | — | 4.7 | U | U | — | — |
| Pentachlorophenol | 24 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 76 | QB | U | — | — | 32 | QB | U | — | — |
| Benzoic acid | 110 | J | J | — | — | 380 | U | U | — | — |

| | SD-503G | | | | | SD-504G | | | | | SD-505G | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | -11.6 ft MLLW | | | | | -4.1 ft MLLW | | | | | -10.5 ft MLLW | | | | |
| **Analyte** | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | |
| **Conventionals** | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | 1.56 | | | — | — | 1.85 | | | — | — | 1.47 | | | — | — |
| Total Solids (Percent) | 48.3 | | | — | — | 57.1 | | | — | — | 45.1 | | | — | — |
| **Metals** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 15.5 | | | — | — | 684 | | | — | — | 29.7 | | J | — | — |
| Cadmium | 0.6 | | | — | — | 1.1 | | | — | — | 0.6 | | | — | — |
| Chromium | 28 | | | — | — | 50.5 | | | — | — | 30 | | | — | — |
| Copper | 37.5 | | | — | — | 50.7 | | | — | — | 40.7 | | | — | — |
| Lead | 15 | | | — | — | 51 | | | — | — | 20 | | | — | — |
| Mercury | 0.09 | | | — | — | 0.16 | | | — | — | 0.07 | | | — | — |
| Silver | 0.6 | U | U | — | — | 0.5 | U | U | — | — | 0.6 | U | U | — | — |
| Zinc | 83 | | | — | — | 151 | | | — | — | 98 | | | — | — |
| **Nonionizable Organic Compounds** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | |
| *Total LPAH* | 127 | | | 8.14 | | 290 | | | 15.68 | | 152 | | | 10.34 | |
| Naphthalene | 19 | U | U | 1.22 | U | 36 | | | 1.95 | | 20 | U | U | 1.36 | U |
| Acenaphthylene | 19 | U | U | 1.22 | U | 12 | J | J1 | 0.65 | J | 20 | U | U | 1.36 | U |
| Acenaphthene | 19 | U | U | 1.22 | U | 49 | | | 2.65 | | 20 | U | U | 1.36 | U |
| Fluorene | 11 | J | J1 | 0.71 | J | 26 | | | 1.41 | | 20 | U | U | 1.36 | U |
| Phenanthrene | 97 | | | 6.22 | | 130 | | | 7.03 | | 120 | | J | 8.16 | |
| Anthracene | 19 | | | 1.22 | | 37 | | | 2.00 | | 32 | | | 2.18 | |
| 2-Methylnaphthalene | 19 | U | U | 1.22 | U | 21 | | | 1.14 | | 20 | U | U | 1.36 | U |
| *Total HPAH* | 1,113 | | | 71.35 | | 1,537 | | | 83.08 | | 1,741 | | J | 118.44 | |
| Fluoranthene | 230 | | | 14.74 | | 310 | | | 16.76 | | 340 | | J | 23.13 | |
| Pyrene | 190 | | | 12.18 | | 300 | | | 16.22 | | 280 | | J | 19.05 | |
| Benz[a]anthracene | 84 | | | 5.38 | | 120 | | | 6.49 | | 130 | | J | 8.84 | |
| Chrysene | 130 | | | 8.33 | | 160 | | | 8.65 | | 200 | | J | 13.61 | |
| Total benzofluoranthenes | 210 | | | 13.46 | | 270 | | | 14.59 | | 340 | | | 23.13 | |
| Benzo[a]pyrene | 100 | | | 6.41 | | 140 | | | 7.57 | | 170 | | | 11.56 | |
| Indeno[1,2,3-c,d]pyrene | 66 | | | 4.23 | | 92 | | | 4.97 | | 110 | | | 7.48 | |
| Dibenzo[a,h]anthracene | 32 | | | 2.05 | | 45 | | | 2.43 | | 51 | | | 3.47 | |
| Benzo[g,h,i]perylene | 71 | | | 4.55 | | 100 | | | 5.41 | | 120 | | | 8.16 | |
| cPAH (µg TEQ/kg dw) | 150.1 | | | | | 207.8 | | | | | 250.4 | | | | |
| **Chlorinated Benzenes** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| 1,2-Dichlorobenzene | 4.8 | U | U | 0.31 | U | 4.9 | | | 0.26 | | 4.9 | U | U | 0.33 | U |
| 1,4-Dichlorobenzene | 4.8 | U | U | 0.31 | U | 3.6 | J | J1 | 0.19 | J | 4.9 | U | U | 0.33 | U |
| 1,2,4-Trichlorobenzene | 4.8 | U | U | 0.31 | U | 2.5 | J | J1 | 0.14 | J | 4.9 | U | U | 0.33 | U |
| Hexachlorobenzene | 4.8 | U | U | 0.31 | U | 4.8 | U | U | 0.26 | U | 4.9 | U | U | 0.33 | U |
| **Phthalate Esters** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Dimethyl phthalate | 6.4 | | | 0.41 | | 4.8 | U | U | 0.26 | U | 3.6 | J | J1 | 0.24 | J |
| Diethyl phthalate | 48 | U | U | 3.08 | U | 48 | U | U | 2.59 | U | 49 | U | U | 3.33 | U |
| Di-n-butyl phthalate | 19 | U | U | 1.22 | U | 20 | | | 1.08 | | 20 | U | U | 1.36 | U |
| Butyl benzyl phthalate | 9.5 | | | 0.61 | | 55 | | | 2.97 | | 19 | | J | 1.29 | |
| Bis[2-ethylhexyl]phthalate | 140 | B | U | 8.97 | B | 67 | B | U | 3.62 | B | 660 | B | J | 44.90 | B |
| Di-n-octyl phthalate | 19 | U | U | 1.22 | U | 19 | U | U | 1.03 | U | 20 | U | U | 1.36 | U |
| **Miscellaneous** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Dibenzofuran | 19 | U | U | 1.22 | U | 23 | | | 1.24 | | 20 | U | U | 1.36 | U |
| Hexachlorobutadiene | 4.8 | U | U | 0.31 | U | 4.8 | U | U | 0.26 | U | 4.9 | U | U | 0.33 | U |
| N-nitrosodiphenylamine | 4.8 | U | U | 0.31 | U | 4.8 | U | U | 0.26 | U | 4.9 | U | U | 0.33 | U |
| Carbazole | 18 | J | J1 | | | 25 | | | | | 35 | | | | |
| **Pesticides and PCBs** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Aroclor 1016 | 20 | U | U | | | 20 | U | U | | | 20 | U | U | | |
| Aroclor 1242 | 20 | U | U | | | 20 | U | U | | | 20 | U | U | | |
| Aroclor 1248 | 37 | Y | U | | | 88 | Y | U | | | 39 | Y | U | | |
| Aroclor 1254 | 55 | | | | | 220 | | | | | 62 | | | | |
| Aroclor 1260 | 27 | | | | | 180 | | | | | 37 | | | | |
| Aroclor 1221 | 20 | U | U | | | 20 | U | U | | | 20 | U | U | | |
| Aroclor 1232 | 20 | U | U | | | 20 | U | U | | | 20 | U | U | | |
| Aroclor 1262 | 20 | U | U | | | 20 | U | U | | | 20 | U | U | | |
| Aroclor 1268 | 20 | U | U | | | 20 | U | U | | | 20 | U | U | | |
| Total PCBs | 82 | | | 5.26 | | 400 | | | 21.62 | | 99 | | | 6.73 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 14 | J | J1 | — | — | 22 | | | — | — | 19 | J | J1 | — | — |
| 2-Methylphenol | 4.8 | U | U | — | — | 3.8 | J | J | — | — | 2.7 | J | J1 | — | — |
| 4-Methylphenol | 38 | U | U | — | — | 25 | J | J1 | — | — | 40 | U | U | — | — |
| 2,4-Dimethylphenol | 4.8 | U | U | — | — | 6 | | | — | — | 3.3 | J | J1 | — | — |
| Pentachlorophenol | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 25 | U | UJ | — | — |
| Benzyl alcohol | 66 | QB | U | — | — | 28 | QB | U | — | — | 68 | QB | UJ | — | — |
| Benzoic acid | 380 | U | U | — | — | 380 | U | U | — | — | 400 | U | U | — | — |

## TABLE 43

## RESULTS FROM RI SURFACE SEDIMENT GRAB SAMPLES
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Analyte | RAO 1: Human Seafood Consumption Site-wide | RAO 2: Human Direct Contact Site-wide | RAO 2: Human Direct Contact Clamming areas | RAO 3: Benthic Organisms Sediment Management Standards SCO[1] | RAO 3: Benthic Organisms Sediment Management Standards LAET[2] | SMS CSL[3] | Elev. | SD-516G Value | Q1 | Q2 | | | SD-506G Value | Q1 | Q2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | -10.5 ft MLLW | | | | | -0.7 ft MLLW | | | | |
| **Conventionals** | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | — | — | — | | 1.78 | | | — | — | 1.75 | | | — | — |
| Total Solids (Percent) | — | — | — | — | — | — | | 44.8 | | | — | — | 59.6 | | | — | — |
| **Metals** | | mg/kg dw | mg/kg dw | mg/kg dw | mg/kg dw | mg/kg dw | | mg/kg dw | | | | | mg/kg dw | | | | |
| Arsenic | NC | 7 | 7 | 57 | 57 | 93 | | 16.8 | | J | — | — | 396 | | | — | — |
| Cadmium | — | — | — | 5.1 | 5.1 | 6.7 | | 0.6 | | | — | — | 0.8 | U | U | — | — |
| Chromium | — | — | — | 260 | 260 | 270 | | 29 | | | — | — | 55 | | | — | — |
| Copper | — | — | — | 390 | 390 | 390 | | 38.7 | | | — | — | 72.6 | | | — | — |
| Lead | — | — | — | 450 | 450 | 530 | | 17 | | | — | — | 91 | | | — | — |
| Mercury | — | — | — | 0.41 | 0.41 | 0.59 | | 0.11 | | | — | — | 0.1 | | | — | — |
| Silver | — | — | — | 6.1 | 6.1 | 6.1 | | 0.6 | U | U | — | — | 2 | | | — | — |
| Zinc | — | — | — | 410 | 410 | 960 | | 89 | | | — | — | 225 | | | — | — |
| **Nonionizable Organic Compounds** | | | | mg/kg OC | µg/kg dw | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | |
| *Total LPAH* | — | — | — | 370 | 5,200 | 780 | | 615 | | | 34.55 | | 1,837 | | | 104.97 | |
| Naphthalene | — | — | — | 99 | 2,100 | 170 | | 14 | J | J1 | 0.79 | J | 28 | J | J1 | 1.60 | J |
| Acenaphthylene | — | — | — | 66 | 1,300 | 66 | | 16 | J | J1 | 0.90 | J | 57 | U | U | 3.26 | U |
| Acenaphthene | — | — | — | 16 | 500 | 57 | | 21 | | | 1.18 | | 63 | | | 3.60 | |
| Fluorene | — | — | — | 23 | 540 | 79 | | 28 | | | 1.57 | | 86 | | | 4.91 | |
| Phenanthrene | — | — | — | 100 | 1,500 | 480 | | 480 | | J | 26.97 | | 1,400 | | | 80.00 | |
| Anthracene | — | — | — | 220 | 960 | 1,200 | | 56 | | | 3.15 | | 260 | | | 14.86 | |
| 2-Methylnaphthalene | — | — | — | 38 | 670 | 64 | | 12 | J | J1 | 0.67 | J | 57 | U | U | 3.26 | U |
| *Total HPAH* | — | — | — | 960 | 12,000 | 5,300 | | 4,129 | | J | 231.97 | | 12,330 | | | 704.57 | |
| Fluoranthene | — | — | — | 160 | 1,700 | 1,200 | | 1,500 | | J | 84.27 | | 2,800 | | | 160.00 | |
| Pyrene | — | — | — | 1,000 | 2,600 | 1,400 | | 1,100 | | J | 61.80 | | 2,200 | | | 125.71 | |
| Benz[a]anthracene | — | — | — | 110 | 1,300 | 270 | | 190 | | J | 10.67 | | 1,000 | | | 57.14 | |
| Chrysene | — | — | — | 110 | 1,400 | 460 | | 460 | | J | 25.84 | | 1,400 | | | 80.00 | |
| Total benzofluoranthenes | — | — | — | 230 | 3,200 | 450 | | 440 | | | 24.72 | | 2,100 | | | 120.00 | |
| Benzo[a]pyrene | — | — | — | 99 | 1,600 | 210 | | 180 | | | 10.11 | | 1,200 | | | 68.57 | |
| Indeno[1,2,3-c,d]pyrene | — | — | — | 34 | 600 | 88 | | 100 | | | 5.62 | | 670 | | | 38.29 | |
| Dibenzo[a,h]anthracene | — | — | — | 12 | 230 | 33 | | 49 | | | 2.75 | | 280 | | | 16.00 | |
| Benzo[g,h,i]perylene | — | — | — | 31 | 670 | 78 | | 110 | | | 6.18 | | 680 | | | 38.86 | |
| cPAH (µg TEQ/kg dw) | NC | 380 | 150 | — | — | — | | 277.2 | | | | | 1,703 | | | | |
| **Chlorinated Benzenes** | | | | mg/kg OC | µg/kg dw | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| 1,2-Dichlorobenzene | — | — | — | 2.3 | 35 | 2.3 | | 4.9 | U | U | 0.28 | U | 14 | U | U | 0.80 | U |
| 1,4-Dichlorobenzene | — | — | — | 3.1 | 110 | 9 | | 4.9 | U | U | 0.28 | U | 14 | U | U | 0.80 | U |
| 1,2,4-Trichlorobenzene | — | — | — | 0.81 | 31 | 1.8 | | 4.9 | U | U | 0.28 | U | 14 | U | U | 0.80 | U |
| Hexachlorobenzene | — | — | — | 0.38 | 22 | 2.3 | | 4.9 | U | U | 0.28 | U | 14 | U | U | *0.80* | U |
| **Phthalate Esters** | | | | mg/kg OC | µg/kg dw | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| Dimethyl phthalate | — | — | — | 53 | 71 | 53 | | 9.2 | | | 0.52 | | 9.4 | J | J1 | 0.54 | J |
| Diethyl phthalate | — | — | — | 61 | 200 | 110 | | 49 | U | U | 2.75 | U | 140 | U | U | 8.00 | U |
| Di-n-butyl phthalate | — | — | — | 220 | 1,400 | 1,700 | | 9.8 | J | J1 | 0.55 | J | 43 | J | J1 | 2.46 | J |
| Butyl benzyl phthalate | — | — | — | 4.9 | 63 | 64 | | 35 | | J | 1.97 | | 19 | | | 1.09 | |
| Bis[2-ethylhexyl]phthalate | — | — | — | 47 | 1,300 | 78 | | 120 | B | UJ | 6.74 | B | 820 | B | | 46.86 | B |
| Di-n-octyl phthalate | — | — | — | 58 | 6,200 | 4,500 | | 20 | U | U | 1.12 | U | 100 | | | 5.71 | |
| **Miscellaneous** | | | | mg/kg OC | µg/kg dw | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| Dibenzofuran | — | — | — | 15 | 540 | 58 | | 16 | J | J1 | 0.90 | J | 86 | | | 4.91 | |
| Hexachlorobutadiene | — | — | — | 3.9 | 11 | 6.2 | | 4.9 | U | U | 0.28 | U | 14 | U | U | 0.80 | U |
| N-nitrosodiphenylamine | — | — | — | 11 | 28 | 11 | | 4.9 | U | U | 0.28 | U | 14 | U | U | 0.80 | U |
| Carbazole | — | — | — | — | — | — | | 61 | | | | | 230 | | | | |
| **Pesticides and PCBs** | µg/kg dw | µg/kg dw | µg/kg dw | mg/kg OC | µg/kg dw | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| Aroclor 1016 | — | — | — | — | — | — | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1242 | — | — | — | — | — | — | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1248 | — | — | — | — | — | — | | 32 | Y | U | | | 140 | Y | U | | |
| Aroclor 1254 | — | — | — | — | — | — | | 48 | | | | | 350 | | | | |
| Aroclor 1260 | — | — | — | — | — | — | | 30 | | | | | 150 | | | | |
| Aroclor 1221 | — | — | — | — | — | — | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1232 | — | — | — | — | — | — | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1262 | — | — | — | — | — | — | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1268 | — | — | — | — | — | — | | 20 | U | U | | | 19 | U | U | | |
| Total PCBs | 2 | 1,300 | 500 | 12 | 130 | 65 | | 78 | | | 4.38 | | 500 | | | 28.57 | |
| **Ionizable Organic Compounds** | | | | µg/kg dw | µg/kg dw | µg/kg dw | | µg/kg dw | | | | | µg/kg dw | | | | |
| Phenol | — | — | — | 420 | 420 | 1,200 | | 19 | J | J1 | — | — | 57 | U | U | — | — |
| 2-Methylphenol | — | — | — | 63 | 63 | 63 | | 4.9 | U | U | — | — | 14 | U | U | — | — |
| 4-Methylphenol | — | — | — | 670 | 670 | 670 | | 13 | J | J1 | — | — | 110 | U | U | — | — |
| 2,4-Dimethylphenol | — | — | — | 29 | 29 | 29 | | 2.7 | J | J1 | — | — | 14 | U | U | — | — |
| Pentachlorophenol | — | — | — | 360 | 360 | 690 | | 24 | U | UJ | — | — | 71 | U | UJ | — | — |
| Benzyl alcohol | — | — | — | 57 | 57 | 73 | | 130 | QB | J | — | — | 22 | QB | U | — | — |
| Benzoic acid | — | — | — | 650 | 650 | 650 | | 150 | J | J1 | — | — | *1100* | U | U | — | — |

| Analyte | SD-507G Value | Q1 | Q2 | | | SD-508G Value | Q1 | Q2 | | | SD-509G Value | Q1 | Q2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | -10.0 ft MLLW | | | | | -2.0 ft MLLW | | | | | -9.8 ft MLLW | | | | |
| **Conventionals** | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | 1.27 | | | — | — | 1.66 | | | — | — | 1.57 | | | — | — |
| Total Solids (Percent) | 45 | | | — | — | 45.8 | | | — | — | 48.5 | | | — | — |
| **Metals** | mg/kg dw | | | | | mg/kg dw | | | | | mg/kg dw | | | | |
| Arsenic | 22.2 | | | — | — | 29.5 | | | — | — | 9.1 | | | — | — |
| Cadmium | 0.7 | | | — | — | 0.6 | | | — | — | 0.5 | | | — | — |
| Chromium | 44 | | | — | — | 30 | | | — | — | 27 | | | — | — |
| Copper | 36.3 | | | — | — | 42.2 | | | — | — | 38.2 | | | — | — |
| Lead | 19 | | | — | — | 29 | | | — | — | 15 | | | — | — |
| Mercury | 0.08 | | | — | — | 0.1 | | | — | — | 0.08 | | | — | — |
| Silver | 0.9 | | | — | — | 0.8 | | | — | — | 0.6 | U | | — | — |
| Zinc | 89 | | | — | — | 100 | | | — | — | 83 | | | — | — |
| **Nonionizable Organic Compounds** | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | |
| *Total LPAH* | 705 | | | 55.51 | | 414 | | | 24.94 | | 108 | J | | 4.33 | J |
| Naphthalene | 15 | J | J1 | 1.18 | J | 12 | J | J1 | 0.72 | J | 20 | U | J1 | 1.27 | U |
| Acenaphthylene | 20 | U | U | 1.57 | U | 19 | U | U | 1.14 | U | 20 | U | U | 1.27 | U |
| Acenaphthene | 59 | | | 4.65 | | 15 | J | J1 | 0.90 | J | 20 | U | J1 | 1.27 | U |
| Fluorene | 62 | | | 4.88 | | 29 | | | 1.75 | | 20 | U | | 1.27 | U |
| Phenanthrene | 510 | | | 40.16 | | 300 | | | 18.07 | | 55 | | | 3.50 | |
| Anthracene | 59 | | | 4.65 | | 58 | | | 3.49 | | 13 | J | | 0.83 | J |
| 2-Methylnaphthalene | 50 | | | 3.94 | | 19 | U | U | 1.14 | U | 20 | U | U | 1.27 | U |
| *Total HPAH* | 2,952 | | | 232.44 | | 3,159 | | | 190.30 | | 650 | | | 41.40 | |
| Fluoranthene | 700 | | | 55.12 | | 650 | | | 39.16 | | 120 | | | 7.64 | |
| Pyrene | 530 | | | 41.73 | | 520 | | | 31.33 | | 110 | | | 7.01 | |
| Benz[a]anthracene | 220 | | | 17.32 | | 230 | | | 13.86 | | 48 | | | 3.06 | |
| Chrysene | 350 | | | 27.56 | | 480 | | | 28.92 | | 80 | | | 5.10 | |
| Total benzofluoranthenes | 500 | | | 39.37 | | 570 | | | 34.34 | | 130 | | | 8.28 | |
| Benzo[a]pyrene | 250 | | | 19.69 | | 260 | | | 15.66 | | 61 | | | 3.89 | |
| Indeno[1,2,3-c,d]pyrene | 160 | | | 12.60 | | 180 | | | 10.84 | | 40 | | | 2.55 | |
| Dibenzo[a,h]anthracene | 72 | | | 5.67 | | 79 | | | 4.76 | | 16 | | | 1.02 | |
| Benzo[g,h,i]perylene | 170 | | | 13.39 | | 190 | | | 11.45 | | 45 | | | 2.87 | |
| cPAH (µg TEQ/kg dw) | 370.3 | | | | | 394.4 | | | | | 90 | | | | |
| **Chlorinated Benzenes** | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| 1,2-Dichlorobenzene | 4.9 | U | U | 0.39 | U | 4.8 | U | U | 0.29 | U | 5 | U | U | 0.32 | U |
| 1,4-Dichlorobenzene | 4.9 | U | U | 0.39 | U | 4.8 | U | U | 0.29 | U | 5 | U | U | 0.32 | U |
| 1,2,4-Trichlorobenzene | 4.9 | U | U | 0.39 | U | 4.8 | U | U | 0.29 | U | 5 | U | U | 0.32 | U |
| Hexachlorobenzene | 4.9 | U | U | *0.39* | U | 4.8 | U | U | 0.29 | U | 5 | U | U | 0.32 | U |
| **Phthalate Esters** | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| Dimethyl phthalate | 17 | | | 1.34 | | 13 | | | 0.78 | | 4.3 | J | | 0.27 | J |
| Diethyl phthalate | 49 | U | U | 3.86 | U | 48 | U | U | 2.89 | U | 50 | U | U | 3.18 | U |
| Di-n-butyl phthalate | 20 | U | U | 1.57 | U | 19 | U | U | 1.14 | U | 20 | U | U | 1.27 | U |
| Butyl benzyl phthalate | 12 | | | 0.94 | | 45 | | | 2.71 | | 12 | | | 0.76 | |
| Bis[2-ethylhexyl]phthalate | 150 | B | U | 11.81 | B | 190 | B | | 11.45 | B | 110 | B | | 7.01 | B |
| Di-n-octyl phthalate | 20 | U | U | 1.57 | U | 19 | U | U | 1.14 | U | 20 | U | U | 1.27 | U |
| **Miscellaneous** | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| Dibenzofuran | 47 | | | 3.70 | | 15 | J | J1 | 0.90 | J | 20 | U | J1 | 1.27 | U |
| Hexachlorobutadiene | 4.9 | U | U | 0.39 | U | 4.8 | U | U | 0.29 | U | 5 | U | U | 0.32 | U |
| N-nitrosodiphenylamine | 4.9 | U | U | 0.39 | U | 4.8 | U | U | 0.29 | U | 5 | U | U | 0.32 | U |
| Carbazole | 84 | | | | | 61 | | | | | 20 | U | | | |
| **Pesticides and PCBs** | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| Aroclor 1016 | 19 | U | U | | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1242 | 19 | U | U | | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1248 | 43 | Y | U | | | 42 | Y | U | | | 32 | Y | U | | |
| Aroclor 1254 | 70 | | | | | 82 | | | | | 52 | | | | |
| Aroclor 1260 | 42 | | | | | 41 | | | | | 30 | | | | |
| Aroclor 1221 | 19 | U | U | | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1232 | 19 | U | U | | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1262 | 19 | U | U | | | 20 | U | U | | | 19 | U | U | | |
| Aroclor 1268 | 19 | U | U | | | 20 | U | U | | | 19 | U | U | | |
| Total PCBs | 112 | | | 8.82 | | 123 | | | 7.41 | | 82 | | | 5.22 | |
| **Ionizable Organic Compounds** | µg/kg dw | | | | | µg/kg dw | | | | | µg/kg dw | | | | |
| Phenol | 16 | J | J, J1 | — | — | 13 | J | J, J1 | — | — | 12 | J | J, J1 | — | — |
| 2-Methylphenol | 4.9 | U | U | — | — | 4.8 | U | U | — | — | 2.5 | J | U | — | — |
| 4-Methylphenol | 39 | U | U | — | — | 38 | U | U | — | — | 40 | U | U | — | — |
| 2,4-Dimethylphenol | 4.9 | U | UJ | — | — | 4.8 | U | UJ | — | — | 5 | U | UJ | — | — |
| Pentachlorophenol | 25 | U | UJ | — | — | 24 | U | UJ | — | — | 25 | U | UJ | — | — |
| Benzyl alcohol | 55 | B | U | — | — | 38 | B | U | — | — | 56 | B | U | — | — |
| Benzoic acid | 390 | U | U | — | — | 380 | U | U | — | — | 400 | U | U | — | — |

TABLE 43

RESULTS FROM RI SURFACE SEDIMENT GRAB SAMPLES
BOEING ISAACSON-THOMPSON SITE
TUKWILA, WASHINGTON

| | RAO 1: Human Seafood Consumption | RAO 2: Human Direct Contact | | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | Elev. | SD-510G 0.2 ft MLLW | | | | | SD-511G -10.7 ft MLLW | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | Site-wide | Site-wide | Clamming areas | SCO [1] | LAET [2] | CSL [3] | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | — | — | — | | 1.05 | | | — | — | 1.56 | | | — | — |
| Total Solids (Percent) | — | — | — | — | — | — | | 64.2 | | | — | — | 47.6 | | | — | — |
| **Metals** | | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | NC | 7 | 7 | 57 | 57 | 93 | | 16.8 | | | — | — | 10.7 | | | — | — |
| Cadmium | — | — | — | 5.1 | 5.1 | 6.7 | | 0.5 | | | — | — | 0.6 | | | — | — |
| Chromium | — | — | — | 260 | 260 | 270 | | 26.5 | | | — | — | 28 | | | — | — |
| Copper | — | — | — | 390 | 390 | 390 | | 32.9 | | | — | — | 40.2 | | | — | — |
| Lead | — | — | — | 450 | 450 | 530 | | 29 | | | — | — | 15 | | | — | — |
| Mercury | — | — | — | 0.41 | 0.41 | 0.59 | | 0.06 | | | — | — | 0.11 | | | — | — |
| Silver | — | — | — | 6.1 | 6.1 | 6.1 | | 0.4 | U | U | — | — | 0.6 | U | U | — | — |
| Zinc | — | — | — | 410 | 410 | 960 | | 87 | | | — | — | 85 | | | — | — |
| **Nonionizable Organic Compounds** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | |
| *Total LPAH* | — | — | — | 370 | 5,200 | 780 | | 307 | J | J1 | 29.24 | J | 58 | J | J1 | 3.72 | J |
| Naphthalene | — | — | — | 99 | 2,100 | 170 | | 24 | | | 2.29 | | 19 | U | U | 1.22 | U |
| Acenaphthylene | — | — | — | 66 | 1,300 | 66 | | 12 | J | J1 | 1.14 | J | 19 | U | U | 1.22 | U |
| Acenaphthene | — | — | — | 16 | 500 | 57 | | 25 | | | 2.38 | | 19 | U | U | 1.22 | U |
| Fluorene | — | — | — | 23 | 540 | 79 | | 20 | | | 1.90 | | 19 | U | U | 1.22 | U |
| Phenanthrene | — | — | — | 100 | 1,500 | 480 | | 190 | | | 18.10 | | 46 | | | 2.95 | |
| Anthracene | — | — | — | 220 | 960 | 1,200 | | 36 | | | 3.43 | | 12 | J | J1 | 0.77 | J |
| 2-Methylnaphthalene | — | — | — | 38 | 670 | 64 | | 15 | J | J1 | 1.43 | J | 19 | U | U | 1.22 | U |
| *Total HPAH* | — | — | — | 960 | 12,000 | 5,300 | | 2,524 | | | 240.38 | | 512 | | | 32.82 | |
| Fluoranthene | — | — | — | 160 | 1,700 | 1,200 | | 590 | | | 56.19 | | 100 | | | 6.41 | |
| Pyrene | — | — | — | 1,000 | 2,600 | 1,400 | | 520 | | | 49.52 | | 89 | | | 5.71 | |
| Benz[a]anthracene | — | — | — | 110 | 1,300 | 270 | | 170 | | | 16.19 | | 39 | | | 2.50 | |
| Chrysene | — | — | — | 110 | 1,400 | 460 | | 320 | | | 30.48 | | 63 | | | 4.04 | |
| Total benzofluoranthenes | — | — | — | 230 | 3,200 | 450 | | 430 | | | 40.95 | | 100 | | | 6.41 | |
| Benzo[a]pyrene | — | — | — | 99 | 1,600 | 210 | | 200 | | | 19.05 | | 48 | | | 3.08 | |
| Indeno[1,2,3-c,d]pyrene | — | — | — | 34 | 600 | 88 | | 120 | | | 11.43 | | 27 | | | 1.73 | |
| Dibenzo[a,h]anthracene | — | — | — | 12 | 230 | 33 | | 54 | | | 5.14 | | 15 | | | 0.96 | |
| Benzo[g,h,i]perylene | — | — | — | 31 | 670 | 78 | | 120 | | | 11.43 | | 31 | | | 1.99 | |
| cPAH (µg TEQ/kg dw) | NC | 380 | 150 | — | — | — | | 296.8 | | | | | 71.23 | | | | |
| **Chlorinated Benzenes** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| 1,2-Dichlorobenzene | — | — | — | 2.3 | 35 | 2.3 | | 4.8 | U | U | 0.46 | U | 4.8 | U | U | 0.31 | U |
| 1,4-Dichlorobenzene | — | — | — | 3.1 | 110 | 9 | | 4.8 | U | U | 0.46 | U | 4.8 | U | U | 0.31 | U |
| 1,2,4-Trichlorobenzene | — | — | — | 0.81 | 31 | 1.8 | | 4.8 | U | U | 0.46 | U | 4.8 | U | U | 0.31 | U |
| Hexachlorobenzene | — | — | — | 0.38 | 22 | 2.3 | | 4.8 | U | U | *0.46* | U | 4.8 | U | U | 0.31 | U |
| **Phthalate Esters** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Dimethyl phthalate | — | — | — | 53 | 71 | 53 | | 6.3 | | | 0.60 | | 3.4 | J | J1 | 0.22 | J |
| Diethyl phthalate | — | — | — | 61 | 200 | 110 | | 48 | U | U | 4.57 | U | 48 | U | U | 3.08 | U |
| Di-n-butyl phthalate | — | — | — | 220 | 1,400 | 1,700 | | 33 | | | 3.14 | | 13 | J | J1 | 0.83 | J |
| Butyl benzyl phthalate | — | — | — | 4.9 | 63 | 64 | | 37 | | | 3.52 | | 10 | | | 0.64 | |
| Bis[2-ethylhexyl]phthalate | — | — | — | 47 | 1,300 | 78 | | 140 | B | U | 13.33 | B | 110 | B | U | 7.05 | B |
| Di-n-octyl phthalate | — | — | — | 58 | 6,200 | 4,500 | | 19 | U | U | 1.81 | U | 19 | U | U | 1.22 | U |
| **Miscellaneous** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Dibenzofuran | — | — | — | 15 | 540 | 58 | | 14 | J | J1 | 1.33 | J | 19 | U | U | 1.22 | U |
| Hexachlorobutadiene | — | — | — | 3.9 | 11 | 6.2 | | 4.8 | U | U | 0.46 | U | 4.8 | U | U | 0.31 | U |
| N-nitrosodiphenylamine | — | — | — | 11 | 28 | 11 | | 4.8 | U | U | 0.46 | U | 4.8 | U | U | 0.31 | U |
| Carbazole | — | — | — | — | — | — | | 36 | | | | | 19 | U | U | | |
| **Pesticides and PCBs** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Aroclor 1016 | — | — | — | — | — | — | | 19 | U | U | | | 20 | U | U | | |
| Aroclor 1242 | — | — | — | — | — | — | | 19 | U | U | | | 20 | U | U | | |
| Aroclor 1248 | — | — | — | — | — | — | | 73 | Y | U | | | 31 | Y | U | | |
| Aroclor 1254 | — | — | — | — | — | — | | 130 | | | | | 46 | | | | |
| Aroclor 1260 | — | — | — | — | — | — | | 59 | | | | | 29 | | | | |
| Aroclor 1221 | — | — | — | — | — | — | | 19 | U | U | | | 20 | U | U | | |
| Aroclor 1232 | — | — | — | — | — | — | | 19 | U | U | | | 20 | U | U | | |
| Aroclor 1262 | — | — | — | — | — | — | | 19 | U | U | | | 20 | U | U | | |
| Aroclor 1268 | — | — | — | — | — | — | | 19 | U | U | | | 20 | U | U | | |
| Total PCBs | 2 | 1,300 | 500 | 12 | 130 | 65 | | 189 | | | 18.00 | | 75 | | | 4.81 | |
| **Ionizable Organic Compounds** | | | | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | — | — | — | 420 | 420 | 1,200 | | 20 | | | — | — | 13 | J | J1 | — | — |
| 2-Methylphenol | — | — | — | 63 | 63 | 63 | | 4.8 | U | U | — | — | 4.8 | U | U | — | — |
| 4-Methylphenol | — | — | — | 670 | 670 | 670 | | 38 | U | U | — | — | 10 | J | J1 | — | — |
| 2,4-Dimethylphenol | — | — | — | 29 | 29 | 29 | | 4.8 | U | U | — | — | 4.8 | U | U | — | — |
| Pentachlorophenol | — | — | — | 360 | 360 | 690 | | 24 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | — | — | — | 57 | 57 | 73 | | 23 | QB | U | — | — | **120** | QB | J | — | — |
| Benzoic acid | — | — | — | 650 | 650 | 650 | | 380 | U | U | — | — | 120 | J | J1 | — | — |

| | SD-512G 0.1 ft MLLW | | | | | SD-517G 0.2 ft MLLW | | | | | SD-513G -9.1 ft MLLW | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | 1.85 | | | — | — | 1.54 | | | — | — | 1.62 | | | — | — |
| Total Solids (Percent) | 56.6 | | | — | — | 58.8 | | | — | — | 50.4 | | | — | — |
| **Metals** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 19.5 | | | — | — | 13.9 | | | — | — | 10.3 | | | — | — |
| Cadmium | 0.9 | | | — | — | 0.7 | | | — | — | 0.5 | | | — | — |
| Chromium | 49.3 | | | — | — | 33.2 | | | — | — | 27.3 | | | — | — |
| Copper | 73.8 | | | — | — | 40.9 | | | — | — | 37.6 | | | — | — |
| Lead | 51 | | | — | — | 44 | | | — | — | 18 | | | — | — |
| Mercury | 0.21 | | | — | — | 0.09 | | | — | — | 0.1 | | | — | — |
| Silver | 0.5 | U | U | — | — | 0.5 | U | U | — | — | 0.6 | U | U | — | — |
| Zinc | 124 | | | — | — | 99 | | | — | — | 83 | | | — | — |
| **Nonionizable Organic Compounds** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | |
| *Total LPAH* | 88 | J | J1 | 4.76 | J | 97 | J | J1 | 6.30 | J | 51 | | | 3.15 | |
| Naphthalene | 16 | J | J1 | 0.86 | J | 11 | J | J1 | 0.71 | J | 19 | U | U | 1.17 | U |
| Acenaphthylene | 19 | U | U | 1.03 | U | 20 | U | U | 1.30 | U | 19 | U | U | 1.17 | U |
| Acenaphthene | 19 | U | U | 1.03 | U | 20 | U | U | 1.30 | U | 19 | U | U | 1.17 | U |
| Fluorene | 19 | U | U | 1.03 | U | 20 | U | U | 1.30 | U | 19 | U | U | 1.17 | U |
| Phenanthrene | 59 | | | 3.19 | | 68 | | | 4.42 | | 51 | | | 3.15 | |
| Anthracene | 13 | J | J1 | 0.70 | J | 18 | J | J1 | 1.17 | J | 19 | U | U | 1.17 | U |
| 2-Methylnaphthalene | 11 | J | J1 | 0.59 | J | 11 | J | J1 | 0.71 | J | 19 | U | U | 1.17 | U |
| *Total HPAH* | 505 | | | 27.30 | | 813 | | | 52.79 | | 573 | | | 35.37 | |
| Fluoranthene | 110 | | | 5.95 | | 140 | | | 9.09 | | 110 | | | 6.79 | |
| Pyrene | 100 | | | 5.41 | | 190 | | | 12.34 | | 100 | | | 6.17 | |
| Benz[a]anthracene | 35 | | | 1.89 | | 63 | | | 4.09 | | 42 | | | 2.59 | |
| Chrysene | 53 | | | 2.86 | | 89 | | | 5.78 | | 70 | | | 4.32 | |
| Total benzofluoranthenes | 87 | | | 4.70 | | 150 | | | 9.74 | | 110 | | | 6.79 | |
| Benzo[a]pyrene | 45 | | | 2.43 | | 70 | | | 4.55 | | 52 | | | 3.21 | |
| Indeno[1,2,3-c,d]pyrene | 27 | | | 1.46 | | 43 | | | 2.79 | | 34 | | | 2.10 | |
| Dibenzo[a,h]anthracene | 12 | | | 0.65 | | 19 | | | 1.23 | | 16 | | | 0.99 | |
| Benzo[g,h,i]perylene | 36 | | | 1.95 | | 49 | | | 3.18 | | 39 | | | 2.41 | |
| cPAH (µg TEQ/kg dw) | 65.23 | | | | | 104.09 | | | | | 77.7 | | | | |
| **Chlorinated Benzenes** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| 1,2-Dichlorobenzene | 4.8 | U | U | 0.26 | U | 5 | U | U | 0.32 | U | 4.7 | U | U | 0.29 | U |
| 1,4-Dichlorobenzene | 4.8 | U | U | 0.26 | U | 5 | U | U | 0.32 | U | 4.7 | U | U | 0.29 | U |
| 1,2,4-Trichlorobenzene | 4.8 | U | U | 0.26 | U | 5 | U | U | 0.32 | U | 4.7 | U | U | 0.29 | U |
| Hexachlorobenzene | 4.8 | U | U | 0.26 | U | 5 | U | U | 0.32 | U | 4.7 | U | U | 0.29 | U |
| **Phthalate Esters** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Dimethyl phthalate | 10 | | | 0.54 | | 19 | | | 1.23 | | 4.1 | J | J1 | 0.25 | J |
| Diethyl phthalate | 48 | U | U | 2.59 | U | 50 | U | U | 3.25 | U | 1500 | | | 92.59 | |
| Di-n-butyl phthalate | 74 | | | 4.00 | | 110 | | | 7.14 | | 56 | | | 3.46 | |
| Butyl benzyl phthalate | 43 | | | 2.32 | | 150 | | | 9.74 | | 12 | | | 0.74 | |
| Bis[2-ethylhexyl]phthalate | 72 | B | U | 3.89 | B | 110 | B | U | 7.14 | B | 88 | B | U | 5.43 | B |
| Di-n-octyl phthalate | 19 | U | U | 1.03 | U | 20 | U | U | 1.30 | U | 19 | U | U | 1.17 | U |
| **Miscellaneous** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Dibenzofuran | 19 | U | U | 1.03 | U | 10 | J | J1 | 0.65 | J | 19 | U | U | 1.17 | U |
| Hexachlorobutadiene | 4.8 | U | U | 0.26 | U | 5 | U | U | 0.32 | U | 4.7 | U | U | 0.29 | U |
| N-nitrosodiphenylamine | 4.8 | U | U | 0.26 | U | 5 | U | U | 0.32 | U | 4.7 | U | U | 0.29 | U |
| Carbazole | 19 | U | U | | | 12 | J | J1 | | | 19 | U | U | | |
| **Pesticides and PCBs** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| Aroclor 1016 | 19 | U | U | | | 19 | U | U | | | 19 | U | U | | |
| Aroclor 1242 | 19 | U | U | | | 19 | U | U | | | 19 | U | U | | |
| Aroclor 1248 | 120 | | | | | 220 | | | | | 38 | Y | U | | |
| Aroclor 1254 | 250 | | | | | 360 | | | | | 57 | | | | |
| Aroclor 1260 | 82 | | | | | 110 | | | | | 31 | | | | |
| Aroclor 1221 | 19 | U | U | | | 19 | U | U | | | 19 | U | U | | |
| Aroclor 1232 | 19 | U | U | | | 19 | U | U | | | 19 | U | U | | |
| Aroclor 1262 | 19 | U | U | | | 19 | U | U | | | 19 | U | U | | |
| Aroclor 1268 | 19 | U | U | | | 19 | U | U | | | 19 | U | U | | |
| Total PCBs | 452 | | | 24.43 | | 690 | | | 44.81 | | 88 | | | 5.43 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 18 | J | J, J1 | — | — | 18 | J | J, J1 | — | — | 10 | J | J, J1 | — | — |
| 2-Methylphenol | 4.8 | U | U | — | — | 5 | U | U | — | — | 4.7 | U | U | — | — |
| 4-Methylphenol | 30 | J | J1 | — | — | 40 | U | U | — | — | 38 | U | U | — | — |
| 2,4-Dimethylphenol | 2.5 | J | J, J1 | — | — | 5 | U | UJ | — | — | 4.7 | U | UJ | — | — |
| Pentachlorophenol | 24 | U | UJ | — | — | 25 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 24 | B | U | — | — | 20 | B | U | — | — | 52 | B | U | — | — |
| Benzoic acid | 390 | U | U | — | — | 140 | J | J1 | — | — | 380 | U | U | — | — |

## TABLE 43

### RESULTS FROM RI SURFACE SEDIMENT GRAB SAMPLES
### BOEING ISAACSON-THOMPSON SITE
### TUKWILA, WASHINGTON

| | RAO 1: Human Seafood Consumption | RAO 2: Human Direct Contact | | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | Elev. | SD-514G 0.0 ft MLLW | | | | | | SD-515G -9.7 ft MLLW | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | Site-wide | Site-wide | Clamming areas | SCO [1] | LAET [2] | CSL [3] | | Value | Q1 | Q2 | | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | — | — | — | | 1.78 | | | — | — | | 1.22 | | | — | — |
| Total Solids (Percent) | — | — | — | — | — | — | | 55.9 | | | — | — | | 47.8 | | | — | — |
| **Metals** | | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | **mg/kg dw** | | | | | | **mg/kg dw** | | | | |
| Arsenic | NC | 7 | 7 | 57 | 57 | 93 | | 15.6 | | | — | — | | 11.9 | | | — | — |
| Cadmium | — | — | — | 5.1 | 5.1 | 6.7 | | 0.9 | | | — | — | | 0.5 | | | — | — |
| Chromium | — | — | — | 260 | 260 | 270 | | 47.6 | | | — | — | | 33 | | | — | — |
| Copper | — | — | — | 390 | 390 | 390 | | 76.7 | | | — | — | | 39.4 | | | — | — |
| Lead | — | — | — | 450 | 450 | 530 | | 54 | | | — | — | | 18 | | | — | — |
| Mercury | — | — | — | 0.41 | 0.41 | 0.59 | | 0.24 | | | — | — | | 0.11 | | | — | — |
| Silver | — | — | — | 6.1 | 6.1 | 6.1 | | 0.5 | | | — | — | | 3.2 | | | — | — |
| Zinc | — | — | — | 410 | 410 | 960 | | 123 | | | — | — | | 85 | | | — | — |
| **Nonionizable Organic Compounds** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | — | — | — | 370 | 5,200 | 780 | | 67 | J | J1 | 3.76 | J | | 47 | | | 3.85 | |
| Naphthalene | — | — | — | 99 | 2,100 | 170 | | 16 | J | J1 | 0.90 | J | | 20 | U | U | 1.64 | U |
| Acenaphthylene | — | — | — | 66 | 1,300 | 66 | | 19 | U | U | 1.07 | U | | 20 | U | U | 1.64 | U |
| Acenaphthene | — | — | — | 16 | 500 | 57 | | 19 | U | U | 1.07 | U | | 20 | U | U | 1.64 | U |
| Fluorene | — | — | — | 23 | 540 | 79 | | 19 | U | U | 1.07 | U | | 20 | U | U | 1.64 | U |
| Phenanthrene | — | — | — | 100 | 1,500 | 480 | | 40 | | | 2.25 | | | 47 | | | 3.85 | |
| Anthracene | — | — | — | 220 | 960 | 1,200 | | 11 | J | J1 | 0.62 | J | | 20 | U | U | 1.64 | U |
| 2-Methylnaphthalene | — | — | — | 38 | 670 | 64 | | 14 | J | J1 | 0.79 | J | | 20 | U | U | 1.64 | U |
| *Total HPAH* | — | — | — | 960 | 12,000 | 5,300 | | 420.7 | J | J1 | 23.63 | J | | 523 | | | 42.87 | |
| Fluoranthene | — | — | — | 160 | 1,700 | 1,200 | | 96 | | | 5.39 | | | 100 | | | 8.20 | |
| Pyrene | — | — | — | 1,000 | 2,600 | 1,400 | | 87 | | | 4.89 | | | 94 | | | 7.70 | |
| Benz[a]anthracene | — | — | — | 110 | 1,300 | 270 | | 37 | | | 2.08 | | | 39 | | | 3.20 | |
| Chrysene | — | — | — | 110 | 1,400 | 460 | | 52 | | | 2.92 | | | 65 | | | 5.33 | |
| Total benzofluoranthenes | — | — | — | 230 | 3,200 | 450 | | 68 | | | 3.82 | | | 100 | | | 8.20 | |
| Benzo[a]pyrene | — | — | — | 99 | 1,600 | 210 | | 33 | | | 1.85 | | | 47 | | | 3.85 | |
| Indeno[1,2,3-c,d]pyrene | — | — | — | 34 | 600 | 88 | | 18 | J | J1 | 1.01 | J | | 29 | | | 2.38 | |
| Dibenzo[a,h]anthracene | — | — | — | 12 | 230 | 33 | | 8.7 | | | 0.49 | | | 13 | | | 1.07 | |
| Benzo[g,h,i]perylene | — | — | — | 31 | 670 | 78 | | 21 | | | 1.18 | | | 36 | | | 2.95 | |
| cPAH (µg TEQ/kg dw) | NC | 380 | 150 | — | — | — | | 49.3 | | | | | | 69.65 | | | | |
| **Chlorinated Benzenes** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | | **µg/kg dw** | | | **mg/kg OC** | |
| 1,2-Dichlorobenzene | — | — | — | 2.3 | 35 | 2.3 | | 4.8 | U | U | 0.27 | U | | 4.9 | U | U | 0.40 | U |
| 1,4-Dichlorobenzene | — | — | — | 3.1 | 110 | 9 | | 5.1 | | | 0.29 | | | 4.9 | U | U | 0.40 | U |
| 1,2,4-Trichlorobenzene | — | — | — | 0.81 | 31 | 1.8 | | 4.8 | U | U | 0.27 | U | | 4.9 | U | U | 0.40 | U |
| Hexachlorobenzene | — | — | — | 0.38 | 22 | 2.3 | | 4.8 | U | U | 0.27 | U | | 4.9 | U | U | *0.40* | U |
| **Phthalate Esters** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | | **µg/kg dw** | | | **mg/kg OC** | |
| Dimethyl phthalate | — | — | — | 53 | 71 | 53 | | 4.8 | U | U | 0.27 | U | | 4.8 | J | J1 | 0.39 | J |
| Diethyl phthalate | — | — | — | 61 | 200 | 110 | | 48 | U | U | 2.70 | U | | 49 | U | U | 4.02 | U |
| Di-n-butyl phthalate | — | — | — | 220 | 1,400 | 1,700 | | 82 | | | 4.61 | | | 20 | U | U | 1.64 | U |
| Butyl benzyl phthalate | — | — | — | 4.9 | 63 | 64 | | 20 | | | 1.12 | | | 17 | | | 1.39 | |
| Bis[2-ethylhexyl]phthalate | — | — | — | 47 | 1,300 | 78 | | 71 | B | U | 3.99 | B | | 120 | B | U | 9.84 | B |
| Di-n-octyl phthalate | — | — | — | 58 | 6,200 | 4,500 | | 19 | U | U | 1.07 | U | | 20 | U | U | 1.64 | U |
| **Miscellaneous** | | | | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | | **µg/kg dw** | | | **mg/kg OC** | |
| Dibenzofuran | — | — | — | 15 | 540 | 58 | | 19 | U | U | 1.07 | U | | 20 | U | U | 1.64 | U |
| Hexachlorobutadiene | — | — | — | 3.9 | 11 | 6.2 | | 4.8 | U | U | 0.27 | U | | 4.9 | U | U | 0.40 | U |
| N-nitrosodiphenylamine | — | — | — | 11 | 28 | 11 | | 4.8 | U | U | 0.27 | U | | 4.9 | U | U | 0.40 | U |
| Carbazole | — | — | — | — | — | — | | 19 | U | U | | | | 20 | U | U | | |
| **Pesticides and PCBs** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | | **µg/kg dw** | | | **mg/kg OC** | |
| Aroclor 1016 | — | — | — | — | — | — | | 20 | U | U | | | | 20 | U | U | | |
| Aroclor 1242 | — | — | — | — | — | — | | 20 | U | U | | | | 20 | U | U | | |
| Aroclor 1248 | — | — | — | — | — | — | | 360 | | | | | | 42 | Y | U | | |
| Aroclor 1254 | — | — | — | — | — | — | | 750 | | | | | | 62 | | | | |
| Aroclor 1260 | — | — | — | — | — | — | | 180 | | | | | | 36 | | | | |
| Aroclor 1221 | — | — | — | — | — | — | | 20 | U | U | | | | 20 | U | U | | |
| Aroclor 1232 | — | — | — | — | — | — | | 20 | U | U | | | | 20 | U | U | | |
| Aroclor 1262 | — | — | — | — | — | — | | 20 | U | U | | | | 20 | U | U | | |
| Aroclor 1268 | — | — | — | — | — | — | | 20 | U | U | | | | 20 | U | U | | |
| Total PCBs | 2 | 1,300 | 500 | 12 | 130 | 65 | | 1,290 | | | **72.47** | | | 98 | | | 8.03 | |
| **Ionizable Organic Compounds** | | | | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | **µg/kg dw** | | | | | | **µg/kg dw** | | | | |
| Phenol | — | — | — | 420 | 420 | 1,200 | | 22 | Q | J | — | — | | 14 | J | J, J1 | — | — |
| 2-Methylphenol | — | — | — | 63 | 63 | 63 | | 4.8 | U | U | — | — | | 2.5 | J | J1 | — | — |
| 4-Methylphenol | — | — | — | 670 | 670 | 670 | | 15 | J | J1 | — | — | | 39 | U | U | — | — |
| 2,4-Dimethylphenol | — | — | — | 29 | 29 | 29 | | 3.7 | J | J, J1 | — | — | | 4.9 | U | UJ | — | — |
| Pentachlorophenol | — | — | — | 360 | 360 | 690 | | 24 | U | UJ | — | — | | 24 | U | UJ | — | — |
| Benzyl alcohol | — | — | — | 57 | 57 | 73 | | 21 | B | U | — | — | | *70* | B | U | — | — |
| Benzoic acid | — | — | — | 650 | 650 | 650 | | 390 | U | U | — | — | | 390 | U | U | — | — |

**TABLE 43**

**RESULTS FROM RI SURFACE SEDIMENT GRAB SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| | |
|---|---|
| (blue) | Value above PCUL (Human Seafood Consumption) |
| (orange) | Value above PCUL (Human Direct Contact) |
| (purple) | Value above PCUL (Benthic Organism) |
| (red) | Value above SMS CSL (Bold) |
| (grey) | Value above PCUL (Undetected Exceedance–italicized) |

Q1 Laboratory Data Qualifier
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
M = Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match.
U = Indicates the compound was not detected at the reported concentration.

Notes:
1. Sediment Management Standards Sediment Cleanup Objectives (173-204-560) WAC.
2. LAET = Lowest-Apparent-Effects Threshold.
3. Sediment Management Standards Cleanup Screening Levels (173-204-560) WAC.

Q2 Data Qualifiers Assigned during Data Validation
U = Indicates the compound was not detected at or above the reporting limit.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

Abbreviations:
cPAH = carcinogenic polycyclic aromatic hydrocarbons
CSL = cleanup screening level
dw = dry weight
Elev = elevation
ft = feet
HPAH = high-molecular-weight polycyclic aromatic hydrocarbon
LAET = lowest apparent effects threshold
LPAH = low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg = milligrams per kilogram
MLLW = mean lower low water
OC = organic carbon
PCBs = polychlorinated biphenyls
RAO = remedial action objective
SMS = Wahington State Sediment Management Standards
SCO = sediment cleanup objective
TEQ = toxic equivalent concentration
µg/kg = micrograms per kilogram

**TABLE 44**

**RESULTS FROM RI SEDIMENT CORE SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Analyte | RAO 3: Benthic Organisms Sediment Management Standards SCO [1] | LAET [2] | SMS CSL [3] | SD-501-0020 2 to 3 ft Value | Q1 | Q2 | | | SD-501-0040 4 to 5 ft Value | Q1 | Q2 | | | SD-501-0060 6 to 7 ft Value | Q1 | Q2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conventionals** | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 1.8 | | | — | — | 1.54 | | | — | — | 1.29 | | | — | — |
| Total Solids (Percent) | — | — | — | 56.2 | | | — | — | 66.9 | | | — | — | 70.4 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | 12.4 | | | — | — | 13 | | | — | — | 9.5 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 1.2 | | | — | — | 0.8 | | | — | — | 0.5 | | | — | — |
| Chromium | 260 | 260 | 270 | 41.4 | | | — | — | 36.6 | | | — | — | 21.5 | | | — | — |
| Copper | 390 | 390 | 390 | 63.9 | | | — | — | 66 | | | — | — | 46.5 | | | — | — |
| Lead | 450 | 450 | 530 | 67 | | | — | — | 91 | | | — | — | 53 | | | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.16 | | | — | — | 0.15 | | | — | — | 0.23 | | | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.9 | | | — | — | 1.3 | | | — | — | 0.7 | | | — | — |
| Zinc | 410 | 410 | 960 | 144 | | | — | — | 158 | | | — | — | 85 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 569 | | | 31.61 | | 1,256 | | | 81.56 | | 978 | J | | 75.81 | J |
| Naphthalene | 99 | 2,100 | 170 | 46 | | | 2.56 | | 120 | | | 7.79 | | 71 | | | 5.50 | |
| Acenaphthylene | 66 | 1,300 | 66 | 19 | U | U | 1.06 | U | 26 | | | 1.69 | | 15 | J | J1 | 1.16 | J |
| Acenaphthene | 16 | 500 | 57 | 47 | | | 2.61 | | 150 | | | 9.74 | | 82 | | | 6.36 | |
| Fluorene | 23 | 540 | 79 | 45 | | | 2.50 | | 110 | | | 7.14 | | 120 | | J | 9.30 | |
| Phenanthrene | 100 | 1,500 | 480 | 360 | | | 20.00 | | 650 | | | 42.21 | | 580 | | J | 44.96 | |
| Anthracene | 220 | 960 | 1,200 | 71 | | | 3.94 | | 200 | | | 12.99 | | 110 | | J | 8.53 | |
| 2-Methylnaphthalene | 38 | 670 | 64 | 29 | | | 1.61 | | 45 | | | 2.92 | | 28 | | | 2.17 | |
| *Total HPAH* | 960 | 12,000 | 5,300 | 2,307 | | | 128.17 | | 3,104 | | | 201.56 | | 1,911 | J | | 148.14 | |
| Fluoranthene | 160 | 1,700 | 1,200 | 380 | | | 21.11 | | 570 | | | 37.01 | | 300 | | J | 23.26 | |
| Pyrene | 1,000 | 2,600 | 1,400 | 520 | | | 28.89 | | 920 | | | 59.74 | | 620 | | J | 48.06 | |
| Benz[a]anthracene | 110 | 1,300 | 270 | 170 | | | 9.44 | | 290 | | | 18.83 | | 170 | | J | 13.18 | |
| Chrysene | 110 | 1,400 | 460 | 260 | | | 14.44 | | 340 | | | 22.08 | | 220 | | J | 17.05 | |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 420 | | | 23.33 | | 350 | | | 22.73 | | 210 | | | 16.28 | |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 230 | | | 12.78 | | 310 | | | 20.13 | | 190 | | J | 14.73 | |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 130 | | | 7.22 | | 110 | | | 7.14 | | 72 | | | 5.58 | |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 57 | | | 3.17 | | 54 | | | 3.51 | | 32 | | | 2.48 | |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 140 | | | 7.78 | | 160 | | | 10.39 | | 97 | | | 7.52 | |
| cPAH (µg TEQ/kg dw) | — | — | — | 327.4 | | | | | 410 | | | | | 250.2 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.8 | U | U | 0.27 | U | 4.7 | U | U | 0.31 | U | 4.8 | U | U | 0.37 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.3 | J | J1 | 0.24 | J | 5.3 | | | 0.34 | | 2.5 | J | J1 | 193.80 | J |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.8 | U | U | 0.27 | U | 4.7 | U | U | 0.31 | U | 4.8 | U | U | 372.09 | U |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.8 | U | U | 0.27 | U | 4.7 | U | U | 0.31 | U | 4.8 | U | U | 0.37 | U |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 11 | | | 0.61 | | 15 | | | 0.97 | | 3.4 | J | J1 | 0.26 | J |
| Diethyl phthalate | 61 | 200 | 110 | 48 | U | U | 2.67 | U | 47 | U | U | 3.05 | U | 48 | U | U | 3.72 | U |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 19 | U | U | 1.06 | U | 12 | J | J1 | 0.78 | J | 19 | U | U | 1.47 | U |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 31 | | | 1.72 | | 14 | | | 0.91 | | 15 | | | 1.16 | |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 330 | | | 18.33 | | 70 | | | 4.55 | | 38 | | | 2.95 | |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 19 | U | U | 1.06 | U | 19 | U | U | 1.23 | U | 19 | U | U | 1.47 | U |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 28 | | | 1.56 | | 29 | | | 1.88 | | 31 | | | 2.40 | |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.8 | U | U | 0.27 | U | 4.7 | U | U | 0.31 | U | 4.8 | U | U | 0.37 | U |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.8 | U | U | 0.27 | U | 4.7 | U | U | 0.31 | U | 5.5 | | | 0.43 | |
| Carbazole | — | — | — | 53 | | | | | 18 | J | J1 | | | 11 | J | J1 | | |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 580 | | | 32.22 | | 1230 | | | **79.87** | | 660 | | | 51.16 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 41 | | | — | — | 16 | J | J1 | — | — | 12 | J | J1 | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 13 | | | — | — | 3.1 | J | J1 | — | — | 2.9 | J | J1 | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 45 | | | — | — | 24 | J | J1 | — | — | 24 | J | J1 | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 16 | | | — | — | 4.6 | J | J1 | — | — | 4.3 | J | J1 | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 51 | | | — | — | 32 | | | — | — | 46 | | | — | — |
| Benzoic acid | 650 | 650 | 650 | 140 | J | J1 | — | — | 380 | U | U | — | — | 380 | U | U | — | — |

| Analyte | SD-501-0080 8 to 9 ft Value | Q1 | Q2 | | | SD-502-0020 2 to 3 ft Value | Q1 | Q2 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Conventionals** | | | | | | | | | | |
| Total Organic Carbon (Percent) | 1.4 | | | — | — | 0.839 | | | — | — |
| Total Solids (Percent) | 75.2 | | | — | — | 88.6 | | | — | — |
| **Metals** | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 5.7 | | | — | — | 3.6 | | | — | — |
| Cadmium | 0.4 | | | — | — | 0.2 | U | U | — | — |
| Chromium | 17.2 | | | — | — | 10.7 | | | — | — |
| Copper | 23.8 | | | — | — | 10.7 | | | — | — |
| Lead | 13 | | J | — | — | 2 | U | U | — | — |
| Mercury | 0.07 | | | — | — | 0.02 | U | U | — | — |
| Silver | 0.4 | U | U | — | — | 0.3 | U | U | — | — |
| Zinc | 63 | | | — | — | 26 | | | — | — |
| **Nonionizable Organic Compounds** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | |
| *Total LPAH* | 20 | U | | 1.43 | U | 32 | J | | 3.81 | J |
| Naphthalene | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| Acenaphthylene | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| Acenaphthene | 20 | U | U | 1.43 | U | 21 | | | 2.50 | |
| Fluorene | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| Phenanthrene | 20 | U | U | 1.43 | U | 11 | J | J1 | 1.31 | J |
| Anthracene | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| 2-Methylnaphthalene | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| *Total HPAH* | 71 | J | | 5.07 | J | 85.8 | J | | 10.23 | J |
| Fluoranthene | 16 | J | J1 | 1.14 | J | 22 | | | 2.62 | |
| Pyrene | 38 | | | 2.71 | | 21 | | | 2.50 | |
| Benz[a]anthracene | 20 | U | U | 1.43 | U | 10 | J | J1 | 1.19 | J |
| Chrysene | 20 | U | U | 1.43 | U | 11 | J | J1 | 1.31 | J |
| Total benzofluoranthenes | 17 | J | J1 | 1.21 | J | 19 | | | 2.26 | |
| Benzo[a]pyrene | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| Indeno[1,2,3-c,d]pyrene | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| Dibenzo[a,h]anthracene | 5 | U | U | 0.36 | U | 2.8 | J | J1 | 0.33 | J |
| Benzo[g,h,i]perylene | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| cPAH (µg TEQ/kg dw) | 14.8 | | | | | 14.58 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | |
| 1,2-Dichlorobenzene | 5 | U | U | 0.36 | U | 4.7 | U | U | 0.56 | U |
| 1,4-Dichlorobenzene | 5 | U | U | 0.36 | U | 4.7 | U | U | 0.56 | U |
| 1,2,4-Trichlorobenzene | 5 | U | U | 0.36 | U | 4.7 | U | U | 0.56 | U |
| Hexachlorobenzene | 5 | U | U | 0.36 | U | 4.7 | U | U | *0.56* | U |
| **Phthalate Esters** | | | | | | | | | | |
| Dimethyl phthalate | 5 | U | U | 0.36 | U | 4.7 | U | U | 0.56 | U |
| Diethyl phthalate | 50 | U | U | 3.57 | U | 47 | U | U | 5.60 | U |
| Di-n-butyl phthalate | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| Butyl benzyl phthalate | 5 | U | U | 0.36 | U | 4.7 | U | U | 0.56 | U |
| Bis[2-ethylhexyl]phthalate | 25 | U | UJ | 1.79 | U | 26 | | | 3.10 | |
| Di-n-octyl phthalate | 20 | U | UJ | 1.43 | U | 19 | U | U | 2.26 | U |
| **Miscellaneous** | | | | | | | | | | |
| Dibenzofuran | 20 | U | U | 1.43 | U | 19 | U | U | 2.26 | U |
| Hexachlorobutadiene | 5 | U | U | 0.36 | U | 4.7 | U | U | 0.56 | U |
| N-nitrosodiphenylamine | 5 | U | U | 0.36 | U | 4.7 | U | U | 0.56 | U |
| Carbazole | 20 | U | UJ | | | 19 | U | U | | |
| **Pesticides and PCBs** | | | | | | | | | | |
| Total PCBs | 191 | | | 13.64 | | 19 | U | U | 2.26 | U |
| **Ionizable Organic Compounds** | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 20 | U | UJ | — | — | 19 | U | U | — | — |
| 2-Methylphenol | 5 | U | U | — | — | 4.7 | U | U | — | — |
| 4-Methylphenol | 40 | U | U | — | — | 38 | U | U | — | — |
| 2,4-Dimethylphenol | 5 | U | UJ | — | — | 4.7 | U | U | — | — |
| Pentachlorophenol | 25 | U | U | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 8.6 | B | U | — | — | 8.8 | | | — | — |
| Benzoic acid | 400 | U | U | — | — | 380 | U | U | — | — |

**TABLE 44**

**RESULTS FROM RI SEDIMENT CORE SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Analyte | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | SD-502-0040 | | | | | SD-502-0060 | | | | | SD-503-0020 | | | | | SD-503-0040 | | | | | SD-503-0060 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 4 to 5 ft | | | | | 6 to 7 ft | | | | | 2 to 3 ft | | | | | 4 to 5 ft | | | | | 6 to 7 ft | | | | |
| Analyte | SCO [1] | LAET [2] | CSL [3] | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 0.402 | | | — | — | 0.182 | | | — | — | 1.67 | | | — | — | 1.69 | | | — | — | 0.917 | | | — | — |
| Total Solids (Percent) | — | — | — | 84.1 | | | — | — | 86.6 | | | — | — | 56.9 | | | — | — | 65 | | | — | — | 74.6 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | 1.1 | | | — | — | 2.6 | | | — | — | 47 | | | — | — | 40.4 | | | — | — | 9.2 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 0.2 | U | U | — | — | 0.2 | U | U | — | — | 1.2 | | | — | — | 0.8 | | | — | — | 0.7 | | | — | — |
| Chromium | 260 | 260 | 270 | 10.6 | | | — | — | 12.2 | | | — | — | 45.9 | | | — | — | 30.6 | | | — | — | 23.3 | | | — | — |
| Copper | 390 | 390 | 390 | 10.2 | | | — | — | 10.1 | | | — | — | 59.4 | | | — | — | 41.9 | | | — | — | 29.8 | | | — | — |
| Lead | 450 | 450 | 530 | 2 | U | U | — | — | 2 | U | U | — | — | 44 | | | — | — | 22 | | | — | — | 10 | | | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.02 | U | U | — | — | 0.02 | U | U | — | — | 0.32 | | | — | — | 0.3 | | | — | — | 0.09 | | | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.3 | U | U | — | — | 0.3 | U | U | — | — | 0.5 | U | U | — | — | 0.4 | U | U | — | — | 0.4 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 20 | | | — | — | 24 | | | — | — | 319 | | | — | — | 226 | | | — | — | 64 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 18 | U | | — | — | 20 | U | | — | — | 43 | J | | 2.57 | J | 20 | | | 1.18 | | 20 | | | 2.18 | |
| Naphthalene | 99 | 2,100 | 170 | 18 | U | U | — | — | 20 | U | U | — | — | 13 | J | J1 | 0.78 | J | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Acenaphthylene | 66 | 1,300 | 66 | 18 | U | U | — | — | 20 | U | U | — | — | 19 | U | U | 1.14 | U | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Acenaphthene | 16 | 500 | 57 | 18 | U | U | — | — | 20 | U | U | — | — | 19 | U | U | 1.14 | U | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Fluorene | 23 | 540 | 79 | 18 | U | U | — | — | 20 | U | U | — | — | 19 | U | U | 1.14 | U | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Phenanthrene | 100 | 1,500 | 480 | 18 | U | U | — | — | 20 | U | U | — | — | 30 | | | 1.80 | | 20 | | | 1.18 | | 20 | | | 2.18 | |
| Anthracene | 220 | 960 | 1,200 | 18 | U | U | — | — | 20 | U | U | — | — | 19 | U | U | 1.14 | U | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| 2-Methylnaphthalene | 38 | 670 | 64 | 18 | U | U | — | — | 20 | U | U | — | — | 10 | J | J1 | 0.60 | J | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| *Total HPAH* | 960 | 12,000 | 5,300 | 18 | U | | — | — | 20 | U | | — | — | 260.9 | J | | 15.62 | J | 66 | J | | 3.91 | J | 60 | J | | 6.54 | J |
| Fluoranthene | 160 | 1,700 | 1,200 | 18 | U | U | — | — | 20 | U | U | — | — | 44 | | | 2.63 | | 18 | J | J1 | 1.07 | J | 19 | | | 2.07 | |
| Pyrene | 1,000 | 2,600 | 1,400 | 18 | U | U | — | — | 20 | U | U | — | — | 65 | | | 3.89 | | 31 | | | 1.83 | | 27 | | | 2.94 | |
| Benz[a]anthracene | 110 | 1,300 | 270 | 18 | U | U | — | — | 20 | U | U | — | — | 19 | | | 1.14 | | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Chrysene | 110 | 1,400 | 460 | 18 | U | U | — | — | 20 | U | U | — | — | 26 | | | 1.56 | | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 18 | U | U | — | — | 20 | U | U | — | — | 49 | | | 2.93 | | 17 | J | J1 | 1.01 | J | 14 | J | J1 | 1.53 | J |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 18 | U | U | — | — | 20 | U | U | — | — | 26 | | | 1.56 | | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 18 | U | U | — | — | 20 | U | U | — | — | 13 | J | J1 | 0.78 | J | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 3.9 | J | J1 | 0.23 | J | 4.9 | U | U | 0.29 | U | 4.8 | U | U | 0.52 | U |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 18 | U | U | — | — | 20 | U | U | — | — | 15 | J | J1 | 0.90 | J | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| cPAH (µg TEQ/kg dw) | — | — | — | 12.71 | | | — | — | 14.08 | | | — | — | 35.92 | | | | | 14.78 | | | | | 13.855 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 17 | | | 1.02 | | 2.5 | J | J1 | 0.15 | J | 4.8 | U | U | 0.52 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.8 | | | 0.29 | | 4.9 | U | U | 0.29 | U | 4.8 | U | U | 0.52 | U |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.7 | U | U | 0.28 | U | 4.9 | U | U | 0.29 | U | 4.8 | U | U | 0.52 | U |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.7 | U | U | 0.28 | U | 4.9 | U | U | 0.29 | U | 4.8 | U | U | *0.52* | U |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 7.1 | | | 0.43 | | 5.4 | | | 0.32 | | 3.5 | J | J1 | 0.38 | J |
| Diethyl phthalate | 61 | 200 | 110 | 46 | U | U | — | — | 49 | U | U | — | — | 47 | U | U | 2.81 | U | 49 | U | U | 2.90 | U | 40 | JB | UJ | 4.36 | JB |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 18 | U | U | — | — | 20 | U | U | — | — | 10 | J | J1 | 0.60 | J | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 5.9 | | | 0.35 | | 2.5 | J | J1 | 0.15 | J | 7.8 | | | 0.85 | |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 23 | U | U | — | — | 24 | U | U | — | — | 44 | B | U | 2.63 | B | 28 | B | U | 1.66 | B | 22 | JB | UJ | 2.40 | JB |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 18 | U | U | — | — | 20 | U | U | — | — | 19 | U | U | 1.14 | U | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 18 | U | U | — | — | 20 | U | U | — | — | 19 | U | U | 1.14 | U | 20 | U | U | 1.18 | U | 19 | U | U | 2.07 | U |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.7 | U | UJ | 0.28 | U | 4.9 | U | UJ | 0.29 | U | 4.8 | U | UJ | 0.52 | U |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.7 | U | U | 0.28 | U | 4.9 | U | U | 0.29 | U | 4.8 | U | U | 0.52 | U |
| Carbazole | — | — | — | 18 | U | U | — | — | 20 | U | U | — | — | 19 | U | U | | | 20 | U | U | | | 19 | U | U | | |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 19 | U | U | — | — | 20 | U | U | — | — | 201 | | | 12.04 | | 203 | | | 12.01 | | 61 | | | 6.65 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 18 | U | U | — | — | 20 | U | U | — | — | 37 | | | — | — | 20 | U | U | — | — | 19 | U | U | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.7 | U | U | — | — | 4.9 | U | U | — | — | 4.8 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 37 | U | U | — | — | 39 | U | U | — | — | 19 | J | J1 | — | — | 15 | J | J1 | — | — | 18 | J | J1 | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.1 | J | J1 | — | — | 4.9 | U | U | — | — | 4.8 | U | U | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 23 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 7.7 | | | — | — | 8.5 | | | — | — | 20 | Q | J | — | — | 16 | Q | J | — | — | 9.3 | Q | J1 | — | — |
| Benzoic acid | 650 | 650 | 650 | 370 | U | U | — | — | 390 | U | U | — | — | 380 | U | U | — | — | 390 | U | U | — | — | 380 | U | U | — | — |

## RESULTS FROM RI SEDIMENT CORE SAMPLES
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | SD-504-0020 2 to 3 ft | | | | | SD-504-0040 4 to 5 ft | | | | | SD-505-0020 2 to 3 ft | | | | | SD-505-0040 4 to 5 ft | | | | | SD-505-0060 6 to 7 ft | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | SCO [1] | LAET [2] | CSL [3] | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 2.75 | | | — | — | 0.129 | | | — | — | 1.49 | | | — | — | 2.24 | | | — | — | 2 | | | — | — |
| Total Solids (Percent) | — | — | — | 77.7 | | | — | — | 82.2 | | | — | — | 60 | | | — | — | 58 | | | — | — | 63.6 | | | — | — |
| **Metals** | mg/kg dw | mg/kg dw | mg/kg dw | mg/kg dw | | | | | mg/kg dw | | | | | mg/kg dw | | | | | mg/kg dw | | | | | mg/kg dw | | | | |
| Arsenic | 57 | 57 | 93 | 268 | | | — | — | 17.6 | | | — | — | 16.8 | | | — | — | 12.1 | | | — | — | 20.3 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 0.2 | U | U | — | — | 0.2 | U | U | — | — | 0.8 | | | — | — | 1 | | | — | — | 0.6 | | | — | — |
| Chromium | 260 | 260 | 270 | 13.1 | | | — | — | 10.6 | | | — | — | 30.5 | | | — | — | 31.5 | | | — | — | 27.7 | | | — | — |
| Copper | 390 | 390 | 390 | 22.4 | | | — | — | 9.8 | | | — | — | 45.8 | | | — | — | 51.1 | | | — | — | 44 | | | — | — |
| Lead | 450 | 450 | 530 | 7 | | | — | — | 3 | | | — | — | 38 | | | — | — | 50 | | | — | — | 23 | | | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.03 | U | U | — | — | 0.03 | U | U | — | — | 0.12 | | | — | — | 0.12 | | | — | — | 0.15 | | | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.4 | U | U | — | — | 0.3 | U | U | — | — | 0.5 | U | U | — | — | 0.5 | U | U | — | — | 0.5 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 219 | | | — | — | 71 | | | — | — | 118 | | | — | — | 119 | | | — | — | 110 | | | — | — |
| **Nonionizable Organic Compounds** | mg/kg OC | µg/kg dw | mg/kg OC | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | | µg/kg dw | | | mg/kg OC | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 185 | J | | 6.73 | J | 19 | U | | — | — | 427 | J | | 28.66 | J | 185 | J | | 8.26 | J | 102 | J | | 5.10 | J |
| Naphthalene | 99 | 2,100 | 170 | 59 | | | 2.15 | | 19 | U | U | — | — | 15 | J | J1 | 1.01 | J | 20 | U | U | 0.89 | U | 19 | U | U | 0.95 | U |
| Acenaphthylene | 66 | 1,300 | 66 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 20 | U | U | 1.34 | U | 20 | U | U | 0.89 | U | 19 | U | U | 0.95 | U |
| Acenaphthene | 16 | 500 | 57 | 93 | | | 3.38 | | 19 | U | U | — | — | 24 | | | 1.61 | | 13 | J | J1 | 0.58 | J | 14 | J | J1 | 0.70 | J |
| Fluorene | 23 | 540 | 79 | 16 | J | J1 | 0.58 | J | 19 | U | U | — | — | 29 | | | 1.95 | | 14 | J | J1 | 0.63 | J | 10 | J | J1 | 0.50 | J |
| Phenanthrene | 100 | 1,500 | 480 | 17 | J | J1 | 0.62 | J | 19 | U | U | — | — | 300 | | | 20.13 | | 130 | | | 5.80 | | 62 | | | 3.10 | |
| Anthracene | 220 | 960 | 1,200 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 59 | | | 3.96 | | 28 | | | 1.25 | | 16 | J | J1 | 0.80 | J |
| 2-Methylnaphthalene | 38 | 670 | 64 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 11 | J | J1 | 0.74 | J | 20 | U | U | 0.89 | U | 19 | U | U | 0.95 | U |
| *Total HPAH* | 960 | 12,000 | 5,300 | 33 | J | | 1.20 | J | 19 | U | | — | — | 3,181 | J | | 213.49 | J | 1,158 | J | | 51.70 | J | 482 | J | | 24.10 | J |
| Fluoranthene | 160 | 1,700 | 1,200 | 17 | J | J1 | 0.62 | J | 19 | U | U | — | — | 560 | | | 37.58 | | 210 | | | 9.38 | | 100 | | | 5.00 | |
| Pyrene | 1,000 | 2,600 | 1,400 | 16 | J | J1 | 0.58 | J | 19 | U | U | — | — | 670 | | | 44.97 | | 250 | | | 11.16 | | 120 | | | 6.00 | |
| Benz[a]anthracene | 110 | 1,300 | 270 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 250 | | | 16.78 | | 91 | | | 4.06 | | 43 | | | 2.15 | |
| Chrysene | 110 | 1,400 | 460 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 350 | | | 23.49 | | 130 | | | 5.80 | | 56 | | | 2.80 | |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 580 | | | 38.93 | | 210 | | | 9.38 | | 70 | | | 3.50 | |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 310 | | | 20.81 | | 110 | | | 4.91 | | 38 | | | 1.90 | |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 180 | | | 12.08 | | 62 | | | 2.77 | | 22 | | | 1.10 | |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 4.7 | U | U | 0.17 | U | 3.4 | U | U | — | — | 81 | Q | J | 5.44 | Q | 29 | Q | J | 1.29 | Q | 10 | Q | J | 0.50 | Q |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 200 | | | 13.42 | | 66 | | | 2.95 | | 23 | | | 1.15 | |
| cPAH (µg TEQ/kg dw) | — | — | — | 13.385 | | | | | 13.125 | | | — | — | 446.9 | | | | | 159.2 | | | | | 56.06 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.7 | U | U | 0.17 | U | 3.4 | U | U | — | — | 4.9 | U | U | 0.33 | U | 4.9 | U | U | 0.22 | U | 4.8 | U | U | 0.24 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.7 | U | U | 0.17 | U | 3.4 | U | U | — | — | 4.9 | U | U | 0.33 | U | 4.9 | U | U | 0.22 | U | 4.8 | U | U | 0.24 | U |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.7 | U | U | 0.17 | U | 3.4 | U | U | — | — | 4.9 | U | U | 0.33 | U | 4.9 | U | U | 0.22 | U | 4.8 | U | U | 0.24 | U |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.7 | U | U | 0.17 | U | 3.4 | U | U | — | — | 4.9 | U | U | 0.33 | U | 4.9 | U | U | 0.22 | U | 4.8 | U | U | 0.24 | U |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 4.7 | U | U | 0.17 | U | 3.4 | U | U | — | — | 31 | | | 2.08 | | 7.6 | | | 0.34 | | 4.8 | U | U | 0.24 | U |
| Diethyl phthalate | 61 | 200 | 110 | 47 | U | U | 1.71 | U | 48 | U | U | — | — | 49 | U | U | 3.29 | U | 49 | U | U | 2.19 | U | 38 | J | J1 | 1.90 | J |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 740 | | | 49.66 | | 20 | U | U | 0.89 | U | 19 | U | U | 0.95 | U |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 4.7 | U | U | 0.17 | U | 3.4 | U | U | — | — | 34 | | | 2.28 | | 14 | | | 0.63 | | 8.3 | | | 0.42 | |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 17 | J | J1 | 0.62 | J | 24 | U | U | — | — | 430 | B | | 28.86 | B | 130 | B | U | 5.80 | B | 43 | B | U | 2.15 | B |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 20 | U | U | 1.34 | U | 20 | U | U | 0.89 | U | 19 | U | U | 0.95 | U |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 19 | U | U | 0.69 | U | 19 | U | U | — | — | 14 | J | J1 | 0.94 | J | 20 | U | U | 0.89 | U | 19 | U | U | 0.95 | U |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.7 | U | U | 0.17 | U | 3.4 | U | U | — | — | 4.9 | U | U | 0.33 | U | 4.9 | U | U | 0.22 | U | 4.8 | U | U | 0.24 | U |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.7 | U | U | 0.17 | U | 3.4 | U | U | — | — | 4.9 | U | U | 0.33 | U | 4.9 | U | U | 0.22 | U | 4.8 | U | U | 0.24 | U |
| Carbazole | — | — | — | 19 | U | U | | | 19 | U | U | — | — | 42 | | | | | 17 | J | J1 | | | 19 | U | U | | |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 22 | | | 0.80 | | 20 | U | U | — | — | 369 | | | 24.77 | | 189 | | | 8.44 | | 211 | | | 10.55 | |
| **Ionizable Organic Compounds** | µg/kg dw | µg/kg dw | µg/kg dw | µg/kg dw | | | | | µg/kg dw | | | | | µg/kg dw | | | | | µg/kg dw | | | | | µg/kg dw | | | | |
| Phenol | 420 | 420 | 1,200 | 15 | J | J1 | — | — | 19 | U | U | — | — | 34 | Q | J | — | — | 19 | J | J, J1 | — | — | 19 | U | UJ | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.7 | U | U | — | — | 3.4 | U | U | — | — | 4.9 | U | U | — | — | 4.9 | U | U | — | — | 4.8 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 38 | U | U | — | — | 38 | U | U | — | — | 11 | J | J1 | — | — | 39 | U | U | — | — | 38 | U | U | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 2.4 | J | J1 | — | — | 3.4 | U | U | — | — | 4.9 | U | UJ | — | — | 4.9 | U | UJ | — | — | 4.8 | U | UJ | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 24 | U | UJ | — | — | 17 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 9.5 | | | — | — | 6.8 | | | — | — | 19 | B | U | — | — | 14 | B | U | — | — | 4.4 | J | UJ | — | — |
| Benzoic acid | 650 | 650 | 650 | 380 | U | U | — | — | 380 | U | U | — | — | 390 | U | U | — | — | 390 | U | U | — | — | 380 | U | U | — | — |

**TABLE 44**

**RESULTS FROM RI SEDIMENT CORE SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Analyte | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | SD-505-0080 8 to 9 ft | | | | | SD-516-0020 2 to 3 ft | | | | | SD-516-0040 4 to 5 ft | | | | | SD-516-0060 6 to 7 ft | | | | | SD-516-0080 8 to 9 ft | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SCO [1] | LAET [2] | CSL [3] | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 0.972 | | | — | — | 1.98 | | | — | — | 1.97 | | | — | — | 2.07 | | | — | — | 1.36 | | | — | — |
| Total Solids (Percent) | — | — | — | 75.4 | | | — | — | 55.4 | | | — | — | 56.6 | | | — | — | 58.2 | | | — | — | 70.9 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | 21 | | | — | — | 14.9 | | | — | — | 11.9 | | | — | — | 30.2 | | | — | — | 24.1 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 0.4 | | | — | — | 0.9 | | | — | — | 0.9 | | | — | — | 1.2 | | J | — | — | 0.6 | | | — | — |
| Chromium | 260 | 260 | 270 | 18 | | | — | — | 29.4 | | | — | — | 27.9 | | | — | — | 33.4 | | | — | — | 21.9 | | | — | — |
| Copper | 390 | 390 | 390 | 21 | | | — | — | 47.6 | | | — | — | 48.4 | | | — | — | 53.5 | | | — | — | 29.6 | | | — | — |
| Lead | 450 | 450 | 530 | 13 | | | — | — | 37 | | | — | — | 40 | | | — | — | 57 | | J | — | — | 19 | | | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.06 | | | — | — | 0.14 | | | — | — | 0.13 | | | — | — | 0.2 | | | — | — | 0.08 | | | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.4 | U | U | — | — | 0.5 | U | U | — | — | 0.5 | U | U | — | — | 0.8 | | | — | — | 0.4 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 102 | | | — | — | 114 | | | — | — | 112 | | | — | — | 141 | | | — | — | 102 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 67 | J | | 6.89 | J | 1,866 | J | | 94.24 | J | 148 | J | | 7.51 | J | 412 | J | | 19.90 | J | 23 | | | 1.69 | |
| Naphthalene | 99 | 2,100 | 170 | 19 | | | 1.95 | | 56 | | | 2.83 | | 20 | U | U | 1.02 | U | 15 | J | J1 | 0.72 | J | 20 | U | U | 1.47 | U |
| Acenaphthylene | 66 | 1,300 | 66 | 18 | U | U | 1.85 | U | 10 | J | J1 | 0.51 | J | 20 | U | U | 1.02 | U | 19 | U | U | 0.92 | U | 20 | U | U | 1.47 | U |
| Acenaphthene | 16 | 500 | 57 | 18 | U | U | 1.85 | U | 180 | | | 9.09 | | 12 | J | J1 | 0.61 | J | 38 | | | 1.84 | | 20 | U | U | 1.47 | U |
| Fluorene | 23 | 540 | 79 | 10 | J | J1 | 1.03 | J | 180 | | | 9.09 | | 14 | J | J1 | 0.71 | J | 39 | | | 1.88 | | 20 | U | U | 1.47 | U |
| Phenanthrene | 100 | 1,500 | 480 | 38 | | | 3.91 | | 1,200 | | | 60.61 | | 100 | | | 5.08 | | 260 | | | 12.56 | | 23 | | | 1.69 | |
| Anthracene | 220 | 960 | 1,200 | 18 | U | U | 1.85 | U | 240 | | | 12.12 | | 22 | | | 1.12 | | 60 | | | 2.90 | | 20 | U | U | 1.47 | U |
| 2-Methylnaphthalene | 38 | 670 | 64 | 11 | J | J1 | 1.13 | J | 30 | | | 1.52 | | 20 | U | U | 1.02 | U | 10 | J | J1 | 0.48 | J | 20 | U | U | 1.47 | U |
| *Total HPAH* | 960 | 12,000 | 5,300 | 241.1 | J | | 24.80 | J | 6,500 | J | | 328.28 | J | 856 | J | | 43.45 | J | 2,034 | J | | 98.26 | J | 210 | J | | 15.44 | J |
| Fluoranthene | 160 | 1,700 | 1,200 | 52 | | | 5.35 | | 1,300 | | | 65.66 | | 160 | | | 8.12 | | 440 | | | 21.26 | | 38 | | | 2.79 | |
| Pyrene | 1,000 | 2,600 | 1,400 | 64 | | | 6.58 | | 1,400 | | | 70.71 | | 210 | | | 10.66 | | 470 | | | 22.71 | | 49 | | | 3.60 | |
| Benz[a]anthracene | 110 | 1,300 | 270 | 18 | | | 1.85 | | 570 | | | 28.79 | | 70 | | | 3.55 | | 180 | | | 8.70 | | 16 | J | J1 | 1.18 | J |
| Chrysene | 110 | 1,400 | 460 | 26 | | | 2.67 | | 740 | | | 37.37 | | 94 | | | 4.77 | | 240 | | | 11.59 | | 22 | | | 1.62 | |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 35 | | | 3.60 | | 1,000 | | | 50.51 | | 140 | | | 7.11 | | 300 | | | 14.49 | | 39 | | | 2.87 | |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 19 | | | 1.95 | | 640 | | | 32.32 | | 75 | | | 3.81 | | 170 | | | 8.21 | | 18 | J | J1 | 1.32 | J |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 10 | J | J1 | 1.03 | J | 340 | | | 17.17 | | 43 | | | 2.18 | | 93 | | | 4.49 | | 9.8 | J | J1 | 0.72 | J |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 5.1 | Q | J | 0.52 | Q | 160 | Q | J | 8.08 | Q | 20 | Q | J | 1.02 | Q | 42 | Q | J | 2.03 | Q | 5.2 | Q | J | 0.38 | Q |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 12 | J | J1 | 1.23 | J | 350 | | | 17.68 | | 44 | | | 2.23 | | 99 | | | 4.78 | | 13 | J | J1 | 0.96 | J |
| cPAH (µg TEQ/kg dw) | — | — | — | 27.6 | | | | | 902.4 | | | | | 109.24 | | | | | 246.5 | | | | | 26.78 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.6 | U | U | 0.47 | U | 4.7 | U | U | 0.24 | U | 4.9 | U | U | 0.25 | U | 3.4 | J | J1 | 0.16 | J | 4.9 | U | U | 0.36 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.6 | U | U | 0.47 | U | 3.4 | J | J1 | 0.17 | J | 4.9 | U | U | 0.25 | U | 4 | J | J1 | 0.19 | J | 4.9 | U | U | 0.36 | U |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.6 | U | U | 0.47 | U | 4.7 | U | U | 0.24 | U | 4.9 | U | U | 0.25 | U | 4.8 | U | U | 0.23 | U | 4.9 | U | U | 0.36 | U |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.6 | U | U | *0.47* | U | 4.7 | U | U | 0.24 | U | 4.9 | U | U | 0.25 | U | 4.8 | U | U | 0.23 | U | 4.9 | U | U | 0.36 | U |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 4.6 | U | U | 0.47 | U | 14 | | | 0.71 | | 5.4 | | | 0.27 | | 7.6 | | | 0.37 | | 4.9 | U | U | 0.36 | U |
| Diethyl phthalate | 61 | 200 | 110 | 46 | U | U | 4.73 | U | 47 | U | U | 2.37 | U | 49 | U | U | 2.49 | U | 48 | U | U | 2.32 | U | 49 | U | U | 3.60 | U |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 18 | U | U | 1.85 | U | 18 | J | J1 | 0.91 | J | 20 | U | U | 1.02 | U | 19 | U | U | 0.92 | U | 20 | U | U | 1.47 | U |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 3.4 | J | J1 | 0.35 | J | 30 | | | 1.52 | | 12 | | | 0.61 | | 30 | | | 1.45 | | 7.7 | | | 0.57 | |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 26 | B | U | 2.67 | B | 660 | B | | 33.33 | B | 160 | B | U | 8.12 | B | 200 | B | | 9.66 | B | 64 | B | U | 4.71 | B |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 18 | U | U | 1.85 | U | 19 | U | U | 0.96 | U | 20 | U | U | 1.02 | U | 19 | U | U | 0.92 | U | 20 | U | U | 1.47 | U |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 18 | U | U | 1.85 | U | 80 | | | 4.04 | | 20 | U | U | 1.02 | U | 17 | J | J1 | 0.82 | J | 20 | U | U | 1.47 | U |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.6 | U | U | 0.47 | U | 4.7 | U | U | 0.24 | U | 4.9 | U | U | 0.25 | U | 4.8 | U | U | 0.23 | U | 4.9 | U | U | 0.36 | U |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.6 | U | U | 0.47 | U | 4.7 | U | U | 0.24 | U | 4.9 | U | U | 0.25 | U | 4.8 | U | U | 0.23 | U | 4.9 | U | U | 0.36 | U |
| Carbazole | — | — | — | 18 | U | U | | | 150 | | | | | 13 | J | J1 | | | 28 | | | | | 20 | U | U | | |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 224 | | | 23.05 | | 324 | | | 16.36 | | 279 | | | 14.16 | | 480 | | | 23.19 | | 566 | | | 41.62 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 18 | U | UJ | — | — | 22 | Q | J | — | — | 20 | U | UJ | — | — | 12 | J | J, J1 | — | — | 20 | U | UJ | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.6 | U | U | — | — | 3.4 | J | J1 | — | — | 4.9 | U | U | — | — | 3 | J | J1 | — | — | 4.9 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 37 | U | U | — | — | 38 | U | U | — | — | 39 | U | U | — | — | 13 | J | J1 | — | — | 39 | U | U | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 4.6 | U | UJ | — | — | 2.9 | J | J, J1 | — | — | 4.9 | U | UJ | — | — | 2.6 | J | J, J1 | — | — | 4.9 | U | UJ | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 23 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 6.1 | B | U | — | — | 37 | B | U | — | — | 6 | B | U | — | — | 5.2 | B | U | — | — | 6.5 | B | U | — | — |
| Benzoic acid | 650 | 650 | 650 | 370 | U | U | — | — | 380 | U | U | — | — | 390 | U | U | — | — | 380 | U | U | — | — | 390 | U | U | — | — |

## TABLE 44

## RESULTS FROM RI SEDIMENT CORE SAMPLES
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | SD-516-0100 | | | | | SD-506-0020 | | | | | SD-506-0040 | | | | | SD-507-0020 | | | | | SD-507-0040 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 10 to 11 ft | | | | | 2 to 3 ft | | | | | 4 to 5 ft | | | | | 2 to 3 ft | | | | | 4 to 5 ft | | | | |
| Analyte | SCO [1] | LAET [2] | CSL [3] | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 1.87 | | | — | — | 1.41 | | | — | — | 0.173 | | | — | — | 1.85 | | | — | — | 2.44 | | | — | — |
| Total Solids (Percent) | — | — | — | 71.4 | | | — | — | 64.2 | | | — | — | 84.7 | | | — | — | 61.7 | | | — | — | 55.7 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | — | — | | — | — | **270** | | | — | — | 28.7 | | | — | — | 29.4 | | | — | — | 26.1 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | — | — | | — | — | 0.8 | | | — | — | 0.2 | U | U | — | — | 1.3 | | | — | — | 1.7 | | | — | — |
| Chromium | 260 | 260 | 270 | — | — | | — | — | 31.2 | | | — | — | 10 | | | — | — | 39.2 | | | — | — | 40.4 | | | — | — |
| Copper | 390 | 390 | 390 | — | — | | — | — | 45.3 | | | — | — | 7.7 | | | — | — | 62.4 | | | — | — | 67.3 | | | — | — |
| Lead | 450 | 450 | 530 | — | — | | — | — | 19 | | | — | — | 2 | U | U | — | — | 63 | | | — | — | 71 | | | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | — | — | | — | — | 0.2 | | | — | — | 0.02 | U | U | — | — | 0.34 | | | — | — | 0.16 | | | — | — |
| Silver | 6.1 | 6.1 | 6.1 | — | — | | — | — | 0.5 | U | U | — | — | 0.3 | U | U | — | — | 0.9 | | | — | — | 1.5 | | | — | — |
| Zinc | 410 | 410 | 960 | — | — | | — | — | 129 | | | — | — | 31 | | | — | — | 152 | | | — | — | 155 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | — | — | | — | — | 882 | J | | 62.55 | J | 43 | | | — | — | 803 | | | 43.41 | | 3,906 | J | | 160.08 | J |
| Naphthalene | 99 | 2,100 | 170 | — | — | | — | — | 48 | | | 3.40 | | 19 | U | U | — | — | 54 | | | 2.92 | | 140 | | | 5.74 | |
| Acenaphthylene | 66 | 1,300 | 66 | — | — | | — | — | 14 | J | J1 | 0.99 | J | 19 | U | U | — | — | 21 | | | 1.14 | | 16 | J | J1 | 0.66 | J |
| Acenaphthene | 16 | 500 | 57 | — | — | | — | — | 700 | | | 49.65 | | 43 | | | — | — | 40 | | | 2.16 | | 390 | | | 15.98 | |
| Fluorene | 23 | 540 | 79 | — | — | | — | — | 16 | J | J1 | 1.13 | J | 19 | U | U | — | — | 52 | | | 2.81 | | 360 | | | 14.75 | |
| Phenanthrene | 100 | 1,500 | 480 | — | — | | — | — | 82 | | | 5.82 | | 19 | U | U | — | — | 550 | | | 29.73 | | 2,600 | | | 106.56 | |
| Anthracene | 220 | 960 | 1,200 | — | — | | — | — | 22 | | | 1.56 | | 19 | U | U | — | — | 86 | | | 4.65 | | 400 | | | 16.39 | |
| 2-Methylnaphthalene | 38 | 670 | 64 | — | — | | — | — | 43 | | | 3.05 | | 19 | U | U | — | — | 31 | | | 1.68 | | 76 | | | 3.11 | |
| *Total HPAH* | 960 | 12,000 | 5,300 | — | — | | — | — | 268.2 | J | | 19.02 | J | 11 | J | | — | — | 4,600 | | | 248.65 | | 11,670 | | | 478.28 | |
| Fluoranthene | 160 | 1,700 | 1,200 | — | — | | — | — | 75 | | | 5.32 | | 11 | J | J1 | — | — | 860 | | | 46.49 | | 2,600 | | | 106.56 | |
| Pyrene | 1,000 | 2,600 | 1,400 | — | — | | — | — | 74 | | | 5.25 | | 19 | U | U | — | — | 1100 | | | 59.46 | | 2,600 | | | 106.56 | |
| Benz[a]anthracene | 110 | 1,300 | 270 | — | — | | — | — | 22 | | | 1.56 | | 19 | U | U | — | — | 310 | | | 16.76 | | 1,000 | | | 40.98 | |
| Chrysene | 110 | 1,400 | 460 | — | — | | — | — | 38 | | | 2.70 | | 19 | U | U | — | — | 480 | | | 25.95 | | 1,400 | | | 57.38 | |
| Total benzofluoranthenes | 230 | 3,200 | 450 | — | — | | — | — | 39 | | | 2.77 | | 19 | U | U | — | — | 850 | | | 45.95 | | 1,700 | | | 69.67 | |
| Benzo[a]pyrene | 99 | 1,600 | 210 | — | — | | — | — | 17 | J | J1 | 1.21 | J | 19 | U | U | — | — | 410 | | | 22.16 | | 1,100 | | | 45.08 | |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | — | — | | — | — | 20 | U | U | 1.42 | U | 19 | U | U | — | — | 240 | | | 12.97 | | 520 | | | 21.31 | |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | — | — | | — | — | 3.2 | J | J1 | 0.23 | J | 4.8 | U | U | — | — | 110 | | | 5.95 | | 250 | | | 10.25 | |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | — | — | | — | — | 20 | U | U | 1.42 | U | 19 | U | U | — | — | 240 | | | 12.97 | | 500 | | | 20.49 | |
| cPAH (µg TEQ/kg dw) | — | — | — | — | — | | | | 25.76 | | | | | 13.405 | | | — | — | 598.8 | | | | | 1,536 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | — | — | | — | — | 2.7 | J | J1 | 0.19 | J | 4.8 | U | U | — | — | 8.4 | | | 0.45 | | 8.6 | | | 0.35 | |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | — | — | | — | — | 2.9 | J | J1 | 0.21 | J | 4.8 | U | U | — | — | 12 | | | 0.65 | | 8.8 | | | 0.36 | |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | — | — | | — | — | 4.9 | U | U | 0.35 | U | 4.8 | U | U | — | — | 2.8 | J | J1 | 0.15 | J | 4.8 | U | U | 0.20 | U |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | — | — | | — | — | 4.9 | U | U | 0.35 | U | 4.8 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.8 | U | U | 0.20 | U |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | — | — | | — | — | 7.3 | | | 0.52 | | 4.8 | U | U | — | — | 32 | | | 1.73 | | 28 | | | 1.15 | |
| Diethyl phthalate | 61 | 200 | 110 | — | — | | — | — | 49 | U | U | 3.48 | U | 48 | U | U | — | — | 49 | U | U | 2.65 | U | 48 | U | U | 1.97 | U |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | — | — | | — | — | 20 | U | U | 1.42 | U | 19 | U | U | — | — | 44 | | | 2.38 | | 19 | U | U | 0.78 | U |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | — | — | | — | — | 24 | | | 1.70 | | 4.8 | U | U | — | — | 370 | | | 20.00 | | 32 | | | 1.31 | |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | — | — | | — | — | 18 | J | J1 | 1.28 | J | 24 | U | U | — | — | 9,500 | B | B | **513.51** | B | 400 | B | B | 16.39 | B |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | — | — | | — | — | 20 | U | U | 1.42 | U | 19 | U | U | — | — | 20 | U | U | 1.08 | U | 19 | U | U | 0.78 | U |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | — | — | | — | — | 25 | | | 1.77 | | 19 | U | U | — | — | 45 | | | 2.43 | | 180 | | | 7.38 | |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | — | — | | — | — | 4.9 | U | U | 0.35 | U | 4.8 | U | U | — | — | 4.9 | U | UJ | 0.26 | U | 4.8 | U | UJ | 0.20 | U |
| N-nitrosodiphenylamine | 11 | 28 | 11 | — | — | | — | — | 4.9 | U | U | 0.35 | U | 4.8 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.8 | U | U | 0.20 | U |
| Carbazole | — | — | — | — | — | | — | — | 20 | U | U | | | 19 | U | U | — | — | 98 | | | | | 320 | | | | |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 204 | | | 10.91 | | 141 | | | 10.00 | | 19 | U | U | — | — | 2070 | | | **111.89** | | 420 | | | 17.21 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | — | — | | — | — | 23 | | | — | — | 19 | U | U | — | — | 610 | | | — | — | 35 | | | — | — |
| 2-Methylphenol | 63 | 63 | 63 | — | — | | — | — | 4.2 | J | J1 | — | — | 4.8 | U | U | — | — | 10 | | | — | — | 6.4 | | | — | — |
| 4-Methylphenol | 670 | 670 | 670 | — | — | | — | — | 68 | | | — | — | 38 | U | U | — | — | 25 | J | J1 | — | — | 26 | J | J1 | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | — | — | | — | — | 6.3 | | | — | — | 4.8 | U | U | — | — | 9.1 | | | — | — | 6.8 | | | — | — |
| Pentachlorophenol | 360 | 360 | 690 | — | — | | — | — | 25 | U | UJ | — | — | 24 | U | U | — | — | 25 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 57 | 57 | 73 | — | — | | — | — | 45 | | | — | — | 10 | | J | — | — | 45 | Q | J | — | — | 41 | Q | J | — | — |
| Benzoic acid | 650 | 650 | 650 | — | — | | — | — | 140 | J | J1 | — | — | 380 | U | U | — | — | 110 | J | J1 | — | — | 380 | U | U | — | — |

**TABLE 44**

**RESULTS FROM RI SEDIMENT CORE SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | SD-507-0060 6 to 7 ft | | | | | SD-507-0080 8 to 9 ft | | | | | SD-507-0100 10 to 11 ft | | | | | SD-508-0020 2 to 3 ft | | | | | SD-508-0040 4 to 5 ft | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Analyte** | **SCO [1]** | **LAET [2]** | **CSL [3]** | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 1.78 | | | — | — | 2.02 | | | — | — | 1.71 | | | — | — | 2.45 | | | — | — | 0.498 | | | — | — |
| Total Solids (Percent) | — | — | — | 62.6 | | | — | — | 71.5 | | | — | — | 80.4 | | | — | — | 60.9 | | | — | — | 84.2 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | 35.6 | | | — | — | 20.5 | | | — | — | — | — | | — | — | **248** | | | — | — | 3.4 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 1.3 | | | — | — | 1 | | | — | — | — | — | | — | — | 2.9 | | | — | — | 0.2 | U | U | — | — |
| Chromium | 260 | 260 | 270 | 35.3 | | | — | — | 28.2 | | | — | — | — | — | | — | — | 51.5 | | | — | — | 10.4 | | | — | — |
| Copper | 390 | 390 | 390 | 55.8 | | | — | — | 34.3 | | | — | — | — | — | | — | — | 67.1 | | | — | — | 9.8 | | | — | — |
| Lead | 450 | 450 | 530 | 70 | | | — | — | 43 | | | — | — | — | — | | — | — | 100 | | | — | — | 2 | U | U | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.15 | | | — | — | 0.1 | | J | — | — | — | — | | — | — | 0.31 | | | — | — | 0.02 | U | U | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 1 | | | — | — | 0.4 | U | U | — | — | — | — | | — | — | 0.5 | U | U | — | — | 0.3 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 147 | | | — | — | 117 | | | — | — | — | — | | — | — | **1790** | | | — | — | 23 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 972 | J | | 54.61 | J | 375 | | | 18.56 | | — | — | | — | — | 611 | | | 24.94 | | 19 | U | | — | — |
| Naphthalene | 99 | 2,100 | 170 | 38 | | | 2.13 | | 31 | | | 1.53 | | — | — | | — | — | 190 | | | 7.76 | | 19 | U | U | — | — |
| Acenaphthylene | 66 | 1,300 | 66 | 10 | J | J1 | 0.56 | J | 20 | U | U | 0.99 | U | — | — | | — | — | 19 | U | U | 0.78 | U | 19 | U | U | — | — |
| Acenaphthene | 16 | 500 | 57 | 75 | | | 4.21 | | 31 | | | 1.53 | | — | — | | — | — | 100 | | | 4.08 | | 19 | U | U | — | — |
| Fluorene | 23 | 540 | 79 | 79 | | | 4.44 | | 33 | | | 1.63 | | — | — | | — | — | 81 | | | 3.31 | | 19 | U | U | — | — |
| Phenanthrene | 100 | 1,500 | 480 | 630 | | | 35.39 | | 220 | | | 10.89 | | — | — | | — | — | 140 | | | 5.71 | | 19 | U | U | — | — |
| Anthracene | 220 | 960 | 1,200 | 140 | | | 7.87 | | 60 | | | 2.97 | | — | — | | — | — | 100 | | | 4.08 | | 19 | U | U | — | — |
| 2-Methylnaphthalene | 38 | 670 | 64 | 25 | | | 1.40 | | 32 | | | 1.58 | | — | — | | — | — | 60 | | | 2.45 | | 19 | U | U | — | — |
| *Total HPAH* | 960 | 12,000 | 5,300 | 3,755 | | | 210.96 | | 1,296 | | | 64.16 | | — | — | | — | — | 1,868 | | | 76.24 | | 19 | U | | — | — |
| Fluoranthene | 160 | 1,700 | 1,200 | 920 | | | 51.69 | | 260 | | | 12.87 | | — | — | | — | — | 440 | | | 17.96 | | 19 | U | U | — | — |
| Pyrene | 1,000 | 2,600 | 1,400 | 790 | | | 44.38 | | 310 | | | 15.35 | | — | — | | — | — | 400 | | | 16.33 | | 19 | U | U | — | — |
| Benz[a]anthracene | 110 | 1,300 | 270 | 340 | | | 19.10 | | 120 | | | 5.94 | | — | — | | — | — | 110 | | | 4.49 | | 19 | U | U | — | — |
| Chrysene | 110 | 1,400 | 460 | 430 | | | 24.16 | | 160 | | | 7.92 | | — | — | | — | — | 290 | | | 11.84 | | 19 | U | U | — | — |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 570 | | | 32.02 | | 200 | | | 9.90 | | — | — | | — | — | 290 | | | 11.84 | | 19 | U | U | — | — |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 330 | | | 18.54 | | 120 | | | 5.94 | | — | — | | — | — | 170 | | | 6.94 | | 19 | U | U | — | — |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 150 | | | 8.43 | | 52 | | | 2.57 | | — | — | | — | — | 73 | | | 2.98 | | 19 | U | U | — | — |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 65 | | | 3.65 | | 22 | | | 1.09 | | — | — | | — | — | 23 | | | 0.94 | | 4.7 | U | U | — | — |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 160 | | | 8.99 | | 52 | | | 2.57 | | — | — | | — | — | 72 | | | 2.94 | | 19 | U | U | — | — |
| cPAH (µg TEQ/kg dw) | — | — | — | 466.3 | | | | | 167.6 | | | | | | | | | | 229.4 | | | | | 13.385 | | | — | — |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.9 | | | 0.28 | | 5.2 | | | 0.26 | | — | — | | — | — | 140 | | | **5.71** | | 4.7 | U | U | — | — |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.1 | J | J1 | 0.23 | J | 6.9 | | | 0.34 | | — | — | | — | — | 77 | | | 3.14 | | 4.7 | U | U | — | — |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.7 | U | U | 0.26 | U | 5 | U | U | 0.25 | U | — | — | | — | — | 4.7 | U | U | 0.19 | U | 4.7 | U | U | — | — |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.7 | U | U | 0.26 | U | 5 | U | U | 0.25 | U | — | — | | — | — | 4.7 | U | U | 0.19 | U | 4.7 | U | U | — | — |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 22 | | | 1.24 | | 14 | | | 0.69 | | — | — | | — | — | 4.7 | U | U | 0.19 | U | 4.7 | U | U | — | — |
| Diethyl phthalate | 61 | 200 | 110 | 47 | U | U | 2.64 | U | 50 | U | U | 2.48 | U | — | — | | — | — | 95 | | | 3.88 | | 47 | U | U | — | — |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 19 | U | U | 1.07 | U | 20 | U | U | 0.99 | U | — | — | | — | — | 19 | U | U | 0.78 | U | 19 | U | U | — | — |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 32 | | | 1.80 | | 36 | | | 1.78 | | — | — | | — | — | 13 | | | 0.53 | | 4.7 | U | U | — | — |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 420 | B | B | 23.60 | B | 460 | B | B | 22.77 | B | — | — | | — | — | 80 | | | 3.27 | | 39 | | | — | — |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 20 | | | 1.12 | | 20 | U | U | 0.99 | U | — | — | | — | — | 19 | U | U | 0.78 | U | 19 | U | U | — | — |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 45 | | | 2.53 | | 23 | | | 1.14 | | — | — | | — | — | 85 | | | 3.47 | | 19 | U | U | — | — |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.7 | U | UJ | 0.26 | U | 5 | U | UJ | 0.25 | U | — | — | | — | — | 4.7 | U | U | 0.19 | U | 4.7 | U | U | — | — |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.7 | U | U | 0.26 | U | 5 | U | U | 0.25 | U | — | — | | — | — | 4.7 | U | U | 0.19 | U | 4.7 | U | U | — | — |
| Carbazole | — | — | — | 110 | | | | | 28 | | | | | — | — | | | | 19 | U | U | | | 19 | U | U | — | — |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 415 | | | 23.31 | | 481 | | | 23.81 | | 341 | | | 19.94 | | 1010 | | | 41.22 | | 19 | U | U | — | — |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 22 | | | — | — | 34 | | | — | — | — | — | | — | — | 35 | | | — | — | 19 | U | U | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.5 | J | J1 | — | — | 5 | U | U | — | — | — | — | | — | — | 19 | | | — | — | 4.7 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 54 | | | — | — | 23 | J | J1 | — | — | — | — | | — | — | 120 | | | — | — | 37 | U | U | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 5 | | | — | — | 8.5 | | | — | — | — | — | | — | — | 20 | | | — | — | 4.7 | U | U | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 24 | U | UJ | — | — | 25 | U | UJ | — | — | — | — | | — | — | 14 | QJ | J1 | — | — | 23 | U | U | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 26 | Q | J | — | — | 25 | Q | J | — | — | — | — | | — | — | **76** | | J | — | — | 7.8 | | J | — | — |
| Benzoic acid | 650 | 650 | 650 | 380 | U | U | — | — | 400 | U | U | — | — | — | — | | — | — | 140 | J | J1 | — | — | 370 | U | U | — | — |

## TABLE 44

### RESULTS FROM RI SEDIMENT CORE SAMPLES
### BOEING ISAACSON-THOMPSON SITE
### TUKWILA, WASHINGTON

| Analyte | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | SD-508-0060 6 to 7 ft | | | | | SD-508-0080 8 to 9 ft | | | | | SD-509-0020 2 to 3 ft | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SCO [1] | LAET [2] | CSL [3] | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 0.192 | | | — | — | 1.85 | | | — | — | 0.965 | | | — | — |
| Total Solids (Percent) | — | — | — | 84.1 | | | — | — | 80.2 | | | — | — | 60.5 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | 2.3 | | | — | — | 3.5 | | | — | — | 10.9 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 0.2 | U | U | — | — | 0.2 | U | U | — | — | 0.6 | | | — | — |
| Chromium | 260 | 260 | 270 | 11 | | | — | — | 9.9 | | | — | — | 26.4 | | | — | — |
| Copper | 390 | 390 | 390 | 8.6 | | | — | — | 11 | | | — | — | 38.5 | | | — | — |
| Lead | 450 | 450 | 530 | 2 | U | U | — | — | 2 | U | U | — | — | 25 | | | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.02 | U | U | — | — | 0.03 | U | U | — | — | 0.1 | | | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.3 | U | U | — | — | 0.4 | U | U | — | — | 0.5 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 22 | | | — | — | 22 | | | — | — | 91 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 19 | U | | — | — | 20 | U | | 1.08 | U | 95 | J | | 9.84 | J |
| Naphthalene | 99 | 2,100 | 170 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 19 | U | U | 1.97 | U |
| Acenaphthylene | 66 | 1,300 | 66 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 19 | U | U | 1.97 | U |
| Acenaphthene | 16 | 500 | 57 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 19 | U | U | 1.97 | U |
| Fluorene | 23 | 540 | 79 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 19 | U | U | 1.97 | U |
| Phenanthrene | 100 | 1,500 | 480 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 78 | | | 8.08 | |
| Anthracene | 220 | 960 | 1,200 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 17 | J | J1 | 1.76 | J |
| 2-Methylnaphthalene | 38 | 670 | 64 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 19 | U | U | 1.97 | U |
| *Total HPAH* | 960 | 12,000 | 5,300 | 18 | U | | — | — | 20 | U | | 1.08 | U | 1,047 | | | 108.50 | |
| Fluoranthene | 160 | 1,700 | 1,200 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 160 | | | 16.58 | |
| Pyrene | 1,000 | 2,600 | 1,400 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 220 | | | 22.80 | |
| Benz[a]anthracene | 110 | 1,300 | 270 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 74 | | | 7.67 | |
| Chrysene | 110 | 1,400 | 460 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 110 | | | 11.40 | |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 210 | | | 21.76 | |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 110 | | | 11.40 | |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 66 | | | 6.84 | |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 4.6 | U | U | — | — | 4.9 | U | U | 0.26 | U | 30 | | | 3.11 | |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 67 | | | 6.94 | |
| cPAH (µg TEQ/kg dw) | — | — | — | 12.71 | | | — | — | 14.08 | | | | | 158.1 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.6 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.7 | U | U | 0.49 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.6 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.7 | U | U | 0.49 | U |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.6 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.7 | U | U | 0.49 | U |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.6 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.7 | U | U | *0.49* | U |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 4.6 | U | U | — | — | 5.5 | | | 0.30 | | 8.6 | | | 0.89 | |
| Diethyl phthalate | 61 | 200 | 110 | 46 | U | U | — | — | 49 | U | U | 2.65 | U | 47 | U | U | 4.87 | U |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 19 | U | U | 1.97 | U |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 4.6 | U | U | — | — | 4.9 | U | U | 0.26 | U | 20 | | | 2.07 | |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 23 | U | U | — | — | 24 | U | U | 1.30 | U | 130 | B | U | 13.47 | B |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 19 | U | U | 1.97 | U |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 18 | U | U | — | — | 20 | U | U | 1.08 | U | 19 | U | U | 1.97 | U |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.6 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.7 | U | U | 0.49 | U |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.6 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.7 | U | U | 0.49 | U |
| Carbazole | — | — | — | 18 | U | U | — | — | 20 | U | U | | | 11 | J | J1 | | |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 19 | U | U | — | — | 20 | U | U | 1.08 | U | 187 | | | 19.38 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 18 | U | U | — | — | 20 | U | U | — | — | 10 | J | J1 | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.7 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 37 | U | U | — | — | 39 | U | U | — | — | 38 | U | U | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.7 | U | UJ | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 23 | U | U | — | — | 24 | U | U | — | — | 24 | U | U | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 8.5 | | J | — | — | 9.7 | | J | — | — | 18 | BQ | U | — | — |
| Benzoic acid | 650 | 650 | 650 | 370 | U | U | — | — | 390 | U | U | — | — | 380 | U | U | — | — |

| Analyte | SD-509-0040 4 to 5 ft | | | | | SD-509-0060 6 to 7 ft | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | |
| Total Organic Carbon (Percent) | 2.77 | | | — | — | 2.07 | | | — | — |
| Total Solids (Percent) | 57.8 | | | — | — | 58.3 | | | — | — |
| **Metals** | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 22.7 | | | — | — | 32.2 | | | — | — |
| Cadmium | 1 | | | — | — | 1 | | | — | — |
| Chromium | 30.1 | | | — | — | 32 | | | — | — |
| Copper | 51.6 | | | — | — | 51.1 | | | — | — |
| Lead | 43 | | | — | — | 43 | | | — | — |
| Mercury | 0.14 | | | — | — | 0.14 | | | — | — |
| Silver | 0.5 | U | U | — | — | 0.5 | | | — | — |
| Zinc | 176 | | | — | — | 198 | | | — | — |
| **Nonionizable Organic Compounds** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | |
| *Total LPAH* | 88 | J | | 3.18 | J | 310 | J | | 14.98 | J |
| Naphthalene | 20 | U | U | 0.72 | U | 13 | J | J1 | 0.63 | J |
| Acenaphthylene | 20 | U | U | 0.72 | U | 20 | U | U | 0.97 | U |
| Acenaphthene | 20 | U | U | 0.72 | U | 29 | | | 1.40 | |
| Fluorene | 20 | U | U | 0.72 | U | 27 | | | 1.30 | |
| Phenanthrene | 70 | | | 2.53 | | 190 | | | 9.18 | |
| Anthracene | 18 | J | J1 | 0.65 | J | 51 | | | 2.46 | |
| 2-Methylnaphthalene | 20 | U | U | 0.72 | U | 12 | J | J1 | 0.58 | J |
| *Total HPAH* | 791 | | | 28.56 | | 1,839 | | | 88.84 | |
| Fluoranthene | 140 | | | 5.05 | | 400 | | | 19.32 | |
| Pyrene | 200 | | | 7.22 | | 420 | | | 20.29 | |
| Benz[a]anthracene | 57 | | | 2.06 | | 170 | | | 8.21 | |
| Chrysene | 78 | | | 2.82 | | 200 | | | 9.66 | |
| Total benzofluoranthenes | 140 | | | 5.05 | | 280 | | | 13.53 | |
| Benzo[a]pyrene | 76 | | | 2.74 | | 170 | | | 8.21 | |
| Indeno[1,2,3-c,d]pyrene | 38 | | | 1.37 | | 80 | | | 3.86 | |
| Dibenzo[a,h]anthracene | 20 | | | 0.72 | | 40 | | | 1.93 | |
| Benzo[g,h,i]perylene | 42 | | | 1.52 | | 79 | | | 3.82 | |
| cPAH (µg TEQ/kg dw) | 108.28 | | | | | 241 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | |
| 1,2-Dichlorobenzene | 3.2 | J | J1 | 0.12 | J | 3.8 | J | J1 | 0.18 | J |
| 1,4-Dichlorobenzene | 2.7 | J | J1 | 0.10 | J | 2.6 | J | J1 | 0.13 | J |
| 1,2,4-Trichlorobenzene | 4.9 | U | U | 0.18 | U | 4.9 | U | U | 0.24 | U |
| Hexachlorobenzene | 4.9 | U | U | 0.18 | U | 4.9 | U | U | 0.24 | U |
| **Phthalate Esters** | | | | | | | | | | |
| Dimethyl phthalate | 7.8 | | | 0.28 | | 7.4 | | | 0.36 | |
| Diethyl phthalate | 49 | U | U | 1.77 | U | 49 | U | U | 2.37 | U |
| Di-n-butyl phthalate | 20 | U | U | 0.72 | U | 11 | J | J1 | 0.53 | J |
| Butyl benzyl phthalate | 18 | | | 0.65 | | 26 | | | 1.26 | |
| Bis[2-ethylhexyl]phthalate | 160 | B | U | 5.78 | B | 120 | B | U | 5.80 | B |
| Di-n-octyl phthalate | 20 | U | U | 0.72 | U | 20 | U | U | 0.97 | U |
| **Miscellaneous** | | | | | | | | | | |
| Dibenzofuran | 20 | U | U | 0.72 | U | 13 | J | J1 | 0.63 | J |
| Hexachlorobutadiene | 4.9 | U | U | 0.18 | U | 4.9 | U | U | 0.24 | U |
| N-nitrosodiphenylamine | 4.9 | U | U | 0.18 | U | 4.9 | U | U | 0.24 | U |
| Carbazole | 20 | U | U | | | 24 | | | | |
| **Pesticides and PCBs** | | | | | | | | | | |
| Total PCBs | 262 | | | 9.46 | | 330 | | | 15.94 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 20 | U | U | — | — | 20 | U | U | — | — |
| 2-Methylphenol | 4.9 | U | U | — | — | 4.9 | U | U | — | — |
| 4-Methylphenol | 39 | U | U | — | — | 21 | J | J1 | — | — |
| 2,4-Dimethylphenol | 4.9 | U | UJ | — | — | 4.9 | U | UJ | — | — |
| Pentachlorophenol | 24 | U | U | — | — | 24 | U | U | — | — |
| Benzyl alcohol | 18 | BQ | U | — | — | 19 | BQ | U | — | — |
| Benzoic acid | 390 | U | U | — | — | 390 | U | U | — | — |

## TABLE 44

### RESULTS FROM RI SEDIMENT CORE SAMPLES
### BOEING ISAACSON-THOMPSON SITE
### TUKWILA, WASHINGTON

| | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | SD-509-0080 8 to 9 ft | | | | | SD-509-0100 10 to 11 ft | | | | | SD-510-0020 2 to 3 ft | | | | | SD-510-0040 4 to 5 ft | | | | | SD-510-0060 6 to 7 ft | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Analyte** | **SCO [1]** | **LAET [2]** | **CSL [3]** | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 1.45 | | | — | — | 0.5 | | | — | — | 1.31 | | | — | — | 1.91 | | | — | — | 0.191 | | | — | — |
| Total Solids (Percent) | — | — | — | 70.8 | | | — | — | 75.7 | | | — | — | 62.5 | | | — | — | 64.6 | | | — | — | 88.1 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | 18.3 | | | — | — | — | — | | — | — | 10.9 | | | — | — | 278 | | | — | — | 4.5 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 0.7 | | | — | — | — | — | | — | — | 0.8 | | | — | — | 1.7 | | | — | — | 0.2 | U | U | — | — |
| Chromium | 260 | 260 | 270 | 26.5 | | | — | — | — | — | | — | — | 26.8 | | | — | — | 37.8 | | | — | — | 11 | | | — | — |
| Copper | 390 | 390 | 390 | 29.8 | | | — | — | — | — | | — | — | 35.8 | | | — | — | 50.9 | | | — | — | 9.9 | | | — | — |
| Lead | 450 | 450 | 530 | 13 | | | — | — | — | — | | — | — | 31 | | | — | — | 34 | | | — | — | 2 | U | U | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.09 | | | — | — | — | — | | — | — | 0.16 | | | — | — | 0.23 | | | — | — | 0.02 | U | U | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.4 | U | U | — | — | — | — | | — | — | 0.4 | U | U | — | — | 0.4 | U | U | — | — | 0.3 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 127 | | | — | — | — | — | | — | — | 80 | | | — | — | 510 | | | — | — | 24 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 97 | J | | 6.69 | J | — | — | | — | — | 105 | J | | 8.02 | J | 128 | J | | 6.70 | J | 18 | U | | — | — |
| Naphthalene | 99 | 2,100 | 170 | 15 | J | J1 | 1.03 | J | — | — | | — | — | 19 | | | 1.45 | | 22 | | | 1.15 | | 18 | U | U | — | — |
| Acenaphthylene | 66 | 1,300 | 66 | 18 | U | U | 1.24 | U | — | — | | — | — | 19 | U | U | 1.45 | U | 20 | U | U | 1.05 | U | 18 | U | U | — | — |
| Acenaphthene | 16 | 500 | 57 | 18 | U | U | 1.24 | U | — | — | | — | — | 19 | U | U | 1.45 | U | 12 | J | J1 | 0.63 | J | 18 | U | U | — | — |
| Fluorene | 23 | 540 | 79 | 13 | J | J1 | 0.90 | J | — | — | | — | — | 12 | J | J1 | 0.92 | J | 20 | | | 1.05 | | 18 | U | U | — | — |
| Phenanthrene | 100 | 1,500 | 480 | 57 | | | 3.93 | | — | — | | — | — | 57 | | | 4.35 | | 58 | | | 3.04 | | 18 | U | U | — | — |
| Anthracene | 220 | 960 | 1,200 | 12 | J | J1 | 0.83 | J | — | — | | — | — | 17 | J | J1 | 1.30 | J | 16 | J | J1 | 0.84 | J | 18 | U | U | — | — |
| 2-Methylnaphthalene | 38 | 670 | 64 | 18 | | | 1.24 | | — | — | | — | — | 27 | | | 2.06 | | 25 | | | 1.31 | | 18 | U | U | — | — |
| *Total HPAH* | 960 | 12,000 | 5,300 | 313.9 | J | | 21.65 | J | — | — | | — | — | 121 | J | | 9.24 | J | 278.9 | J | | 14.60 | J | 18 | U | | — | — |
| Fluoranthene | 160 | 1,700 | 1,200 | 73 | | | 5.03 | | — | — | | — | — | 32 | | | 2.44 | | 69 | | | 3.61 | | 18 | U | U | — | — |
| Pyrene | 1,000 | 2,600 | 1,400 | 80 | | | 5.52 | | — | — | | — | — | 35 | | | 2.67 | | 79 | | | 4.14 | | 18 | U | U | — | — |
| Benz[a]anthracene | 110 | 1,300 | 270 | 29 | | | 2.00 | | — | — | | — | — | 13 | J | J1 | 0.99 | J | 23 | | | 1.20 | | 18 | U | U | — | — |
| Chrysene | 110 | 1,400 | 460 | 37 | | | 2.55 | | — | — | | — | — | 20 | | | 1.53 | | 35 | | | 1.83 | | 18 | U | U | — | — |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 40 | | | 2.76 | | — | — | | — | — | 21 | | | 1.60 | | 39 | | | 2.04 | | 18 | U | U | — | — |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 23 | | | 1.59 | | — | — | | — | — | 19 | U | U | 1.45 | U | 20 | U | U | 1.05 | U | 18 | U | U | — | — |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 11 | J | J1 | 0.76 | J | — | — | | — | — | 19 | U | U | 1.45 | U | 13 | J | J1 | 0.68 | J | 18 | U | U | — | — |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 5.9 | Q | J | 0.41 | Q | — | — | | — | — | 4.8 | U | U | 0.37 | U | 2.9 | J | J1 | 0.15 | J | 4.6 | U | U | — | — |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 15 | J | J1 | 1.03 | J | — | — | | — | — | 19 | U | U | 1.45 | U | 18 | J | J1 | 0.94 | J | 18 | U | U | — | — |
| cPAH (µg TEQ/kg dw) | — | — | — | 33.73 | | | | | — | — | | — | — | 15.01 | | | | | 19.01 | | | | | 12.71 | | | — | — |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 2.5 | J | J1 | 0.17 | J | — | — | | — | — | 4.8 | U | U | 0.37 | U | 4.9 | U | U | 0.26 | U | 4.6 | U | U | — | — |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.6 | U | U | 0.32 | U | — | — | | — | — | 4.8 | U | U | 0.37 | U | 4.9 | U | U | 0.26 | U | 4.6 | U | U | — | — |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.6 | U | U | 0.32 | U | — | — | | — | — | 4.8 | U | U | 0.37 | U | 4.9 | U | U | 0.26 | U | 4.6 | U | U | — | — |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.6 | U | U | 0.32 | U | — | — | | — | — | 4.8 | U | U | 0.37 | U | 4.9 | U | U | 0.26 | U | 4.6 | U | U | — | — |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 3.6 | J | J1 | 0.25 | J | — | — | | — | — | 6.5 | | | 0.50 | | 8.4 | | | 0.44 | | 4.6 | U | U | — | — |
| Diethyl phthalate | 61 | 200 | 110 | 46 | U | U | 3.17 | U | — | — | | — | — | 48 | U | U | 3.66 | U | 49 | U | U | 2.57 | U | 90 | B | U | — | — |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 18 | U | U | 1.24 | U | — | — | | — | — | 19 | U | U | 1.45 | U | 22 | | | 1.15 | | 18 | U | U | — | — |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 14 | | | 0.97 | | — | — | | — | — | 4.8 | U | U | 0.37 | U | 5.3 | | | 0.28 | | 4.6 | U | U | — | — |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 23 | B | U | 1.59 | B | — | — | | — | — | 18 | JB | UJ | 1.37 | JB | 20 | JB | UJ | 1.05 | JB | 23 | U | U | — | — |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 18 | U | U | 1.24 | U | — | — | | — | — | 19 | U | U | 1.45 | U | 20 | U | U | 1.05 | U | 18 | U | U | — | — |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 13 | J | J1 | 0.90 | J | — | — | | — | — | 13 | J | J1 | 0.99 | J | 14 | J | J1 | 0.73 | J | 18 | U | U | — | — |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.6 | U | U | 0.32 | U | — | — | | — | — | 4.8 | U | UJ | 0.37 | U | 4.9 | U | UJ | 0.26 | U | 4.6 | U | UJ | — | — |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.6 | U | U | 0.32 | U | — | — | | — | — | 4.8 | U | U | 0.37 | U | 4.9 | U | U | 0.26 | U | 4.6 | U | U | — | — |
| Carbazole | — | — | — | 18 | U | U | | | | | | | | 19 | U | U | | | 20 | U | U | | | 18 | U | U | — | — |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 320 | | | 22.07 | | 20 | U | U | 4.00 | U | 48 | | | 3.66 | | 130 | | | 6.81 | | 19 | U | U | — | — |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 18 | U | UJ | — | — | — | — | | — | — | 13 | J | J1 | — | — | 18 | J | J1 | — | — | 18 | U | U | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.6 | U | U | — | — | — | — | | — | — | 4.8 | U | U | — | — | 2.8 | J | J1 | — | — | 4.6 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 11 | J | J1 | — | — | — | — | | — | — | 47 | | | — | — | 28 | J | J1 | — | — | 37 | U | U | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 4.6 | U | UJ | — | — | — | — | | — | — | 2.8 | J | J1 | — | — | 5.2 | | | — | — | 4.6 | U | U | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 23 | U | UJ | — | — | — | — | | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 23 | U | UJ | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 11 | B | U | — | — | — | — | | — | — | 35 | Q | J | — | — | 23 | Q | J . | — | — | 7.2 | Q | J | — | — |
| Benzoic acid | 650 | 650 | 650 | 370 | U | U | — | — | — | — | | — | — | 120 | J | J1 | — | — | 100 | J | J1 | — | — | 370 | U | U | — | — |

**TABLE 44**

**RESULTS FROM RI SEDIMENT CORE SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Analyte | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | SD-510-0080 8 to 9 ft | | | | | SD-511-0020 2 to 3 ft | | | | | SD-511-0040 4 to 5 ft | | | | | SD-511-0060 6 to 7 ft | | | | | SD-511-0080 8 to 9 ft | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SCO [1] | LAET [2] | CSL [3] | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | | Value | Q1 | Q2 | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 0.143 | | | — | — | 1.88 | | | — | — | 2.05 | | | — | — | 2.33 | | | — | — | 2.15 | | | — | — |
| Total Solids (Percent) | — | — | — | 83.8 | | | — | — | 54.1 | | | — | — | 58.2 | | | — | — | 60.3 | | | — | — | 59.4 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | 3.2 | | | — | — | 9.8 | | | — | — | 9.5 | | | — | — | 9.7 | | | — | — | 11.4 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 0.2 | U | U | — | — | 0.7 | | | — | — | 0.9 | | | — | — | 0.8 | | | — | — | 0.9 | | | — | — |
| Chromium | 260 | 260 | 270 | 11 | | | — | — | 33.5 | | | — | — | 27.3 | | | — | — | 26.3 | | | — | — | 29.9 | | | — | — |
| Copper | 390 | 390 | 390 | 9.1 | | | — | — | 51.2 | | | — | — | 48.1 | | | — | — | 46.3 | | | — | — | 49.6 | | | — | — |
| Lead | 450 | 450 | 530 | 2 | U | U | — | — | 27 | | | — | — | 39 | | | — | — | 33 | | | — | — | 34 | | | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.02 | U | U | — | — | 0.11 | | | — | — | 0.13 | | | — | — | 0.12 | | | — | — | 0.12 | | | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.4 | U | U | — | — | 0.5 | U | U | — | — | 0.6 | | | — | — | 0.5 | U | U | — | — | 0.5 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 21 | | | — | — | 118 | | | — | — | 111 | | | — | — | 103 | | | — | — | 105 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 19 | U | | — | — | 97 | J | | 5.16 | J | 165 | J | | 8.05 | J | 179 | J | | 7.68 | J | 365 | | | 16.98 | |
| Naphthalene | 99 | 2,100 | 170 | 19 | U | U | — | — | 20 | U | U | 1.06 | U | 11 | J | J1 | 0.54 | J | 11 | J | J1 | 0.47 | J | 19 | U | U | 0.88 | U |
| Acenaphthylene | 66 | 1,300 | 66 | 19 | U | U | — | — | 20 | U | U | 1.06 | U | 20 | U | U | 0.98 | U | 19 | U | U | 0.82 | U | 19 | U | U | 0.88 | U |
| Acenaphthene | 16 | 500 | 57 | 19 | U | U | — | — | 20 | U | U | 1.06 | U | 20 | U | U | 0.98 | U | 14 | J | J1 | 0.60 | J | 34 | | | 1.58 | |
| Fluorene | 23 | 540 | 79 | 19 | U | U | — | — | 20 | U | U | 1.06 | U | 15 | J | J1 | 0.73 | J | 21 | | | 0.90 | | 34 | | | 1.58 | |
| Phenanthrene | 100 | 1,500 | 480 | 19 | U | U | — | — | 81 | | | 4.31 | | 110 | | | 5.37 | | 100 | | | 4.29 | | 240 | | | 11.16 | |
| Anthracene | 220 | 960 | 1,200 | 19 | U | U | — | — | 16 | J | J1 | 0.85 | J | 29 | | | 1.41 | | 33 | | | 1.42 | | 57 | | | 2.65 | |
| 2-Methylnaphthalene | 38 | 670 | 64 | 19 | U | U | — | — | 20 | U | U | 1.06 | U | 20 | U | U | 0.98 | U | 12 | J | J1 | 0.52 | J | 19 | U | U | 0.88 | U |
| *Total HPAH* | 960 | 12,000 | 5,300 | 19 | U | | — | — | 1,113 | | | 59.20 | | 1,322 | | | 64.49 | | 1,153 | | | 49.48 | | 1,795 | | | 83.49 | |
| Fluoranthene | 160 | 1,700 | 1,200 | 19 | U | U | — | — | 180 | | | 9.57 | | 220 | | | 10.73 | | 270 | | | 11.59 | | 420 | | | 19.53 | |
| Pyrene | 1,000 | 2,600 | 1,400 | 19 | U | U | — | — | 220 | | | 11.70 | | 290 | | | 14.15 | | 270 | | | 11.59 | | 400 | | | 18.60 | |
| Benz[a]anthracene | 110 | 1,300 | 270 | 19 | U | U | — | — | 76 | | | 4.04 | | 100 | | | 4.88 | | 88 | | | 3.78 | | 160 | | | 7.44 | |
| Chrysene | 110 | 1,400 | 460 | 19 | U | U | — | — | 130 | | | 6.91 | | 150 | | | 7.32 | | 120 | | | 5.15 | | 200 | | | 9.30 | |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 19 | U | U | — | — | 230 | | | 12.23 | | 250 | | | 12.20 | | 180 | | | 7.73 | | 260 | | | 12.09 | |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 19 | U | U | — | — | 110 | | | 5.85 | | 130 | | | 6.34 | | 96 | | | 4.12 | | 160 | | | 7.44 | |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 19 | U | U | — | — | 67 | | | 3.56 | | 72 | | | 3.51 | | 54 | | | 2.32 | | 78 | | | 3.63 | |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 4.8 | U | U | — | — | 28 | | | 1.49 | | 33 | | | 1.61 | | 18 | | | 0.77 | | 40 | | | 1.86 | |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 19 | U | U | — | — | 72 | | | 3.83 | | 77 | | | 3.76 | | 57 | | | 2.45 | | 77 | | | 3.58 | |
| cPAH (µg TEQ/kg dw) | — | — | — | 13.405 | | | — | — | 159.8 | | | | | 186.9 | | | | | 136.6 | | | | | 227.8 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.8 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.9 | U | U | 0.24 | U | 2.7 | J | J1 | 0.12 | J | 4.7 | U | U | 0.22 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.8 | U | U | — | — | 4.9 | U | U | 0.26 | U | 2.5 | J | J1 | 0.12 | J | 3.6 | J | J1 | 0.15 | J | 4.7 | U | U | 0.22 | U |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.8 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.9 | U | U | 0.24 | U | 3.7 | J | J1 | 0.16 | J | 4.7 | U | U | 0.22 | U |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.8 | U | U | — | — | 4.9 | U | U | 0.26 | U | 4.9 | U | U | 0.24 | U | 4.7 | U | U | 0.20 | U | 4.7 | U | U | 0.22 | U |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 4.8 | U | U | — | — | 13 | | | 0.69 | | 12 | | | 0.59 | | 41 | | | 1.76 | | 4.6 | J | J1 | 0.21 | J |
| Diethyl phthalate | 61 | 200 | 110 | 48 | U | U | — | — | 49 | U | U | 2.61 | U | 49 | U | U | 2.39 | U | 47 | U | U | 2.02 | U | 47 | U | U | 2.19 | U |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 19 | U | U | — | — | 20 | U | U | 1.06 | U | 20 | U | U | 0.98 | U | 19 | U | U | 0.82 | U | 19 | U | U | 0.88 | U |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 4.8 | U | U | — | — | 17 | | | 0.90 | | 35 | | | 1.71 | | 74 | | | 3.18 | | 14 | | | 0.65 | |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 16 | JB | UJ | — | — | 110 | B | U | 5.85 | B | 240 | B | | 11.71 | B | 250 | B | | 10.73 | B | 120 | B | U | 5.58 | B |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 19 | U | U | — | — | 20 | U | U | 1.06 | U | 20 | U | U | 0.98 | U | 19 | U | U | 0.82 | U | 19 | U | U | 0.88 | U |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 19 | U | U | — | — | 20 | U | U | 1.06 | U | 20 | U | U | 0.98 | U | 15 | J | J1 | 0.64 | J | 15 | J | J1 | 0.70 | J |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.8 | U | UJ | — | — | 4.9 | U | U | 0.26 | U | 4.9 | U | U | 0.24 | U | 4.7 | U | U | 0.20 | U | 4.7 | U | U | 0.22 | U |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.8 | U | U | — | — | 4.9 | U | U | 0.26 | U | 8.1 | | | 0.40 | | 4.7 | U | U | 0.20 | U | 4.7 | U | U | 0.22 | U |
| Carbazole | — | — | — | 19 | U | U | — | — | 14 | J | J1 | | | 14 | J | J1 | | | 11 | J | J1 | | | 26 | | | | |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 20 | U | U | — | — | 160 | | | 8.51 | | 189 | | | 9.22 | | 208 | | | 8.93 | | 196 | | | 9.12 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 19 | U | U | — | — | 22 | | | — | — | 22 | | | — | — | 11 | J | J1 | — | — | 19 | U | U | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.8 | U | U | — | — | 4.9 | U | U | — | — | 4.9 | U | U | — | — | 2.6 | J | J1 | — | — | 4.7 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 38 | U | U | — | — | 39 | U | U | — | — | 11 | J | J1 | — | — | 25 | J | J1 | — | — | 38 | U | U | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 4.8 | U | U | — | — | 4.9 | U | UJ | — | — | 4.9 | U | UJ | — | — | 2.6 | J | J, J1 | — | — | 4.7 | U | UJ | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 24 | U | UJ | — | — | 25 | U | U | — | — | 24 | U | U | — | — | 24 | U | U | — | — | 24 | U | U | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 8.1 | Q | J | — | — | 38 | BQ | U | — | — | 24 | BQ | U | — | — | 30 | BQ | U | — | — | 23 | BQ | U | — | — |
| Benzoic acid | 650 | 650 | 650 | 380 | U | U | — | — | 390 | U | U | — | — | 390 | U | U | — | — | 380 | U | U | — | — | 380 | U | U | — | — |

**TABLE 44**

**RESULTS FROM RI SEDIMENT CORE SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Analyte | RAO 3: Benthic Organisms Sediment Management Standards SCO [1] | LAET [2] | SMS CSL [3] | SD-512-0020 2 to 3 ft Value | Q1 | Q2 | | | SD-512-0040 4 to 5 ft Value | Q1 | Q2 | | | SD-512-0060 6 to 7 ft Value | Q1 | Q2 | | | SD-517-0020 2 to 3 ft Value | Q1 | Q2 | | | SD-517-0040 4 to 5 ft Value | Q1 | Q2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 1.86 | | | — | — | 1.79 | | | — | — | 0.104 | | | — | — | 2.3 | | | — | — | 0.1 | | | — | — |
| Total Solids (Percent) | — | — | — | 65.1 | | | — | — | 78.6 | | | — | — | 84.6 | | | — | — | 60.3 | | | — | — | 86.4 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | **290** | | | — | — | 5.2 | | | — | — | 0.9 | | | — | — | 56.3 | | | — | — | 2.3 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 1.7 | | | — | — | 0.2 | U | U | — | — | 0.2 | U | U | — | — | 2.6 | | | — | — | 0.2 | U | U | — | — |
| Chromium | 260 | 260 | 270 | 31.3 | | | — | — | 15.4 | | | — | — | 10.6 | | | — | — | 39.1 | | | — | — | 11.4 | | | — | — |
| Copper | 390 | 390 | 390 | 62.7 | | | — | — | 9.1 | | | — | — | 9.4 | | | — | — | 53.6 | | | — | — | 10.6 | | | — | — |
| Lead | 450 | 450 | 530 | 22 | | | — | — | 2 | U | U | — | — | 2 | U | U | — | — | 25 | | | — | — | 2 | U | U | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.21 | | | — | — | 0.03 | U | U | — | — | 0.03 | U | U | — | — | 0.22 | | | — | — | 0.03 | U | U | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.5 | U | U | — | — | 0.4 | U | U | — | — | 0.3 | U | U | — | — | 0.5 | U | U | — | — | 0.3 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 138 | | | — | — | 23 | | | — | — | 22 | | | — | — | 91 | | | — | — | 23 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 144 | J | | 7.74 | J | 18 | U | | 1.01 | U | 20 | U | | — | — | 280 | J | | 12.17 | J | 19 | U | | — | — |
| Naphthalene | 99 | 2,100 | 170 | 48 | | | 2.58 | | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 93 | | | 4.04 | | 19 | U | U | — | — |
| Acenaphthylene | 66 | 1,300 | 66 | 12 | J | J1 | 0.65 | J | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 33 | | | 1.43 | | 19 | U | U | — | — |
| Acenaphthene | 16 | 500 | 57 | 11 | J | J1 | 0.59 | J | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 19 | J | J1 | 0.83 | J | 19 | U | U | — | — |
| Fluorene | 23 | 540 | 79 | 14 | J | J1 | 0.75 | J | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 21 | | | 0.91 | | 19 | U | U | — | — |
| Phenanthrene | 100 | 1,500 | 480 | 48 | | | 2.58 | | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 92 | | | 4.00 | | 19 | U | U | — | — |
| Anthracene | 220 | 960 | 1,200 | 11 | J | J1 | 0.59 | J | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 22 | | | 0.96 | | 19 | U | U | — | — |
| 2-Methylnaphthalene | 38 | 670 | 64 | 19 | | | 1.02 | | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 32 | | | 1.39 | | 19 | U | U | — | — |
| *Total HPAH* | 960 | 12,000 | 5,300 | 179 | J | | 9.62 | J | 18 | U | | 1.01 | U | 20 | U | | — | — | 388 | J | | 16.87 | J | 19 | U | | — | — |
| Fluoranthene | 160 | 1,700 | 1,200 | 50 | | | 2.69 | | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 110 | | | 4.78 | | 19 | U | U | — | — |
| Pyrene | 1,000 | 2,600 | 1,400 | 52 | | | 2.80 | | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 110 | | | 4.78 | | 19 | U | U | — | — |
| Benz[a]anthracene | 110 | 1,300 | 270 | 15 | J | J1 | 0.81 | J | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 28 | | | 1.22 | | 19 | U | U | — | — |
| Chrysene | 110 | 1,400 | 460 | 21 | | | 1.13 | | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 40 | | | 1.74 | | 19 | U | U | — | — |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 27 | | | 1.45 | | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 51 | | | 2.22 | | 19 | U | U | — | — |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 19 | U | U | 1.02 | U | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 20 | U | U | 0.87 | U | 19 | U | U | — | — |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 19 | U | U | 1.02 | U | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 17 | J | J1 | 0.74 | J | 19 | U | U | — | — |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 4.8 | U | U | 0.26 | U | 4.6 | U | U | 0.26 | U | 4.9 | U | U | — | — | 4 | J | J1 | 0.17 | J | 4.7 | U | U | — | — |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 14 | J | J1 | 0.75 | J | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 28 | | | 1.22 | | 19 | U | U | — | — |
| cPAH (µg TEQ/kg dw) | — | — | — | 15.82 | | | | | 12.71 | | | | | 14.08 | | | — | — | 20.4 | | | | | 13.385 | | | — | — |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.8 | U | U | 0.26 | U | 4.6 | U | U | 0.26 | U | 4.9 | U | U | — | — | 5 | U | U | 0.22 | U | 4.7 | U | U | — | — |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.8 | U | U | 0.26 | U | 4.6 | U | U | 0.26 | U | 4.9 | U | U | — | — | 5 | U | U | 0.22 | U | 4.7 | U | U | — | — |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.8 | U | U | 0.26 | U | 4.6 | U | U | 0.26 | U | 4.9 | U | U | — | — | 5 | U | U | 0.22 | U | 4.7 | U | U | — | — |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.8 | U | U | 0.26 | U | 4.6 | U | U | 0.26 | U | 4.9 | U | U | — | — | 5 | U | U | 0.22 | U | 4.7 | U | U | — | — |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 4.8 | U | U | 0.26 | U | 4.6 | U | U | 0.26 | U | 4.9 | U | U | — | — | 5 | U | U | 0.22 | U | 4.7 | U | U | — | — |
| Diethyl phthalate | 61 | 200 | 110 | 48 | U | U | 2.58 | U | 46 | U | U | 2.57 | U | 49 | U | U | — | — | 52 | | | 2.26 | | 47 | U | U | — | — |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 19 | U | U | 1.02 | U | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 20 | U | U | 0.87 | U | 19 | U | U | — | — |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 3.8 | J | J1 | 0.20 | J | 4.6 | U | U | 0.26 | U | 4.9 | U | U | — | — | 5 | U | U | 0.22 | U | 4.7 | U | U | — | — |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 24 | U | U | 1.29 | U | 23 | U | U | 1.28 | U | 24 | U | U | — | — | 25 | U | U | 1.09 | U | 24 | U | U | — | — |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 19 | U | U | 1.02 | U | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 20 | U | U | 0.87 | U | 19 | U | U | — | — |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 14 | J | J1 | 0.75 | J | 18 | U | U | 1.01 | U | 20 | U | U | — | — | 24 | | | 1.04 | | 19 | U | U | — | — |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.8 | U | U | 0.26 | U | 4.6 | U | U | 0.26 | U | 4.9 | U | U | — | — | 5 | U | U | 0.22 | U | 4.7 | U | U | — | — |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.8 | U | U | 0.26 | U | 4.6 | U | U | 0.26 | U | 4.9 | U | U | — | — | 5 | U | U | 0.22 | U | 4.7 | U | U | — | — |
| Carbazole | — | — | — | 19 | U | U | | | 18 | U | U | | | 20 | U | U | — | — | 20 | U | U | | | 19 | U | U | — | — |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 110 | | | 5.91 | | 19 | U | U | 1.06 | U | 20 | U | U | — | — | 95 | | | 4.13 | | 19 | U | U | — | — |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 11 | QJ | J, J1 | — | — | 18 | U | UJ | — | — | 20 | U | UJ | — | — | 20 | U | UJ | — | — | 19 | U | UJ | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.8 | U | U | — | — | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 3.7 | J | J1 | — | — | 4.7 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 40 | | | — | — | 10 | J | J1 | — | — | 39 | U | U | — | — | 52 | | | — | — | 38 | U | U | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 2.6 | J | J1 | — | — | 4.6 | U | U | — | — | 4.9 | U | U | — | — | 4.4 | J | J1 | — | — | 4.7 | U | U | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 24 | U | UJ | — | — | 23 | U | UJ | — | — | 24 | U | UJ | — | — | 25 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 17 | BQ | U | — | — | 8.6 | BQ | U | — | — | 9.2 | BQ | U | — | — | 16 | BQ | U | — | — | 8.8 | BQ | U | — | — |
| Benzoic acid | 650 | 650 | 650 | 390 | U | U | — | — | 370 | U | U | — | — | 390 | U | U | — | — | 110 | J | J1 | — | — | 380 | U | U | — | — |

## TABLE 44

## RESULTS FROM RI SEDIMENT CORE SAMPLES
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Analyte | RAO 3: Benthic Organisms Sediment Management Standards SCO [1] | LAET [2] | SMS CSL [3] | SD-513-0020 2 to 3 ft Value | Q1 | Q2 | | | SD-513-0040 4 to 5 ft Value | Q1 | Q2 | | | SD-513-0060 6 to 7 ft Value | Q1 | Q2 | | | SD-513-0080 8 to 9 ft Value | Q1 | Q2 | | | SD-514-0020 2 to 3 ft Value | Q1 | Q2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 1.66 | | | — | — | 1.99 | | | — | — | 3.07 | | | — | — | 1.42 | | | — | — | 1.71 | | | — | — |
| Total Solids (Percent) | — | — | — | 55.9 | | | — | — | 59.5 | | | — | — | 53.7 | | | — | — | 68.3 | | | — | — | 79.3 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | 9.4 | | | — | — | 10 | | | — | — | 13.5 | | | — | — | 18.9 | | | — | — | 5.1 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 0.6 | | | — | — | 0.8 | | | — | — | 1 | | | — | — | 0.6 | | | — | — | 0.2 | U | U | — | — |
| Chromium | 260 | 260 | 270 | 29.6 | | | — | — | 28.4 | | | — | — | 29 | | | — | — | 20.8 | | | — | — | 13.8 | | | — | — |
| Copper | 390 | 390 | 390 | 43.5 | | | — | — | 45.4 | | | — | — | 57.1 | | | — | — | 26.3 | | | — | — | 14.3 | | | — | — |
| Lead | 450 | 450 | 530 | 23 | | | — | — | 40 | | | — | — | 52 | | | — | — | 8 | | | — | — | 4 | | | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.1 | | | — | — | 0.13 | | | — | — | 0.21 | | | — | — | 0.08 | | | — | — | 0.03 | U | U | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.5 | U | U | — | — | 0.5 | U | U | — | — | 0.6 | | | — | — | 0.4 | U | U | — | — | 0.4 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 97 | | | — | — | 103 | | | — | — | 120 | | | — | — | 61 | | | — | — | 31 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 79 | J | | 4.76 | J | 86.5 | J | | 4.35 | J | 312 | J | | 10.16 | J | 57 | J | | 4.01 | J | 23 | J | | 1.35 | J |
| Naphthalene | 99 | 2,100 | 170 | 19 | U | U | 1.14 | U | 19 | U | U | 0.95 | U | 12 | J | J1 | 0.39 | J | 15 | J | J1 | 1.06 | J | 12 | J | J1 | 0.70 | J |
| Acenaphthylene | 66 | 1,300 | 66 | 19 | U | U | 1.14 | U | 19 | U | U | 0.95 | U | 19 | U | U | 0.62 | U | 19 | U | U | 1.34 | U | 19 | U | U | 1.11 | U |
| Acenaphthene | 16 | 500 | 57 | 19 | U | U | 1.14 | U | 19 | U | U | 0.95 | U | 26 | | | 0.85 | | 19 | U | U | 1.34 | U | 19 | U | U | 1.11 | U |
| Fluorene | 23 | 540 | 79 | 19 | U | U | 1.14 | U | 9.5 | J | J1 | 0.48 | J | 23 | | | 0.75 | | 19 | U | U | 1.34 | U | 19 | U | U | 1.11 | U |
| Phenanthrene | 100 | 1,500 | 480 | 66 | | | 3.98 | | 61 | | | 3.07 | | 200 | | | 6.51 | | 42 | | | 2.96 | | 11 | J | J1 | 0.64 | J |
| Anthracene | 220 | 960 | 1,200 | 13 | J | J1 | 0.78 | J | 16 | J | J1 | 0.80 | J | 51 | | | 1.66 | | 19 | U | U | 1.34 | U | 19 | U | U | 1.11 | U |
| 2-Methylnaphthalene | 38 | 670 | 64 | 19 | U | U | 1.14 | U | 19 | U | U | 0.95 | U | 9.6 | J | J1 | 0.31 | J | 19 | | | 1.34 | | 19 | U | U | 1.11 | U |
| *Total HPAH* | 960 | 12,000 | 5,300 | 875 | J | | 52.71 | J | 686 | J | | 34.47 | J | 2,011 | J | | 65.50 | | 127 | J | | 8.94 | J | 29 | J | | 1.70 | J |
| Fluoranthene | 160 | 1,700 | 1,200 | 130 | | | 7.83 | | 110 | | | 5.53 | | 410 | | | 13.36 | | 31 | | | 2.18 | | 13 | J | J1 | 0.76 | J |
| Pyrene | 1,000 | 2,600 | 1,400 | 180 | | | 10.84 | | 180 | | | 9.05 | | 490 | | | 15.96 | | 43 | | | 3.03 | | 16 | J | J1 | 0.94 | J |
| Benz[a]anthracene | 110 | 1,300 | 270 | 62 | | | 3.73 | | 47 | | | 2.36 | | 170 | | | 5.54 | | 13 | J | J1 | 0.92 | J | 19 | U | U | 1.11 | U |
| Chrysene | 110 | 1,400 | 460 | 89 | | | 5.36 | | 68 | | | 3.42 | | 220 | | | 7.17 | | 19 | | | 1.34 | | 19 | U | U | 1.11 | U |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 180 | | | 10.84 | | 120 | | | 6.03 | | 300 | | | 9.77 | | 21 | | | 1.48 | | 19 | U | U | 1.11 | U |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 87 | | | 5.24 | | 63 | | | 3.17 | | 180 | | | 5.86 | | 19 | U | U | 1.34 | U | 19 | U | U | 1.11 | U |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 58 | | | 3.49 | | 38 | | | 1.91 | | 96 | | | 3.13 | | 19 | U | U | 1.34 | U | 19 | U | U | 1.11 | U |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 24 | Q | J | 1.45 | Q | 17 | Q | J | 0.85 | Q | 45 | Q | J | 1.47 | Q | 4.8 | U | UJ | 0.34 | U | 4.8 | U | U | 0.28 | U |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 65 | | | 3.92 | | 43 | | | 2.16 | | 100 | | | 3.26 | | 19 | U | U | 1.34 | U | 19 | U | U | 1.11 | U |
| cPAH (µg TEQ/kg dw) | — | — | — | 127.49 | | | | | 90.98 | | | | | 256.8 | | | | | 15 | | | | | 13.405 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.8 | U | U | 0.29 | U | 4.8 | U | U | 0.24 | U | 4.8 | U | U | 0.16 | U | 4.8 | U | U | 0.34 | U | 4.8 | U | U | 0.28 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.8 | U | U | 0.29 | U | 2.4 | J | J1 | 0.12 | J | 3.2 | J | J1 | 0.10 | J | 4.8 | U | U | 0.34 | U | 4.8 | U | U | 0.28 | U |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.8 | U | U | 0.29 | U | 4.8 | U | U | 0.24 | U | 4.8 | U | U | 0.16 | U | 4.8 | U | U | 0.34 | U | 4.8 | U | U | 0.28 | U |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.8 | U | U | 0.29 | U | 4.8 | U | U | 0.24 | U | 4.8 | U | U | 0.16 | U | 4.8 | U | U | 0.34 | U | 4.8 | U | U | 0.28 | U |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 22 | | | 1.33 | | 6.6 | | | 0.33 | | 12 | | | 0.39 | | 4.8 | U | U | 0.34 | U | 4.8 | U | U | 0.28 | U |
| Diethyl phthalate | 61 | 200 | 110 | 48 | U | U | 2.89 | U | 48 | U | U | 2.41 | U | 48 | U | U | 1.56 | U | 48 | U | U | 3.38 | U | 47 | U | U | 2.75 | U |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 19 | U | U | 1.14 | U | 19 | U | U | 0.95 | U | 19 | U | U | 0.62 | U | 11 | J | J1 | 0.77 | J | 19 | U | U | 1.11 | U |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 17 | | | 1.02 | | 25 | | | 1.26 | | 57 | | | 1.86 | | 4.8 | U | U | 0.34 | U | 4.8 | U | U | 0.28 | U |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 130 | B | U | 7.83 | B | 190 | B | | 9.55 | B | 180 | B | | 5.86 | B | 20 | J | UJ | 1.41 | J | 24 | U | U | 1.40 | U |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 19 | U | U | 1.14 | U | 19 | U | U | 0.95 | U | 19 | U | U | 0.62 | U | 19 | U | U | 1.34 | U | 19 | U | U | 1.11 | U |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 19 | U | U | 1.14 | U | 19 | U | U | 0.95 | U | 15 | J | J1 | 0.49 | J | 19 | U | U | 1.34 | U | 19 | U | U | 1.11 | U |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.8 | U | U | 0.29 | U | 4.8 | U | U | 0.24 | U | 4.8 | U | U | 0.16 | U | 4.8 | U | U | 0.34 | U | 4.8 | U | U | 0.28 | U |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.8 | U | U | 0.29 | U | 4.8 | U | U | 0.24 | U | 4.8 | U | U | 0.16 | U | 4.8 | U | U | 0.34 | U | 4.8 | U | U | 0.28 | U |
| Carbazole | — | — | — | 9.6 | J | J1 | | | 19 | U | U | | | 26 | | | | | 19 | U | U | | | 19 | U | U | | |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 168 | | | 10.12 | | 302 | | | 15.18 | | 272 | | | 8.86 | | 12 | J | J1 | 0.85 | J | 18 | U | U | 1.05 | U |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 12 | J | J, J1 | — | — | 10 | J | J, J1 | — | — | 15 | J | J, J1 | — | — | 19 | U | UJ | — | — | 19 | U | UJ | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.8 | U | U | — | — | 4.8 | U | U | — | — | 2.9 | J | J1 | — | — | 4.8 | U | U | — | — | 4.8 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 38 | U | U | — | — | 38 | U | U | — | — | 38 | U | U | — | — | 12 | J | J1 | — | — | 38 | U | U | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 4.8 | U | UJ | — | — | 3.9 | J | J, J1 | — | — | 4.8 | U | UJ | — | — | 4.8 | U | UJ | — | — | 4.8 | U | U | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 24 | B | U | — | — | 25 | B | U | — | — | 36 | B | U | — | — | 17 | B | U | — | — | 7.2 | BQ | U | — | — |
| Benzoic acid | 650 | 650 | 650 | 380 | U | U | — | — | 380 | U | U | — | — | 380 | U | U | — | — | 380 | U | U | — | — | 380 | U | U | — | — |

## TABLE 44

### RESULTS FROM RI SEDIMENT CORE SAMPLES
### BOEING ISAACSON-THOMPSON SITE
### TUKWILA, WASHINGTON

| | RAO 3: Benthic Organisms Sediment Management Standards | | SMS | SD-515-0020 2 to 3 ft | | | | | SD-515-0040 4 to 5 ft | | | | | SD-515-0060 6 to 7 ft | | | | | SD-515-0080 8 to 9 ft | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Analyte** | **SCO [1]** | **LAET [2]** | **CSL [3]** | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | | **Value** | **Q1** | **Q2** | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | 1.7 | | | — | — | 2.38 | | | — | — | 2.37 | | | — | — | 1.5 | | | — | — |
| Total Solids (Percent) | — | — | — | 57.2 | | | — | — | 57.5 | | | — | — | 55.6 | | | — | — | 68 | | | — | — |
| **Metals** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | | **mg/kg dw** | | | | |
| Arsenic | 57 | 57 | 93 | 9 | | | — | — | 10.4 | | | — | — | 16.3 | J | | — | — | 24.4 | | | — | — |
| Cadmium | 5.1 | 5.1 | 6.7 | 0.6 | | | — | — | 1.3 | | | — | — | 2 | | | — | — | 1.1 | | | — | — |
| Chromium | 260 | 260 | 270 | 30.4 | | | — | — | 31.3 | | | — | — | 38.9 | | | — | — | 24.8 | | | — | — |
| Copper | 390 | 390 | 390 | 42.9 | | | — | — | 55.5 | | | — | — | 62.5 | | | — | — | 30.6 | | | — | — |
| Lead | 450 | 450 | 530 | 24 | | | — | — | 51 | | | — | — | 60 | | | — | — | 13 | | | — | — |
| Mercury | 0.41 | 0.41 | 0.59 | 0.09 | | | — | — | 0.21 | | | — | — | 0.18 | | | — | — | 0.07 | | | — | — |
| Silver | 6.1 | 6.1 | 6.1 | 0.5 | U | U | — | — | 0.5 | U | U | — | — | 0.5 | U | U | — | — | 0.4 | U | U | — | — |
| Zinc | 410 | 410 | 960 | 95 | | | — | — | 122 | | | — | — | 136 | | | — | — | 80 | | | — | — |
| **Nonionizable Organic Compounds** | **mg/kg OC** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | | **µg/kg dw** | | | **mg/kg OC** | |
| **Aromatic Hydrocarbons** | | | | | | | | | | | | | | | | | | | | | | | |
| *Total LPAH* | 370 | 5,200 | 780 | 105 | J | | 6.18 | J | 156 | J | | 6.55 | J | 522 | | | 22.03 | | 81 | J | | 5.40 | J |
| Naphthalene | 99 | 2,100 | 170 | 15 | J | J1 | 0.88 | J | 17 | J | J1 | 0.71 | J | 58 | | | 2.45 | | 24 | | | 1.60 | |
| Acenaphthylene | 66 | 1,300 | 66 | 20 | U | U | 1.18 | U | 19 | U | U | 0.80 | U | 19 | U | U | 0.80 | U | 19 | U | U | 1.27 | U |
| Acenaphthene | 16 | 500 | 57 | 20 | U | U | 1.18 | U | 9.5 | J | J1 | 0.40 | J | 44 | | | 1.86 | | 19 | U | U | 1.27 | U |
| Fluorene | 23 | 540 | 79 | 20 | U | U | 1.18 | U | 9.5 | J | J1 | 0.40 | J | 56 | | | 2.36 | | 15 | J | J1 | 1.00 | J |
| Phenanthrene | 100 | 1,500 | 480 | 75 | | | 4.41 | | 95 | | | 3.99 | | 270 | | | 11.39 | | 42 | | | 2.80 | |
| Anthracene | 220 | 960 | 1,200 | 15 | J | J1 | 0.88 | J | 25 | | | 1.05 | | 94 | | | 3.97 | | 19 | U | U | 1.27 | U |
| 2-Methylnaphthalene | 38 | 670 | 64 | 20 | U | U | 1.18 | U | 12 | J | J1 | 0.50 | J | 190 | | | 8.02 | | 33 | | | 2.20 | |
| *Total HPAH* | 960 | 12,000 | 5,300 | 1,122 | | | 66.00 | | 1,298 | | | 54.54 | | 2,236 | | | 94.35 | | 141.4 | J | | 9.43 | J |
| Fluoranthene | 160 | 1,700 | 1,200 | 150 | | | 8.82 | | 180 | | | 7.56 | | 480 | | | 20.25 | | 37 | | | 2.47 | |
| Pyrene | 1,000 | 2,600 | 1,400 | 230 | | | 13.53 | | 340 | | | 14.29 | | 590 | | | 24.89 | | 44 | | | 2.93 | |
| Benz[a]anthracene | 110 | 1,300 | 270 | 73 | | | 4.29 | | 80 | | | 3.36 | | 180 | | | 7.59 | | 13 | J | J1 | 0.87 | J |
| Chrysene | 110 | 1,400 | 460 | 110 | | | 6.47 | | 120 | | | 5.04 | | 250 | | | 10.55 | | 19 | | | 1.27 | |
| Total benzofluoranthenes | 230 | 3,200 | 450 | 240 | | | 14.12 | | 250 | | | 10.50 | | 300 | | | 12.66 | | 19 | | | 1.27 | |
| Benzo[a]pyrene | 99 | 1,600 | 210 | 120 | | | 7.06 | | 130 | | | 5.46 | | 190 | | | 8.02 | | 19 | U | U | 1.27 | U |
| Indeno[1,2,3-c,d]pyrene | 34 | 600 | 88 | 77 | | | 4.53 | | 77 | | | 3.24 | | 93 | | | 3.92 | | 19 | U | U | 1.27 | U |
| Dibenzo[a,h]anthracene | 12 | 230 | 33 | 33 | | | 1.94 | | 34 | | | 1.43 | | 43 | | | 1.81 | | 4.7 | U | U | 0.31 | U |
| Benzo[g,h,i]perylene | 31 | 670 | 78 | 89 | | | 5.24 | | 87 | | | 3.66 | | 110 | | | 4.64 | | 9.4 | J | J1 | 0.63 | J |
| cPAH (µg TEQ/kg dw) | — | — | — | 173.3 | | | | | 185.5 | | | | | 267 | | | | | 14.78 | | | | |
| **Chlorinated Benzenes** | | | | | | | | | | | | | | | | | | | | | | | |
| 1,2-Dichlorobenzene | 2.3 | 35 | 2.3 | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.20 | U | 2.5 | J | J1 | 0.11 | J | 4.7 | U | U | 0.31 | U |
| 1,4-Dichlorobenzene | 3.1 | 110 | 9 | 4.9 | U | U | 0.29 | U | 4.1 | J | J1 | 0.17 | J | 4.4 | J | J1 | 0.19 | J | 4.7 | U | U | 0.31 | U |
| 1,2,4-Trichlorobenzene | 0.81 | 31 | 1.8 | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.20 | U | 4.8 | U | U | 0.20 | U | 4.7 | U | U | 0.31 | U |
| Hexachlorobenzene | 0.38 | 22 | 2.3 | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.20 | U | 4.8 | U | U | 0.20 | U | 4.7 | U | U | 0.31 | U |
| **Phthalate Esters** | | | | | | | | | | | | | | | | | | | | | | | |
| Dimethyl phthalate | 53 | 71 | 53 | 12 | | | 0.71 | | 20 | | | 0.84 | | 17 | | | 0.72 | | 4.7 | U | U | 0.31 | U |
| Diethyl phthalate | 61 | 200 | 110 | 49 | U | U | 2.88 | U | 47 | U | U | 1.97 | U | 48 | U | U | 2.03 | U | 47 | U | U | 3.13 | U |
| Di-n-butyl phthalate | 220 | 1,400 | 1,700 | 20 | U | U | 1.18 | U | 19 | U | U | 0.80 | U | 19 | U | U | 0.80 | U | 19 | U | U | 1.27 | U |
| Butyl benzyl phthalate | 4.9 | 63 | 64 | 27 | | | 1.59 | | 37 | | | 1.55 | | 48 | | | 2.03 | | 4.7 | U | U | 0.31 | U |
| Bis[2-ethylhexyl]phthalate | 47 | 1,300 | 78 | 72 | | | 4.24 | | 140 | | | 5.88 | | 82 | | | 3.46 | | 24 | U | U | 1.60 | U |
| Di-n-octyl phthalate | 58 | 6,200 | 4,500 | 20 | U | U | 1.18 | U | 19 | U | U | 0.80 | U | 19 | U | U | 0.80 | U | 19 | U | U | 1.27 | U |
| **Miscellaneous** | | | | | | | | | | | | | | | | | | | | | | | |
| Dibenzofuran | 15 | 540 | 58 | 20 | U | U | 1.18 | U | 13 | J | J1 | 0.55 | J | 32 | | | 1.35 | | 9.4 | J | J1 | 0.63 | J |
| Hexachlorobutadiene | 3.9 | 11 | 6.2 | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.20 | U | 4.8 | U | U | 0.20 | U | 4.7 | U | U | 0.31 | U |
| N-nitrosodiphenylamine | 11 | 28 | 11 | 4.9 | U | U | 0.29 | U | 4.7 | U | U | 0.20 | U | 4.8 | U | U | 0.20 | U | 4.7 | U | U | 0.31 | U |
| Carbazole | — | — | — | 13 | J | J1 | | | 15 | J | J1 | | | 19 | U | U | | | 19 | U | U | | |
| **Pesticides and PCBs** | | | | | | | | | | | | | | | | | | | | | | | |
| Total PCBs | 12 | 130 | 65 | 92 | | | 5.41 | | 243 | | | 10.21 | | 371 | | | 15.65 | | 33 | | | 2.20 | |
| **Ionizable Organic Compounds** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | | **µg/kg dw** | | | | |
| Phenol | 420 | 420 | 1,200 | 12 | QJ | J, J1 | — | — | 18 | QJ | J, J1 | — | — | 16 | QJ | J, J1 | — | — | 19 | U | UJ | — | — |
| 2-Methylphenol | 63 | 63 | 63 | 4.9 | U | U | — | — | 2.6 | J | J1 | — | — | 3.4 | J | J1 | — | — | 4.7 | U | U | — | — |
| 4-Methylphenol | 670 | 670 | 670 | 40 | U | U | — | — | 38 | U | U | — | — | 47 | | | — | — | 22 | J | J1 | — | — |
| 2,4-Dimethylphenol | 29 | 29 | 29 | 4.9 | U | U | — | — | 4.7 | U | U | — | — | 4.8 | U | U | — | — | 4.7 | U | U | — | — |
| Pentachlorophenol | 360 | 360 | 690 | 25 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — | 24 | U | UJ | — | — |
| Benzyl alcohol | 57 | 57 | 73 | 20 | BQ | U | — | — | 65 | BQ | J | — | — | 66 | BQ | J | — | — | 23 | BQ | U | — | — |
| Benzoic acid | 650 | 650 | 650 | 400 | U | U | — | — | 380 | U | U | — | — | 380 | U | U | — | — | 380 | U | U | — | — |

## TABLE 44

## RESULTS FROM RI SEDIMENT CORE SAMPLES
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | |
|---|---|
| (lavender) | Value above SMS SCO or LAET |
| (red) | Value above SMS CSL (Bold) |
| (gray) | Undetected exceedance of the SMS criteria (Italicized) |

Notes:

1. Sediment Management Standards Sediment Quality Objectives (173-204-560) WAC.
2. LAET = Lowest-Apparent-Effects Threshold.
3. Sediment Management Standards Cleanup Screening Levels (173-204-560) WAC.

Q1 Laboratory Data Qualifier
J = Indicates the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
M = Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match.
U = Indicates the compound was not detected at the reported concentration.

Q2 Data Qualifiers Assigned during Data Validation
U = Indicates the compound was not detected at or above the reporting limit.
J1 = Laboratory flag indicating the analyte was positively identified; the associated concentration is approximate and less than the reporting limit, but equal to or greater than the detection limit.

Abbreviations:
cPAH = carcinogenic polycyclic aromatic hydrocarbons
CSL = cleanup screening level
dw = dry weight
ft = feet
HPAH = high-molecular-weight polycyclic aromatic hydrocarbon
LAET = lowest apparent effects threshold
LPAH = low-molecular-weight polycyclic aromatic hydrocarb
mg/kg = milligrams per kilogram
OC = organic carbon
PCBs = polychlorinated biphenyls
RAO = remedial action objective
SMS = Wahington State Sediment Management Standards
SCO = sediment cleanup objective
TEQ = toxic equivalent concentration
µg/kg = micrograms per kilogram

# TABLE 45

## DIOXIN/FURAN RESULTS FROM RI SURFACE SEDIMENT GRAB SAMPLES
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | SD-514G | | | SD-515G | | | SD-507G | | | SD-508G | | | SD-509G | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dioxins (ng/kg dw)** | **TEF [2]** | **Value** | **Q1 [1]** | **Q2 [1]** | **Value** | **Q1 [1]** | **Q2 [1]** | **Value** | **Q1 [1]** | **Q2 [1]** | **Value** | **Q1 [1]** | **Q2 [1]** | **Value** | **Q1 [1]** | **Q2 [1]** |
| 2,3,7,8-TCDD | 1 | 1.1 | | | 0.287 | JEMPC | UJ | 0.588 | JEMPC | UJ | 1.04 | EMPC | J | 0.322 | JEMPC | UJ |
| 1,2,3,7,8-PeCDD | 1 | 3.85 | | | 0.754 | J | J1 | 1.01 | | | 1.29 | | | 0.844 | J | J1 |
| 1,2,3,4,7,8-HxCDD | 0.1 | 4.79 | | | 0.937 | J | J1 | 1.22 | J | J1 | 1.59 | J | J1 | 0.985 | JEMPC | UJ |
| 1,2,3,6,7,8-HxCDD | 0.1 | 24.5 | | | 4.59 | | | 4.33 | | | 4.88 | | | 3.63 | | |
| 1,2,3,7,8,9-HxCDD | 0.1 | 10.8 | | | 2.46 | | | 2.95 | | | 3.41 | | | 2.44 | | |
| 1,2,3,4,6,7,8-HpCDD | 0.01 | 606 | | | 97.1 | | | 103 | | | 128 | | | 86.7 | | |
| OCDD | 0.0003 | 4950 | | | 760 | | | 936 | | | 1080 | | | 703 | | |
| **Furans (ng/kg dw)** | | | | | | | | | | | | | | | | |
| 2,3,7,8-TCDF | 0.1 | 2.93 | | | 0.77 | J | J1 | 0.851 | J | J1 | 1.1 | | | 0.563 | J | J1 |
| 1,2,3,7,8-PeCDF | 0.03 | 3.42 | | | 0.841 | J | J1 | 0.632 | J | J1 | 0.787 | J | J1 | 0.466 | JX | JX |
| 2,3,4,7,8-PeCDF | 0.3 | 8.62 | | | 2.8 | | | 1.03 | | | 1.3 | | | 0.838 | J | J1 |
| 1,2,3,4,7,8-HxCDF | 0.1 | 66.6 | | | 10.7 | | | 2.71 | | | 3.4 | | | 2.43 | | |
| 1,2,3,6,7,8-HxCDF | 0.1 | 14.6 | | | 2.27 | | | 1.13 | J | J1 | 1.68 | J | J1 | 0.864 | JEMPC | UJ |
| 2,3,4,6,7,8-HxCDF | 0.1 | 19.6 | | | 2.61 | | | 1.64 | J | J1 | 2.1 | | | 2.94 | | |
| 1,2,3,7,8,9-HxCDF | 0.1 | 11.6 | | | 2.37 | | | 0.624 | J | J1 | 0.797 | J | J1 | 0.555 | JEMPC | UJ |
| 1,2,3,4,6,7,8-HpCDF | 0.01 | 243 | | | 22.4 | | | 18.5 | | | 24 | | | 17 | | |
| 1,2,3,4,7,8,9-HpCDF | 0.01 | 38.4 | | | 2.5 | | | 1.72 | J | J1 | 2.03 | | | 1.51 | J | J1 |
| OCDF | 0.0003 | 619 | | | 49.7 | | | 49.4 | | | 63.3 | | | 47.4 | | |
| | | | | | | | | | | | | | | | | |
| **TEQ (ND=1/2RL) [3]** | | 33.73 | | | 5.90 | | | 4.71 | | | 6.52 | | | 3.87 | | |
| **TEQ (ND=0) [3]** | | 33.73 | | | 5.75 | | | 4.41 | | | 6.52 | | | 3.69 | | |
| | | | | | | | | | | | | | | | | |
| **Homolog Totals (ng/kg dw)** | | | | | | | | | | | | | | | | |
| Total TCDD | | 20.1 | | | 3.77 | | | 4.97 | | | 5.06 | | | 4.55 | | |
| Total PeCDD | | 38.8 | | | 6.91 | | | 7.75 | | | 8.41 | | | 6.95 | | |
| Total HpCDD | | 1140 | | | 239 | | | 282 | | | 417 | | | 235 | | |
| Total HxCDD | | 164 | | | 33.4 | | | 41.7 | | | 54.5 | | | 33.5 | | |
| OCDD | | 4950 | | | 760 | | | 936 | | | 1080 | | | 703 | | |
| | | | | | | | | | | | | | | | | |
| Total TCDF | | 72.1 | | | 13.8 | | | 12.4 | | | 19.9 | | | 11.1 | | |
| Total PeCDF | | 162 | | | 32.4 | | | 20.8 | | | 28.1 | | | 17.4 | | |
| Total HxCDF | | 494 | | | 63.5 | | | 32.6 | | | 42.5 | | | 44.2 | | |
| Total HpCDF | | 1010 | | | 77.1 | | | 61.4 | | | 76.9 | | | 64.6 | | |
| OCDF | | 619 | | | 49.7 | | | 49.4 | | | 63.3 | | | 47.4 | | |

Notes(s)

1. Data qualifiers are as follows.
   - EMPC = Estimated Maximum Possible Concentration
   - J = Estimated value, concentration less than reporting limit.
   - J1 = Estimated value, concentration less than reporting limit. Assigned during data validation
   - JEMPC = Estimated Maximum Possible Concentration (EMPC), concentration less than reporting limit.
   - JX = Estimated value, concentration less than the reporting limit. Polychlorinated diphenyl ether interference.
   - UJ = Undetected at the reporting limit. Reporting limit estimated.
2. 2005 World Health Organization (WHO) (Van den Berg et al. 2006).
3. Expressed as ng TEQ/kg dw.

Abbreviation(s)

- ND = nondetect
- ng/kg dw = nanograms per kilogram dry weight
- Q1 = laboratory assigned qualifier
- Q2 = qualifier assigned during data validation
- RI = Remedial Investigation
- RL= reporting limit
- TEF = toxicity equivalency factor
- TEQ = toxic equivalent concentration

**TABLE 46**

**SUMMARY STATISTICS FOR CHEMICALS OF CONCERN IN RI SEDIMENT SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| | Preliminary Cleanup Levels | | | | | | | | | | | | | | Surface Samples (only) | | | | Surface and Core Samples | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RAO 1: Human Seafood Consumption | RAO 2: Human Direct Contact | | RAO 3: Benthic Organisms Sediment Management Standards Sediment Quality Standards | | RAO 4: Ecological (River Otter Site-wide) | Sediment Management Standards Cleanup Screening Levels | Min Value (Detected Value or RL) | Max Value (Detected Value or RL) | Min Detected Value | Max Detected Value | Min OC Norm Value | Max OC Norm Value | Total # of Samples Analyzed [4] | RAO 1: Human Seafood Consumption Exceedance | RAO 2: Human Direct Contact Exceedance | | RAO 3: Benthic Organisms SCO Exceedance | Total Number of Detected SCO Exceedances (# undetected) [5] | Total Number of detected CSL Exceedances (# undetected) [6] |
| Analyte | Site-wide | Site-wide | Clamming areas | SCO [1] | LAET [3] | | | | | | | | | | Site-wide | Site-wide | Clamming areas | | | |
| **Conventionals** | | | | | | | | | | | | | | | | | | | | |
| Total Organic Carbon (Percent) | — | — | — | — | — | — | — | 0.1 | 3.07 | 0.1 | 3.07 | — | — | 17 / 59 | — | — | — | — | — | — |
| Total Solids (Percent) | — | — | — | — | — | — | — | 44.8 | 88.6 | 44.8 | 88.6 | — | — | 17 / 59 | — | — | — | — | — | — |
| **Metals** | | **mg/kg dw** | | **mg/kg dw** | **mg/kg dw** | | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | **mg/kg dw** | | | | | | | | | |
| Arsenic | NC | 7 | 7 | 57 | 57 | — | 93 | 0.9 | 684 | 0.9 | 684 | — | — | 17 / 56 | — | 17 | 8 | 2 | 7 (0) | 7 (0) |
| Cadmium | — | — | — | 5.1 | 5.1 | — | 6.7 | 0.2 | 2.9 | 0.4 | 2.9 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Chromium | — | — | — | 260 | 260 | — | 270 | 9.9 | 55 | 9.9 | 55 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Copper | — | — | — | 390 | 390 | — | 390 | 7.7 | 76.7 | 7.7 | 76.7 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Lead | — | — | — | 450 | 450 | — | 530 | 2 | 100 | 3.0 | 100 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Mercury | — | — | — | 0.41 | 0.41 | — | 0.59 | 0.02 | 0.34 | 0.06 | 0.34 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Silver | — | — | — | 6.1 | 6.1 | — | 6.1 | 0.3 | 3.2 | 0.5 | 3.2 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Zinc | — | — | — | 410 | 410 | — | 960 | 20 | 1,790 | 20 | 1,790 | — | — | 17 / 56 | — | — | — | 0 | 2 (0) | 1 (0) |
| **Nonionizable Organic Compounds** | | | | | | | | | | | | | | | | | | | | |
| **Aromatic Hydrocarbons** | | | | **mg/kg OC** | **µg/kg dw** | | **mg/kg OC** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **mg/kg OC** | | | | | | | |
| *LPAH* | — | — | — | 370 | 5,200 | — | 780 | 18 | 3,906 | 20 | 3,906 | 1.18 | 160.08 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Naphthalene | — | — | — | 99 | 2,100 | — | 170 | 11 | 190 | 11 | 190 | 0.4 | 7.8 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Acenaphthylene | — | — | — | 66 | 1,300 | — | 66 | 10 | 57 | 10 | 33 | 0.5 | 3.3 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Acenaphthene | — | — | — | 16 | 500 | — | 57 | 9.5 | 700 | 9.5 | 700 | 0.4 | 49.6 | 17 / 56 | — | — | — | 0 | 1 (0) | 0 |
| Fluorene | — | — | — | 23 | 540 | — | 79 | 9.5 | 360 | 9.5 | 360 | 0.4 | 14.8 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Phenanthrene | — | — | — | 100 | 1,500 | — | 480 | 11 | 2,600 | 11 | 2,600 | 0.6 | 106.6 | 17 / 56 | — | — | — | 0 | 1 (0) | 0 |
| Anthracene | — | — | — | 220 | 960 | — | 1,200 | 11 | 400 | 11 | 400 | 0.6 | 16.4 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| 2-Methylnaphthalene | — | — | — | 38 | 670 | — | 64 | 9.6 | 190 | 9.6 | 190 | 0.3 | 8.0 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| *HPAH* | — | — | — | 960 | 12,000 | — | 5,300 | 11 | 12,330 | 11 | 12,330 | 1.0 | 704.6 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Fluoranthene | — | — | — | 160 | 1,700 | — | 1,200 | 11 | 2,800 | 11 | 2,800 | 0.6 | 160.0 | 17 / 56 | — | — | — | 1 | 1 (0) | 0 |
| Pyrene | — | — | — | 1,000 | 2,600 | — | 1,400 | 16 | 2,600 | 16 | 2,600 | 0.6 | 125.7 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Benz[a]anthracene | — | — | — | 110 | 1,300 | — | 270 | 10 | 1,000 | 10 | 1,000 | 0.7 | 57.1 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Chrysene | — | — | — | 110 | 1,400 | — | 460 | 11 | 1,400 | 11 | 1,400 | 0.7 | 80.0 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Total benzofluoranthenes | — | — | — | 230 | 3,200 | — | 450 | 14 | 2,100 | 14 | 2100 | 0.7 | 120.0 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Benzo[a]pyrene | — | — | — | 99 | 1,600 | — | 210 | 17 | 1,200 | 17 | 1,200 | 0.7 | 68.6 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Indeno[1,2,3-c,d]pyrene | — | — | — | 34 | 600 | — | 88 | 9.8 | 670 | 9.8 | 670 | 0.7 | 38.3 | 17 / 56 | — | — | — | 1 | 1 (0) | 0 |
| Dibenzo[a,h]anthracene | — | — | — | 12 | 230 | — | 33 | 2.8 | 280 | 2.8 | 280 | 0.2 | 16.0 | 17 / 56 | — | — | — | 1 | 1 (0) | 0 |
| Benzo[g,h,i]perylene | — | — | — | 31 | 670 | — | 78 | 9.4 | 680 | 9.4 | 680 | 0.6 | 38.9 | 17 / 56 | — | — | — | 1 | 1 (0) | 0 |
| cPAH (µg TEQ/kg dw) [7] | NC | 380 | 150 | — | — | — | | — | — | 12.7 | 1703 | — | — | 17 / 56 | — | 3 | 4 | — | — | — |

**TABLE 46**

**SUMMARY STATISTICS FOR CHEMICALS OF CONCERN IN RI SEDIMENT SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| | Preliminary Cleanup Levels | | | | | | | | | | | | | | Surface Samples (only) | | | | Surface and Core Samples | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RAO 1: Human Seafood Consumption | RAO 2: Human Direct Contact | | RAO 3: Benthic Organisms Sediment Management Standards Sediment Quality Standards | | RAO 4: Ecological (River Otter Site-wide) | Sediment Management Standards Cleanup Screening Levels | Min Value (Detected Value or RL) | Max Value (Detected Value or RL) | Min Detected Value | Max Detected Value | Min OC Norm Value | Max OC Norm Value | Total # of Samples Analyzed [4] | RAO 1: Human Seafood Consumption Exceedance | RAO 2: Human Direct Contact Exceedance | | RAO 3: Benthic Organisms SCO Exceedance | Total Number of Detected SCO Exceedances (# undetected) [5] | Total Number of detected CSL Exceedances (# undetected) [6] |
| Analyte | Site-wide | Site-wide | Clamming areas | SCO [1] | LAET [3] | | | | | | | | | | Site-wide | Site-wide | Clamming areas | | | |
| **Chlorinated Benzenes (µg/kg)** | | | | **mg/kg OC** | **µg/kg dw** | | | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **mg/kg OC** | | | | | | | |
| 1,2-Dichlorobenzene | — | — | — | 2.3 | 35 | — | 2.3 | 2.5 | 160 | 2.5 | 160 | 0.1 | 6.5 | 17 / 56 | — | — | — | 0 | 1 (0) | 1 (0) |
| 1,4-Dichlorobenzene | — | — | — | 3.1 | 110 | — | 9 | 2.4 | 77 | 2.4 | 77 | 0.1 | 3.1 | 17 / 56 | — | — | — | 0 | 1 (0) | 0 |
| 1,2,4-Trichlorobenzene | — | — | — | 0.81 | 31 | — | 1.8 | 2.5 | 14 | 2.5 | 3.7 | 0.14 | 0.80 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Hexachlorobenzene | — | — | — | 0.38 | 22 | — | 2.3 | 3.4 | 14 | — | — | 0.16 | 0.80 | 17 / 56 | — | — | — | 4 | 0 (8) | 0 |
| **Phthalate Esters (µg/kg)** | | | | **mg/kg OC** | **µg/kg dw** | | | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **mg/kg OC** | | | | | | | |
| Dimethyl phthalate | — | — | — | 53 | 71 | — | 53 | 3.4 | 44 | 3.4 | 44 | 0.2 | 2.2 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Diethyl phthalate | — | — | — | 61 | 200 | — | 110 | 38 | 1,500 | 38 | 1,500 | 1.6 | 92.6 | 17 / 56 | — | — | — | 1 | 1 (0) | 0 |
| Di-n-butyl phthalate | — | — | — | 220 | 1,400 | — | 1,700 | 9.8 | 740 | 9.8 | 740 | 0.5 | 49.7 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Butyl benzyl phthalate | — | — | — | 4.9 | 63 | — | 64 | 2.5 | 380 | 2.5 | 380 | 0.1 | 20.5 | 17 / 56 | — | — | — | 1 | 2 (0) | 0 |
| Bis[2-ethylhexyl]phthalate | — | — | — | 47 | 1,300 | — | 78 | 16 | 9,500 | 16 | 9,500 | 0.6 | 513.5 | 17 / 56 | — | — | — | 0 | 1 (0) | 1 (0) |
| Di-n-octyl phthalate | — | — | — | 58 | 6,200 | — | 4,500 | 18 | 100 | 20 | 100 | 0.6 | 5.7 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| **Miscellaneous (µg/kg)** | | | | **mg/kg OC** | **µg/kg dw** | | | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **mg/kg OC** | | | | | | | |
| Dibenzofuran | — | — | — | 15 | 540 | — | 58 | 9.4 | 180 | 9.4 | 180 | 0.5 | 7.4 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Hexachlorobutadiene | — | — | — | 3.9 | 11 | — | 6.2 | 3.4 | 14 | — | — | 0.2 | 0.8 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| N-nitrosodiphenylamine | — | — | — | 11 | 28 | — | 11 | 3.4 | 14 | 5.5 | 8.1 | 0.2 | 0.8 | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Carbazole | — | — | — | — | — | — | — | 9.6 | 320 | 9.6 | 320 | — | — | 17 / 56 | — | — | — | | — | — |
| **Pesticides and PCBs** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **µg/kg dw** | **µg/kg dw** | | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **mg/kg OC** | **mg/kg OC** | | | | | | | |
| Total PCBs | 2 | 1,300 | 500 | 12 | 130 | 128-159 | 65 | 12 | 2,070 | 12 | 2,070 | 0.8 | 111.9 | 17 / 59 | 17 | 0 | 3 | 7 | 30 (0) | 3 (0) |
| **Ionizable Organic Compounds** | | | | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | **µg/kg dw** | | | | | | | | | |
| Phenol | — | — | — | 420 | 420 | — | 1,200 | 10 | 610 | 10 | 610 | — | — | 17 / 56 | — | — | — | 0 | 1 (0) | 0 |
| 2-Methylphenol | — | — | — | 63 | 63 | — | 63 | 2.5 | 19 | 2.5 | 19 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| 4-Methylphenol | — | — | — | 670 | 670 | — | 670 | 10 | 120 | 10 | 120 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| 2,4-Dimethylphenol | — | — | — | 29 | 29 | — | 29 | 2.4 | 23 | 2.4 | 23 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Pentachlorophenol | — | — | — | 360 | 360 | — | 690 | 14 | 71 | 14 | 14 | — | — | 17 / 56 | — | — | — | 0 | 0 | 0 |
| Benzyl alcohol | — | — | — | 57 | 57 | — | 73 | 4.4 | 130 | 6.8 | 130 | — | — | 17 / 56 | — | — | — | 6 | 5 (6) | 3 (1) |
| Benzoic acid | — | — | — | 650 | 650 | — | 650 | 100 | 1,100 | 100 | 150 | — | — | 17 / 56 | — | — | — | 1 | 0 (1) | 0 (1) |

**TABLE 46**

**SUMMARY STATISTICS FOR CHEMICALS OF CONCERN IN RI SEDIMENT SAMPLES**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| | Preliminary Cleanup Levels | | | | | | | | | | | | | | Surface Samples (only) | | | | Surface and Core Samples | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RAO 1: Human Seafood Consumption | RAO 2: Human Direct Contact | | RAO 3: Benthic Organisms Sediment Management Standards Sediment Quality Standards | | RAO 4: Ecological (River Otter Site-wide) | Sediment Management Standards Cleanup Screening Levels | Min Value (Detected Value or RL) | Max Value (Detected Value or RL) | Min Detected Value | Max Detected Value | Min OC Norm Value | Max OC Norm Value | Total # of Samples Analyzed [4] | RAO 1: Human Seafood Consumption Exceedance | RAO 2: Human Direct Contact Exceedance | | RAO 3: Benthic Organisms SCO Exceedance | Total Number of Detected SCO Exceedances (# undetected) [5] | Total Number of detected CSL Exceedances (# undetected) [6] |
| Analyte | Site-wide | Site-wide | Clamming areas | SCO [1] | LAET [3] | | | | | | | | | | Site-wide | Site-wide | Clamming areas | | | |
| **Dioxins/Furans** | **µg TEQ/kg dw** | **µg TEQ/kg dw** | | | | | | **ng/kg dw** | **ng/kg dw** | **ng/kg dw** | **ng/kg dw** | | | | | | | | | |
| 2,3,7,8-TCDD | — | — | — | — | — | — | — | 0.287 | 1.1 | 1.1 | 1.1. | — | — | 5 / 0 | — | — | — | — | — | — |
| 2,3,7,8-TCDF | — | — | — | — | — | — | — | 0.563 | 2.93 | 0.563 | 2.93 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,7,8-PeCDD | — | — | — | — | — | — | — | 0.754 | 3.85 | 0.754 | 3.85 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,7,8-PeCDF | — | — | — | — | — | — | — | 0.466 | 3.42 | 0.466 | 3.42 | — | — | 5 / 0 | — | — | — | — | — | — |
| 2,3,4,7,8-PeCDF | — | — | — | — | — | — | — | 0.838 | 8.62 | 0.838 | 8.62 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,4,7,8-HxCDD | — | — | — | — | — | — | — | 0.937 | 4.79 | 0.937 | 4.79 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,6,7,8-HxCDD | — | — | — | — | — | — | — | 3.63 | 24.5 | 3.63 | 24.5 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,7,8,9-HxCDD | — | — | — | — | — | — | — | 2.44 | 10.8 | 2.44 | 10.8 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,4,7,8-HxCDF | — | — | — | — | — | — | — | 2.43 | 66.6 | 2.43 | 66.6 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,6,7,8-HxCDF | — | — | — | — | — | — | — | 0.864 | 14.6 | 1.13 | 14.6 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,7,8,9-HxCDF | — | — | — | — | — | — | — | 0.555 | 11.6 | 0.624 | 11.6 | — | — | 5 / 0 | — | — | — | — | — | — |
| 2,3,4,6,7,8-HxCDF | — | — | — | — | — | — | — | 1.64 | 19.6 | 1.64 | 19.6 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,4,6,7,8-HpCDD | — | — | — | — | — | — | — | 86.7 | 606 | 86.7 | 606 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,4,6,7,8-HpCDF | — | — | — | — | — | — | — | 17 | 243 | 17 | 243 | — | — | 5 / 0 | — | — | — | — | — | — |
| 1,2,3,4,7,8,9-HpCDF | — | — | — | — | — | — | — | 1.51 | 38.4 | 1.51 | 38.4 | — | — | 5 / 0 | — | — | — | — | — | — |
| OCDD | — | — | — | — | — | — | — | 703 | 4950 | 7.3 | 4950 | — | — | 5 / 0 | — | — | — | — | — | — |
| OCDF | — | — | — | — | — | — | — | 47.4 | 619 | 47.4 | 619 | — | — | 5 / 0 | — | — | — | — | — | — |
| TEQ (ND=1/2RL) [7] | 2 | 37 | 13 | — | — | — | — | — | — | 3.87 | 33.73 | — | — | 5 / 0 | 5 | 0 | 1 | — | — | — |
| TEQ (ND=0) [8] | 2 | 37 | 13 | — | — | — | — | — | — | 3.69 | 33.73 | — | — | 5 / 0 | 5 | 0 | 1 | — | — | — |

Notes:
1. Sediment Management Standards Sediment Cleanup Objectives (173-204-560) WAC.
2. Sediment Management Standards Cleanup Screening Levels (173-204-560) WAC.
3. LAET = Lowest-Apparent-Effects Threshold.
4. Number of Surface Samples / Core Samples Analyzed (Including Field Duplicates)
5. Number of Samples with Detected Exceedances of SCO (Number of Undetected Exceedances). Number Includes Samples that Exceed CSL.
6. Number of Samples with Detected Exceedances of CSL (Number of Undetected Exceedances)
7. TEQ values calculated using 1/2 the RL for non-detected compounds.
8. TEQ values calculated using zero for non-detected compounds: expressed as ng TEQ/kg dw

Abbreviations:
CSL = cleanup screening level
dw = dry weight
HPAH = high-molecular-weight polycyclic aromatic hydrocarbon
LAET = lowest apparent effects threshold
LPAH = low-molecular-weight polycyclic aromatic hydrocarbon
mg/kg = milligrams per kilogram
ND = non detects
ng/kg = nanograms per kilogram
OC = organic carbon
PCBs = polychlorinated biphenyls
RI = Remedial Investigation
RL = reporting limit
RAO = remedial action objective
SMS = Washington State Sediment Management Standards
SCO = sediment cleanup objective
TEQ = toxic equivalent concentration
µg/kg = micrograms per kilogram

**TABLE 47**
**SUMMARY OF CONSTITUENTS DETECTED IN UPLAND SOIL AND GROUNDWATER AND SEDIMENTS**
**AT CONCENTRATIONS EXCEEDING THE PRELIMINARY CLEANUP LEVELS**
**BOEING ISAACSON-THOMPSON SITE**
**TUKWILA, WASHINGTON**

| Constituents Exceeding Preliminary Cleanup Levels in One or More Samples | North of Former Slip 5 Area | | Former Slip 5 Area | | South of Former Slip 5 Area | | Western Property Boundary | | Sediments (a) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Soil* | *GW* | *Soil* | *GW* | *Soil* | *GW* | *Soil* | *GW* | *Surface (0-10 cm)* | *2 ft to 3 ft* | *4 ft to 5 ft* | *6 ft to 7 ft* | *8 ft to 9 ft* | *10 ft to 11 ft* |
| Acrylonitrile | | x | | | | x | | | | | | | | |
| Naphthalene | | | x | | | | | | | | | | | |
| 1,1-Dichloroethene | | | | | | x | | | | | | | | |
| cis-1,2-Dichloroethene | | | | | | x | | | | | | | | |
| Trichloroethene | | | | | x | x | | x | | | | | | |
| Vinyl Chloride | | x | | | | x | | | | | | | | |
| Benzoic Acid | | x | | | | | | | | | | | | |
| Bis(2-ethylhexyl)phthalate | | x | | x | | | | | | x | | | | |
| Total cPAHs (TEQ) | x | x | x | x | x | x | x | x | x | | | | | |
| PCBs | x | x | x | x | x | | x | x | x | x | x | x | x | x |
| TPH-Dx | x | | | | | | | | | | | | | |
| TPH-Gx | x | | x | | x | | | | | | | | | |
| Arsenic | x | x | x | x | x | x | x | x | x | x | x | | | |
| Barium | | | x | | | | | | | | | | | |
| Cadmium | x | x | x | x | | | x | x | | | | | | |
| Chromium | | | x | | | | | | | | | | | |
| Chromium VI | | x | x | | | x | | | | | | | | |
| Copper | x | x | x | | x | | x | | | | | | | |
| Lead | x | x | x | | | | x | | | | | | | |
| Nickel | | x | x | x | | x | | x | | | | | | |
| Mercury | x | x | x | | | | | | | | | | | |
| Selenium | | x | | | | | | | | | | | | |
| Thallium | | x | x | | | | | | | | | | | |
| Zinc | x | x | x | | | | x | | | x | x | | | |

TPH-Dx = total petroleum hydrocarbons-Diesel
TPH-Gx = total petroleum hydrocarbons-Gasoline
cPAHs = carcinogenic polycyclic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls

(a) Listed sediment exceedances are for constituents that exceed soil or groundwater preliminary cleanups levels only. All sediment exceedances are summarized in Table 51.

# TABLE 48
## SUMMARY OF PRELIMINARY CLEANUP LEVELS EXCEEDANCES IN SOIL REMAINING NORTH OF THE FORMER SLIP 5 AREA ON BOEING PROPERTY
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| North of Slip 5 Soil Statistics | Preliminary Cleanup Levels | Number of Soil Samples Analyzed | Number of Nondetects | Number of Samples with Detected Concentrations | Frequency of Detection (percent) | Number of Soil Samples with Concentrations Exceeding Preliminary Cleanup Levels | Frequency of Exceedance (percent) | Maximum Detection |
|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES (µg/kg)** | | | | | | | | |
| **Method SW8270D/SW8270C-SIM** | | | | | | | | |
| Total cPAHs TEQ | 15 | 80 | 30 | 50 | 63 | 33 | 41 | 6593 |
| **PCBs (µg/kg)** | | | | | | | | |
| **Method SW8082** | | | | | | | | |
| Aroclor 1254 | 0.29 | 79 | 78 | 1 | 1 | 1 | 1 | 43 |
| Aroclor 1260 | 5.4 | 79 | 76 | 3 | 4 | 2 | 3 | 56 |
| Total PCBs | 1.8 | 81 | 77 | 4 | 5 | 4 | 5 | 56 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | |
| **Method NWTPH-Dx** | | | | | | | | |
| Diesel-Range Organics | 2000 | 74 | 40 | 34 | 46 | 2 | 3 | 7400 |
| Oil-Range Organics | 2000 | 74 | 33 | 41 | 55 | 2 | 3 | 25000 |
| **Method NWTPH-G** | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 70 | 62 | 8 | 11 | 1 | 1 | 36 (a) |
| **TOTAL METALS (mg/kg)** | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | |
| Arsenic | 7 | 309 | 42 | 267 | 86 | 204 | 66 | 3500 |
| Cadmium | 1.3 | 114 | 54 | 60 | 53 | 18 | 16 | 15 |
| Copper | 36 | 89 | 0 | 89 | 100 | 45 | 51 | 1170 |
| Lead | 250 | 116 | 5 | 111 | 96 | 5 | 4 | 1210 |
| Mercury | 1.5 | 114 | 34 | 80 | 70 | 1 | 1 | 1.82 |
| Zinc | 1418 | 103 | 0 | 103 | 100 | 2 | 2 | 3030 |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
SIM = Selected Ion Monitoring
cPAHs = carginogenic polycyclic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls
TPH-Dx = total petroleum hydrocarbons-Diesel
TPH-G = total petroleum hydrocarbons-Gasoline

(a) Benzene is present at a concentration of 4.4 µg/kg

# TABLE 49
## SUMMARY OF PRELIMINARY CLEANUP LEVELS EXCEEDANCES IN SOIL REMAINING WITHIN THE FORMER SLIP 5 AREA ON BOEING PROPERTY
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Slip 5 Soil Statistics | Preliminary Cleanup Levels | Number of Soil Samples Analyzed | Number of Nondetects | Number of Samples with Detected Concentrations | Frequency of Detection (percent) | Number of Soil Samples with Concentrations Exceeding Preliminary Cleanup Levels | Frequency of Exceedance (percent) | Maximum Detection |
|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES (µg/kg)** | | | | | | | | |
| **Method SW8270D** | | | | | | | | |
| Naphthalene | 2,100 | 73 | 33 | 40 | 55 | 1 | 1 | 2200 |
| **Method SW8270D/SW8270D-SIM** | | | | | | | | |
| Total cPAHs TEQ | 15 | 73 | 10 | 63 | 86 | 42 | 58 | 8394 |
| **PCBs (µg/kg)** | | | | | | | | |
| **Method SW8082** | | | | | | | | |
| Aroclor 1242 | 0.72 | 83 | 82 | 1 | 1 | 1 | 1 | 60 |
| Aroclor 1254 | 0.29 | 83 | 60 | 23 | 28 | 23 | 28 | 12,000 |
| Aroclor 1260 | 5.4 | 83 | 63 | 20 | 24 | 20 | 24 | 5200 |
| Total PCBs | 1.8 | 93 | 62 | 31 | 33 | 31 | 33 | 12,000 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | |
| **Method NWTPH-G** | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 70 | 55 | 15 | 21 | 3 (a) | 4 | 120 |
| **TOTAL METALS (mg/kg)** | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | |
| Arsenic | 7 | 182 | 14 | 168 | 92 | 100 | 55 | 4000 |
| Barium | 640 | 91 | 0 | 91 | 100 | 2 | 2 | 650 |
| Cadmium | 1.3 | 127 | 38 | 89 | 70 | 36 | 28 | 28.1 |
| Chromium | 1480 | 180 | 0 | 180 | 100 | 10 | 6 | 4180 |
| Chromium VI | 3.8 | 70 | 63 | 7 | 10 | 1 | 1 | 8.32 |
| Copper | 36 | 157 | 0 | 157 | 100 | 84 | 54 | 1500 |
| Lead | 250 | 176 | 16 | 160 | 91 | 39 | 22 | 4200 |
| Mercury | 1.5 | 126 | 47 | 79 | 63 | 3 | 2 | 4.3 |
| Nickel | 210 | 140 | 0 | 140 | 100 | 21 | 15 | 4940 |
| Thallium | 0.67 | 70 | 69 | 1 | 1 | 1 | 1 | 1.1 |
| Zinc | 1400 | 172 | 0 | 172 | 100 | 14 | 8 | 9040 |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
SIM = Selected Ion Monitoring
cPAHs = carginogenic polycyclic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls
TPH-G = total petroleum hydrocarbons-Gasoline

(a) One additional sample above 30 mg/kg and below 100 mg/kg was also analyzed for benzene and benzene was not detected.

# TABLE 50
## SUMMARY OF PRELIMINARY CLEANUP LEVELS EXCEEDANCES
## IN SOIL REMAINING SOUTH OF THE FORMER SLIP 5 AREA ON BOEING PROPERTY
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| South of Slip 5 Soil Statistics | Preliminary Cleanup Levels | Number of Soil Samples Analyzed | Number of Nondetects | Number of Samples with Detected Concentrations | Frequency of Detection (percent) | Number of Soil Samples with Concentrations Exceeding Preliminary Cleanup Levels | Frequency of Exceedance (percent) | Maximum Detection |
|---|---|---|---|---|---|---|---|---|
| **VOLATILES (µg/kg)** | | | | | | | | |
| **Method SW8260C** | | | | | | | | |
| Trichloroethene | 51 | 126 | 101 | 25 | 20 | 4 | 3 | 270 |
| **SEMIVOLATILES (µg/kg)** | | | | | | | | |
| **Method SW8270D/SW8270C-SIM** | | | | | | | | |
| Total cPAHs TEQ | 15 | 84 | 27 | 57 | 68 | 20 | 24 | 537 |
| **PCBs (µg/kg)** | | | | | | | | |
| **Method SW8082** | | | | | | | | |
| Aroclor 1254 | 0.29 | 99 | 89 | 10 | 10 | 10 | 10 | 660 |
| Aroclor 1260 | 5.4 | 99 | 94 | 5 | 5 | 5 | 5 | 73 |
| Total PCBs | 1.8 | 100 | 88 | 12 | 12 | 12 | 12 | 660 |
| **TOTAL METALS (mg/kg)** | | | | | | | | |
| **Methods 200.8/7471A/SW7196A** | | | | | | | | |
| Arsenic | 7 | 192 | 26 | 166 | 86 | 20 | 10 | 43 |
| Copper | 36 | 118 | 0 | 118 | 100 | 15 | 13 | 97.1 |
| **TOTAL PETROLEUM HYDROCARBONS (mg/kg)** | | | | | | | | |
| **NWTPH-G** | | | | | | | | |
| Gasoline-Range Organics | 100/30 | 76 | 69 | 7 | 9 | 1 | 1 | 150 |

µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
SIM = Selected Ion Monitoring
cPAHs = carginogenic polycyclic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls
TPH-G = total petroleum hydrocarbons-Gasoline

# TABLE 51
## SUMMARY OF PRELIMINARY CLEANUP LEVELS EXCEEDANCES IN GROUNDWATER NORTH OF THE FORMER SLIP 5 AREA ON BOEING PROPERTY
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| North of Slip 5 Groundwater Statistics | Preliminary Cleanup Levels | Number of GW Samples Analyzed | Number of Nondetects | Number of Samples with Detected Concentrations | Frequency of Detection (percent) | Number of Samples with Concentrations Exceeding Preliminary Cleanup Levels | Frequency of Exceedance (percent) | Maximum Detection |
|---|---|---|---|---|---|---|---|---|
| **VOLATILES (µg/L)** | | | | | | | | |
| **Method SW8260C/SW8260C-SIM** | | | | | | | | |
| Acrylonitrile | 0.057 | 12 | 11 | 1 | 8 | 1 | 8 | 0.059 |
| Vinyl Chloride | 0.53 | 48 | 26 | 22 | 46 | 5 | 10 | 2.0 |
| **SEMIVOLATILES (µg/L)** | | | | | | | | |
| **Method SW8270D/SW8270C-SIM** | | | | | | | | |
| Benzoic Acid | 2,240 | 48 | 40 | 8 | 17 | 1 | 2 | 3400 |
| bis(2-Ethylhexyl)phthalate | 1.2 | 48 | 47 | 1 | 2 | 1 | 2 | 1.8 |
| **cPAHs (µg/L)** | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | |
| Total cPAHs TEQ | 0.00018 | 48 | 40 | 8 | 17 | 8 | 17 | 0.008 |
| **PCBs (µg/L)** | | | | | | | | |
| **Method SW8082** | | | | | | | | |
| Aroclor 1248 | 0.000023 | 48 | 47 | 1 | 2 | 1 | 2 | 0.0086 |
| Aroclor 1260 | 0.000023 | 48 | 44 | 4 | 8 | 4 | 8 | 0.024 |
| Total PCBs | 0.000023 | 48 | 43 | 5 | 10 | 5 | 10 | 0.024 |
| **DISSOLVED METALS (µg/L)** | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | |
| Arsenic | 8 | 48 | 2 | 46 | 96 | 38 | 79 | 285,000 |
| Cadmium | 0.25 | 48 | 38 | 10 | 21 | 5 | 10 | 0.8 |
| Copper | 8 | 48 | 11 | 37 | 77 | 18 | 38 | 2050 |
| Lead | 2.5 | 48 | 29 | 19 | 40 | 3 | 6 | 5.5 |
| Nickel | 8.2 | 48 | 3 | 45 | 94 | 12 | 25 | 297 |
| Selenium | 5 | 48 | 26 | 22 | 46 | 5 | 10 | 13.4 |
| Thallium | 0.47 | 48 | 46 | 2 | 4 | 1 | 2 | 0.5 |
| Zinc | 56 | 48 | 13 | 35 | 73 | 15 | 31 | 477 |
| **TOTAL METALS** | | | | | | | | |
| **Method SW7470A/EPA 1631E (ng/L)** | | | | | | | | |
| Mercury | 12 | 48 | 18 | 30 | 63 | 7 | 15 | 1750 |
| **Method SW7196A (mg/L)** | | | | | | | | |
| Chromium VI | 0.00058 | 48 | 45 | 3 | 6 | 3 | 6 | 0.037 |

GW = groundwater
µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
SIM = Selected Ion Monitoring
cPAHs = carginogenic polycyclic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls

# TABLE 52
## SUMMARY OF PRELIMINARY CLEANUP LEVELS EXCEEDANCES
## IN GROUNDWATER WITHIN THE FORMER SLIP 5 AREA ON BOEING PROPERTY
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| Slip 5 Groundwater Statistics | Preliminary Cleanup Levels | Number of GW Samples Analyzed | Number of Nondetects | Number of Samples with Detected Concentrations | Frequency of Detection (percent) | Number of Samples with Concentrations Exceeding Preliminary Cleanup Levels | Frequency of Exceedance (percent) | Maximum Detection |
|---|---|---|---|---|---|---|---|---|
| **SEMIVOLATILES (µg/L)** | | | | | | | | |
| **Method SW8270D/SW8270C-SIM** | | | | | | | | |
| bis(2-Ethylhexyl)phthalate | 1.2 | 56 | 53 | 3 | 5 | 3 | 5 | 3.7 |
| **cPAHs (µg/L)** | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | |
| Chrysene | 0.018 | 56 | 48 | 8 | 14 | 2 | 4 | 0.13 |
| Total cPAHs TEQ | 0.00018 | 56 | 42 | 14 | 25 | 13 | 23 | 0.152 |
| **PCBs (µg/L)** | | | | | | | | |
| **Method SW8082** | | | | | | | | |
| Aroclor 1248 | 0.000023 | 56 | 52 | 4 | 7 | 4 | 7 | 0.024 |
| Aroclor 1254 | 0.0000055 | 56 | 47 | 9 | 16 | 9 | 16 | 0.015 |
| Aroclor 1260 | 0.000023 | 56 | 54 | 2 | 4 | 2 | 4 | 0.0065 |
| Total PCBs | 0.000023 | 56 | 42 | 14 | 25 | 14 | 25 | 0.024 |
| **DISSOLVED METALS (µg/L)** | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | |
| Arsenic | 8 | 56 | 1 | 55 | 98 | 27 | 48 | 8,010 |
| Cadmium | 0.25 | 56 | 48 | 8 | 14 | 5 | 9 | 0.47 |
| Nickel | 8.2 | 56 | 12 | 44 | 79 | 1 | 2 | 9.1 |

GW = groundwater
µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
SIM = Selected Ion Monitoring
cPAHs = carginogenic polycyclic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls

# TABLE 53
## SUMMARY OF PRELIMINARY CLEANUP LEVELS EXCEEDANCES IN GROUNDWATER SOUTH OF THE FORMER SLIP 5 AREA ON BOEING PROPERTY
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| South of Slip 5 Groundwater Statistics | Preliminary Cleanup Levels | Number of GW Samples Analyzed | Number of Nondetects | Number of Samples with Detected Concentrations | Frequency of Detection (percent) | Number of Samples with Concentrations Exceeding Preliminary Cleanup Levels | Frequency of Exceedance (percent) | Maximum Detection |
|---|---|---|---|---|---|---|---|---|
| **VOLATILES (µg/L)** | | | | | | | | |
| **Method SW8260C/SW8260C-SIM** | | | | | | | | |
| Vinyl Chloride | 0.53 | 48 | 20 | 28 | 58 | 5 | 10 | 140.0 |
| 1,1-Dichloroethene | 3.2 | 48 | 43 | 5 | 10 | 1 | 2 | 4.3 |
| cis-1,2-Dichloroethene | 130 | 48 | 26 | 22 | 46 | 4 | 8 | 260 |
| Trichloroethene | 1.4 | 48 | 40 | 8 | 17 | 5 | 10 | 150 |
| Acrylonitrile | 0.057 | 13 | 12 | 1 | 8 | 1 | 8 | 0.16 |
| **cPAHs (µg/L)** | | | | | | | | |
| **Method SW8270D-SIM** | | | | | | | | |
| Total cPAHs TEQ | 0.00018 | 48 | 47 | 1 | 2 | 1 | 2 | 0.0007 |
| **DISSOLVED METALS (µg/L)** | | | | | | | | |
| **Methods 200.8/SW7196A** | | | | | | | | |
| Arsenic | 8 | 48 | 4 | 44 | 92 | 15 | 31 | 464 |
| Nickel | 8.2 | 48 | 4 | 44 | 92 | 1 | 2 | 10.3 |
| **TOTAL METALS** | | | | | | | | |
| **Method SW7196A (mg/L)** | | | | | | | | |
| Chromium VI | 0.00058 | 48 | 44 | 4 | 8 | 4 | 8 | 0.019 |

GW = groundwater
µg/L = micrograms per liter
mg/L = milligrams per liter
ng/L = nanograms per liter
SIM = Selected Ion Monitoring
cPAHs = carginogenic polycyclic aromatic hydrocarbons
TEQ = Toxic Equivalent Concentration
PCBs = polychlorinated biphenyls

## TABLE 54

### EXCEEDANCES OF THE SMS CRITERIA FOR THE SMS CHEMICALS
Boeing Isaacson-Thompson Site
Tukwila, Washington

| Sample Location | Surface (0-10 cm) | Subsurface Core Segments 1 ft to 2 ft -0010 | 2 ft to 3 ft -0020 | 3 ft to 4 ft -0030 | 4 ft to 5 ft -0040 | 5 ft to 6 ft -0050 | 6 ft to 7 ft -0060 | 7 ft to 8 ft -0070 | 8 ft to 9 ft -0080 | 9 ft to 10 ft -0090 | 10 ft to 11 ft -0100 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SD-501** | Arsenic<br>Total PCBs<br>*Benzyl Alcohol* | | Total PCBs | | **Total PCBs** | | Total PCBs | | Total PCBs | | |
| **SD-502** | Arsenic<br>cPAHs<br>Total PCBs | | *Hexachlorobenzene* | | | | | | | | |
| **SD-503** | *Benzyl Alcohol*<br>Arsenic<br>Total PCBs | | Total PCBs | | Total PCBs | | *Hexachlorobenzene* | | | | |
| **SD-504** | Total PCBs<br>**Arsenic**<br>cPAHs | | **Arsenic** | | | | | | | | |
| **SD-505** [1] | Arsenic<br>Total PCBs<br>*Benzyl Alcohol* | | Total PCBs | | | | | | Total PCBs<br>*Hexachlorobenzene* | | |
| **SD-516** | *Benzyl Alcohol*<br>Arsenic<br>Total PCBs | | Total PCBs | | Total PCBs | | Total PCBs | | Total PCBs | | |
| **SD-506** | Total PCBs<br>**Arsenic**<br>cPAHs<br>Benzo(g,h,i)perylene<br>Dibenzo(a,h)anthracene<br>Indeno(1,2,3-cd)pyrene<br>Fluoranthene<br>*Benzoic Acid*<br>*Hexachlorobenzene* | | Acenaphthene<br>**Arsenic** | | | | | | | | |
| **SD-507** | Arsenic<br>Total PCBs<br>*Hexachlorobenzene* | | **Total PCBs**<br>Phenol<br>Butyl benzyl phthalate<br>**Bis(2-ethylhexyl phthalate** | | Total PCBs<br>Phenanthrene | | Total PCBs | | Total PCBs | | Total PCBs |
| **SD-508** | Arsenic<br>Total PCBs<br>cPAHs | | Total PCBs<br>**Arsenic**<br>**Zinc**<br>**1,2-Dichlorobenzene**<br>1,4-Dichlorobenzene<br>**Benzyl Alcohol** | | | | | | | | |
| **SD-509** | Arsenic<br>Total PCBs | | Total PCBs<br>*Hexachlorobenzene* | | | | Total PCBs | | Total PCBs | | |
| **SD-510** | Total PCBs<br>*Hexachlorobenzene*<br>cPAH<br>Arsenic | | | | **Arsenic**<br>Zinc | | | | | | |
| **SD-511** | **Benzyl Alcohol**<br>Arsenic<br>Total PCBs | | | | | | | | | | |
| **SD-512** [2] | Total PCBs<br>Arsenic | | **Arsenic** | | | | | | | | |
| **SD-517** | Total PCBs<br>Butyl benzyl phthalate<br>Arsenic | | | | | | | | | | |
| **SD-513** | Diethyl phthalate<br>Total PCBs<br>Arsenic | | | | Total PCBs | | | | | | |
| **SD-514** | **Total PCBs**<br>Arsenic | | | | | | | | | | |
| **SD-515** | *Hexachlorobenzene*<br>*Benzyl Alcohol*<br>Arsenic<br>Total PCBs | | | | Benzyl Alcohol | | Total PCBs<br>Benzyl Alcohol | | | | |

**Surface Sample Color Coding**
- Value above PCUL (Human Seafood Consumption)
- Value above PCUL (Human Direct Contact)
- Detected Chemical Exceeds the SMS SCO
- Detected Chemical Exceeds the SMS Cleanup Screeing Level (Bold)

**Subsurface Core Sample Color Coding**
- All SMS Chemicals Below the SMS Sediment Cleanup Objectives (SCO)
- Detected Chemical Exceeds the SMS SCO
- Detected Chemical Exceeds the SMS Cleanup Screeing Level (Bold)
- Undetected Chemical Exceeds the SMS criteria (Italicized).

## TABLE 55

## REMEDIAL ACTION LEVELS FROM EPA's PROPOSED PLAN (EPA 2013)
## BOEING ISAACSON-THOMPSON SITE
## TUKWILA, WASHINGTON

| | | **Intertidal Sediments** (+11.3 ft MLLW to -4 ft MLLW) | | | | **Subtidal Sediments** (> -4 ft MLLW) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Recovery Category 1[a]** | | **Recovery Categories 2 and 3[a]** | | **Recovery Category 1[a]** | | **Recovery Categories 2 and 3[a]** | |
| **Contaminant** | **Units** | **0-10 cm depth** | **0-45 cm depth** | **0-10 cm depth** | **0-45 cm depth** | **0-10 cm depth** | **0-60 cm depth** | **0-10 cm depth** | **0-60 cm depth** |
| PCBs (Total) | mg/kg OC | 12 | 12 | 12 | 65 | 12 | 12 | 12 | 195 where there is the potential for vessel scour |
| cPAHs | µg TEQ /kg-dw | 1,000 | 900 | 1,000 | 900 | 1,000 | 1,000 | 1,000 | -- |
| Dioxins/Furans | ng TEQ/kg-dw | 25 | 28 | 25 | 28 | 25 | 25 | 25 | -- |
| Arsenic (Total) | mg/kg-dw | 57 | 28 | 57 | 28 | 57 | 57 | 57 | -- |
| SMS contaminants | contaminant-specifi | SQO | -- | 2 x SCO (but not to exceed the CSL) | -- | SQO | SQO | 2 x SCO (but not to exceed the CSL) | -- |

Notes:

a. Recovery categories were designated in the EPA's Proposed Plan for the LDW Superfund site (EPA 2013a). Recovery Category 1 areas are those where the potential for natural recovery to occur is limited; Recovery Category 2 areas are those where natural recovery may occur but is less certain; and Recovery Category 3 areas where natural recovery is predicted to occur. At the Isaacson-Thompson site, all of the intertidal and shallow subtidal areas were judged to be Recovery Category 2, while the deeper subtidal areas (including the navigation channel) were judged to be Recovery Category 1.

cm = centimeter; cPAHs = carcinogenic polycyclic aromatic hydrocarbons; CSL = cleanup screening level; dw = dry weight; ft = feet; kg = kilogram; ug = micrograms; mg = milligrams; MLLW = mean lower low water; ng = nanograms; PCB = polychlorinated biphenyl; RAL = remedial action level; SMS = Sediment Management Standards; SCO = sediment cleanup objective, TEQ = toxic equivalent concentration

**TABLE 56**
**STORAGE TANK AND SUMP INVENTORY**
**BOEING ISAACSON-THOMPSON PROPERTY**
**TUKWILA, WASHINGTON**

| Tank Number | Alternate ID | Type | Building | Location | Purpose | Contents | Size (gallons) | Status | Release |
|---|---|---|---|---|---|---|---|---|---|
| TS-01 | TS 01 | UST | 14-02 | West Yard | Reserve boiler fuel | Fuel oil #2 | 20,000 | Closed-in-place | No indication of release based on TPH results for soil samples from TDP-24, TP-106B, and MW-10, and groundwater samples from MW-10, which are below the RI preliminary cleanup levels. |
| TS-02 | | UST | 14-02 | West Yard | Storage for dispensing | Gasoline | 1,000 | Removed | No indication of release based on TPH results for soil samples from TDP-24, TP-106B, and MW-10, and groundwater samples from MW-10, which are below the RI preliminary cleanup levels. |
| TS-03 | | UST | 14-02 | West Yard | Emergency generator fuel | Diesel | 500 (a) | Removed | No indication of release based on TPH results for soil samples from TDP-24, TP-106B, and MW-10, and groundwater samples from MW-10, which are below the RI preliminary cleanup levels. |
| TS-04 | | UST | 14-03 | East Yard | Hold tank for OWS TS-92 | Stormwater/oil | 4000 (b) | Removed | Petroleum-impacted soil removed in 1994. Post-remedial action investigation conducted and results are below the RI preliminary cleanup levels. Except for cPAHs, which are not typically associated with hydraulic oil, no preliminary cleanup levels were exceeded in soil and groundwater samples collected from MW-11. |
| TSA-14 | BMA 014 / Tank A | AST | 14-01 | West Yard | Accumulation for disposal | Paint booth waste | 10,000 | Removed | No indication of a release based on pre-RI soil sample results, RI soil and groundwater sample results, and construction-related soil sample results. |
| TSA-15 | BMA 015 / Tank B | AST | 14-01 | West Yard | Accumulation for disposal | Paint booth waste | 10,000 | Removed | No indication of release based on pre-RI soil sample results, RI soil and groundwater sample results, and construction-related soil sample results. |
| TSA-21 | BMA 021 / Tank C / BP-1 | AST | 14-01 | West Yard | Accumulation for disposal | Copper plating / acid / aqueous degreaser overflow | 5,000 | Removed | No indication of release based on pre-RI soil sample results, RI soil and groundwater sample results, and construction-related soil sample results. |
| TSA-25 | BMA 025 | AST | 14-13 | North Side | Emergency generator fuel | Diesel | 200 | Active | None observed |
| TS-26 | BMA 026 / BP-2 | Sump | 14-01 | Column D1-6 | Temporary holding sump | Copper plating / aqueous degreaser | 400 | Removed | The sump, constructed of fiberglass, was encased in concrete and no soil was exposed during removal; therefore, no soil samples were collected. There are no indications of a release based on RI soil and groundwater results for MW-1 located adjacent to the sump. |
| BMA046 | | Sump | 14-01 | Column B-12 | Lift station sump | Sewage | | Unknown | Unknown; No investigation was conducted since this is a sanitary sewer sump. |
| BMA050 | | AST | 14-03 | Inside Building | Fatigue test | Hydraulic oil | 3,100 | Removed | Unknown; No investigation was conducted since this tank was located inside an existing building. |
| BMA051 | | AST | 14-03 | Inside Building | Fatigue test | Hydraulic oil | 3,100 | Removed | Unknown; No investigation was conducted since this tank was located inside an existing building. |
| TS-57 | BMA 057 | AST | 14-02 | West Side | Emergency generator fuel | Diesel | 500 | Active | None observed. |
| BMA064 | | AST | 14-01 | West Side | Fueling vehicles | Propane | 500 | Removed / relocated | None observed. |
| TS-67 | BMA 067 | Sump | 14-01 | E7 (Outside) | Wastewater collection | Paint booth waste | 100 | Removed | No indication of release based on pre-RI soil sample results, RI soil and groundwater sample results, and construction-related soil sample results. |
| TS-68 | BMA 068 | Sump | 14-01 | E8 (Outside) | Wastewater collection | Paint booth waste | 100 | Removed | No indication of release based on pre-RI soil sample results, RI soil and groundwater sample results, and construction-related soil sample results. |
| TS-69 | BMA 069 | Sump | 14-01 | E9 (Outside) | Wastewater collection | Paint booth waste | 100 | Removed | No indication of release based on pre-RI soil sample results, RI soil and groundwater sample results, and construction-related soil sample results. |

**TABLE 56**
**STORAGE TANK AND SUMP INVENTORY**
**BOEING ISAACSON-THOMPSON PROPERTY**
**TUKWILA, WASHINGTON**

| Tank Number | Alternate ID | Type | Building | Location | Purpose | Contents | Size (gallons) | Status | Release |
|---|---|---|---|---|---|---|---|---|---|
| TS-92 | SEP 04 | OWS | 14-03 | East Yard | Hydraulics and parking lot | Stormwater/oil | | Removed | Petroleum-impacted soil removed in 1994. Post-remedial action investigation conducted and results are below the RI preliminary cleanup levels, except for cPAHs, which are not typically associated with hydraulic oil. No preliminary cleanup levels were exceeded in soil and groundwater samples collected from MW-11. |
| TS-93 | SEP N | OWS | 14-01 | Southwest Yard | Oil trap for parking lot | Stormwater/oil | | Active | Unknown; no investigation planned. |
| TS-91 | SEP S | OWS | 14-03 | North End | Oil trap for parking lot | Stormwater/oil | | Active | Unknown; no investigation planned. |
| SMPTS1 | | Sump | 14-03 | 737 Fatigue Test Pad | Hydraulic fluid leaks | Hydraulic fluid | | Removed | Petroleum-impacted soil removed in 1994. Post-remedial action investigation conducted and results are below the RI preliminary cleanup levels, except for cPAHs, which are not typically associated with hydraulic oil. No preliminary cleanup levels were exceeded in soil and groundwater samples collected from MW-11 |
| TS-05 | | UST | 14-05 | Southeast Yard | Storage for dispensing | Diesel | 6,000 | Removed | No indication of a release based on field screening and soil sample results at RI test pit TP-109. |
| TS-06 | | UST | 14-05 | Southeast Yard | Storage for dispensing | Diesel | 6,000 | Removed | No indication of a release based on field screening and soil sample results at RI test pit TP-109. |
| TS-07 | | UST | 14-05 | Southeast Yard | Storage for dispensing | Diesel | 6,000 | Removed | No indication of a release based on field screening and soil sample results at RI test pit TP-109. |
| TS-08 | | UST | 14-05 | Southeast Yard | Storage for dispensing | Diesel | 6,000 | Removed | No indication of a release based on field screening and soil sample results at RI test pit TP-109. |
| TS-09 | | Sump | 14-08 | North Yard | Unknown | Paint Sludge | 10,000 | Removed | No indication of a release based on pre-RI soil sample results, RI soil sample results for SB-9, SB-10, and SB-11, and RI groundwater results for MW-15. |
| TS-10 | | Sump | 14-08 | North Yard | Unknown | Paint Sludge | 10,000 | Removed | No indication of a release based on pre-RI soil sample results, RI soil sample results for SB-9, SB-10, and SB-11, and RI groundwater results for MW-15. |
| TS-11 | | Sump | 14-08 | North Yard | Unknown | Paint Sludge | 10,000 | Removed | No indication of a release based on pre-RI soil sample results, RI soil sample results for SB-9, SB-10, and SB-11, and RI groundwater results for MW-15. |
| TS-12 | | UST | 14-05 | North Yard | Reserve Boiler Fuel | Fuel Oil | two 1,000 | Removed | Previously investigated and results are below the RI preliminary cleanup levels. |
| 14-02 Indoor Sump | | Sump | 14-02 | Inside at SE Corner | Mechanical Pit | Pipes | 60 | Active | A reconnaissance of the sump was conducted and the sump has no outlet pipe. A pump was in the sump during the reconnaissance. |
| Tunnel Sump | | Sump | 14-01 | North (outside) | Rainwater Collection | Rainwater | Approx 60 | Active | None |
| Tunnel Sump | | Sump | 14-01 | North (outside) | Rainwater Collection | Rainwater | Approx 60 | Active | None |
| Stair Sump | | Sump | 14-01 | Northeast (outside) | Rainwater Collection | Rainwater | Approx 60 | Active | None |
| NE Former Sump | | Sump | 14-05 | East Side | Unknown | Unknown | Approx 50 | Removed | Previously investigated and results are below the RI preliminary cleanup levels with the exception of arsenic and PCBs, which are not an indication of a release. |
| Former Steam Cleaning Rack and Sump | | Sump | 14-05 | Courtyard | Wastewater Collection | Steam Cleaning Waste | | Removed | Previously investigated and results are below the RI preliminary cleanup levels with the exception of arsenic, which is not an indication of a release. |

TPH = total petroleum hydrocarbon
RI = remedial investigation
cPAHs = polycyclic aromatic hydrocarbons
PCBs = polychlorinated biphenyls

UST = Underground storage tank
AST = Aboveground storage tank
OWS = Oil/water separator

(a) Some historical records indicate that this was a 500-gallon tank and others indicate that it may have been a 2,000-gallon tank.
(b) Some historical records indicate that this was a 4,000-gallon tank and others indicate that it may have been a 5,000-gallon tank.