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Revised Augmented Remedial Investigation and Feasibility Report Former Tacoma Metals Site Tacoma, Washington

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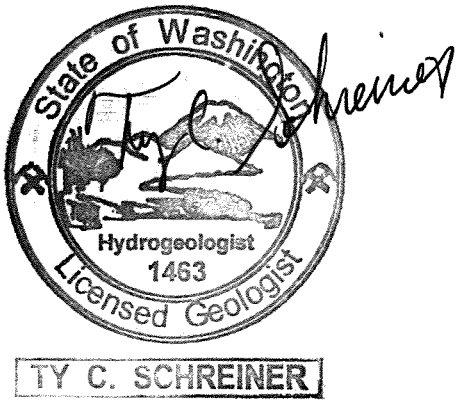

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List of Acronyms

Acronym	Description
ARARs	applicable, relevant, and appropriate requirements
AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
COC(s)	chemical(s) of concern
cPAH(s)	carcinogenic polycyclic aromatic hydrocarbon(s)
CPOC	conditional point of compliance
DNAPL	dense non-aqueous phase liquid
DPA	disproportionate cost analysis
Ecology	Washington State Department of Ecology
EODT	EOD Technology, Inc.
EPA(s)	extractable petroleum hydrocarbon(s)
FBI	Friedman & Bruya, Inc.
LNAPL	light non-aqueous phase liquid
MTCA	Model Toxics Control Act
NWTPH-Dx	Northwest Total Petroleum Hydrocarbons as Diesel and Oil Extended
ORC	oxygen release compound
PAH(s)	polycyclic aromatic hydrocarbon(s)
PCB(s)	polychlorinated biphenyl(s)
POC	point of compliance
PRSC	Puyallup River Side Channel
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
SIM	select ion monitoring
site	Former Tacoma Metals site
SPLP	Synthetic Precipitation Leaching Procedure
SVOC(s)	semi-volatile organic compound(s)

Acronym	Description
TCLP	Toxicity Characteristic Leaching Procedure
TCU	temporary containment unit
TEE	terrestrial ecological evaluation
TNT/DNT	trinitrotoluene/dinitrotoluene
USACE	United States Army Corps of Engineers
UXO	unexploded ordnance
VOC(s)	volatile organic compound(s)
WAC	Washington Administrative Code

Executive Summary

This report was prepared at the request of the Washington State Department of Ecology (Ecology) to augment the Remedial Investigation and Feasibility Study (RI/FS) originally prepared for the former Tacoma Metals site by Kennedy/Jenks Consultants in 2001. The site location is shown on Figure 1.

During the initial RI, impacts to environmental site media related to former site uses as a metals recycling facility (primary use 1950s through 1990s) and coke manufacturing plant (limited use 1940s) were evaluated and fully characterized. However, an additional historical site use as a creosoting plant (1910s to 1930s) was identified during the initial RI in the western portion of the site. Impacts to environmental media related to the creosoting plant were identified, but not fully characterized, during the initial RI.

A supplemental RI was performed between 2002 and 2011 to evaluate and characterize potential impacts to environmental site media related to the former creosoting plant. The supplemental RI work areas included the former Tacoma Metals property (western portion) and Off-Property areas to the north and west of the former Tacoma Metals property, collectively called the Creosoting Plant Area, and the bank area adjacent to the Puyallup River Side Channel (PRSC) to the north of the site. The supplemental RI work areas are depicted on Figure 2.

The supplemental RI was performed in phases, with each phase of work approved by Ecology prior to implementation. Impacts to environmental media related to the former creosoting plant were evaluated and fully characterized during the supplemental RI. Sample locations for the initial RI and supplemental RI are summarized on Figure 3.

Other work performed after the initial RI, at Ecology's request, included a terrestrial ecological evaluation (TEE), a cleanup level evaluation [including and assessment of the proposed remedial options with respect to the disproportionate cost analysis (DPA) framework], and a forensic evaluation of hydrocarbons to identity the appropriate cleanup standards for creosote-related compounds.

The forensic evaluation concluded that cleanup standards for petroleum-based hydrocarbons are inappropriate for creosote-related compounds because creosote is derived from coal tar (pyrogenic) rather than petroleum (petrogenic). The results of the TEE and cleanup level evaluation were incorporated into the FS update prepared for this report (discussed below).

In addition to the investigations and reports discussed above, two interim remedial actions have been performed at the site since completion of the initial RI. These interim remedial actions included an investigation and mitigation of potential unexploded ordnance (UXO) along the northern margin of the former Tacoma Metals property and onsite treatment of approximately 3,440 tons of lead-impacted soil excavated north of the site during construction of the PRSC by the City of Tacoma (the impacted soil was related to metals recycling activities).

For the initial (2001) FS, three remedial alternatives were evaluated and Alternative 2 was selected as the preferred alternative. Alternative 2 included excavation and offsite disposal of hydrocarbon-affected soil, excavation and onsite consolidation of metals-impacted soil from the perimeter of the site, installation of an asphalt cap with stormwater controls, *in situ* treatment of residual hydrocarbon impacts, institutional controls, and long-term monitoring.

The FS was updated for this report, and included updates to potential exposure pathways, the conceptual site model, proposed cleanup levels, potential costs for the three original remedial alternatives, and an evaluation of the appropriateness of the preferred cleanup alternative (Alternative 2) based on the findings of the supplemental RI (and other work performed since the initial RI).

The findings of the supplemental RI (and other work performed since the initial RI) and updated FS do not substantively alter the components of preferred cleanup Alternative 2, although the volume of potentially affected environmental media related to the former creosoting plant increased based on the results of the supplemental RI, an additional excavation area is proposed around boring location B-36 (located on the Simpson Property), and installation of a soil cap is proposed for the Off-Property 18th Street Right-of-Way area.

The findings of the supplemental RI and FS update confirm the appropriateness of Alternative 2, which is protective of human health and the environment under an industrial use scenario, as the preferred remedial alternative for the site.

Section 1: Introduction

This report was prepared at the request of the Washington State Department of Ecology (Ecology) and provides an augmentation to the Remedial Investigation and Feasibility Study (RI/FS) report for the former Tacoma Metals site (site). The RI/FS report was originally submitted to Ecology in June 2001 (Kennedy/Jenks Consultants 2001). Following submittal of the RI/FS report, a series of additional investigations were performed at the request of Ecology. The information presented herein provides a compilation of all relevant data for the site. The report then uses the available information to re-evaluate the preferred cleanup remedy selected for the site in the 2001 FS (Kennedy/Jenks Consultants 2001). As the information summarized herein has been previously submitted to Ecology in various other prior reports, the reader is referred to those reports for additional information.

1.1 Purpose and Regulatory Framework

The purpose of this document is to summarize current and available information regarding site conditions and re-evaluate whether or not the preferred cleanup remedy presented in the RI/FS Report (Kennedy/Jenks Consultants 2001) is protective of human health and the environment. This report is also intended to facilitate Ecology's review of current site conditions, and to facilitate review of site information during the public comment period that will precede the cleanup action by consolidating relevant information into a single document.

The investigation and remediation activities described in this report were performed under an Agreed Order (No. DE97-5435) between Ecology and Mr. and Mrs. Leslie Sussman (owners) through the entity Portland Avenue Associates, LLC (owner). Work was performed in accordance with Ecology's Model Toxics Control Act (MTCA) regulations published in Washington Administrative Code (WAC) 173-340 (Ecology 2001, updated October 2007). Each phase of work described in this report was performed under a separate Work Plan, which was submitted to Ecology for approval under the Agreed Order prior to the start of the work. The Work Plans and subsequent summary reports for individual phases of work are referenced as appropriate.

1.2 Site Location

The former Tacoma Metals site is located at 1919 Portland Avenue in Tacoma, Washington, in an industrial-zoned area within the Tacoma Tideflats (refer to Figure 1). The site is bounded to

the north by the Puyallup River, to the east by the Lincoln Avenue Bridge, which crosses the Puyallup River, to the south by Portland Avenue, and to the west by a City of Tacoma right-of-way and private properties. The former Tacoma Metals property is approximately 5.9 acres, but investigative work has also been performed at Off-Property locations adjoining the main property (refer to Figure 2). Section 1.3 provides an overview of different site areas and nomenclature.

Note on Directions: The site is geographically oriented with the long axis trending approximately northwest to southeast. To simplify descriptions of site locations for this report, the property boundary located along Portland Avenue will be considered the southern property boundary, and the property boundary along Lincoln Avenue will be considered the eastern property boundary.

1.3 Site Areas and Nomenclature

Work has been performed at different portions of the site, as depicted on Figure 2. The following terminology will be used herein to describe the different portions of the site:

- ***Site:*** Refers to the entire former Tacoma Metals site including On-Property and Off-Property areas.
- ***On-Property / Tacoma Metals Property:*** The actual former Tacoma Metals property only, corresponding to the relevant Pierce County tax parcels.
- ***Off-Property:*** Work areas located west to northwest of the On-Property area including the City of Tacoma 18th Street right-of-way and two private properties (Simpson and JJ Port properties).
- ***Creosoting Plant Area:*** That portion of the site affected by historical releases from a former creosoting plant, including the western portion of the On-Property area and the Off-Property areas.
- ***Puyallup River Side Channel (PRSC):*** The area where an estuary and wetland was constructed to the north of the site in 2005 by the City of Tacoma. The PRSC is not part of the site, although some investigation work has been performed by Kennedy/Jenks Consultants in PRSC bank areas since the PRSC was constructed in 2005. The PRSC adjoins both the On-Property and Off-property portions of the site and is separated from the site by an earthen levee maintained by the United States Army Corps of Engineers (USACE).

1.4 Previous Reports

As previously indicated, this report summarizes information previously submitted to Ecology in various site investigation, data transmittal, and site evaluation reports. The information summarized in this report includes that which is relevant to the preferred cleanup remedy presented in the RI/FS (Kennedy/Jenks Consultants 2001). While summarizing all relevant historical data for the site, this report includes only original data that has been previously provided to Ecology.

Because the purpose of this report is to provide a concise summary of site conditions, detailed discussion of the specific activities and findings for each individual phase of work is beyond the scope of this report. However, select information (i.e., tables, figures, maps, and other information) from previous reports is attached to this report for reference purposes, as appropriate. Additional information and discussion regarding the various phases of work performed at the site is available in the investigation and evaluation documents referenced below and cited as appropriate within this report.

Previous environmental investigation and data transmittal reports prepared by Kennedy/Jenks Consultants include the following:

- *Remedial Investigation / Feasibility Study Report, Former Tacoma Metals Facility* (Kennedy/Jenks Consultants 2001).
- *Supplemental Data Summary Report, Former Tacoma Metals Property* (Kennedy/Jenks Consultants 2007a).
- *Revised Soil and Groundwater Investigation Results – Data Transmittal, October 2007-April 2008 Investigation, Former Tacoma Metals Facility* (Kennedy/Jenks Consultants 2008b).
- *Groundwater Investigation Summary, Puyallup River Side Channel Investigation, Former Tacoma Metals Facility* (Kennedy/Jenks Consultants 2012).

Previous site evaluation reports prepared by Kennedy/Jenks Consultants include the following:

- *Cleanup Level Evaluation, Former Tacoma Metals Facility* (Kennedy/Jenks Consultants 2007c).

- *Response to Ecology Comments, Forensic Evaluation of Hydrocarbons, Former Tacoma Metals Facility* (Kennedy/Jenks Consultants 2009).
- *Terrestrial Ecological Evaluation, Former Tacoma Metals Facility* (Kennedy/Jenks Consultants 2010a).

Other work performed at the site by Kennedy/Jenks Consultants, including interim cleanup actions, is summarized in the reports referenced below, and discussed herein as appropriate:

- *Summary Report for Treating/Disposal of Lead-Containing Soil Materials, Former Tacoma Metals Site* (Kennedy/Jenks Consultants 2008a).
- *Final Letter Report for UXO Investigation Services at the Former Tacoma Metals Site* (EODT 2006).
- Limited investigation work was also performed at the site by others prior to the work performed by Kennedy/Jenks Consultants. Refer to the RI/FS (Kennedy/Jenks Consultants 2001) for a discussion of investigation work and findings performed by others prior the RI/FS.

In addition, investigation, remediation, and general construction activities were performed by others as part of the PRSC project, as referenced below and discussed herein as appropriate:

- *Soil and Groundwater Quality Testing Results, Puyallup River Site Channel and Tacoma Metals Site, Tacoma, Washington* (Hart-Crowser 2003).
- *Remedial Action Construction Report* (City of Tacoma 2006).

1.5 Report Organization

The remainder of this report is organized as follows.

- Section 2 provides a summary of background information regarding historical site uses, hydrogeologic setting, and work performed.
- Section 3 provides a summary of work performed for the initial RI (2001 RI) and FS.
- Section 4 provides a summary of supplemental RI activities performed at the site since completion of the 2001 RI/FS. This section also summarizes interim remedial actions, which have been performed at the site.

- Section 5 provides a discussion of the preferred cleanup alternative, including the site conceptual model, proposed cleanup levels, and proposed modifications based on the findings of investigation and evaluation activities performed for the supplemental RI.
- Section 6 provides a summary of the information presented in this report and conclusions.
- Section 7 provides a list of references cited in this document.

Section 2: Background

This section provides an overview of historical site uses, hydrogeologic conditions, and the main phases of work performed at the site by Kennedy/Jenks Consultants. Investigation results, current conditions, and impacts to environmental media are discussed in greater detail in subsequent sections of this report.

2.1 Historical Site Uses

Kennedy/Jenks Consultants' understanding of previous site uses is based on extensive historical research including review of aerial photographs, Sanborn Fire Insurance Maps, published accounts of site uses and activities (i.e., newspaper articles, trade publications, and historical summary texts), and other historical materials housed at the Tacoma Public Library (maps and ground-level photographs) and the Washington State Historical Society (historical ground-level photographs).

Three distinct phases of developed use were identified for the site during previous investigations. The primary uses associated with the three development phases include:

- Creosoting Plant (1900s to 1930s) (refer to Section 2.1.1)
- Coke Plant (early 1940s) (refer to Section 2.1.2)
- Metals Recycling Facility (1950s to 1990s) (refer to Section 2.1.3).

Metals recycling operations ceased in 1999 and the property was vacated. Site investigation remediation activities have been performed at the site by Kennedy/Jenks Consultants since 2000, and previous investigation activities were performed by others on a limited basis beginning in 1988 (refer to Section 2.3). In addition, the PRSC habitat was constructed to the north of the site by the City of Tacoma in 2005 (refer to Section 2.1.4).

Previous site uses are discussed in detail in the RI/FS Report (Kennedy/Jenks Consultants 2001) and the *Response to Ecology Comments* letter (Kennedy/Jenks Consultants 2009), and are summarized below.

2.1.1 Creosoting Plant

Facilities associated with a creosoting plant operated by the St. Paul and Tacoma Lumber Company were previously located on the western portion of the former Tacoma Metals Property and the Off-Property areas to the west (i.e., the Creosoting Plant Area, refer to Figure 2). The creosoting plant appears to have been constructed in the late 1900s to early 1910s, and appears to have been operational until the late 1920s to early 1930s.

The primary creosoting plant facilities included the main creosoting plant structure, which housed a 130-foot treatment retort and a 1,500-gallon aboveground storage tank (AST), and two separate ASTs (102,000-gallon and 450,000-gallon) located northwest of the main structure. Other associated facilities included an overhead crane, overhead tramways, a wharf, and several smaller structures. Boardwalks and storage areas were located to the north and east of the retort structure.

Based on the available information, the two large ASTs likely contained creosote and the smaller AST was possibly used to mix wood treatment materials prior to use. Kennedy/Jenks Consultants has previously reviewed information related to the storage tanks, including detailed summaries of site operation provided in the May 21, 1921 issue of *American Lumberman* and the book *Mill on the Boot* by Murray Morgan, multiple site and vicinity maps (Sanborn Maps, Metsker's Maps, St. Paul and Tacoma site map included in the May 21, 1921 *American Lumberman*), and St. Paul and Tacoma Lumber Company documents housed at the University of Washington Special Collections Library (Kennedy/Jenks Consultants 2009). Although the various information sources did not specifically list the product stored in the tanks as creosote (listed as "oil tanks" on the 1912 Sanborn Map), the facility associated with the tanks is referred to as a "creosoting plant" and creosoting operations are described in detail in the book *Mill on the Boot* and *American Lumberman*. The association of the storage tanks with the creosoting plant, and references to creosote oil in St. Paul and Tacoma company internal purchase documents, strongly suggests that the storage tanks were used to contain creosote product. Refer to the referenced February 17, 2009 *Response to Ecology Comments, Forensic Evaluation of Hydrocarbons* for additional information.

The wharf was located along the Puyallup River, which directly adjoined the site to the north during the time period in which the creosoting plant was operational, and appears to have been used as a dock and/or mooring location. A wooden bulkhead appears to have been located

along the approximate current northern Tacoma Metals Property margin, directly adjoining the Puyallup River. [Note: The course of the Puyallup River was shifted to the north, away from the northern site boundary, when an earthen levee was constructed by the USACE during the late 1940s and 1950s (refer to Section 2.1.4).]

2.1.2 Coke Plant

A coke manufacturing facility was constructed on the former Tacoma Metals Property during the early 1940s. The coke plant facility appears to have been used to produce metallurgical coke and coal gas (as a byproduct of the coke production process), and appears to have been operational for only a short time beginning in 1943.

The primary coke production structure was located in the central portion of the former Tacoma Metals Property. Other structures associated with the coke plant were located on the western portion of the former Tacoma Metals Property, in the vicinity of the former creosoting plant location, and appear to have been related to storage and distribution of coal gas.

The creosoting plant was demolished prior to construction of the coke plant, and approximately 3 to 5 feet of fill material was placed over the former Tacoma Metals Property area, including over the former creosoting plant. The coke plant structures were constructed after placement of the fill layer, which represents a “marker bed” associated with the particular time period between the abandonment of the creosoting plant and construction of the coke plant.

Most of the coke plant structures, except for part of the main building and several concrete foundation pads (three of which were located near former creosoting plant location), appear to have been demolished in the 1950s.

2.1.3 Metals Recycling

The former Tacoma Metals Property has been used for recycling ferrous and nonferrous metals since the early 1950s and was initially occupied by General Metals and subsequently by Tacoma Metals beginning in the early 1980s. Metals recycling does not appear to have been performed on Off-Property areas, although some debris and wastes from metal recycling may have accumulated to the north of the former Tacoma Metals Property (discussed in Section 4.3).

Metals recycling activities generally included the collection, storage, cutting, shredding, and bundling of various items including, but not limited to, aluminum cans and scrap, wheels, radiators, engine blocks, computer cases, and other scrap metal. Historical metals recycling activities also included dismantling and shredding of automobiles, motors, locomotives, and similar products.

Equipment used as part of the daily recycling operation included gasoline- and diesel-powered vehicles and equipment, as well as mobile and stationary hydraulic machinery. Stockpiles of various materials and associated processing machinery (balers, shears, etc.) were located throughout the former Tacoma Metals Property, although most of the machinery appears to have been located on the central and western portions of the former Tacoma Metals Property.

The remaining portion of the main coke plant structure appears to have been used as a processing and warehouse facility, although most of the materials were stored outside directly on the ground surface in piles or stacks. Most of the former Tacoma Metals Property appears to have been paved with asphalt by the 1970s, but an area along the northern property boundary remained unpaved throughout the time when metal recycling was performed (see Figure 3).

Other structures associated with metals recycling included small structures associated with the processing machinery referenced above, and a warehouse building constructed to the east of the main building during the 1980s. The aboveground portions of former metal recycling structures have been demolished and removed from the site, although most of the asphalt-paved areas and some concrete foundations remain.

2.1.4 Puyallup River Side Channel

As indicated above, the path of the Puyallup River was modified by construction of an earthen levee by the USACE in the late 1940s and 1950s. Prior to construction of the levee, the southern bank of the river adjoined the northern boundary of the site. During construction of the levee, the course of the river was shifted to the north, and a portion of the former Puyallup River channel located to the north of the western portion of former Tacoma Metals Property and the Off-Property areas was isolated from the main channel. The former channel area was gradually filled over time (by other property owners not associated with the former Tacoma Metals Property), primarily with wood-waste material. The site was separated from the Puyallup River by the former channel area and earthen levee until the levee was modified in 2005.

The original levee remained intact until 2005, when the PRSC estuary habitat was constructed by the City of Tacoma. The wood waste material that had accumulated in the former channel area was removed, and the original levee was breached to flood the former channel area. The course of the Puyallup River was not modified (portions of the original levee remained intact, but were lowered, to preserve the main channel), but an estuary habitat was created within the former channel area. A new levee was constructed immediately north of the former Tacoma Metals Property and Off-Property areas, between the site and the PRSC. PRSC construction activities are described in detail in the Remedial Action Construction Report (City of Tacoma 2006).

2.2 Hydrogeologic Setting

The current understanding of the site hydrogeology is based on observations of soil conditions in test pits and soil borings installed throughout the site, and water elevation monitoring of site groundwater monitoring wells performed during multiple phases of investigation.

The site is located in the Tacoma Tideflats physiographic area, which is part of the Puyallup River delta. Typical stratigraphy of the Tacoma Tideflats includes up to 10 feet of hydraulic fill (dredge) deposits of gravel, sand, silt, and organic debris underlain by silty and sandy deltaic sediments deposited by the Puyallup River. Glacial deposits typically underlie the Puyallup River sediments (Hart-Crowser 1975). Refer to the RI/FS report (Kennedy/Jenks Consultants 2001) for additional discussion of the regional geologic setting.

Our current understanding of the site-specific soil stratigraphy and hydraulic gradient is summarized below and discussed in more detail in subsequent sections of this report.

2.2.1 Soil Stratigraphy

Soil materials encountered during the investigation activities described above have included sandy and gravelly fill materials (typically with varying quantities of wood, metal, or other debris), woody debris with and without matrix material (typically silt and sand), and native materials including sand, silt, and clay.

Table 1 provides a detailed description of the stratigraphic units encountered at the site including lithologic composition, relative stratigraphic position, and typical thicknesses and depths at which the stratigraphic units are typically encountered.

Representative geologic cross-sections are provided in Appendix A and include cross-sections originally prepared for the 2001 RI/FS report for the former Tacoma Metals Property (Kennedy/Jenks Consultants 2001), and originally prepared for the October 2007 to April 2008 investigation letter report (Kennedy/Jenks Consultants 2008b) for the Creosoting Plant Area.

2.2.2 Groundwater Gradient

The direction of the hydraulic gradient in shallow groundwater at the site is influenced by tidal fluctuations in the Puyallup River and varies between high and low tidal cycles. At low tide, the hydraulic gradient is generally toward the Puyallup River, and at high tide, the gradient is generally toward the site, away from the Puyallup River. A localized stagnation zone is observed in the central portions of the site at high tide, primarily at the On-Property portion of the Creosoting Plant Area where accumulation of wood debris is greatest.

As previously indicated, depth to shallow groundwater varies with tidal levels. Saturated conditions are generally encountered at approximately 10 feet below ground surface (bgs) on the former Tacoma Metals Property, but the depth to groundwater varies for the Off-Property areas based on differing surface elevations which are generally higher on the 18th Street right-of-way and Simpson Property and lower on the JJ Port Property.

No seep discharges have been identified along the portion of the PRSC bank areas located north of the site.

Representative groundwater gradient maps for high and low tidal conditions are provided in Appendix B, including maps prepared for the two most recent site-wide water level monitoring events (2006 and 2008) that were performed after construction of the PRSC habitat area. Previous groundwater gradient maps are not included because the monitoring well network in the Off-Property areas was less extensive prior to 2006, and water elevation measurements made prior to 2006 may not be representative of current conditions (i.e., prior to construction of the PRSC). Refer to the RI/FS (Kennedy/Jenks Consultants 2001) and Supplemental Data Summary Report (Kennedy/Jenks Consultants 2007a) for gradient maps based on monitoring events prior to 2006.

2.3 Phases of Work Performed

Work was performed at the site by Kennedy/Jenks Consultants in three general phases listed below. The rationale, purpose, and overall scope of the work performed during each phase are

summarized below. The specific work and findings associated with each phase are discussed in Sections 3 (initial RI/FS) and 4 (supplemental RI) of this report.

2.3.1 Initial RI/FS

The initial RI/FS was performed between 2000 and 2001, with most of the onsite work completed during 2000. The RI/FS included only the On-Property portion of the site (the former Tacoma Metals Property only). The purpose of the RI/FS was to characterize the nature and extent of impacts to environmental media, including confirmation of the results of several limited investigations performed prior to the RI/FS between 1988 and 1995, develop a site model, and evaluate remedial options based on findings of the investigation. The RI/FS also included remedial activities related to demolition of buildings and disposal of waste material associated with site structures including building materials, liquid materials accumulated in subsurface vaults, and general refuse.

The RI/FS focused primarily on potential impacts to environmental media related to metals recycling and coke plant site uses (refer to Sections 2.1.2 and 2.1.3). Impacts to environmental media related to metals recycling and coke plant operations were fully characterized, defined, and evaluated during the RI/FS.

The former creosoting plant (refer to Section 2.1.1) was identified during the RI/FS and investigation activities were performed in the On-Property portion of the Creosoting Plant Area, but the Off-Property environmental impacts related to the creosoting plant were not fully defined.

Work performed and findings for the initial RI/FS are described in greater detail in Section 3. Site and sample location maps prepared for the initial RI/FS are included in Appendix C for reference.

2.3.2 Supplemental RI

Supplemental RI activities are summarized below. Additional description of work performed for each phase of Supplemental RI activities is provided in Table 2.

2.3.2.1 Creosoting Plant Area

The Creosoting Plant Area includes the western portion of the former Tacoma Metals Property, and the Off-Property area to the west (Figure 2). As indicated above, the former creosoting plant was identified during the RI/FS, but the extent of related impacts to soil and groundwater,

particularly in off-property areas, was not fully defined. Supplemental RI activities related to the Creosoting Plant Area were performed between 2002 and 2008 and included multiple phases of investigation which are summarized in Table 2.

Creosoting Plant Area investigation activities were performed in phases, beginning at On-Property areas (beginning in 2002) and progressing to Off-Property areas (beginning in 2004) iteratively until the extent of impacts was defined to Ecology's satisfaction. Supplemental RI activities were initially performed at On-Property areas in the immediate vicinity of the former creosoting plant location. Based on the initial findings, supplemental RI activities were performed on the City of Tacoma 18th Street right-of-way, which adjoins the former Tacoma Metals Property to the west, and subsequently progressed westward onto two private properties, the Simpson Property and the JJ Port Property (refer to Figures 2 and 3).

The supplemental RI fully characterized and defined the extent of impacts to environmental media related to the former creosoting plant facility. Work performed and findings for the supplemental RI are described in greater details in Section 4. Maps showing site features and sampling locations for the Creosoting Plant Area are included in Appendix D for reference.

2.3.2.2 PRSC and Conditional Point of Compliance Wells

Following review of data summary documents for supplemental RI activities performed in the Creosoting Plant Area, Ecology requested further investigation be performed along the conditional point of compliance (CPOC) adjacent to the PRSC.

The PRSC investigation was performed between October 2010 and February 2011. The purpose of the investigation was to evaluate groundwater conditions at the southern margin of the PRSC, specifically in the area to the north of monitoring well MW-8R, which is located near the northwestern corner of the former Tacoma Metals Property (refer to Figure 3) within the Creosoting Plant Area. The PRSC investigation also included evaluation of groundwater conditions in several proposed point of compliance (POC) monitoring wells located along the northern margin of the Creosoting Plant Area (refer to Figure 3). Work performed for the PRSC investigation summarized in Table 2.

The results of the PRSC investigation did not identify impacts to groundwater beyond those previously documented during the supplemental RI. Work performed and findings for the PRSC investigation are discussed in Section 4.

2.3.2.3 Interim Remedial Actions

In addition to the investigation activities described above, interim remedial actions have been performed at the site since completion of the initial RI. These have included an investigation and mitigation of potential unexploded ordnance (UXO) performed along the northern margin of the former Tacoma Metals Property in 2006, and onsite remediation of approximately 3,440 tons of lead-impacted soil material excavated from north of the former Tacoma Metals Property during construction of the PRSC by the City of Tacoma. These interim remedial actions are discussed in greater detail in Section 3.4.

Section 3: Initial RI/FS (2000-2001)

This section provides a summary of the findings of the initial RI and associated FS. Refer to the RI/FS report (Kennedy/Jenks Consultants 2001) for additional information.

3.1 Initial RI Work Performed

Work performed during the initial RI (March 2000 to May 2001) included both sampling and characterization of potentially impacted environmental media (soil, groundwater, and surface water) and demolition of existing site structures, including disposal of building materials and other associated waste materials. This section provides a general overview of the RI work performed at the site. Refer to the RI/FS report (Kennedy/Jenks Consultants 2001) for additional information regarding investigation activities and methods.

Sampling and characterization activities generally included the following:

- Excavation of 65 test pit trenches (TP-1 through TP-65) to depths of up to 12 feet bgs, and collection and laboratory analysis of soil samples. Test pits included both grid-based locations for general site-wide assessment, and additional test pits at specific locations based on historical site uses, previous investigation results, and grid-based test pit findings. Test pit locations are shown on Figure 3 and on the sample location summary map (Figure 2-1) included in Appendix C.
- Advancement of 18 soil borings (RGW-1 through RGW-18) to shallow groundwater depths (typically 10 to 15 feet bgs), and collection of reconnaissance groundwater samples for laboratory analysis. Soil boring locations are shown on the sample location summary map (Figure 2-1) included in Appendix C.
- Replacement of two previously existing shallow monitoring wells (MW-4 and MW-8) with new wells at the same locations [MW-4(R) and MW-8(R)] and installation of four new monitoring wells (MW-9 through MW-12). During monitoring well installation, soil samples were collected from soil borings for laboratory analyses. Monitoring well locations are shown on Figure 3 and on the sample location summary map (Figure 2-1) included in Appendix C.

- Collection of groundwater samples from 11 existing, replaced, and new shallow groundwater monitoring wells [MW-1, MW-2, and MW-4(R) through MW-12] for laboratory analysis.
- Sampling and analyzing surface water runoff from two locations (SW-1 and SW-2), and mapping of primary surface water flow pathways. Surface water sampling locations are shown on Figure 3 and on the sample location summary map (Figure 2-1) included in Appendix C.
- Hydraulic investigations, including water level monitoring, performing slug tests, and testing selected soil samples for geotechnical parameters.

Specific laboratory analyses performed for soil, groundwater, and surface water samples are summarized in the data tables prepared for the RI/FS report (Kennedy/Jenks Consultants 2001) and included in Appendix C for reference.

[Note: The cleanup levels listed in the data tables from the RI/FS report (Appendix C) may not necessarily be the current cleanup levels. Refer to Table 3 for a summary of the cleanup levels currently applicable to the site.]

Analyses typically included one or more of the following:

- Diesel- and oil-range petroleum hydrocarbons by Ecology Method Northwest Total Petroleum Hydrocarbons as Diesel and Oil Extended (NWTPH-Dx) (all media)
- Resource Conservation and Recovery Act (RCRA) eight metals (total and/or dissolved) plus copper by EPA 6010/7000 Series methods (all media)
- Volatile organic compounds (VOCs) by EPA Method 8260 (soil and groundwater only)
- Polychlorinated biphenyls (PCBs) by EPA Method 8082 (all media)
- Polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270B using select ion monitoring (SIM) (all media)
- Extractable petroleum hydrocarbons (EPHs) by using Ecology methods (select soil samples only)
- Trinitrotoluene/dinitrotoluene (TNT/DNT) by EPA Method 8330 (select soil samples only)

- Toxicity Characteristic Leaching Procedure (TCLP) and Synthetic Precipitation Leaching Procedure (SPLP) analysis for metals and PAH analytes for waste characterization (select soil samples only).

Prior to the initial RI sampling and characterization activities, existing site structures (excluding one storage building which was subsequently demolished in 2011) and approximately 1,800 feet of railroad track were demolished. The demolished structures included the main warehouse and office building, the red brick building, concrete foundations likely associated with the former coke plant (refer to Section 2.1.2) and various equipment and storage structures (refer to Figure 1-2 in Appendix C) associated with metals recycling. Solid waste materials generated from demolition activities included concrete, brick, glass, metal, wood, and other debris. In addition, liquid wastes were removed from two vault structures located below or in the vicinity of the red brick building. Solid and liquid wastes were disposed offsite as both hazardous and non-hazardous wastes. Refer to the RI/FS report (Kennedy/Jenks Consultants 2001) for additional information.

3.2 Initial RI Findings

The primary chemicals of concern (COCs) identified during the initial RI included metals, carcinogenic PAHs (cPAHs), naphthalene, PCBs, and diesel- and oil-range petroleum hydrocarbons. The COCs identified during the initial RI appear to be primarily related to metals recycling activities. Some COC impacts could also be related to coke plant operations, but there is no specific indication of such.

The identified soil impacts related to metals recycling occur primarily in the upper fill material, typically at depths of less than 5 feet bgs. Most of the locations where deeper soil impacts were identified during the initial RI are within the Creosoting Plant Area (see Section 2.3.2.1) and do not appear to be related to the metals recycling or coke plant site uses. The metals COCs in soil generally occur throughout the former Tacoma Metals property, but other COC impacts are more localized (see Section 3.2.1).

The primary COC impacts to groundwater identified during the initial RI were located in the western portion of the former Tacoma Metals Property and appear to be attributable to the former creosoting plant. However, COCs including cPAHs and metals were also detected sporadically in groundwater samples collected from other parts of the former Tacoma Metals property (See Section 3.2.2).

3.2.1 Soil

For comparison purposes, MTCA Method C Industrial soil cleanup levels (as defined in WAC 173-340-745) are used to assess compliance with regulatory standards. When Method C cleanup values are not available, MTCA Method A values are used (e.g., lead). Cleanup levels are summarized in Table 3.

The COC impacts to soil identified at the site occur in two distinct zones related to the source of the impacts. COC soil impacts related to the metals recycling (and possibly coke plant) site uses occur primarily within the upper fill layer throughout the former Tacoma Metals Property. COC soil impacts related to the former creosoting plant occur beneath the upper fill layer in the Creosoting Plant Area (On-Property and Off-Property areas).

COC impacts related to metals recycling, and possibly coke plant operations, occur primarily within the layer of fill material that was installed on the former Tacoma Metals Property following demolition of the former creosoting plant and related structures, and prior to construction of the coke plant and related facilities (late 1930s to early 1940s). The extent of COC impacts within the shallow fill material was identified and characterized during the 2001 RI, as shown on the soil concentration contour and data flag maps originally prepared for the RI/FS report (Kennedy/Jenks Consultants 2001) and included in Appendix C (Figures 4-1 through 4-4).

COCs were identified at concentrations above the proposed soil cleanup levels (refer to Table 3) mainly within the uppermost 3 feet of fill material (i.e., to depths of approximately 3 feet bgs), but were identified locally to depths of up to 10 feet bgs [Note: The deeper COC impacts in the Creosoting Plant Area shown on the initial RI maps in Appendix C (Figures 4-3 and 4-4) are associated with the former creosoting plant (refer to Section 4.2) and are separate from the metals recycling related impacts]. The COC soil impacts related to metals recycling are discussed in greater detail in the RI/FS report (Kennedy/Jenks Consultants 2001), and summarized below:

- Metals, primarily lead but also chromium, were identified in shallow soil at concentrations above the proposed MTCA Method A/C industrial soil cleanup levels (refer to Table 3) throughout the former Tacoma Metals Property. The metals impacts occur primarily at depths of less than 3 feet bgs, but were identified at two locations in the eastern portion of the former Tacoma Metals Property at depths of up to 6 feet bgs (refer to RI/FS Map Figure 4-1 in Appendix C). The lead impacts identified at one location [TP-16 located

south of the former red brick building location (refer to Figures 1-2 and 4-1 in Appendix C)] appear to be related to the presence of buried lead-acid battery casings. Initial RI analytical results for metals are summarized in Table 4-1 in Appendix C.

- PCBs were identified in shallow soil at concentrations above the proposed MTCA Method A industrial soil cleanup level (refer to Table 3) in the easternmost portion of the former Tacoma Metals Property. The PCB impacts occur at depths of less than 3 feet bgs (refer to RI/FS Map Figure 4-2 in Appendix C). Initial RI analytical results for PCBs are summarized in Table 4-2 in Appendix C.

- CPAHs were identified in shallow soil at concentrations above the proposed cleanup level (refer to Table 3) at one location in the eastern portion the former Tacoma Metals Property at a depth of less than 1 foot bgs (refer to RI/FS Map Figure 4-3 in Appendix A). CPAH impacts were also identified near the southwestern corner of the former Tacoma Metals Property (i.e. in the Creosoting Plant Area) at depths of 6 to 10 feet bgs, and appear to be associated with the former creosoting plant rather than metals recycling site uses. Initial RI analytical results for PAHs are summarized in Table 4-3 in Appendix C.

- Hydrocarbon compounds were identified in shallow soil at concentrations above the proposed cleanup level (refer to Table 3) at multiple locations on the former Tacoma Metals Property, typically at depths of less than 3 feet bgs (refer to RI/FS Map Figure 4-4 in Appendix C), but were identified at greater depths at two locations. Hydrocarbon impacts to depths of 10 feet bgs were identified in the west-central portion of the former Tacoma Metals Property, and appear to be related to a former hydraulic sheer (associated with metals recycling) at that location. Hydrocarbon impacts identified near the southwestern corner of the former Tacoma Metals Property to depths of 10 feet bgs are associated with the former creosoting plant rather than metals recycling site uses, as previously discussed. Initial RI analytical results for hydrocarbons are summarized in Table 4-4 in Appendix C. [Note: During performance of the Supplemental RI, extensive forensic evaluations were conducted to evaluate the nature of hydrocarbon compounds detected in the Creosoting Plant Area (Kennedy/Jenks Consultants 2009). The results of this investigation, which are discussed later, indicated that hydrocarbons associated with the creosoting plant are derived from pyrogenic source (i.e., creosote) and are not

petrogenic in nature. Consequently, MTCA petroleum hydrocarbon cleanup standards were not used to evaluate hydrocarbon detections in the Creosoting Plant Area.]

3.2.2 Groundwater

As previously indicated, the groundwater impacts identified in the western portion of the former Tacoma Metals Property appear to be primarily related to the former creosoting plant and are discussed in Section 4.2.

During the initial RI, COCs including naphthalene, hydrocarbons, PCBs, total and individual cPAHs, and metals (selenium, cadmium, lead, mercury, and copper) were detected at concentrations above the proposed cleanup levels (refer to Table 3) in monitoring well and reconnaissance groundwater samples collected from the Former Tacoma Metals Property [refer to the groundwater results data flag map (Figure 5-1) provided in Appendix C]. Naphthalene and hydrocarbon concentrations detected in the Creosoting Plant Area are related to the former creosoting plant, as previously discussed, and were further evaluated in the Supplemental RI (refer to Section 4). Metals analytes were detected sporadically and were not suspected to be representative of site groundwater conditions (Kennedy/Jenks Consultants 2001). Additional testing for metals was performed as part of the Supplemental RI (Section 4). The detection of PCBs was considered to be anomalous based on the low solubility and mobility of PCBs in the environment, and not representative of groundwater conditions (Kennedy/Jenks Consultants 2001). Analytical data tables prepared for the RI/FS report are also included in Appendix C for reference (Tables 5-1 through 5-9).

3.2.3 Surface Water

Two surface water sampling events were performed during the RI/FS at two locations where surface water discharges from the former Tacoma Metals Property were observed [refer to the surface water flow and samples map (Figure 3-8) provided in Appendix C]. Metals, PCBs, and cPAHs were identified in surface water samples at samples above surface water cleanup levels. Analytical results for surface water samples are summarized in the data table provided in Appendix C (Table 6-1).

The surface water sampling events were performed soon after Tacoma Metals vacated the property and although the paved surfaces at the site were cleaned as part of the RI, entrainment of residual particles associated with metals recycling may have contributed to the detected COC

concentrations and the results are therefore not necessarily indicative of current conditions. Following collection surface water samples, all storm lines at the site were cleaned and waste materials were transported offsite for disposal. Installation of a surface cap and surface water discharge management are included in the preferred remedial option (refer to Section 5.4).

3.3 Initial FS

The initial FS was performed in 2001 and the findings were reported to Ecology in the 2001 RI/FS report (Kennedy/Jenks Consultants 2001). The initial FS findings are summarized below, including an overview of the preferred cleanup alternative based on the initial FS.

3.3.1 Initial FS Summary

The initial FS included an evaluation of chemical fate and transport for the site, including a conceptual site model, and evaluation of potential exposure routes and receptors. The initial FS also included an evaluation of potential cleanup standards and other applicable, relevant, and appropriate requirements (ARARs), potential points of compliance, and an estimate of the extent of affected site media. The initial FS evaluated three cleanup alternatives and selected a preferred alternative based on evaluation of criteria including protectiveness to human health and the environment, compliance with cleanup levels and ARARs, effectiveness, permanence, practicality of implementation, and cost (refer to the 2001 FS for additional information).

The cleanup alternatives presented in the initial FS included the following:

- **Alternative 1:** Source Control (Free Product Removal and Petroleum Hydrocarbon-Impacted Soil Excavation with Offsite Disposal), Asphalt Cap with Stormwater Control, Enhanced Groundwater Biodegradation, Institutional Controls, Groundwater/Surface Water Compliance Monitoring, and Periodic Review.

- **Alternative 2:** Source Control (Free Product Removal and Petroleum Hydrocarbon-Impacted Soil Excavation with Offsite Disposal), Limited Metals-Impacted Soil Excavation with Onsite Consolidation, Asphalt Cap with Stormwater Control, Enhanced Groundwater Biodegradation, Institutional Controls, Groundwater/Surface Monitoring, and Periodic Review.

- **Alternative 3:** Source Control (Free Product Removal and Petroleum Hydrocarbon-Impacted Soil Excavation), Limited Metals-Impacted Soil Excavation, Onsite Treatment

& Reuse of Excavated Soil, Cap, Enhanced Groundwater Biodegradation, Institutional Controls, Groundwater/Surface Monitoring, and Periodic Review.

The preferred cleanup alternative (Alternative 2) is summarized in greater detail in Section 3.3.2.

Because the initial FS was completed prior to Supplemental RI activities, Ecology requested that the initial FS be updated to reflect the findings of the Supplemental RI and to verify the adequacy of the preferred cleanup alternative. Ecology's request also included additional evaluation of potential exposure pathways and cleanup standards primarily for impacts to wildlife and aquatic organisms and for consumption of fish (Ecology 2009b).

The updated FS is discussed in Section 5.

3.3.2 Preferred Cleanup Alternative

The initial FS included an evaluation of three potential cleanup alternatives for the site. The preferred cleanup alternative, Alternative 2, is summarized below. Refer to the RI/FS (Kennedy/Jenks Consultants 2001) and Section 5.4 of this report for additional information regarding the cleanup alternatives and evaluation criteria. The preferred cleanup alternative (Alternative 2) presented in the initial FS included the following general elements:

- Source control (free product removal and petroleum hydrocarbon-impacted soil excavation with offsite disposal).
- Localized removal and consolidation of metals-impacted soils along the northern portion of the Tacoma Metals Property.
- Installation of an asphalt cap with stormwater controls on the former Tacoma Metals Property.
- Enhanced groundwater biodegradation [i.e., application of oxygen release compound (ORC) or similar material to enhance natural biodegradation of COCs] and monitored natural attenuation.
- Institutional controls.
- Groundwater monitoring.
- Periodic review.

Kennedy/Jenks Consultants proposed removal of the ORC application (for the Creosoting Plant Area only) from Alternative 2 in the Cleanup Level Evaluation report (Kennedy/Jenks Consultants 2007c) as ORC is not expected to be effective for the treatment of creosote-related COCs because they are pyrogenic (coal tar based) rather the petrogenic (petroleum based) in origin (Kennedy/Jenks Consultants 2009). Additional discussion of the preferred cleanup alternative, including other proposed modifications, is presented in Section 5.4.

Section 4: Supplemental RI

This section provides a summary of the work performed and findings of the Supplemental RI, including interim remedial actions, performed between October 2001 and February 2011.

4.1 Supplemental RI Work Performed

Work performed for the Supplemental RI is described below.

4.1.1 Creosoting Plant Area

Investigation work was performed at the Creosoting Plant Area between October 2001 and February 2011 and included sampling and characterization of potentially impacted environmental media (soil and groundwater) associated with the former creosoting plant. Work was performed in multiple phases at On-Property and Off-Property locations. Soil boring and monitoring well locations associated with the Creosoting Plant Area are shown on the site maps included in Appendix D.

Each phase of work performed at the Creosoting Plant Area was performed under an Ecology-approved Work Plan. Subsequent phases of work were performed at Ecology's request based on the results of the previous phase of work. The specific work performed during each phase of Creosoting Plant Area investigation, including report and Work Plan references, is summarized in Table 2. The specific work for each phase varied, but generally included the following elements:

- Advancement of direct-push soil borings and collection and laboratory analysis of soil samples and/or reconnaissance groundwater samples.
- Installation, development, and sampling of groundwater monitoring wells. Well locations were typically based on the findings of the direct-push soil borings and the finding of preceding investigations.
- Laboratory analysis of groundwater samples collected from monitoring wells.
- Elevation surveying of new monitoring wells.

- Water level monitoring in new and existing monitoring wells (including all site wells both On-Property and Off-Property).
- Monitoring of light and dense non-aqueous phase liquid (LNAPL and DNAPL) in Creosoting Plant Area wells.
- Evaluation of the depth, lithology, and stratigraphy of a silt/clay layer which appears to be acting as a confining layer (discussed in greater detail in Section 5.2).

Specific laboratory analyses performed for soil and groundwater samples are summarized in the data tables provided in Appendix D. Analyses typically included one or more of the following:

- Diesel- and oil-range petroleum hydrocarbons by Ecology Method NWTPH-Dx (all media). [Note: Although petroleum hydrocarbon analyses were performed for samples collected in the Creosoting Plant Area, they are not a COC for impacts related to the former creosoting plant (Kennedy/Jenks Consultants 2009; Ecology 2009a).]
- PAHs or semi-volatile organic compounds (SVOCs) by EPA Method 8270 (all media).
- RCRA eight metals (total and/or dissolved) plus copper by EPA 6010/7000 Series methods (groundwater only, limited number of samples).
- VOCs by EPA Method 8260 (all media, limited number of samples).
- PCBs by EPA Method 8082 (groundwater only, limited number of samples).

Refer to the previously prepared reports (Kennedy/Jenks Consultants 2007a, 2008b) for additional information regarding the Creosoting Plant Area investigations. Data tables originally prepared for the above-referenced reports are included in Appendix D for reference. In addition, analytical data for the COCs associated with the Creosoting Plant Area [naphthalene, cPAHs, and benzene, toluene, ethylbenzene, and total xylenes (BTEX)] are summarized in Table 4 (soil samples), Table 5 (reconnaissance groundwater samples), and Table 6 (monitoring well groundwater samples).

[Note: The cleanup levels listed in the data tables from previous reports (Appendix D) may not be the current proposed cleanup levels. Refer to Table 3 for a summary of the cleanup levels currently applicable to the site.]

4.1.2 Forensic Evaluation of Hydrocarbons

The Forensic Evaluation of Hydrocarbons study was performed between 2007 and 2009 to demonstrate that the impacts to soil and groundwater associated with the former creosoting plant should be evaluated using cleanup standards based on the components of creosote (PAHs, naphthalene, BTEX) rather than petroleum hydrocarbons.

The initial evaluation included forensic analysis of soil and groundwater samples for PAHs and review of previous site data by Friedman & Bruya, Inc. (FBI) of Seattle, Washington. FBI concluded that the contaminants were indicative of a pyrogenic (e.g., coal-tar creosote) origin rather that a petrogenic (e.g., petroleum hydrocarbon) source [submitted to Ecology by Kennedy/Jenks Consultants (Kennedy/Jenks Consultants 2007b)]. In response to this report, Ecology provided a letter indicating it did not agree with the FBI's conclusions, and suggested that a gasoline source may have contributed to the observed impacts to soil and groundwater.

In response to Ecology's comments, Kennedy/Jenks Consultants prepared a summary of historical site uses, field observations, and case studies to supplement FBI's separate response to Ecology's comments, and to demonstrate that no potential gasoline sources existed historically at the Creosoting Plant Area (Kennedy/Jenks Consultants 2009). Ecology subsequently agreed that the use of petroleum hydrocarbon cleanup standards for impacts related to the former creosoting plant were inappropriate (Ecology 2009a).

4.1.3 PRSC

Work for the PRSC investigation was performed between October 2010 and February 2011 and included sampling and characterization of potentially impacted environmental media, including groundwater from reconnaissance borings and proposed POC monitoring wells, along the southern margin of the PRSC and northern site boundary. The PRSC investigation was performed at Ecology's request under an Ecology-approved Work Plan (Kennedy/Jenks Consultants 2010b).

Work performed for the PRSC investigation included the following:

- Installation of three temporary piezometers adjacent to the PRSC (two sampling events).

- Collection of reconnaissance groundwater samples from the three piezometers and laboratory analysis of PAHs and BTEX (two sampling events).
- Collection of groundwater samples from six proposed POC monitoring wells (MW-19, MW-20, MW-23, MW-26, MW-29, and MW-35) and laboratory analysis of PAHs and BTEX (two sampling events).

Data tables and maps associated with the PRSC investigation are provided in Appendix E for reference. Refer to the letter report for the PRSC investigation (Kennedy/Jenks Consultants 2012) for additional information.

4.2 Supplemental RI Findings

The primary COCs associated with the former creosoting plant include various chemical components of creosote, which is derived from the distillation of coal tar. The COCs relevant to the characterization of creosote impacts at the Creosoting Plant Area include naphthalene, cPAHs, and BTEX. Refer to the 2009 Response to Ecology Comments letter (Kennedy/Jenks Consultants 2009) for additional information regarding the origin and composition of creosote. Creosote-related COCs have been delineated in both soil and groundwater at the Creosoting Plant Area (both On-Property and Off-Property Areas).

The potential COCs for the PRSC investigation included the creosote-related compounds listed above for the Creosoting Plant Area. The results of the PRSC investigation did not indicate the migration of COCs from the Creosoting Plant Area to the PRSC habitat area (Kennedy/Jenks Consultants 2012).

4.2.1 Soil

COC impacts related to the former creosoting plant occur in the western portion of the former Tacoma Metals Property and at Off-Property areas to the west (i.e., the Creosoting Plant Area). Soil impacts related to the former creosoting plant are initially encountered at approximately 5 feet bgs at the former creosoting plant location, corresponding to the approximate base of the fill material installed after demolition of the former creosoting plant, and are evident to depths of approximately 25 feet bgs. Creosote-related impacts to soil extend away for the former creosoting plant location primarily to the north and west, with impacts to the south and east diminishing over a relatively short distance.

The depth to the top of creosote-impacted soil increases with distance away from the former creosoting plant location, primarily to the north and west, to approximately 10 feet bgs, which corresponds with the typical depth to shallow groundwater (refer to Section 2. 2). The maximum depth of creosote-impacted soil is approximately 25 feet bgs for the On-Property areas, but increases to over 30 feet bgs in Off-Property areas to the west and northwest, corresponding to the depth of a silty confining layer (refer to Section 5.2). Geologic cross-sections depicting the lateral and vertical distribution of creosote-related impacts to soil, originally prepared for the Forensic Evaluation of Hydrocarbons (Kennedy/Jenks Consultants 2009), are included in Appendix A. In addition, maps showing the distribution of creosote-impacted soil and the depth to the silty confining layer (discussed in greater detail in Section 5.2) are included in Appendix F.

Soil samples with cPAH concentrations above the proposed cleanup level (refer to Table 3) are typically associated with the areas of heavily stained soil (e.g., areas where NAPL was typically observed in the soil samples). The thickness of the areas of heavy soil impact decreases away from the former creosoting plant location, occurring in thin layers at the base of the wood-fill unit and just above the silty confining layer at some Off-Property locations (refer to the maps and cross sections in Appendix F which illustrate the distribution of subsurface soils affected by creosote-related compounds).

Other creosote-related COCs (naphthalene and BTEX) were not detected in soil samples at concentrations above the proposed cleanup levels (refer to Table 3).

Areas with COC concentrations in soil above the proposed cleanup levels (see Table 3) and at depths above the direct contact standard point of compliance (15 feet bgs) and the TEE conditional point of compliance (6 feet bgs) and are illustrated on Figure 3 for the entire site (On-Property and Off-Property areas).

Most of the affected soil on the former Tacoma Metals Property occurs within the uppermost 6 feet of the soil sequence, extending to depths between 6 and 15 feet at only three locations, including the former hydraulic shear area (west of the former main structure/warehouse building), the former creosoting plant area, and the area around well MW-8(R).

As discussed above, the depth to creosote-affected soil generally increases with depth away from the former creosoting plant location. As a result, COC-affected soil at Off-Property locations does not occur in the uppermost 6 feet of the soil sequence, but is present above 15 feet bgs at two locations (see Figure 3).

COC-affected soil was identified between 6 and 15 feet below grade in the central portion of the 18th Street Right-of-Way and at boring B-36 on the Simpson Property. The affected soil in the 18th Street Right-of-Way correlates laterally with the COC-affected soil identified at the former creosoting plant area (see Figure 6). However, the affected soil identified at boring B-36 from approximately 8 to 10 feet bgs does not appear to correlate directly with the creosote-affected soil at the creosoting plant area or with that identified on the 18th Street Right-of-Way (see Figure 6).

While the source of elevated cPAHs identified at the 8 to 10 foot depth interval is uncertain, it does not appear to be associated with lateral migration of oil contamination beneath the footprint of the former retort or former Creosoting Plant due to its horizontal and vertical location. Therefore, the COC-affected soil in boring B-36 (above 15 feet bgs) appears to be from a source separate from the release associated with the former creosoting plant retort area.

4.2.2 Groundwater

Groundwater COCs at concentrations above the proposed cleanup levels (refer to Table 3) were initially identified during the RI for the On-Property portion of the Creosoting Plant Area, and included cPAHs, naphthalene, gasoline-range petroleum hydrocarbons, and PCBs. [Note: Cleanup levels based on gasoline-range hydrocarbons were subsequently determined to be not applicable for the Creosoting Plant Area due to the pyrogenic nature of the hydrocarbon compounds, as discussed in Section 4.1.1 and 4.1.2.] Data tables for groundwater samples and data flag maps for COCs detected at concentrations above proposed cleanup levels during the RI are provided in Appendix C.

PCBs were detected at concentrations above the proposed cleanup level (refer to Table 3) in two wells [MW-8(R) and MW-11] during one monitoring event performed during the initial RI, but not during previous monitoring events or in reconnaissance groundwater samples collected in the same area. Based on previous analytical findings and potential matrix interference reported by the analytical laboratory ("Y" data flag), the detected PCB concentrations did not appear to be representative of actual PCB concentrations in groundwater (Kennedy/Jenks Consultants 2001). In addition, PCBs were not detected in a subsequent sample collected from MW-8(R) in August 2002, consistent with the conclusions of the 2001 RI/FS. Based on these data, it was concluded that PCBs were a laboratory artifact and not indicative of site conditions.

Groundwater impacts related to other Creosoting Plant Area COCs (cPAHs, naphthalene, BTEX) were further characterized during subsequent investigations performed at On-Property and Off-Property portions of the Creosoting Plant Area (refer to Section 3.2). Petroleum hydrocarbon (gasoline-, diesel-, and oil-range) results are not discussed herein because these compounds are not applicable for the Creosoting Plant Area (Kennedy/Jenks Consultants 2009; Ecology 2009a), but historical data are included on the tables presented in Appendix D.

Naphthalene was detected at concentrations above the proposed cleanup level in groundwater samples collected from monitoring wells installed at On-Property and Off-Property locations. Naphthalene was identified in samples collected from On-Property wells located north of the former creosoting plant location [MW-8(R), MW-18, and MW-22] at concentrations above the proposed cleanup level (refer to Table 3) during at least one monitoring event, but only at well MW-18 for all monitoring events. Naphthalene was also detected in Off-Property wells MW-24 and MW-28(R), west to northwest of the former creosoting plant location, at concentrations above the proposed cleanup level, but not for all monitoring events. Naphthalene was also detected at concentrations above the proposed cleanup level in three reconnaissance groundwater samples collected from soil boring located in the 18th Street right-of-way (B-19, B-21, and B-31, refer to sample maps included in Appendix D). Historical analytical results for naphthalene are included in Table 5 (reconnaissance groundwater samples) and Table 6 (monitoring well samples). Concentration contour maps for naphthalene for the two most recent monitoring events (February 2006 and March 2008) are included in Appendix D.

Total cPAHs were detected in groundwater samples collected from On-Property and Off-Property locations at concentrations above the proposed cleanup level (refer to Table 3) during each phase of Creosote Plant Area investigation. Groundwater samples in which the total cPAH concentration was above the proposed cleanup level were collected from wells and reconnaissance borings located at the former creosoting plant location, and to the north and west. Based on the results of the PRSC investigation, cPAHs in groundwater have not migrated to the PRSC area (Kennedy/Jenks Consultants 2012).

Historical analytical results for cPAHs are included in Table 5 (reconnaissance groundwater samples) and Table 6 (monitoring well samples). Concentration contour maps for total cPAHs for the two most recent monitoring events (February 2006 and March 2008) are included in Appendix D.

Analysis of BTEX was typically not included in the Creosoting Plant Area monitoring events because it was not identified as a specific COC prior to 2009 (Kennedy/Jenks Consultants 2009, Ecology 2009a), but BTEX analysis was performed during the initial RI and the 2003 investigation performed for On-Property portions of the Creosoting Plant Area. BTEX analysis was also included for the samples collected from potential POC wells and reconnaissance groundwater samples during the PRSC investigation (Kennedy/Jenks Consultants 2012). BTEX analytes were not identified at concentrations above the proposed cleanup level (refer to Table 3) during the initial RI or 2003 investigation. Benzene was detected at one potential POC well (MW-23) located Off-Property at a concentration of 56 micrograms per liter (µg/l), above the proposed cleanup level of 23 µg/l, (refer to Table 1 in Appendix E) during the PRSC investigation (Kennedy/Jenks Consultants 2012). Data tables from the RI are provided in Appendix C, for the 2003 investigation in Appendix D, and for the PRSC investigation in Appendix E.

4.2.3 Additional Groundwater Metals Analyses

Analysis of groundwater samples for total and dissolved metals was performed in 2001 (dissolved lead only), 2002 (MW-13 only) and 2003 (21 On-Property wells). Total arsenic, total lead, total and dissolved mercury, and total and dissolved selenium were detected at concentrations above the proposed cleanup levels (refer to Table 3) in samples collected from wells for the 2003 sampling event. Data tables for metals analyses are provided in Appendix D (Tables 5D, 5E, 7F, and 8).

4.2.4 LNAPL and DNAPL

Monitoring for LNAPL and DNAPL was performed during the initial RI and subsequent Creosoting Plant Area investigation. In the Creosoting Plant Area, DNAPL accumulation was identified in Off-Property well MW-28(R), and LNAPL accumulation was intermittently identified in On-Property well MW-8(R). Although DNAPL was identified in well MW-28(R), it was not identified in well MW-28, which was located less than 5 feet from the location of well MW-28(R) Well MW-28(R) was installed in February 2006 as a replacement for MW-28, which was originally installed in April 2005 and subsequently damaged by a contractor during PRSC construction activities. The presence of DNAPL in well MW-28(R), and not in any other wells including the original MW-28, may indicate a localized topographic low in the upper surface of the silt/clay confining layer previously described.

The LNAPL and DNAPL identified in the Creosoting Plant Area appear to be creosote product. Samples of both LNAPL [from MW-8(R)] and DNAPL [from MW-28(R)] were evaluated by Friedman & Bruya, Inc. of Seattle, Washington and found to contain only creosote product (Kennedy/Jenks Consultants 2007b). LNAPL accumulation was also identified in well MW-12, near the former location a hydraulic shear, and appears to be a petroleum hydrocarbon product (hydraulic oil). Monitoring well locations are shown on Figure 3. Historical LNAPL and DNAPL measurements for wells MW-8(R) and MW-28(R) are included in Appendix B (Table 10).

4.3 Interim Remedial Actions

As previously indicated, in addition to the investigation activities described above, interim remedial actions have been performed at the site since completion of the initial RI. These have included the following:

- Containment, onsite treatment, and subsequent offsite disposal of approximately 3,440 tons of lead-impacted soil material excavated from north of the former Tacoma Metals Property during construction of the PRSC was performed between 2005 and 2007 (the material was suspected to have originated from the former Tacoma Metals Property). The soil material was placed in a lined temporary containment unit (TCU) enclosure for treatment to reduce the lead concentration to levels below the threshold, requiring disposal as hazardous waste. The work was performed under an Ecology-approved Work Plan (Kennedy/Jenks Consultants 2007d) and the results of

the soil treatment, verification sampling, and disposal activities were reported to Ecology following completion of the project work (Kennedy/Jenks Consultants 2008a).

- An investigation of potential UXO was performed along the northern margin of the former Tacoma Metals Property in 2006 by EOD Technology, Inc. (EODT) based on an Ecology-approved Work Plan (Kennedy/Jenks Consultants 2006). The investigation was performed to determine if UXO materials, which were identified by the City of Tacoma in 1995 to the north of the former Tacoma Metals Property, were also present on the Tacoma Metals Property. Eleven test pits were excavated by EODT along the northern margin of the Tacoma Metals Property, and no UXO materials were identified (EODT 2006). In addition, two test pits were excavated in the vicinity of monitoring well MW-8(R) to identify potential sources of LNAPL periodically observed in the well. No obvious sources of LNAPL were observed in the two test pits.

- Cleaning of the onsite storm sewer lines to remove sediment that had accumulated during the operational history of site use.

- Demolition of site buildings and removal and disposal of wastes associated with these activities.

Section 5: FS Update and Preferred Cleanup Alternative

This section provides an update to the initial (2001) FS including a description of additional work performed, an updated site conceptual model, proposed cleanup levels, and an update to the preferred remedial alternative (Alternative 2) originally presented in the initial RI/FS report (Kennedy/Jenks Consultants 2001) and summarized in Section 3.3 above.

5.1 Work Performed

5.1.1 Cleanup Level Evaluation

The Cleanup Level Evaluation was performed by Kennedy/Jenks Consultants in 2007 to provide updated cleanup levels based on the results of investigations performed subsequent to the 2001 RI/FS and to evaluate cleanup levels and the preferred remedial alternative presented in the 2001 RI/FS with respect to the 2001 revision (updated October 2007) of Ecology's MTCA Cleanup Regulation [the RI/FS was originally performed under the previous (1996) MTCA revision].

The Cleanup Level Evaluation report (Kennedy/Jenks Consultants 2007c) submitted to Ecology included a human health risk evaluation, proposed cleanup levels based on the risk evaluation and 2001 MTCA Cleanup Regulation revision, proposed POC wells, and an evaluation of the selected remedial alternative from the RI/FS (Kennedy/Jenks Consultants 2001; refer to Section 2.5), including an evaluation based on the disproportionate cost analysis (DCA) framework introduced in the 2001 MTCA Cleanup Regulation revision (Ecology 2001, updated October 2007).

Ecology provided comments on the Cleanup Level Evaluation in a letter dated 4 May 2009 (Ecology 2009b). Ecology expressed concerns regarding the effectiveness of the preferred cleanup alternative presented in the initial RI/FS report (Kennedy/Jenks Consultants 2001) (refer to Section 3.3.1), primarily with respect to protectiveness of aquatic and terrestrial organisms. Ecology requested that a TEE be performed and that the site model presented in the 2001 RI/FS be updated to reflect potential exposure pathways for aquatic and terrestrial organisms.

Ecology's comments regarding the findings of the Cleanup Level Evaluation are addressed in the PRSC Investigation (refer to Section 4.1.3), the TEE (see Section 5.1.2 below) and in

subsequent sections of this report. The updated site conceptual model is discussed in Section 5.2.

5.1.2 Terrestrial Ecological Evaluation

A TEE was performed in accordance with MTCA regulations (WAC 173-340-7493) to evaluate the potential for adverse impacts to land-based ecological receptors from exposure to potentially impacted soil. The site was evaluated under an industrial use scenario, at Ecology's direction, and only the TEE screening values for wildlife protection were evaluated (Kennedy/Jenks Consultants 2010a).

Potential COCs concentrations identified in soil samples were compared to the wildlife protection screening values for soil provided in MTCA Table 749-3. COC concentrations exceeded the TEE screening values for metals, PCBs, PAHs, and diesel-range petroleum hydrocarbons for some soil samples (Kennedy/Jenks Consultants 2010a). However, because the preferred cleanup alternative includes installation of a pavement cap, the potential wildlife exposure pathways will be eliminated.

Ecology accepted the conclusions of the TEE, including a determination that no further TEE activities are necessary for the site, in an opinion letter dated July 7, 2010.

5.2 Site Conceptual Model

This section provides a summary of our current site conceptual model based on the model presented in the initial RI/FS report (Kennedy/Jenks Consultants 2001) and updated to reflect the results of work performed for the supplemental RI. The updated site conceptual model also incorporates the findings of the Cleanup Level Evaluation report (Kennedy/Jenks Consultants 2007c), including Ecology's comments (Ecology 2009b), and the TEE (Kennedy/Jenks Consultants 2010a).

5.2.1 Background

A conceptual site model based on the findings of the RI was originally presented in the initial RI/FS report (Kennedy/Jenks Consultants 2001) and included an evaluation of chemical fate and transport for unsaturated soil and shallow groundwater. Surface water pathways were not evaluated because surface runoff does not interact with the Puyallup River (or PRSC) due to the man-made levee located north of the site. The 2001 RI/FS report also included an evaluation of cleanup levels and other ARARs for the site.

Potential chemical migration pathways identified in the RI/FS report included vertical migration through the vadose zone to shallow groundwater, and horizontal migration in the shallow groundwater zone both towards and away from Puyallup River (tidal fluctuation). The 2001 RI/FS report concluded that COCs in shallow groundwater are unlikely to migrate beyond the northern Tacoma Metals Property boundary based on site-specific modeling results. A depiction of the conceptual site model presented in the RI/FS report is included in Appendix G (Figure 8-1).

The Cleanup Level Evaluation report (Kennedy/Jenks Consultants 2007c) provided additional evaluation of potential pathways and cleanup levels protective of human health based on the findings of investigations performed since the RI. The TEE provided an evaluation of potential exposure pathways and protective cleanup levels for ecological receptors. The PRSC investigation provided analytical data relevant to assessment of potential groundwater to surface water and sediments pathway at the southern margin of the PRSC to the north of the site.

Based on the findings of the studies listed above, the conceptual site model was updated and is summarized below.

5.2.2 Updated Site Conceptual Model

A discussion of potential exposure pathways in the context of updated site conceptual model and hydrogeologic setting is presented below. The updated site conceptual model is depicted on Figure 4.

5.2.2.1 Site Stratigraphy

As discussed in Section 2.2.1, soil materials encountered at the site have included both native and fill materials (refer to Table 1). Fill materials include an upper gravel layer installed prior to

coke plant and metals recycling site operations, and wood waste material, which likely accumulated at the site prior to construction of the former creosoting plant. Native materials encountered beneath the fill layers include sand and fine-grained (silt and clay). Typically, sand or silty sand is encountered directly beneath the fill materials and a layer of fine-grained material (silt and clay) is encountered beneath the sand. Where the fine-grained material was penetrated by soil borings, sand and silty sand were encountered beneath.

The fine-grained materials were identified in soil borings throughout the site and appear to form a roughly continuous layer beneath the site. The upper surface of the fine-grained unit occurs at depths of 20 to 25 feet bgs in soil borings installed on the former Tacoma Metals Property and on the western and southern portions of the Off-Property Areas. Beneath the central and northern portion of the Simpson and JJ Port portion of the Off-Property Areas, the upper surface of the fine-grained unit slopes downwards to a depth of over 40 feet bgs beneath the north-central portion of the JJ Port property, forming a trough-shaped feature, which might represent a former drainage channel (refer to the maps provided in Appendix F).

The fine-grained unit appears to have acted as a barrier to downward migration of creosote-related COCs in the Creosoting Plant Area and also appears to have influenced the lateral migration of creosote-related COCs components. Creosote-related COCs appear to generally follow the slope of the upper surface of the fine-grained materials away from the former creosoting plant. As predicted by modeling performed during the initial RI, creosote-related impacts to not appear to have migrated to the PRSC or Puyallup River (see Section 5.2.3) although creosote was last used at the site during the 1930s.

Maps and geologic cross sections prepared as part of the Forensic Evaluation of Hydrocarbons (Kennedy/Jenks Consultants 2009) illustrate the lateral and vertical distribution of creosote-related impacts identified in the Creosoting Plant Area (copies provided in Appendix F).

5.2.2.2 Site Hydrogeology

As discussed in Section 2.2.2, the shallow groundwater gradient at the site is tidally influenced. Based on historical groundwater elevation monitoring results, the tidally influenced variation in shallow groundwater elevation is greatest for monitoring wells located along the northern site margin and in the western portion of the site, and decreases to the south and, to a lesser extent, to the east.

The direction of the hydraulic gradient is dependent upon tidal conditions, and location within the site. In the eastern portion of the site (eastern portion of the former Tacoma Metals Property), the shallow groundwater gradient in generally to the east during both high and low tidal conditions, but may be more northerly during low tidal conditions. In the western portion of the site (western portion of the former Tacoma Metals Property and the Off-Property areas), the shallow groundwater gradient is generally towards the PRSC during low tidal conditions and away from the PRSC during high tidal conditions. The magnitude of the shallow groundwater gradient is greater during low tidal conditions than during high tidal conditions, resulting in an overall net gradient towards the PRSC.

The hydraulic gradient also appears to be affected by the presence of wood waste material identified in soil borings and test pits at locations throughout the site, primarily in the vicinity of the former creosoting plant location. The wood debris layer in the vicinity of the former creosoting plant is generally thicker than other parts of the site, and may contribute to the localized hydraulic stagnation zone during high tidal conditions, and localized hydraulic mounding in low tidal conditions.

Groundwater gradient maps for the 2006 and 2008 monitoring events are included in Appendix B. As previously indicated, these monitoring events are most representative of current site conditions because they were conducted after construction of the PRSC habitat area.

5.2.3 Potential Exposure Pathways

The conceptual model for chemical migration presented in the RI/FS (Kennedy/Jenks Consultants 2001) has been updated to reflect the findings of investigation activities performed since the completion of the initial RI, and to address Ecology's comments (Ecology 2009b).

The findings of the Creosoting Plant Area investigations are consistent with the conceptual model presented in the RI/FS report (Kennedy/Jenks Consultants 2001) but also indicate the lateral migration of denser creosote components away from the former creosoting plant location the north and west along the upper surface of the fine-grained unit, as previously described (refer to Figure 4). The denser creosote components appear to be associated with NAPL observed in wood waste fill and native soil materials as small blebs, mainly at locations at or near the former creosoting plant location, but also in thin stringers along the base of the wood

waste fill and along the upper surface of the fine-grained unit (refer to Figure 4 and to the maps and cross sections provided in Appendix F).

Creosote-related COCs do not appear to have migrated northward significantly beyond the northern site boundary, and creosote-related impacts to shallow groundwater were not identified along the southern margin of the PRSC in the 2010/2011 PRSC Investigation (Kennedy/Jenks Consultants 2012). These findings indicate that the potential groundwater to surface water and groundwater to sediment pathways are incomplete for the site. The protectiveness of the proposed remedial alternative with respect to these potential exposure pathways will be addressed in the long-term monitoring component of the proposed remedial alternative (discussed in Section 5.4).

Potential exposure pathways for terrestrial organisms were evaluated in the TEE (Kennedy/Jenks Consultants 2010a). The TEE concluded that potential exposure pathways for wildlife include direct contact only. The direct contact pathway is currently limited to unpaved portions of the former Tacoma Metals Property and Off-Property areas (Simpson Property, 18th Street Right-of-Way, and back (northern) portion of the JJ Port Property). The On-Property areas will be paved as part of the preferred remedial action (refer to Section 5.4) and the direct contact pathway for wildlife will be eliminated because shallow soil impacted by COCs will become inaccessible. In addition, a soil cap will be installed on the 18th Street Right-of-Way to extend the depth to soil impacted by COCs to 15 feet (or more) below grade; the point of compliance for the direct contact pathway.

The proposed cleanup alternative also addresses the potential soil to groundwater pathway by removal of potential sources of petroleum-hydrocarbon and creosote-related impacts in shallow soil, and elimination of direct infiltration by stormwater at currently unpaved areas where shallow soil is affected by COCs. Mitigation of the potential soil to groundwater exposure pathway is accomplished by installation of a low-permeability pavement cap and stormwater controls (discussed in greater detail in Section 5.5.4). In addition, institutional controls for soil and groundwater uses will mitigate the potential for exposure to environmental media affected by COCs.

In addition to the potential exposure pathways described above, the vapor intrusion pathway may potentially be completed if structures are built in the future over portions of the site where VOCs exist and vapors from the site migrate into structures at concentrations exceeding MTCA

Method C indoor air cleanup levels. However, VOC concentrations are generally low and would not be expected to pose a threat to human health at the current concentrations, and a significant portion of the impacted soil materials will be removed from the primary source area during the remedial action, decreasing the potential vapor intrusion risk.

Future potential risks from the vapor intrusion pathway will be managed using property deed restrictions (for the former Tacoma Metals property and Off-Property parcels) and engineering controls, as appropriate. Deed restrictions will require that future development in this area includes an evaluation of potential vapor intrusion. If a possible adverse risk is identified, deed restrictions will require that mitigation measure are installed with new building construction.

5.3 Cleanup Levels

Proposed cleanup levels are based on those originally identified in the initial RI/FS report (Kennedy/Jenks Consultants 2001) and by the findings of the Cleanup Level Evaluation (Kennedy/Jenks Consultants 2007c) and TEE (Kennedy/Jenks Consultants 2010a). The Cleanup Level Evaluation included a human health risk evaluation, which incorporated the findings of investigation activities performed since completion of the RI. The TEE included an assessment of potential exposure to wildlife including risk-based screening against the ecological indicator soil concentrations for protection of wildlife in MTCA Table 749-3. The proposed cleanup levels listed in Table 3 also reflect comments from Ecology regarding comparison of cleanup levels to potential surface water quality standards (Ecology 2009b). The proposed cleanup levels are based on an industrial use scenario and are applicable to the preferred remedial alternative discussed in Section 5.4.

5.4 Cleanup Alternatives

As previously discussed in Section 3.3, three cleanup alternatives were evaluated for the initial FS. The three alternatives were evaluated for various criteria including overall (short term and long term) protectiveness, effectiveness, compliance with cleanup standards, permanence, restoration time frame, ability to be implemented, possible community concerns, and potential cost. The three cleanup alternatives, as presented in the RI/FS report, are depicted on Figure 9-1 in Appendix G and described in Section 3.3.

Alternative 2 was selected as the preferred cleanup alternative for the site in the 2001 RI/FS report (Kennedy/Jenks Consultants 2001), and includes the elements listed in Section 3.3.2.

Based on the findings of the Supplemental RI, Alternative 2 remains the preferred alternative. The findings of the Supplemental RI did not indicate any substantive differences that might require modification of the evaluation criteria presented in the initial RI for the cleanup alternatives.

The additional characterization of site conditions provided by the Supplemental RI expanded, but did not fundamentally alter, our understanding of site conditions, and necessitated changes for On-Property areas only in the quantity of impacted soil to be removed in the Creosoting Plant Area (discussed in Section 5.5).

For Off-Property areas, the additional characterization of site conditions identified areas on the 18th Street Right-of-Way and Simpson Property with soil impacts above the proposed cleanup levels. As previously discussed, the affected soil occurs below a depth of 6 feet bgs for all Off-Property areas and below 15 feet for most Off-Property areas (refer to Section 4.2.1 and Figures 3 and 6).

Based on Supplemental RI findings, installation of a soil cap on the 18th Street Right-of-Way is proposed to raise the ground surface to an elevation sufficient to provide a depth of at least 15 feet from ground surface to the affected soil. The elevation for the top surface of the affected soil currently located less than 15 feet below grade will be identified based on analytical results and field observations. The final soil cap elevation will be 15 feet above the top surface of the affected soil. Kennedy/Jenks Consultants anticipates that the final grade for the 18th Street Right-of-Way will approximately match the final grade of the asphalt cap on the Tacoma Metals property, creating a level transition between the two properties.

Excavation of affected soil at Off-Property location B-36 will also be performed; however, the lateral and vertical extent of shallow (i.e. less than 15 feet below grade) soil impacts in the B-36 area are not fully characterized. To evaluate the extent of shallow soil impacts at B-36, a supplemental field investigation will be performed to prior to performing remedial excavation. The supplemental field investigation is anticipated to include advancement of soil borings on the Simpson and JJ Port properties, including chemical analysis of soil samples for site COCs. The scope of work and anticipated boring locations will be submitted to Ecology for review prior to performing any field investigation activities.

For the purposes of cost estimation for this report, an excavation area of 30 feet by 30 feet and 10 feet deep was assumed for the B-36 area. This volume may increase or decrease based on the findings of the additional B-36 area investigation.

Impacts to groundwater identified at Off-Property locations (Simpson Property and 18th Street Right-of-Way) are consistent with those identified on On-Property locations and do not warrant active remedial actions in addition to the long-term monitoring at proposed CPOC wells described in Section 5.5.2.

Based on the increased volume of soil removal proposed for excavation at the Creosoting Plant Area and boring B-36 area, and the addition of the soil cap proposed for the 18th Street Right-of-Way, the estimated costs for the remedial alternatives were updated. The updated cost estimates for each of the three alternatives discussed in the initial FS (Kennedy/Jenks Consultants 2001), based on the increased excavation volume and soil cap and adjusted for 2014 pricing, are provided in Appendix H for reference. Although the current costs are increased for each alternative, the relative cost difference between the three alternatives is similar to those presented in the initial FS.

5.5 Cleanup Alternative 2 Update

The findings of the investigations and evaluations performed since the completion of the RI/FS did not indicate the need for significant substantive changes to Alternative 2, but revision of the scope of some components of Alternative 2 appears appropriate. Proposed revisions to Alternative 2 are described below and depicted on Figure 5.

5.5.1 Source Control Excavation Areas

The cleanup alternatives presented in the RI/FS report (Kennedy/Jenks Consultants 2001), including Alternative 2, included excavation and offsite disposal of soil materials identified as potential sources for impacts to groundwater. These included soil materials in which NAPL was observed and/or COCs at concentrations above proposed site cleanup levels were identified. Excavation of soil materials to the approximate depth of the shallow saturated zone (approximately 10 feet bgs on the former Tacoma Metals Property) was proposed at three locations designated areas “A”, “B”, and “C” as depicted on Figure 9-1 in Appendix G.

The results of the investigation and evaluation activities performed since completion of the initial RI/FS indicate that proposed excavation area “B”, located at the approximate former location of

the creosoting plant, did not include areas of shallow soil impacts identified to the north of the former creosoting plant location. Therefore, excavation area "B" was expanded approximately 40 feet to the north to include shallow COC impacts identified in soil borings B-14 and B-12, corresponding to an increase in the estimated excavation volume from approximately 3,333 cubic yards (yd^3) to approximately 5,444 yd^3 (refer to Figure 5). Excavation area "B" includes the area where creosote-related impacts occur at less than 6 feet bgs (i.e., TEE conditional point of compliance).

In addition, excavation area "D" was added in the vicinity of well MW-8(R) based on the intermittent occurrence of LNAPL identified at that location. Excavation area "D" includes an approximately 30-foot by 30-foot area around well MW-8(R) with an estimated volume of 333 yd^3 (refer to Figure 5). The proposed depths for excavation areas "B" and "D" are the same as proposed in the RI/FS, approximately 10 feet bgs (top of the saturated zone). No changes for excavation areas "A" and "C" are proposed.

Excavation at Area "E" was added at the Off-Property B-36, as discussed in Section 5.4. The preliminary estimated excavation volume at Area "E" is 333 yd^3 (see Figure 5). However, as previously discussed, the extent of soil impacts has not been fully characterized in the B-36 area and the actual volume may vary. The extent of soil impacts will be evaluated in a supplemental field investigation prior to performing the remedial excavation as discussed in Section 5.4.

Cleanup Alternative 2, as described in the initial RI/FS report (Kennedy/Jenks Consultants 2001) included placement of ORC in excavation areas to enhance the natural biodegradation of potential COCs in the shallow saturated zone. In the Cleanup Level Evaluation (Kennedy/Jenks Consultants 2007c), Kennedy/Jenks Consultants recommended that ORC not be used in excavation areas located in the Creosoting Plant Area (excavation areas "B" and "D" described herein) because ORC is not expected to be an effective treatment for COCs of pyrogenic (e.g., creosote derived from coal tar) origin (refer to Section 3.5.1). Therefore, the application of ORC is proposed only for excavation area "C", where COCs include petroleum hydrocarbon compounds.

Cleanup Alternative 2, as described in the initial RI/FS report (Kennedy/Jenks Consultants 2001) also included "buffer-zone" excavation of shallow soil to depths of 1 to 3 feet bgs at locations around the margins of the former Tacoma Metals Property (refer to Figure 9-1 in

Appendix G), and consolidation of the excavated soil onsite. No changes to the buffer zone excavation areas are proposed, although a portion of the proposed buffer zone is included in the expanded portion of excavation area "B" described above.

5.5.2 Soil Cap Installation

Installation of a soil cap on the 18th Street Right-of-Way is proposed for Cleanup Alternative 2 to raise the ground surface to an elevation sufficient to provide a depth of at least 15 feet from ground surface to the affected soil. The final grade for the 18th Street Right-of-Way will approximately match the final grade of the asphalt cap on the Tacoma Metals property. The fill material placed at this location will include pit-run type material compacted to approximately 90% relative density with crushed rock for the uppermost 6 inches.

5.5.3 Long-Term Monitoring

Cleanup Alternative 2, as described in the initial RI/FS report (Kennedy/Jenks Consultants 2001) also included long-term monitoring of shallow groundwater to confirm the effectiveness of the source control measures described in Section 5.4.3. No changes to this approach are proposed.

Specific wells to be included in the groundwater monitoring program as CPOCs for shallow groundwater were identified in the Cleanup Level Evaluation report (Kennedy/Jenks Consultants 2007c) and are shown on Figures 3 and 5. Before approving the conditional point of compliance, a notice of the proposal (and invitation for comment) will be submitted to the natural resources trustees, the USACE, and the Washington State Department of Natural Resources (WADNR) per WAC 173-340-720(8)(d)(i) and (ii). This notice shall be in addition to any notice provided under WAC 173-340-600. In addition, any affected property owners between the source of contamination and the Puyallup River (i.e., the City of Tacoma and USACE) must agree in writing to the use of the CPOCs.The proposed CPOC wells include those located along the northern site boundary including On-Property wells MW-2, MW-4(R), MW-5, MW-6, MW-9, MW-19, and MW-20 and Off-Property wells MW-23 and MW-29 (refer to Figures 3 and 5). At Ecology's request, Off-Property wells MW-26 and MW-35 and piezometer locations P-1, P-2, and P-3 were added. If approved by USACE, permanent monitoring wells will be installed at the piezometer locations. If installation of permanent wells is not approved by USACE, temporary piezometers will be installed for each sampling event (Note: Permanent wells, if approved, may

need to be installed higher on the bank adjacent to the PRSC than the piezometers to avoid inundation under high-tide conditions).

Monitoring at Off-Property locations should include only the COCs identified for creosote-related site impacts (cPAHs, naphthalene, and BTEX). Monitoring at On-Property locations should include COCs related to metals recycling including metals, PAHs, PCBs, and petroleum hydrocarbons (except for Creosoting Plant Area well MW-20, which should exclude petroleum hydrocarbons and include BTEX).

5.5.4 Capping and Institutional Controls

Cleanup Alternative 2, as described in the RI/FS report (Kennedy/Jenks Consultants 2001) includes installation of a pavement cap, stormwater runoff controls, and institutional controls (i.e., deed restrictions and covenants as appropriate). No changes to these components of Alternative 2 are proposed.

The engineering design for the remedial action will specify a low permeability asphalt pavement cap. We understand Ecology expects the asphalt cap to be essentially impermeable (i.e., hydraulic conductivity of $5x10^{-7}$); however, such a low hydraulic conductivity cap may not be technically achievable. In coordination with Ecology, the engineering design will specify a hydraulic conductivity range that is technically achievable, practicable, and meets Ecology's expectations for pavement permeability at the site.

The proposed capping, stormwater controls, and institutional controls will eliminate potential exposure pathways associated with the impacted shallow soil remaining onsite. Final design details for the cap, stormwater controls, and institutional controls, will be included in a Cleanup Action Plan under separate cover. Refer to the RI/FS report (Kennedy/Jenks Consultants 2001) for additional details.

5.5.5 Points of Compliance

The proposed point of compliance for soil is throughout the site. The proposed point of compliance for shallow groundwater includes the CPOC groundwater monitoring wells and piezometers indicated in Section 5.4.2 and shown on Figures 3 and 5.

5.5.6 Disproportionate Cost Analysis

A DCA was not specifically performed for the proposed site cleanup alternatives in the initial FS, because DCA was not part of the 1996 MTCA revision under which the RI/FS was performed (DCA was introduced in the 2001 MTCA revision); however, the substantive requirements of DCA were addressed in the RI/FS report (Kennedy/Jenks Consultants 2001), as discussed in the Cleanup Level Evaluation (Kennedy/Jenks Consultants 2007c). Kennedy/Jenks Consultants concluded that cleanup Alternative 2 would likely have been selected as the most practicable cleanup alterative under the DCA methodology in the 2001 MTCA revision (updated October 2007), as it was under the methodology of the 1996 MTCA revision (Kennedy/Jenks Consultants 2007c).

Section 6: Summary

Kennedy/Jenks Consultants performed an initial RI/FS at the Former Tacoma Metals Site between 2000 and 2001. Impacts to soil and groundwater, primarily related to previous site uses as a metals recycling facility but also as a coke manufacturing plant, were identified and the extent of impacts to site media from these site uses was fully characterized.

During RI, an additional previous site use was identified as a creosoting plant located in the southwestern portion of the site (designated as the Creosoting Plant Area). The extent of potential impacts to environmental media related to the former creosoting plant were not fully addressed in the initial RI; therefore supplemental RI activities were performed in the Creosoting Plant Area between 2002 and 2011 and the extent of creosote-related impacts to soil and groundwater was identified and characterized.

The cleanup alternative selected in the initial FS (Alternative 2) included excavation and offsite disposal of hydrocarbon and creosote impacted soil, excavation and onsite consolidation of metals-impacted soil from the perimeter of the site, installation of an asphalt cap with stormwater controls, *in situ* treatment of residual hydrocarbon impacts, institutional controls, and long-term monitoring.

The findings of the Supplemental RI did not substantively alter the appropriateness of the selected remedial alternative. Based on our understanding of site conditions, results of the Supplemental RI, and evaluation of the proposed cleanup alternative, Alternative 2 as described in the RI/FS report (Kennedy/Jenks Consultants 2001) and modified herein, is protective of human health and the environment under an industrial use scenario.

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Tables

TABLE 1

GENERALIZED SUMMARY OF STRATIGRAPHIC UNITS
Former Tacoma Metals Site
Tacoma, Washington

Approximate Depths (feet bgs)[a]		Approximate Thickness (feet)[a]	Generalized Description[b]
Top	Bottom		
0	1 to 8	1 to 8	**Gravelly and sandy fill materials.** This material is located throughout the former Tacoma Metals Property. Metal, wood, and miscellaneous debris are typically mixed with the gravel and sand on the former Tacoma Metals Property, primarily in the central and eastern portions. This unit includes the 3 to 5 feet of fill material installed on the former creosoting plant area prior to construction of the coke plant.
0 to 4	5 to 6	2 to 5	**Wood fill material with no evident soil material.** This material is primarily located beneath Off-Property areas including the Simpson Property and 18th Street Right-of-Way.
5 to 6	7 to 13	1 to 8	**Silty sand material locally mixed with gravel, coarse sand, and/or woody material.** Silty sand is also observed at greater depths, but typically does not include gravel and woody material.
3 to 13	7 to 26	1 to 18	**Wood fill material typically mixed with 5-30% sandy, silty, and/or clayey soil.** This material is encountered throughout the former Tacoma Metals Property, but is generally thickest in the Creosoting Plant Area.
10 to 19	22 to 30	2 to 15	**Sandy material, typically poorly graded, locally with some silt and/or fine gravel.** Sand is also encountered locally at shallower depths and at deeper depths beneath the silt/clay described below.
22 to >40	>22 to >40	see description	**Silty/clayey material.** This material is typically several inches to several feet in thickness and is encountered throughout the former Tacoma Metals Site.

Notes:

(a) Depths are given in feet below ground surface (bgs) relative to the exiting surface elevation at the former wood treatment facility, approximately 10 feet above mean sea level. Depth and thickness values indicate the ranges at which the stratigraphic units have typically been observed during our investigation activities. Generalized site soil stratigraphy is shown on the cross sections in Appendices A and F.

(b) Generalized descriptions based on previous field investigations performed by Kennedy/Jenks Consultants. Refer to the Remedial Investigation/Feasibility Study (RI/FS) Report (2001), Site Supplemental Data Summary (2007), and Soil and Groundwater Investigation Results (2008) for additional information.

TABLE 2

SUMMARY OF WORK PERFORMED FOR THE SUPPLEMENTAL REMEDIAL INVESTIGATION
Former Tacoma Metals Site, Tacoma, Washington

Investigation Date	Investigation Objectives	Scope of Work Performed	Results Summary References
October 2010 – February 2011 Investigation Puyallup River Side Channel Creosoting Plant Area On-Property and Off-Property	• Implement the *Revised Groundwater Investigation Work Plan, Puyallup River Site Channel Investigation* submitted to Ecology on 3 September 2010. • Evaluate groundwater conditions along the Puyallup River Side Channel to the north-northeast of well MW-8(R), located in the Creosoting Plant Area.	• Installed three temporary piezometers at locations north-northeast of the Creosoting Plant Area and adjacent to the Puyallup River Side Channel. Groundwater samples were collected from each piezometer for laboratory analysis of applicable chemicals of concern (COCs). The three piezometers were installed and sampled at the same locations during two separate events conducted in October 2010 and again in February 2011. • Performed groundwater sampling and laboratory analysis for applicable COCs at six conditional point of compliance On-Property and Off-Property monitoring wells. Two rounds of sampling were performed in October 2010 and February 2011 coincident with the temporary piezometer installation and sampling.	• *Revised Groundwater Investigation Summary, Puyallup River Side Channel Investigation* (Kennedy/Jenks Consultants 2012) includes data tables, sample location maps, field sampling documents, and analytical reports. Select materials are included in this report for reference as listed below. • A boring and well location map and analytical data tables for groundwater (well and piezometer) samples provided in Appendix E.
October 2007 – April 2008 Investigation Creosoting Plant Area On-Property and Off-Property	• Implement the *Soil and Groundwater Investigation Work Plan* submitted to Ecology dated 12 March 2007. • Further define lateral limits of impacts to soil and groundwater in the western portion of the Creosoting Plant Area.	• Advanced 13 soil borings (B-37 through B-47) to the first encountered silt/clay layer and collected continuous soil samples from each boring for lithologic logging, field screening for indications of COCs and potential presence of dense non-aqueous phase liquid (DNAPL); collected soil and reconnaissance groundwater samples. • Installed and developed four new Off-Property groundwater monitoring wells (MW-32 through MW-35). • Performed groundwater sampling and laboratory analysis for applicable COCs at 25 On-Property and Off-Property monitoring wells, including new and existing wells. • Performed groundwater elevation monitoring for low- and high- tidal conditions at all Site monitoring wells, including new and existing wells, and light non-aqueous phase liquid (LNAPL)/DNAPL screening for Creosoting Plant Area wells.	• *Soil and Groundwater Investigation Results-Data Transmittal* (Kennedy/Jenks 2008b) includes data tables, data maps, gradient maps, cross sections, soil boring and well construction logs, and analytical reports. Select materials are included in this report for reference as listed below. • Boring and well location map provided in Appendix D. • Analytical data tables for soil, reconnaissance groundwater, and groundwater monitoring wells provided in Appendix D. • Concentration contour maps for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) and naphthalene provided in Appendix D • Geologic cross sections for the Creosoting Plant Area showing the depth to the first encountered silt layer included in Appendices A and F. • Groundwater gradient maps and tabulated water elevation measurements for low- and high- tidal conditions provided in Appendix B.
February 2006 Investigation Creosoting Plant Area On-Property and Off- Property	• Implement the *Soil and Groundwater Investigation Work Plan* submitted to Ecology dated 15 December 2005. • Further define lateral limits of impacts to soil and groundwater in the Off-Property portion of the Creosoting Plant Area.	• Advanced three soil borings (B-34 through B-36) to the first encountered silt/clay layer and collected continuous soil samples from each boring for lithologic logging, field screening for indications of COCs and potential presence of DNAPL; collected soil and reconnaissance groundwater samples for laboratory analysis of applicable COCs. • Installed and developed three new Off-Property groundwater monitoring wells (MW-29 through MW-31). • Abandoned and replaced one damaged monitoring well (MW-28) with a new monitoring well [MW-28(R)] installed at the same location. • Performed groundwater sampling and laboratory analysis for applicable COCs at 21 On-Property and Off-Property monitoring wells, including the three new wells and one replacement well. • Performed groundwater elevation monitoring for low- and high- tidal conditions at all Site monitoring wells, including new and existing wells, and LNAPL/DNAPL screening for Creosoting Plant Area wells.	• *Supplemental Data Summary Report* (Kennedy/Jenks 2007a) includes data tables, data maps, gradient maps, cross sections, soil boring and well construction logs, and analytical reports. Select materials are included in this report for reference as listed below. • Boring and well location map provided in Appendix D. • Analytical data tables for soil, reconnaissance groundwater, and groundwater monitoring wells provided in Appendix D. • Concentration contour maps for cPAHs and naphthalene provided in Appendix D. • Geologic cross sections for the Creosoting Plant Area showing the depth to the first encountered silt layer included in Appendices A and F. • Groundwater gradient maps and tabulated water elevation measurements for low- and high- tidal conditions provided in Appendix B.

TABLE 2

SUMMARY OF WORK PERFORMED FOR THE SUPPLEMENTAL REMEDIAL INVESTIGATION
Former Tacoma Metals Site, Tacoma, Washington

Investigation Date	Investigation Objectives	Scope of Work Performed	Results Summary References
March 2005 Investigation Creosoting Plant Area Off-Property	• Implement the *Soil and Groundwater Investigation Work Plan – Off-Property Investigation* submitted to Ecology dated 2 July 2004, including modifications to the Work Plan described in the *Responses to Ecology Comments on Soil and Groundwater Investigation Work Plan Off-Property Investigation* letter to Ecology dated 2 December 2004 and the *Addendum Letter* dated 24 February 2005. • Further define lateral limits of impacts to soil and groundwater at Off-Property areas west of the former creosoting plant location.	• Advanced ten soil borings (B-24 through B-33) to the first encountered silt/clay layer and collected continuous soil samples from each boring for lithologic logging, field screening for indications of COCs and potential presence of DNAPL; collected soil and reconnaissance groundwater samples for laboratory analysis of applicable COCs. • Installed and developed three new Off-Property groundwater monitoring wells (MW-26 through MW-28). • Performed groundwater sampling and laboratory analysis for applicable COCs at the three new Off-Property monitoring wells. • Performed groundwater elevation monitoring for low- and high- tidal conditions at all Site monitoring wells, including new and existing wells, and LNAPL/DNAPL screening for Creosoting Plant Area wells.	• *Supplemental Data Summary Report* (Kennedy/Jenks 2007a) includes data tables, data maps, gradient maps, cross sections, soil boring and well construction logs, and analytical reports. Select materials are included in this report for reference as listed below. • Boring and well location map provided in Appendix D. • Analytical data tables for soil, reconnaissance groundwater, and groundwater monitoring wells provided in Appendix D. • Geologic cross sections for the Creosoting Plant Area showing the depth to the first encountered silt layer included in Appendices A and F. • Tabulated water elevation measurements for low- and high- tidal conditions provided in Appendix B.
March 2004 Investigation Creosoting Plant Area On-Property and Off-Property	• Investigate the area beyond the western former Tacoma Metals Property boundary to evaluate potential Off-Property sources and evaluate the lateral extent of COCs in soil groundwater north and west of the former creosoting plant location.	• Advanced six soil borings (B-18 through B-23) to the first encountered silt/clay layer and collected continuous soil samples from each boring for lithologic logging, field screening for indications of COCs and potential presence of DNAPL; collected soil and reconnaissance groundwater samples for laboratory analysis of applicable COCs. • Installed and developed three new Off-Property groundwater monitoring wells (MW-23 through MW-25) based on reconnaissance groundwater analytical results. • Performed groundwater sampling and laboratory analysis for applicable COCs at the three newly installed Off-Property Monitoring and On-Property well MW-18. • Performed groundwater elevation monitoring for low- and high- tidal conditions at all Site monitoring wells, including new and existing wells, and LNAPL/DNAPL screening for Creosoting Plant Area wells.	• *Supplemental Data Summary Report* (Kennedy/Jenks 2007a). Includes data tables, data maps, gradient maps, cross sections, soil boring and well construction logs, and analytical reports. Select materials are included in this report for reference as listed below. • Boring and well location map provided in Appendix D. • Analytical data tables for soil, reconnaissance groundwater, and groundwater monitoring wells provided in Appendix D. • Geologic cross sections for the Creosoting Plant Area showing the depth to the first encountered silt layer included in Appendices A and F. • Tabulated water elevation measurements for low- and high- tidal conditions provided in Appendix B.
November - December 2003 Investigation Former Tacoma Metals Property Creosoting Plant Area On-Property	• Implement the *Additional Soil and Groundwater Investigation Work Plan* submitted to Ecology dated 19 September 2003. • Investigate potential On-Property source(s) other than the former creosoting plant retort area that may have contributed to COC concentrations detected in groundwater samples collected from well MW-18. • Evaluate metals concentrations in On-Property monitoring wells (entire former Tacoma Metals Property).	• Advanced two deep borings (B-12 and B-13) at the location of a proposed new monitoring well (MW-22) and adjacent to monitoring well MW-18 and collected soil samples for lithologic logging, field screening for indications of COCs and potential presence of DNAPL; collected soil samples for laboratory analysis of applicable COCs. • Advanced four shallow soil borings (B-14 through B-17) in the vicinity of well MW-18 to evaluate other potential On-Property sources that might have contributed to the COC concentrations detected at well MW-18; collected soil samples for laboratory analysis of applicable COCs. • Installed and developed one new groundwater monitoring well (MW-22) at a location approximately equidistant between existing monitoring wells MW-18 and MW-21. • Performed groundwater sampling and laboratory analysis for applicable COCs at 14 monitoring wells on the On-Property portion of the Creosoting Plant Area, including the newly installed MW-22. • Performed groundwater elevation monitoring for low- and high- tidal conditions at all Site monitoring wells, including new and existing wells, and LNAPL/DNAPL screening for Creosoting Plant Area wells.	• *Supplemental Data Summary Report* (Kennedy/Jenks 2007a). Includes data tables, data maps, gradient maps, cross sections, soil boring and well construction logs, and analytical reports. Select materials are included in this report for reference as listed below. • Boring and well location map provided in Appendix D. • Analytical data tables for soil and groundwater monitoring wells provided in Appendix D. • Geologic cross sections for the Creosoting Plant Area showing the depth to the first encountered silt layer included in Appendices A and F. • Tabulated water elevation measurements for low- and high- tidal conditions provided in Appendix B.

TABLE 2

SUMMARY OF WORK PERFORMED FOR THE SUPPLEMENTAL REMEDIAL INVESTIGATION
Former Tacoma Metals Site, Tacoma, Washington

Investigation Date	Investigation Objectives	Scope of Work Performed	Results Summary References
February – March 2003 Investigation Creosoting Plant Area On-Property	• Implement the *Revised DNAPL Investigation Work Plan* submitted to Ecology dated 20 February 2003. • Further assess the potential presence of DNAPL in the vicinity of the former creosoting plant. • Evaluate the extent and topography of the silt and/or clay confining layer(s) encountered during the June-August 2002 investigation. • Install a deeper well (designated MW-20) at the location of MW-13, at the request of Ecology.	• Advanced eight deep borings (MW-14 through MW-21) in the to the first encountered silt/clay layer and collected continuous soil samples from each boring for lithologic logging, field screening for indications of COCs and potential presence of DNAPL; collected soil samples for laboratory analysis of applicable COCs. • Advanced eight supplemental borings (B-4 through B-11) to assist in the evaluation of the first encountered silt/clay layer. • Installed eight new groundwater monitoring wells (MW-14 through MW-21) in the deep soil borings to monitor for visual indications of DNAPL. • Performed groundwater sampling and laboratory analysis for applicable COCs at the eight new monitoring wells.	• *Supplemental Data Summary Report* (Kennedy/Jenks 2007a) includes data tables, data maps, gradient maps, cross sections, soil boring and well construction logs, and analytical reports. Select materials are included in this report for reference as listed below. • Boring and well location map provided in Appendix D. • Analytical data tables for soil and groundwater monitoring wells provided in Appendix D. • Geologic cross sections for the Creosoting Plant Area showing the depth to the first encountered silt layer included in Appendices A and F.
June – August 2002 Investigation Creosoting Plant Area On-Property	• Implement the *DNAPL and Groundwater Investigation Work Plan* submitted to Ecology, dated 20 June 2002 • Advance deep borings at former creosoting plant retort location to assess the potential for DNAPL near the source area. • Identify silt and/or clay horizons located beneath the wood debris layer that may act as “confining layers” and potentially result in the accumulation of DNAPL.	• Advanced two deep borings (B-1 and B-2) with a hollow-stem auger drill rig to assess the potential presence of DNAPL at the former creosoting plant retort location. • Advanced one deep boring (B-3) adjacent to existing well MW-8(R) to assess whether shallow soil in this area contains hydrocarbons contributing to periodic LNAPL accumulation observed in well MW-8(R). • Collected soil samples from each boring for lithologic logging, field screening for indications of COCs and potential presence of DNAPL; collected soil samples for laboratory analysis of applicable COCs. • Installed one new On-Property groundwater monitoring well (MW-13) at the northern property boundary, downgradient of well MW-8(R), and collected one groundwater sample from well MW-13.	• *Supplemental Data Summary Report* (Kennedy/Jenks 2007a) includes data tables, data maps, gradient maps, cross sections, soil boring and well construction logs, and analytical reports. Select materials are included in this report for reference as listed below. • Boring and well location map provided in Appendix D. • Analytical data tables for soil and groundwater monitoring well MW-13 provided in Appendix D. • Geologic cross sections for the Creosoting Plant Area showing the depth to the first encountered silt layer included in Appendices A and F.
October 2001 Investigation Former Tacoma Metals Property Creosoting Plant Area On-Property	• Additional groundwater sampling for metals (lead) analysis on the former Tacoma Metals Property, including the Creosoting Plant Area.	• Collected groundwater samples from 11 On-Property monitoring wells for laboratory analysis of total lead.	• *Supplemental Data Summary Report* (Kennedy/Jenks 2007a) includes data tables, data maps, gradient maps, cross sections, soil boring and well construction logs, and analytical reports. Select materials are included in this report for reference as listed below. • Boring and well location map and analytical data table provided in Appendix D.

TABLE 3

SUMMARY OF PROPOSED CLEANUP LEVELS
Former Tacoma Metals Site
Tacoma, Washington

SOIL (mg/kg)	MTCA Method A Industrial Soil Cleanup Level (WAC 173-340)	MTCA Method C Industrial Soil Cleanup Level (WAC 173-340)	Protection of Wildlife (TEE)[a]	Proposed Cleanup Levels	
				Direct Contact Human Exposure	Ecological Exposure (uppermost 6 feet)
Arsenic	20	88	132	88	132
Barium	na	700,000	102	700,000	102
Cadmium	2	na	14	2	14
Chromium (III)	2,000	5,300,000	67[b]	5,300,000	67[b]
Chromium (VI)	19	11,000	na	11,000	na
Copper	na	140,000	217	140,000	217
Lead	1,000	na	118	1,000	118
Mercury	2	na	5.5	2	5.5
Selenium	na	18,000	0.3	18,000	0.3
Silver	na	18,000	na	18,000	na
Total PCBs	10	66	0.65	66	0.65
Naphthalene	5	70,000	na	70,000	na
Total cPAHs	2	18	12[c]	18	12[c]
Benzene	0.03	2,400	na	2,400	na
Toluene	7	280,000	na	280,000	na
Ethylbenzene	6	350,000	na	350,000	na
Xylenes	9	700,000	na	700,000	na
TPH-Diesel Range	2,000	na	6,000	2,000	5,000
TPH-Oil Range	2,000	na	na	2,000	na

GROUNDWATER (µg/l)	MTCA Method B Surface Water Cleanup Level (WAC 173-340)	Ecology Freshwater Chronic AWQC (WAC 173-201A)	NRWQC for Human Health Consumption or Organisms (Clean Water Act Section 304)	National Toxics Rule Consumption of Organisms (40 CFR 131.36)	Proposed Cleanup Levels
Arsenic	0.098	190	0.14	0.14	0.098
Lead	na	4.74[d]	na	na	4.74[d]
Mercury	na	0.012	na	0.15	0.012 / PQL[e]
Cadmium	41	1.59[d]	na	na	1.59[d]
Chromium (III)	240,000	288[d]	na	na	288[d]
Chromium (VI)	490	10	na	na	10
Copper	2,900	18.76[d]	na	na	18.76[d]
Selenium	2,700	5	4,200	na	5
Total PCBs	0.0001	0.014	0.000064	0.00017	0.000064 / PQL[e]
Naphthalene	4,940	na	na	na	4,940
Total cPAHs	0.03	na	0.018	0.031	0.03
Benzene	23	na	51	71	23
Toluene	19,000	na	15,000	200,000	15,000
Ethylbenzene	6,900	na	2,100	29,000	2,100
Xylenes	1,000[f]	na	na	na	1,000
TPH-Diesel Range	10,000 (NPDES Industrial Stormwater General Permit Benchmark)	na	na	na	10,000
TPH-Oil Range	10,000 (NPDES Industrial Stormwater General Permit Benchmark)	na	na	na	10,000

Notes:

(a) Direct contact for protection of wildlife based on the Terrestrial Ecological Evaluation (TEE) (Kennedy/Jenks Consultants 2010).

(b) Cleanup level is for total chromium.

(c) Cleanup level is for benzo(a)pyrene.

(d) Cleanup level based on an average hardness of 180 mg/l.

(e) Cleanup level is equal to the Practical Quantitation Limit (PQL).

(f) MTCA Method A Groundwater clenaup level (Method B surface water clenaup level not available).

PCBs = Polychlorinated biphenyls

cPAHs = Carcingenic polycyclic aromatic hydrocarbons

TPH = Total petroleum hydrocarbons

NPDES = National pollutant dischage elimiation system

na = not available

mg/kg = milligrams per kilogram

µg/l = micrograms per liter

NOTE: Soil and groundwater cleanup levels shown above may not be protective of the indoor air pathway. Refer to Section 5 of the main text.

TABLE 4

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR SOIL
CREOSOTING PLANT AREA
Former Tacoma Metals Site, Tacoma, Washngton

			BTEX (µg/kg)						PAHs (mg/kg)	cPAHs (mg/kg)							
INVESTIGATION DATE	SAMPLE NAME	SAMPLE DEPTH	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	Total xylenes	Naphthalene	Benzo(a) anthracene	Chrysene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Indeno(1,2,3-cd) pyrene	Dibenz(a,h) anthracene	Total cPAHs[a]
Jun-02	MW-13	17.5	_[b]	--	--	--	--	--	14	0.022	0.029	0.010	<0.0086[c]	0.010	<0.0086	<0.0086	0.01
	B-1	10.5	<5,900	<5,900	<5,900	<5,900	<5,900	<11,800	300 B	79	100	53	34	52	17	8.1	***73.0***
		20.5	<310	<310	<310	<310	<310	<620	110 B	18	18	8.8	7.5	8.9	3.4	1.3	12.9
		26	<780	<780	<780	<780	<780	<1,560	300 B	43	51	22	17	20	7.9	4.2	***31.7***
	B-2	21	<340	<340	<340	<340	<340	<680	58 B	9.7	11	5.8	4.7	5.1	2.2	1.1	8.2
	B-3	10	<11	<11	59	130	160	290	5.6 B	0.046	0.059	0.032	0.035	0.037	0.033	<0.017	0.05
		21.5	<760	<760	<760	<760	<760	<1,520	26 B	1.2	1.1	0.25	0.330	0.260	0.059	0.028	0.45
Feb-03	MW-14	14-14.5	--	--	--	--	--	--	0.980	0.444	0.578	0.620	0.507	0.634	0.451	<0.0222	0.83
		22-22.3	--	--	--	--	--	--	54.1	9.43	8.62	3.25	3.41	2.44	0.925	0.268	5.0
		23.8-24	--	--	--	--	--	--	25.8	3.92	3.41	1.88	0.783	0.940	0.862	<0.500	2.6
		26-26.5	--	--	--	--	--	--	1.03	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
	MW-15	11-11.5	--	--	--	--	--	--	0.695	0.0799	0.0719	0.0739	<0.0304	0.0319	<0.0304	<0.0304	0.09
		25-26	--	--	--	--	--	--	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
	MW-16	7.5-8	--	--	--	--	--	--	40.1	1.64	1.56	1.14	0.864	1.13	0.513	<0.0586	1.6
		25-26	--	--	--	--	--	--	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
	MW-17	12-16	--	--	--	--	--	--	0.375	0.146	0.111	0.0874	0.0185	0.0387	0.0454	<0.0148	0.11
		20.5-22	--	--	--	--	--	--	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
	MW-18	11.5-12	--	--	--	--	--	--	326	27.5	27.9	17.9	6.37	7.96	2.10	1.39	***22.7***
		21.5-21.9	--	--	--	--	--	--	1,750	83.2	75.4	42.8	43.8	42.3	5.25	3.54	***61.4***
	MW-19	16-18	--	--	--	--	--	--	0.0798	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
		23.5-24	--	--	--	--	--	--	<0.0100	0.0125	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
	MW-20	24-24.3	--	--	--	--	--	--	0.631	0.0323	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
	MW-21	20.5-21.4	--	--	--	--	--	--	100	170	130	59.5	59.0	60.5	24.4	4.34	***92.6***
		22.5-23.3	--	--	--	--	--	--	0.664	0.312	0.357	0.189	0.129	0.162	0.0684	<0.0100	0.26
	B-6	23-23.2	--	--	--	--	--	--	1,850	128	111	65.8	30.7	65.8	18.7	8.28	***92.1***
	B-8	23.5-24	--	--	--	--	--	--	103	50.5	52.1	21.1	21.0	24.8	7.91	3.86	***32.4***
		26.5-27	--	--	--	--	--	--	0.432	0.0165	0.0107	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
Nov-03	B-12	4-5	--	--	--	--	--	--	3.48	15.9	17.7	19.5	12.7	19.0	12.8	5.83	***26.3***
		6.5-7.5	--	--	--	--	--	--	0.191	0.0843	0.115	0.271	0.177	0.120	0.226	0.0799	0.34
		9-10	--	--	--	--	--	--	3.28	4.26	3.32	2.13	1.28	2.16	0.882	0.382	3.1
	B-13	1-3	--	--	--	--	--	--	1.44	7.32	7.21	6.64	6.44	7.79	4.74	2.17	9.6
		5-6	--	--	--	--	--	--	0.218	4.65	4.70	5.90	3.53	3.72	3.47	1.09	7.6
		14-15	--	--	--	--	--	--	826	21.2	1.98	6.95	7.48	10.7	2.22	1.18	11.2
	B-14	1-2	--	--	--	--	--	--	0.713	2.50	3.11	2.78	1.99	3.33	2.13	0.966	3.9
		5-6	--	--	--	--	--	--	1.63	22.2	29.6	22.7	18.9	13.4	13.0	5.18	***30.3***
		9-10	--	--	--	--	--	--	4.52	1.38	2.25	1.75	1.27	1.16	0.994	0.403	2.3
	B-15	5-6	--	--	--	--	--	--	0.421	0.474	1.12	1.14	0.788	0.941	0.711	0.329	1.5
		7-8	--	--	--	--	--	--	0.0605	<0.0100	0.0526	<0.0100	<0.0100	0.0307	0.0123	<0.0100	0.01
		10-11	--	--	--	--	--	--	0.0167	0.0376	0.0843	0.104	0.0826	0.0868	0.108	0.0384	0.14
	B-16	3-4	--	--	--	--	--	--	0.0725	0.0156	0.0206	0.0320	0.0320	0.0156	0.0327	<0.0100	0.04
		5-6	--	--	--	--	--	--	11.0	0.221	0.911	0.143	0.130	0.494	0.104	<0.100	0.25
		10-11	--	--	--	--	--	--	22.3	0.264	1.10	<0.200	<0.200	0.512	<0.200	<0.200	0.22
	B-17	3-4	--	--	--	--	--	--	0.0258	0.0301	0.0387	0.0494	0.0444	0.0279	0.0444	0.150	0.08
		5-6	--	--	--	--	--	--	0.353	1.65	2.76	1.66	2.35	1.36	0.888	0.406	2.4
		7-8	--	--	--	--	--	--	0.535	0.171	0.774	0.250	0.375	0.444	0.182	<0.168	0.38
Proposed Cleanup Level[d]			2,400	280,000	350,000	700,000	700,000	700,000	70,000	NA	NA	NA	NA	NA	NA	NA	18

TABLE 4

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR SOIL
CREOSOTING PLANT AREA
Former Tacoma Metals Site, Tacoma, Washngton

			BTEX (µg/kg)						PAHs (mg/kg)	cPAHs (mg/kg)							
INVESTIGATION DATE	SAMPLE NAME	SAMPLE DEPTH	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	Total xylenes	Naphthalene	Benzo(a) anthracene	Chrysene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Indeno(1,2,3-cd) pyrene	Dibenz(a,h) anthracene	Total cPAHs[a]
Mar-04	B-18	6-6.5	--[b]	--	--	--	--	--	0.0872	0.0208	0.0325	0.0286	0.0521	0.0299	0.0156	0.0456	0.05
		12-13	--	--	--	--	--	--	0.873	2.23	2.02	1.74	2.10	0.597	0.867	0.319	2.4
		24-25	--	--	--	--	--	--	0.332	<0.0100[c]	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
	B-19	9-10	--	--	--	--	--	--	8.66	0.189	0.142	0.186	0.194	0.0939	0.115	0.0678	0.25
		14-15	--	--	--	--	--	--	0.375	0.0482	0.0412	0.043	0.057	0.0245	0.0167	0.0324	0.06
		21-22	--	--	--	--	--	--	1,160	87.2	76.2	48.3	68.6	25.4	15.2	31.3	***71.8***
	B-20	7-8	--	--	--	--	--	--	0.235	<0.204	<0.204	<0.204	<0.204	<0.204	<0.204	<0.204	0.15
		10-11	--	--	--	--	--	--	17.2	0.259	0.206	0.166	0.192	0.0557	0.0633	0.0544	0.23
		19-20	--	--	--	--	--	--	7.89	0.228	0.144	0.075	0.0967	0.0533	0.0175	0.0317	0.12
	B-21	8-9	--	--	--	--	--	--	0.402	0.104	0.146	0.118	0.181	0.0709	0.0732	0.0488	0.17
		13-15	--	--	--	--	--	--	0.234	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
		18-19	--	--	--	--	--	--	45.2	6.93	4.10	3.51	5.00	2.72	0.711	0.317	5.1
	B-22	6-7	--	--	--	--	--	--	0.731	3.40	4.68	8.26	9.09	3.64	5.05	1.87	10.6
		11-12	--	--	--	--	--	--	0.918	1.99	1.77	1.34	1.55	0.319	0.961	0.299	1.9
		19-20	--	--	--	--	--	--	<0.100	2.06	1.71	0.679	0.959	0.340	0.195	0.314	1.1
	B-23	6.5-7.5	--	--	--	--	--	--	0.120	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	0.08
		9-10	--	--	--	--	--	--	1.78	12.8	23.0	15.8	16.2	7.69	17.6	<0.266	***21.5***
		18-20	--	--	--	--	--	--	<0.100	<0.100	<0.100	0.122	0.226	<0.100	<0.100	<0.100	0.17
Mar-05	B-24	9-10	--	--	--	--	--	--	<0.0100	<0.0100	0.0280	0.0143	0.0239	0.0299	0.0174	<0.0100	0.02
		15-16	--	--	--	--	--	--	50.9	1.41	1.27	0.501	0.366	0.383	<0.330	<0.330	0.76
		30.5-31.5	--	--	--	--	--	--	0.239	0.264	0.262	0.0951	0.118	0.151	<0.0500	<0.0500	0.16
	B-25	14-15	--	--	--	--	--	--	0.344	<0.0100	0.0190	<0.0100	<0.0100	0.0203	<0.0100	<0.0100	0.01
		30-31	--	--	--	--	--	--	25.7	36.9	35.5	21.1	15.6	17.9	6.64	3.11	***29.5***
	B-26	6.5-7.5	--	--	--	--	--	--	0.181	0.0595	0.148	0.0668	0.116	0.0939	0.0341	0.0131	0.10
		18-19	--	--	--	--	--	--	7.63	34.6	48.7	20.3	15.9	17.1	7.90	3.44	***28.7***
		25-26	--	--	--	--	--	--	13.7	0.539	0.531	<0.330	<0.330	<0.330	<0.330	<0.330	0.29
	B-27	7-8	--	--	--	--	--	--	0.0910	0.300	0.505	0.409	0.447	0.471	0.253	0.112	0.57
		22-23	--	--	--	--	--	--	0.561	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
		24.5-25.5	--	--	--	--	--	--	2,410	102	92.8	37.3	33.1	34.0	10.8	4.86	***56.7***
	B-28	6-7	--	--	--	--	--	--	<0.330	0.711	1.05	1.58	0.759	0.883	1.04	<0.330	1.9
		11-12	--	--	--	--	--	--	1.16	0.0182	0.0248	0.0153	0.0134	0.0229	<0.0100	<0.0100	0.02
		23.5-24.5	--	--	--	--	--	--	33.5	3.91	3.53	0.824	0.915	0.858	<0.656	<0.656	1.5
	B-29	6.5-7.5	--	--	--	--	--	--	<0.330	0.723	1.17	0.832	0.896	0.657	0.520	<0.330	1.1
		11-12	--	--	--	--	--	--	1.20	4.33	7.10	4.79	3.57	3.57	2.11	0.808	6.3
		22.5-23.5	--	--	--	--	--	--	415	25.1	23.2	8.18	7.83	7.32	<6.51	<6.51	13.1
	B-30	5.5-6.5	--	--	--	--	--	--	0.0297	0.0423	0.0689	0.0383	0.0533	0.0652	0.0298	<0.0211	0.06
		11-12	--	--	--	--	--	--	0.188	0.0154	0.0244	0.0119	0.0125	0.0249	<0.0100	<0.0100	0.02
		22-23	--	--	--	--	--	--	<0.643	4.47	4.26	2.20	1.72	1.82	0.698	<0.643	3.1
	B-31	6-7	--	--	--	--	--	--	<0.330	3.69	7.16	6.37	5.85	4.65	3.84	1.53	8.4
		19-20	--	--	--	--	--	--	9.29	19.2	18.1	10.6	8.02	8.36	3.44	1.70	14.9
		24-25	--	--	--	--	--	--	17.7	2.72	2.93	1.69	1.30	1.35	0.542	<0.330	2.3
	B-32	6-7	--	--	--	--	--	--	0.0741	0.0156	0.0273	0.0184	0.0240	0.0345	0.0166	<0.0100	0.03
		11-12	--	--	--	--	--	--	0.327	0.171	0.369	0.241	0.350	0.248	0.371	0.0990	0.37
		19-20	--	--	--	--	--	--	8.27	279	318	202	153	170	76.2	32.2	***276.2***
	B-33	6-7	--	--	--	--	--	--	0.0454	0.0211	0.0323	0.0227	0.0243	0.0340	0.0144	<0.0100	0.03
		18-19	--	--	--	--	--	--	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
		20.5-21.5	--	--	--	--	--	--	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.01
Proposed Cleanup Level[d]			2,400	280,000	350,000	700,000	700,000	700,000	70,000	NA	NA	NA	NA	NA	NA	NA	18

TABLE 4

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR SOIL
CREOSOTING PLANT AREA
Former Tacoma Metals Site, Tacoma, Washngton

			BTEX (µg/kg)						PAHs (mg/kg)	cPAHs (mg/kg)							
INVESTIGATION DATE	SAMPLE NAME	SAMPLE DEPTH	Benzene	Toluene	Ethyl-benzene	m,p-Xylene	o-Xylene	Total xylenes	Naphthalene	Benzo(a) anthracene	Chrysene	Benzo(a) pyrene	Benzo(b) fluoranthene	Benzo(k) fluoranthene	Indeno(1,2,3-cd) pyrene	Dibenz(a,h) anthracene	Total cPAHs[a]
Feb-06	B-34	7-8	--[b]	--	--	--	--	--	<0.118	0.448	0.519	0.491	0.474	0.481	0.330	0.229	0.69
		18-19	--	--	--	--	--	--	0.00992 J	0.0217	0.0300	0.0158	0.0217	0.0225	0.0215	0.0154	0.03
		30-31	--	--	--	--	--	--	0.0539	0.0284	0.0154	0.0102 J	0.00491 J	0.00169 J	<0.0127[c]	<0.0127	0.02
	B-35	6-7	--	--	--	--	--	--	0.0504 J	0.332	0.993	0.755	0.752	0.631	0.550	0.343	1.0
		32-33	--	--	--	--	--	--	1.93	<0.0588	<0.0588	<0.0588	<0.0588	<0.0588	<0.0588	<0.0588	0.04
		39-40	--	--	--	--	--	--	0.658	<0.0600	<0.0600	<0.0600	<0.0600	<0.0600	<0.0600	<0.0600	0.05
	B-36	8-10	--	--	--	--	--	--	1.62 J	71.7	114	88.8	73.2	78.0	31.7	22.1	***117.6***
		23-24	--	--	--	--	--	--	204	403	281	271	215	245	82.7	58.3	***374.2***
		31-32	--	--	--	--	--	--	296	296	507	151	145	135	101	97.7	***233.5***
Oct-07	B-37	5-6	--	--	--	--	--	--	0.020	<0.01	0.016	<0.01	0.018	<0.01	0.011	<0.01	0.01
		14-15	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		21-22	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	B-38	5-6	--	--	--	--	--	--	0.015	0.18	0.27	0.24	0.33	0.13	0.12	0.022	0.32
		14.5-15.5	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		22.5-23.5	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	B-39	5.5-6.5	--	--	--	--	--	--	1.8	0.99	1.7	1.3	2.0	0.62	1.0	0.24	1.8
		10-11	--	--	--	--	--	--	0.24	0.019	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		21-22	--	--	--	--	--	--	<0.01	6.7	9.4	4.2	5.0	1.9	1.9	0.58	5.9
	B-40	6.5-7.5	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		14-15	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		21.5-22.5	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	B-41	7-8	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		11-12	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		24.5-25.5	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	B-42	5-6	--	--	--	--	--	--	0.028	0.11	0.23	0.25	0.36	0.12	0.17	0.040	0.33
		22-23	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		24.5-25.5	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	B-43	6-7	--	--	--	--	--	--	0.028	0.024	0.036	0.010	0.013	<0.01	<0.01	<0.01	0.02
		14.5-15.5	--	--	--	--	--	--	0.26	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		28.5-29.5	--	--	--	--	--	--	0.91	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		34.5-35.5	--	--	--	--	--	--	0.43	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	B-44	2-3	--	--	--	--	--	--	0.045	0.36	0.67	0.73	0.96	0.25	0.49	0.14	0.96
		14-15	--	--	--	--	--	--	<0.01	0.015	0.013	0.014	0.015	<0.01	0.010	<0.01	0.02
		31.5-32.5	--	--	--	--	--	--	0.052	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	B-45	6.5-7.5	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		11-12	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		21-22	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	B-46	6-7	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
		13-14	--	--	--	--	--	--	0.022	0.011	0.024	0.014	0.019	<0.01	0.011	<0.01	0.02
		21-22	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
	B-47	6-7	--	--	--	--	--	--	0.038	0.37	0.73	0.62	0.81	0.22	0.36	0.095	0.81
		13-14	--	--	--	--	--	--	<0.01	0.011	0.013	<0.01	0.011	<0.01	<0.01	<0.01	0.01
		30.5-31.5	--	--	--	--	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Proposed Cleanup Level[d]			2,400	280,000	350,000	700,000	700,000	700,000	70,000	NA	NA	NA	NA	NA	NA	NA	18

Notes:

(a) Total cPAHs were calculated using the toxicity equivalency factor (TEF) methodology described in MTCA [WAC 173-340-708(8)(e)].
For non-detected cPAH analytes, the TEF factor (listed below) was applied to a value of one-half the laboratory reporting limit prior to summation.
TEF = 1.0 for benzo(a)pyrene
TEF = 0.1 for benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(a)-fluoranththene, and benzo(k)- fluoranththene
TEF = 0.01 for chrysene

(b) "--" denotes that the sample was not analyzed for the indicated analyte.

(c) "<" denotes that the analyte was not detected at a concentration above the indicated laboratory reporting limit.

(d) Refer to Table 3 for a summary of proposed cleanup levels. Ceanup levels for soil are based on MTCA Method C cleanup levels for industrial site uses

Bold and italics indicate an analyte concentration above the proposed cleanup level.

BTEX = Benzene, toluene, ethylbenzene, and xylenes
PAHs = Polycyclic aromatic hydrocarbons
cPAHs = Carcinogenic PAHs
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram
B = Laboratory data flag indicating that the analytes was also identified in the method blank
J = Laboratory data flag indicating that the result is an esimated value less than the method reporting limit
NA = Cleanup level is not available for the indicated analyte

TABLE 5

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR RECONNAISSANCE GROUNDWATER
CREOSOTING PLANT AREA
Former Tacoma Metals Site - Tacoma, Washington

SAMPLE LOCATION	INVESTIGATION DATE	PAHs (µg/L)	cPAHs (µg/L)							Total cPAHs[a]	
		Naphthalene	Benzo(a)anthracene	Chrysene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Non-detect values included[b]	Non-detect values excluded[c]
B-18	March-04	36.0	<10.0[d]	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	***7.6***	ND
B-19		***5,870***	<500	<500	<500	<500	<500	<500	<500	***378***	ND
B-20		***22,900***	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	<1,000	***755***	ND
B-21		4,330	<500	<500	<500	<500	<500	<500	<500	***378***	ND
B-22		1,100	<200	<200	<200	<200	<200	<200	<200	***378***	ND
B-23		74.0	0.306	0.253	0.122	0.0906	0.103	0.0372	0.0180	***0.18***	***0.18***
B-24	March-05	2.98	3.52	3.26	1.11	1.39	2.48	<0.500	<0.500	***1.9***	***1.9***
B-25		39.8	9.89	12.3	3.96	7.03	8.13	1.32	<1.00	***6.7***	***6.7***
B-26		17.7	3.92	6.86	2.65	3.53	2.16	1.08	0.784	***3.9***	***3.9***
B-27		4,310	2.06	5.98	<1.00	2.06	1.03	<1.00	<1.00	***0.57***	***0.57***
B-28		1,070	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	***7.6***	ND
B-29		2,730	2.83	2.93	<1.00	<1.00	<1.00	<1.00	<1.00	***1.0***	***0.31***
B-30		3.33	0.882	2.75	<0.500	1.08	0.686	<0.500	<0.500	***0.59***	***0.29***
B-31		***17,400***	1,090	928	654	510	519	246	100	***910***	***910***
B-32		6.83	11.3	12.7	8.12	8.71	8.22	2.67	1.39	***11***	***11***
B-33		1.52	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	***0.38***	ND
B-37	October-07	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-37A		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-38		0.17	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-39		4.2	0.20	0.28	<0.1	<0.1	<0.1	<0.1	<0.1	***0.093***	0.023
B-39A		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-40		0.36	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-41		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-42		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-43		0.96	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-44		2.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-45		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-46		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
B-47		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	***0.076***	ND
Proposed Cleanup Level[f]		**4,940**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**0.030**	**0.030**

NOTES:

(a) Total cPAHs were calculated using the toxicity equivalency factor (TEF) methodology described in MTCA [WAC 173-340-708(8)(e)]. TEFs are listed below.
TEF = 1.0 for benzo(a)pyrene
TEF = 0.1 for benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(a)-fluoranththene, and benzo(k)- fluoranththene
TEF = 0.01 for chrysene

(b) Non-detected cPAH analytes were included in the summation. The TEF factor was applied to a value of one-half the laboratory reporting limit prior to summation.

(c) Non-detected cPAH analytes were not included in the summation.

(d) "<" denotes that the analyte was not detected at a concentration above the indicated laboratory reporting limit.

(e) "ND" indicates that no individual cPAH analytes were detected at a concentration above the laboratory reporting limit.

(f) Refer to Table 3 for a summary of proposed cleanup levels for groundwater.

Bold and italics indicate an analyte concentration above the proposed cleanup level.

PAHs = Polycyclic aromatic hydrocarbons
cPAHs = Carcinogenic PAHs
µg/L = micrograms per liter
NA = Cleanup level is not available for the indicated analyte

TABLE 6

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
CREOSOTING PLANT AREA
Former Tacoma Metals Site - Tacoma, Washington

WELL	DATE	BTEX (µg/L)				Filtering (PAHs and cPAHs)	PAHs (µg/L)	cPAHs (µg/L)							Total cPAHs[a]	
		Benzene	Toluene	Ethyl-benzene	Total Xylenes		Naphthalene	Benzo(a)anthracene	Chrysene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Non-detect values included[b]	Non-detect values excluded[c]
MW-8(R)	Mar-08	---[d]	---	---	---	filtered	2,900	0.072	0.072	<0.02[e]	<0.02	<0.02	<0.02	<0.02	0.022	0.0079
						unfiltered	3,600	0.59	0.56	<0.2	0.24	<0.2	<0.2	<0.2	***0.22***	***0.089***
	Feb-06	---	---	---	---	filtered	2,370	<0179	<0.107	<0.155	<0.482	<0.125	<0.167	<0.173	***0.13***	ND[f]
						unfiltered	***6,810***	6.00	6.52	2.48	2.12	2.52	<0.333	<0.345	***3.6***	***3.6***
	Dec-03	---	---	---	---	filtered	***6,770***	0.710	0.646	0.292	0.277	0.219	0.126	0.0635	***0.44***	***0.44***
						unfiltered	***8,710***	3.09	2.90	1.11	0.841	0.885	0.363	0.186	***1.7***	***1.7***
MW-10	Mar-08	---	---	---	---	filtered	1.3	0.40	0.37	0.18	0.21	0.09	0.037	<0.02	***0.26***	***0.26***
						unfiltered	1.6	0.41	0.37	0.16	0.21	0.069	0.035	<0.02	***0.24***	***0.24***
	Feb-06	---	---	---	---	filtered	1.37	0.105 J	0.0953 J	<0.0302	<0.0942	<0.0244	<0.0326	<0.0337	***0.036***	0.011
						unfiltered	3.38	0.320	0.353	0.104 J	0.0988 J	0.0941 J	<0.0329	<0.0341	***0.16***	***0.16***
	Dec-03	---	---	---	---	filtered	6.68	0.164	0.114	0.0787	0.0753	0.0398	0.0320	0.0168	***0.11***	***0.11***
						unfiltered	6.55	0.533	0.403	0.110	0.109	0.0772	0.0292	0.0118	***0.19***	***0.19***
MW-11	Mar-08	---	---	---	---	filtered	13	0.50	0.39	0.18	0.22	0.089	0.068	<0.02	***0.27***	***0.27***
						unfiltered	18	0.68	0.48	<0.2	0.23	<0.2	<0.2	<0.2	***0.23***	***0.10***
	Feb-06	---	---	---	---	filtered	1.49	0.455	0.450	0.125	0.148	0.145	<0.0318	<0.0330	***0.21***	***0.20***
						unfiltered	5.47	0.739	0.678	0.159	0.137	0.161	<0.0304	<0.0315	***0.27***	***0.27***
	Dec-03	---	---	---	---	filtered	41.7	0.892	0.925	0.442	0.387	0.347	0.185	0.128	***0.65***	***0.65***
						unfiltered	89.3	0.851	0.615	0.226	0.209	0.169	0.119	0.0661	***0.37***	***0.37***
MW-12	Dec-03	---	---	---	---	filtered	1.00	0.0389	0.0240	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.011	0.0041
						unfiltered	1.07	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
MW-13	Dec-03	---	---	---	---	filtered	1.01	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	1.27	0.0439	0.0308	<0.0100	0.0175	0.0186	<0.0100	<0.0100	0.013	0.0083
	Aug-02	7	<1.0	1.4	2.8	unfiltered	11	0.05 J	0.05 MJ	<0.11	<0.11	<0.11	<0.11	<0.11	***0.083***	0.0055
						unfiltered	---	---	---	---	---	---	---	---	---	---
MW-14	Mar-08	---	---	---	---	filtered	0.18	0.052	0.049	<0.02	<0.02	<0.02	<0.02	<0.02	0.020	0.0057
						unfiltered	0.26	0.067	0.065	<0.02	<0.02	<0.02	<0.02	<0.02	0.021	0.0074
	Feb-06	---	---	---	---	filtered	1.02	<0.00427	<0.00305	<0.00226	<0.00331	<0.00380	<0.00258	<0.00295	0.0020	ND
						unfiltered	1.11	0.110 J	0.115	0.0460 J	<0.0931	0.0437 J	<0.0322	<0.0333	***0.070***	***0.063***
	Dec-03	---	---	---	---	filtered	4.35	0.0624	0.0536	0.0185	0.0154	0.0161	<0.0100	<0.0100	0.029	0.028
						unfiltered	10.1	0.446	0.395	0.148	0.144	0.118	0.109	0.0705	***0.24***	***0.24***
	Feb-03	<10.0	<10.0	<10.0	<20.0	filtered	66.4	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	***0.076***	ND
						unfiltered	28.3	1.10	1.08	0.385	0.308	0.423	0.135	<0.100	***0.60***	***0.59***
Proposed Cleanup Level[g]		23	19,000	6,900	1,000	---	4,940	NA	NA	NA	NA	NA	NA	NA	0.030	0.030

TABLE 6

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
CREOSOTING PLANT AREA
Former Tacoma Metals Site - Tacoma, Washington

WELL	DATE	BTEX (µg/L)				Filtering (PAHs and cPAHs)	PAHs (µg/L)	cPAHs (µg/L)							Total cPAHs[a]	
		Benzene	Toluene	Ethyl-benzene	Total Xylenes		Naphthalene	Benzo(a)anthracene	Chrysene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Non-detect values included[b]	Non-detect values excluded[c]
MW-15	Mar-08	---[d]	---	---	---	filtered	0.036	<0.02[e]	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	0.000
						unfiltered	0.036	0.026	0.027	<0.02	0.021	<0.02	<0.02	<0.02	0.018	0.0050
	Feb-06	---	---	---	---	filtered	0.334	<0.0353	<0.0212	<0.0306	<0.0953	<0.0247	<0.0329	<0.0341	0.027	ND[f]
						unfiltered	0.0636 J	<0.00427	<0.00305	<0.00226	<0.00331	<0.00380	<0.00258	<0.00295	0.0020	ND
	Dec-03	---	---	---	---	filtered	0.186	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	<0.100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
	Feb-03	<0.200	<0.200	<0.200	<0.750	filtered	1.720	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	0.235	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	***0.076***	ND
MW-16	Mar-08	---	---	---	---	filtered	0.026	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
						unfiltered	0.023	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
	Feb-06	---	---	---	---	filtered	0.236	<0.00412	<0.00294	<0.00218	<0.00320	<0.00367	<0.00249	<0.00285	0.0019	ND
						unfiltered	0.0233 J	<0.00417	<0.00298	<0.00220	<0.00324	<0.00372	<0.00252	<0.00289	0.0019	ND
	Dec-03	---	---	---	---	filtered	<0.100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	<0.100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
	Feb-03	<0.200	<0.200	<0.200	<0.750	filtered	0.194	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	0.877	0.131	0.0812	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.021	0.014
MW-17	Mar-08	---	---	---	---	filtered	0.21	0.042	0.032	<0.02	<0.02	<0.02	<0.02	<0.02	0.019	0.0045
						unfiltered	0.24	0.049	0.043	<0.02	<0.02	<0.02	<0.02	<0.02	0.019	0.0053
	Feb-06	---	---	---	---	filtered	0.366	0.0494 J	0.0517 J	<0.0292	<0.0910	<0.0236	<0.0315	<0.0326	0.029	0.0055
						unfiltered	0.180 J	<0.0211	<0.0151	<0.0111	<0.0164	<0.0188	<0.0128	<0.0146	0.010	ND
	Dec-03	---	---	---	---	filtered	0.195	0.0335	0.0207	<0.0100	0.0163	0.0140	<0.0100	<0.0100	0.013	0.0066
						unfiltered	0.346	0.0297	0.0157	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.010	0.0031
	Feb-03	<0.200	0.448	<0.200	<0.750	filtered	0.157	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	0.793	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500	***0.038***	ND
MW-18	Mar-08	---	---	---	---	filtered	4,400	0.048	0.036	<0.02	<0.02	<0.02	<0.02	<0.02	0.019	0.0052
						unfiltered	***5,800***	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	***0.15***	ND
	Feb-06	---	---	---	---	filtered	***6,280***	<0.169	<0.101	<0.146	<0.455	<0.118	<0.157	<0.163	***0.13***	ND
						unfiltered	***7,650***	<0.174	<0.105	<0.151	<0.471	<0.122	<0.163	<0.169	***0.13***	ND
	Mar-04	---	---	---	---	filtered	***5,360***	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	***0.076***	ND
						unfiltered	***7,490***	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	***0.076***	ND
	Dec-03	---	---	---	---	filtered	***6,690***	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	***0.076***	ND
						unfiltered	***5,970***	0.192	0.162	<0.100	<0.100	<0.100	<0.100	<0.100	***0.091***	0.021
	Feb-03	<100	<100	246	500	filtered	***4,990***	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	***0.76***	ND
						unfiltered	***9,840 E***	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	***7.6***	ND
Proposed Cleanup Level[g]		23	19,000	6,900	1,000	---	4,940	NA	NA	NA	NA	NA	NA	NA	0.030	0.030

TABLE 6

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
CREOSOTING PLANT AREA
Former Tacoma Metals Site - Tacoma, Washington

WELL	DATE	BTEX (µg/L)				Filtering (PAHs and cPAHs)	PAHs (µg/L)	cPAHs (µg/L)							Total cPAHs[a]	
		Benzene	Toluene	Ethyl-benzene	Total Xylenes		Naphthalene	Benzo(a)anthracene	Chrysene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Non-detect values included[b]	Non-detect values excluded[c]
MW-19	Feb-11	<0.35	<1	<1	<3	filtered	<0.025[e]	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND[f]
						unfiltered	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND
	Oct-10	<0.35 [d]	<1	<1	<3	filtered	0.02 J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***0.076***	ND
						unfiltered	0.01 J	<0.10 J	0.01 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	***0.075***	0.00010
	Mar-08	---[d]	---	---	---	filtered	0.042	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
						unfiltered	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
	Feb-06	---	---	---	---	filtered	0.629	<0.00437	<0.00312	<0.00231	<0.00339	<0.00389	<0.00264	<0.00302	0.0021	ND
						unfiltered	0.0569 J	<0.00432	<0.00308	<0.00228	<0.00335	<0.00385	<0.00261	<0.00299	0.0020	ND
	Dec-03	---	---	---	---	filtered	0.270	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	<0.100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
	Feb-03	<0.200	<0.200	<0.200	<0.750	filtered	<0.100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	<0.100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
MW-20	Feb-11	5.0	<1	2	3.8	filtered	3.2	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND
						unfiltered	3.4	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND
	Oct-10	3.6	<1	3.0	4.7	filtered	6.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***0.076***	ND
						unfiltered	7.4 J	0.02 J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***0.073***	0.0020
	Mar-08	---	---	---	---	filtered	5.8	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
						unfiltered	7.1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	***0.15***	ND
	Feb-06	---	---	---	---	filtered	658	<0.170	<0.102	<0.148	<0.460	<0.119	<0.159	<0.165	***0.13***	ND
						unfiltered	734	<0.172	<0.103	<0.149	<0.466	<0.121	<0.161	<0.167	***0.13***	ND
	Dec-03	---	---	---	---	filtered	3.76	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	13.6	0.0415	0.0255	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.011	0.0044
	Feb-03	3.29 / 3.69[h]	<1.00 / <1.00	11.8 / 14.0	16.2 / 16.9	filtered	24.3 / 14.2	<0.500 / <1.0	<0.500 / <1.0	<0.500 / <1.0	<0.500 / <1.0	<0.500 / <1.0	<0.500 / <1.0	<0.500 / <1.0	***0.38 / 0.76***	ND / ND
						unfiltered	27.9 / 31.2	<0.500 / <0.500	<0.500 / <0.500	<0.500 / <0.500	<0.500 / <0.500	<0.500 / <0.500	<0.500 / <0.500	<0.500 / <0.500	***0.38 / 0.38***	ND / ND
MW-21	Mar-08	---	---	---	---	filtered	560	0.52	0.39	0.13	0.18	0.055	0.028	<0.02	***0.21***	***0.21***
						unfiltered	730	1.3	1.0	0.50	0.66	0.26	<0.2	<0.2	***0.75***	***0.73***
	Feb-06	---	---	---	---	filtered	202	0.274	0.280	0.109	0.101 J	0.105	<0.0295	<0.0305	***0.16***	***0.16***
						unfiltered	139	0.930	0.877	0.291	0.249	0.279	0.0744 J	0.667	***0.52***	***0.52***
	Dec-03	---	---	---	---	filtered	241	0.222	0.174	0.0891	0.0650	0.0708	0.0231	<0.0100	***0.13***	***0.13***
						unfiltered	678	2.52	2.04	1.25	1.16	0.999	0.424	0.231	***1.8***	***1.8***
	Feb-03	<100	<100	<100	<200	filtered	1,290	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	***3.8***	ND
						unfiltered	1,740	0.981	0.654	0.212	0.154	0.212	<0.100	<0.100	***0.36***	***0.35***
MW-22	Mar-08	---	---	---	---	filtered	990	0.36	0.35	0.079	0.099	0.036	<0.02	<0.02	***0.13***	***0.13***
						unfiltered	1,200	0.49	0.47	0.094	0.13	0.041	<0.02	<0.02	***0.17***	***0.16***
	Feb-06	---	---	---	---	filtered	301	0.0966 J	0.0989 J	<0.0292	<0.0910	<0.0236	<0.0315	<0.0326	***0.034***	0.011
						unfiltered	883	0.455	0.505	0.102 J	0.0955 J	0.105 J	<0.0318	<0.0330	***0.18***	***0.17***
	Dec-03	---	---	---	---	filtered	752 / 1,970	0.144 / 0.190	0.121 / 0.150	0.0665 / 0.0536	0.0562 / 0.0489	0.0421 / 0.0212	0.0169 / 0.0149	<0.0100 / <0.0100	***0.094 / 0.083***	***0.094 / 0.083***
						unfiltered	1,940 / 2,170	0.521 / 0.498	0.443 / 0.410	0.117 / 0.134	0.0863 / 0.103	0.0996 / <0.100	0.0303 / <0.100	0.0123 / <0.100	***0.20 / 0.21***	***0.20 / 0.20***
Proposed Cleanup Level[g]		23	19,000	6,900	1,000	---	4,940	NA	NA	NA	NA	NA	NA	NA	0.030	0.030

TABLE 6

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
CREOSOTING PLANT AREA
Former Tacoma Metals Site - Tacoma, Washington

WELL	DATE	BTEX (µg/L)				Filtering (PAHs and cPAHs)	PAHs (µg/L)	cPAHs (µg/L)							Total cPAHs[a]	
		Benzene	Toluene	Ethyl-benzene	Total Xylenes		Naphthalene	Benzo(a)anthracene	Chrysene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Non-detect values included[b]	Non-detect values excluded[c]
MW-23	Feb-11	***53***	1.2	52	18.7	filtered	44	0.15	0.15	<0.025[e]	<0.025	<0.025	<0.025	<0.025	***0.034***	0.017
						unfiltered	50	0.28	0.21	0.029	0.036	<0.025	<0.025	<0.025	***0.066***	***0.063***
	Oct-10	***56***	1.4	56	22	filtered	54	0.20 J	0.17 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	***0.092***	0.022
						unfiltered	59	0.30	0.26	0.015 J	0.02 J	<0.10	<0.10	<0.10	***0.065***	***0.050***
	Mar-08	---[d]	---	---	---	filtered	26	0.220	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	***0.038***	0.024
						unfiltered	32	0.32	0.30	0.022	0.031	<0.02	<0.02	<0.02	***0.063***	***0.060***
	Feb-06	---	---	---	---	filtered	191	0.0391 J	0.0391 J	<0.0299	<0.0931	<0.0241	<0.0322	<0.0333	0.028	0.0043
						unfiltered	799	0.200	0.214	<0.0295	<0.0920	<0.0239	<0.0318	<0.0330	***0.046***	0.022
	Mar-04	---	---	---	---	filtered	742	<0.100	<0.100	<0.100	0.194	<0.100	<0.100	<0.100	***0.090***	0.019
						unfiltered	972	0.577	0.442	<0.100	0.327	<0.100	<0.100	<0.100	***0.16***	***0.095***
MW-24	Mar-08	---	---	---	---	filtered	18	0.31	0.31	0.023	0.038	<0.02	<0.02	<0.02	***0.064***	***0.061***
						unfiltered	19	0.42	0.34	0.043	0.061	0.025	<0.02	<0.02	***0.099***	***0.097***
	Feb-06	---	---	---	---	filtered	18.0	0.0344 J	0.0301 J	<0.0280	<0.0871	<0.0226	<0.0301	<0.0312	0.026	0.0037
						unfiltered	133	0.272	0.288	<0.0292	<0.0910	<0.0236	<0.0315	<0.0326	***0.054***	***0.030***
	Mar-04	---	---	---	---	filtered	4,240	<0.100	<0.100	<0.100	0.231	<0.100	<0.100	<0.100	***0.094***	0.023
						unfiltered	***6,600***	0.800	0.667	<0.100	0.419	0.152	<0.100	<0.100	***0.20***	***0.14***
MW-25	Mar-08	---	---	---	---	filtered	0.21	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND[f]
						unfiltered	0.29	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
	Feb-06	---	---	---	---	filtered	0.536	<0.0345	<0.0207	<0.0299	<0.0931	<0.0241	<0.0322	<0.0333	0.027	ND
						unfiltered	0.640	<0.0316	<0.0189	<0.0274	<0.0853	<0.0221	<0.0295	<0.0305	0.024	ND
	Mar-04	---	---	---	---	filtered	1.60	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
						unfiltered	1.34	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0076	ND
MW-26	Feb-11	<0.35	<1	<1	<3	filtered	44	0.11	0.089	<0.025	<0.025	<0.025	<0.025	<0.025	0.029	0.012
						unfiltered	47	0.12	0.094	<0.025	<0.025	<0.025	<0.025	<0.025	0.030	0.013
	Oct-10	<0.35	<1	1.1	<3	filtered	120 E	0.12	0.09 J	<0.10	<0.10	<0.10	<0.10	<0.10	***0.078***	0.013
						unfiltered	140	0.16	0.13	0.01 J	0.03 J	<0.10	<0.10	<0.10	***0.045***	***0.030***
	Mar-08	---	---	---	---	filtered	74.0	0.12	0.11	<0.02	<0.02	<0.02	<0.02	<0.02	0.027	0.013
						unfiltered	91	0.16	0.15	<0.02	0.026	<0.02	<0.02	<0.02	***0.033***	0.020
	Feb-06	---	---	---	---	filtered	125	<0.00417	<0.00298	<0.00220	<0.00324	<0.00372	<0.00252	<0.00289	0.0019	ND
						unfiltered	501	0.157	0.103	<0.00234	0.0327	0.0142	<0.00267	<0.00306	0.023	0.021
	Mar-05	---	---	---	---	filtered	990	0.122	0.109	<0.100	<0.100	<0.100	<0.100	<0.100	***0.083***	0.013
						unfiltered	987	0.602	0.610	0.127	0.121	0.437	<0.100	<0.100	***0.26***	***0.25***
MW-27	Mar-08	---	---	---	---	filtered	0.22	0.047	0.035	<0.02	<0.02	<0.02	<0.02	<0.02	0.019	0.0051
						unfiltered	0.26	0.066	0.061	<0.02	<0.02	<0.02	<0.02	<0.02	0.021	0.0072
	Feb-06	---	---	---	---	filtered	2.05	<0.00427	<0.00305	<0.00226	<0.00331	<0.00380	<0.00258	<0.00295	0.0020	ND
						unfiltered	1.64	<0.00432	<0.00308	<0.00228	<0.00335	<0.00385	<0.00261	<0.00299	0.0020	ND
	Mar-05	---	---	---	---	filtered	1.33	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	***0.076***	ND
						unfiltered	1.58	0.105	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	***0.081***	0.011
Proposed Cleanup Level[g]		23	19,000	6,900	1,000	---	4,940	NA	NA	NA	NA	NA	NA	NA	0.030	0.030

TABLE 6

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
CREOSOTING PLANT AREA
Former Tacoma Metals Site - Tacoma, Washington

WELL	DATE	BTEX (µg/L)				Filtering (PAHs and cPAHs)	PAHs (µg/L)	cPAHs (µg/L)							Total cPAHs[a]	
		Benzene	Toluene	Ethyl-benzene	Total Xylenes		Naphthalene	Benzo(a)anthracene	Chrysene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Non-detect values included[b]	Non-detect values excluded[c]
MW-28 / 28(R)	Mar-08	---[d]	---	---	---	filtered	160	0.49	0.36	0.067	0.069	0.035	<0.02[e]	<0.02	***0.132***	***0.13***
						unfiltered	370	0.77	0.56	0.17	0.21	0.077	0.036	<0.02	***0.29***	***0.28***
	Feb-06	---	---	---	---	filtered	4,260	<0.659	<0.396	<0.571	<1.78	<0.462	<0.615	<0.637	***0.496***	ND[f]
						unfiltered	***5,900***	11.0	10.6	6.51	5.58	6.02	1.89	6.79	***9.7***	***9.7***
	Mar-05	---	---	---	---	filtered	14.8	0.140	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	***0.085***	0.014
						unfiltered	23.1	0.480	0.447	<0.100	<0.100	<0.100	<0.100	<0.100	***0.12***	***0.052***
MW-29	Feb-11	<0.35	<1	<1	<3	filtered	0.31	0.17	0.15	<0.025	<0.025	<0.025	<0.025	<0.025	***0.036***	0.019
						unfiltered	0.56 J	0.28 J	0.25 J	0.049 J	0.062 J	<0.025 J	<0.025 J	<0.025 J	***0.089***	***0.086***
	Oct-10	<0.35	<1	<1	<3	filtered	0.39	0.16	0.14	0.01 J	0.01 J	<0.10	<0.10	<0.10	***0.043***	0.028
						unfiltered	0.25	0.23 J	0.20 J	0.04 J	0.05 J	0.02 J	<0.10 J	<0.10 J	***0.082***	***0.072***
	Mar-08	---	---	---	---	filtered	0.34	0.18	0.18	<0.02	<0.02	<0.02	<0.02	<0.02	***0.034***	0.020
						unfiltered	0.46	0.26	0.25	0.048	0.057	0.025	<0.02	<0.02	***0.087***	***0.085***
	Feb-06	---	---	---	---	filtered	0.507	<0.00408	<0.00291	<0.00216	<0.00317	<0.00363	<0.00247	<0.00282	0.0019	ND
						unfiltered	2.14	0.392	0.265	0.0698	0.0951	0.0387	0.0641	<0.00254	***0.13***	***0.13***
MW-30	Mar-08	---	---	---	---	filtered	630	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
						unfiltered	790	<0.2	<0.2	<0.02	<0.02	<0.02	<0.02	<0.02	***0.15***	ND
	Feb-06	---	---	---	---	filtered	3.59	0.134	0.0853	0.0267	0.0558	0.0170	<0.00241	<0.00276	***0.048***	***0.048***
						unfiltered	8.13	<0.00403	<0.00288	<0.00213	<0.00313	<0.00359	<0.00244	<0.00279	0.0019	ND
MW-31	Mar-08	---	---	---	---	filtered	0.56 / 0.54[h]	0.57 / 0.62	0.37 / 0.39	0.082 / 0.11	0.10 / 0.15	0.038 / 0.045	<0.02 / <0.02	<0.02 / <0.02	***0.16 / 0.20***	***0.16 / 0.20***
						unfiltered	<2 / <2	0.77 / 0.87	0.46 / 0.55	0.11 / 0.16	0.15 / 0.22	0.052 / 0.073	<0.02 / <0.02	<0.02 / <0.02	***0.21 / 0.28***	***0.21 / 0.28***
	Feb-06	---	---	---	---	filtered	61.7	0.336	0.187	0.105	0.160	0.0795	<0.00252	<0.00289	***0.16***	***0.16***
						unfiltered	57.5	3.87	3.76	1.83	1.30	1.96	0.472 J	3.27	***3.0***	***3.0***
MW-32	Mar-08	---	---	---	---	filtered	0.12	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
						unfiltered	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
MW-33	Mar-08	---	---	---	---	filtered	0.041	<0.02	0.032	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	0.00032
						unfiltered	0.036	0.031	0.040	<0.02	<0.02	<0.02	<0.02	<0.02	0.018	0.004
MW-34	Mar-08	---	---	---	---	filtered	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
						unfiltered	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
MW-35	Feb-11	<0.35	<1	<1	<3	filtered	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND
						unfiltered	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND
	Oct-10	<0.35[d]	<1	<1	<3	filtered	0.01 J	<0.10	0.01 J	<0.10	<0.10	<0.10	<0.10	<0.10	***0.075***	0.00010
						unfiltered	0.02 J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***0.076***	ND
	Mar-08	---	---	---	---	filtered	0.053	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
						unfiltered	0.059	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015	ND
Proposed Cleanup Level[g]		23	19,000	6,900	1,000	---	4,940	NA	NA	NA	NA	NA	NA	NA	0.030	0.030

TABLE 6

SUPPLEMENTAL REMEDIAL INVESTIGATION SUMMARY OF ANALYTICAL RESULTS FOR GROUNDWATER
CREOSOTING PLANT AREA
Former Tacoma Metals Site - Tacoma, Washington

WELL	DATE	BTEX (µg/L)				Filtering (PAHs and cPAHs)	PAHs (µg/L)	cPAHs (µg/L)							Total cPAHs[a]	
		Benzene	Toluene	Ethyl-benzene	Total Xylenes		Naphthalene	Benzo(a)anthracene	Chrysene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Non-detect values included[b]	Non-detect values excluded[c]
Puyallup River Side Channel Temporary Piezometers																
P-1 / P-1R	**Feb-11**	<0.35	<1	<1	<3	filtered	0.081	<0.025[e]	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND[f]
						unfiltered	0.12	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND
	Oct-10	<0.35	<1	<1	<3	filtered	0.10 J	<0.10	0.01 J	<0.10	<0.10	<0.10	<0.10	<0.10	***0.075***	0.00010
						unfiltered	0.14 J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***0.076***	ND
P-2 / P-2R	**Feb-11**	<0.35	<1	<1	<3	filtered	0.032	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND
						unfiltered	0.069	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.019	ND
	Oct-10	<0.35 / <0.35	<1 / <1	<1 / <1	<3 / <3	filtered	0.01 J / <0.10[h]	<0.10 / <0.10	<0.10 / <0.10	<0.10 / <0.10	<0.10 / <0.10	<0.10 / <0.10	<0.10 / <0.10	<0.10 / <0.10	***0.076 / 0.076***	ND / ND
						unfiltered	0.01 J / <0.10	<0.10 / <0.10	0.01 J / <0.10	<0.10 / <0.10	<0.10 / <0.10	<0.10 / <0.10	<0.10 / <0.10	<0.10 / <0.10	***0.075 / 0.076***	ND / ND
P-3 / P-3R	**Feb-11**	2.2 / 2.1	<1 / <1	<1 / <1	<3 / 2.0	filtered	0.28 / 0.58	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	0.019 / 0.019	ND / ND
						unfiltered	0.44 / 0.46	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	<0.025 / <0.025	0.019 / 0.019	ND / ND
	Oct-10	<0.35	<1	<1	<3	filtered	<0.10	<0.10	0.01 J	<0.10	<0.10	<0.10	<0.10	<0.10	***0.075***	0.00010
						unfiltered	0.01 J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***0.076***	ND
Proposed Cleanup Level[g]		23	19,000	6,900	1,000	---	4,940	NA	NA	NA	NA	NA	NA	NA	0.030	0.030

Notes:

(a) Total cPAHs were calculated using the toxicity equivalency factor (TEF) methodology described in MTCA [WAC 173-340-708(8)(e)]. TEFs are listed below.
TEF = 1.0 for benzo(a)pyrene
TEF = 0.1 for benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(a)-fluoranththene, and benzo(k)- fluoranththene
TEF = 0.01 for chrysene

(b) Non-detected cPAH analytes were included in the summation. The TEF factor was applied to a value of one-half the laboratory reporting limit prior to summation.

(c) Non-detected cPAH analytes were not included in the summation.

(d) "--" denotes that the sample was not analyzed for the indicated analyte.

(e) "<" denotes that the analyte was not detected at a concentration above the indicated laboratory reporting limit.

(f) "ND" indicates that no individual cPAH analytes were detected at a concentration above the laboratory reporting limit.

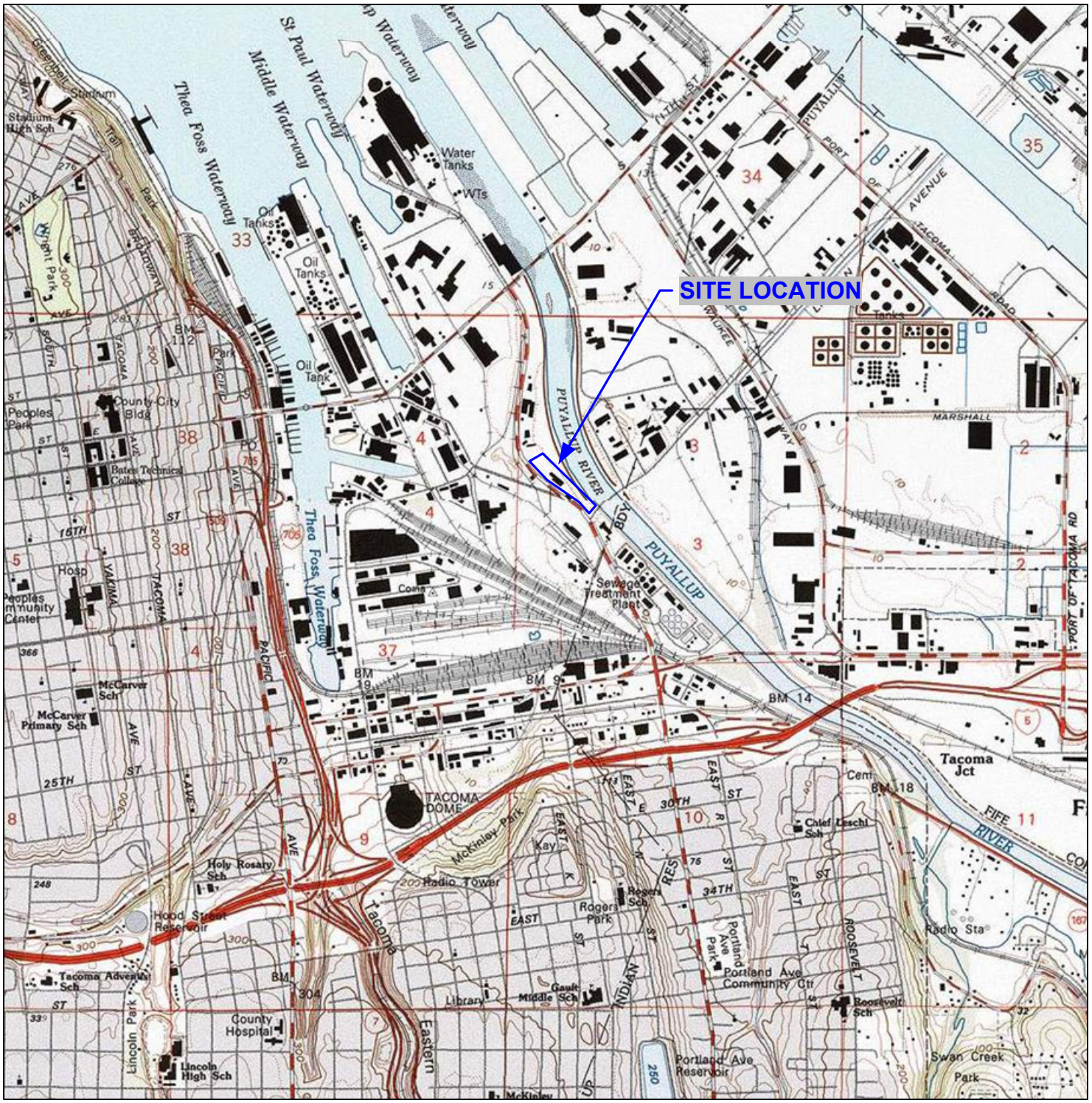
(g) Refer to Table 3 for a summary of proposed cleanup levels for groundwater.

(h) Where two values are displayed, the second is the analytical result for a field blind duplicate sample.

Bold and italics indicate an analyte concentration above the proposed cleanup level.

BTEX = Benzene, toluene, ethylbenzene, and xylenes
PAHs = Polycyclic aromatic hydrocarbons
cPAHs = Carcinogenic PAHs
µg/L = micrograms per liter
M = Laboratory note indicating an estimated value found and confirmed by analyst but with low spectral match
J = Laboratory data flag indicating that the result is an esimated value less than the method reporting limit
E = Laboratory note indicating an estimated result outside the calibration range of the analysis.
NA = Cleanup level is not available for the indicated analyte

Figures



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FORMER TACOMA METALS SITE
TACOMA, WA

SITE LOCATION MAP

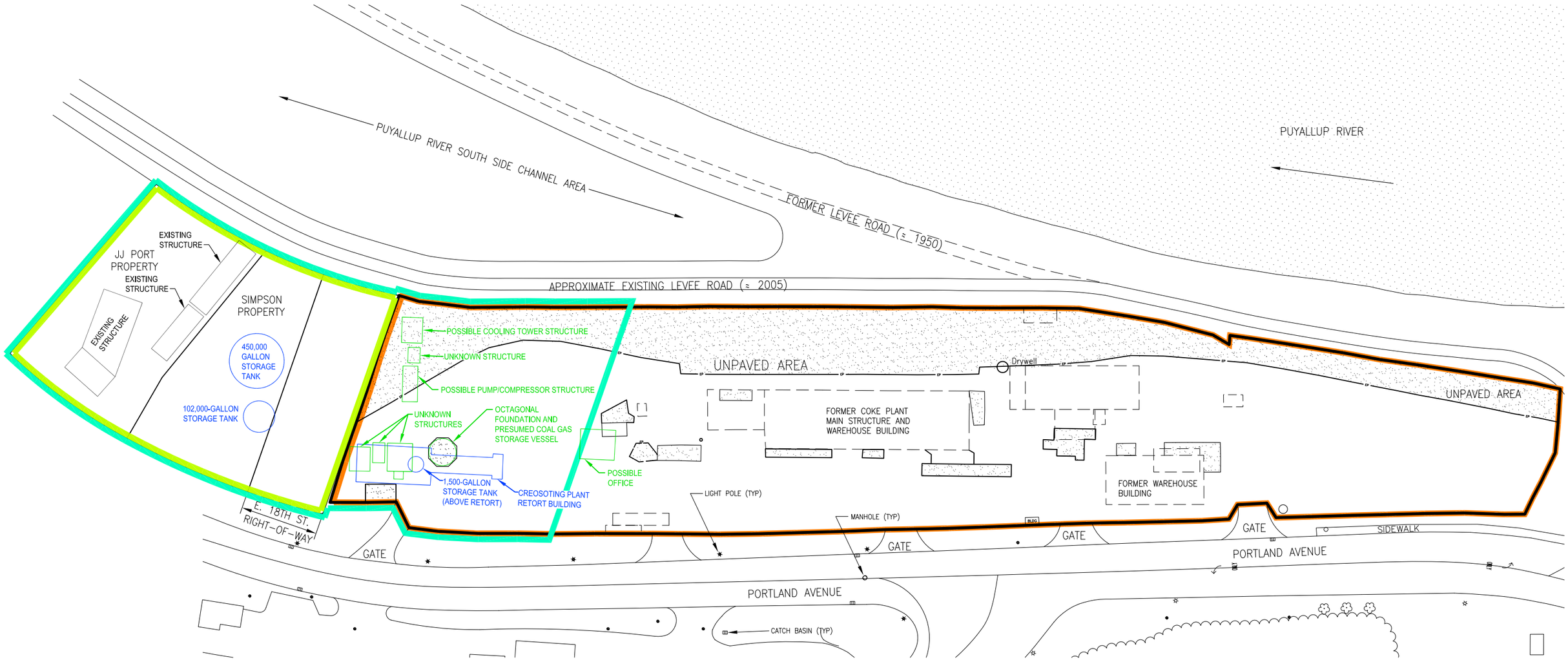
996098.00/Location.VSD

FIGURE 1

N

0 1/2 1

Approximate Scale in Miles



LEGEND:

- FORMER TACOMA METALS PROPERTY/ON PROPERTY AREA
- OFF PROPERTY AREA
- FORMER CREOSOTING PLANT AREA
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS) REFER TO FIGURE 1-2 IN APPENDIX C FOR ADDITIONAL INFORMATION
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3-5' ABOVE FORMER CREOSOTING PLANT FEATURES)

NOTE:

HISTORICAL FEATURE LOCATIONS ARE BASED ON HISTORICAL AERIAL AND GROUND-LEVEL PHOTOGRAPHS AND HISTORICAL MAPS. LOCATIONS ARE APPROXIMATE.

N

0 50 100

APPROX. SCALE: 1=100

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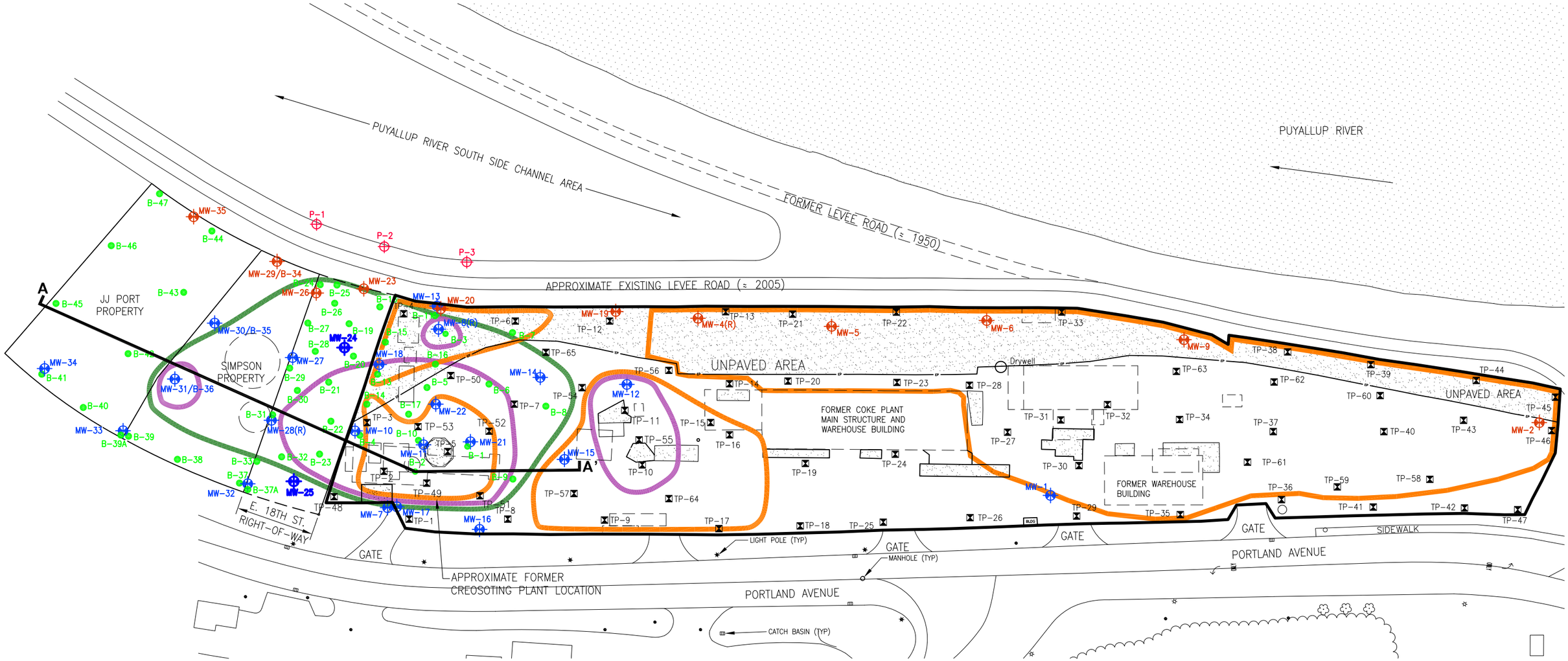
FORMER TACOMA METALS FACILITY
TACOMA, WA

SITE AREA OVERVIEW

996098.00\2013 RI UPDATE\FIG_02

FIGURE 2



LEGEND:

- B-1 — SOIL BORING LOCATION
- MW-26 — PROPOSED POINT OF COMPLIANCE MONITORING WELLS AND PIEZOMETERS
- P-1 — PROPOSED POINT OF COMPLIANCE MONITORING WELLS AND PIEZOMETERS
- MW-26 — OTHER MONITORING WELL LOCATION
- TP-26 — TEST PIT LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS) REFER TO FIGURE 1-2 IN APPENDIX C FOR ADDITIONAL INFORMATION
- A A' — GENERALIZED CROSS-SECTION LOCATION (SEE FIGURE 6)

ESTIMATED EXTENT OF AFFECTED SOIL:

- AFFECTED SOIL LESS THAN 6' bgs
- AFFECTED SOIL 6 TO 15' bgs
- AFFECTED SOIL GREATER THAN 15' bgs

NOTES:

1. WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.
2. bgs = BELOW GROUND SURFACE.
3. AFFECTED SOIL = SOIL WITH CONTAMINANTS AT CONCENTRATIONS ABOVE PROPOSED SITE CLEANUP LEVELS.
4. REFER TO FIGURES 4-1 THROUGH 4-4 IN APPENDIX C FOR DISTRIBUTION OF SPECIFIC CONTAMINANTS IN SOIL.
5. ALL LOCATIONS AND AREAS ARE APPROXIMATE.

N

0 50 100

APPROX. SCALE: 1=100

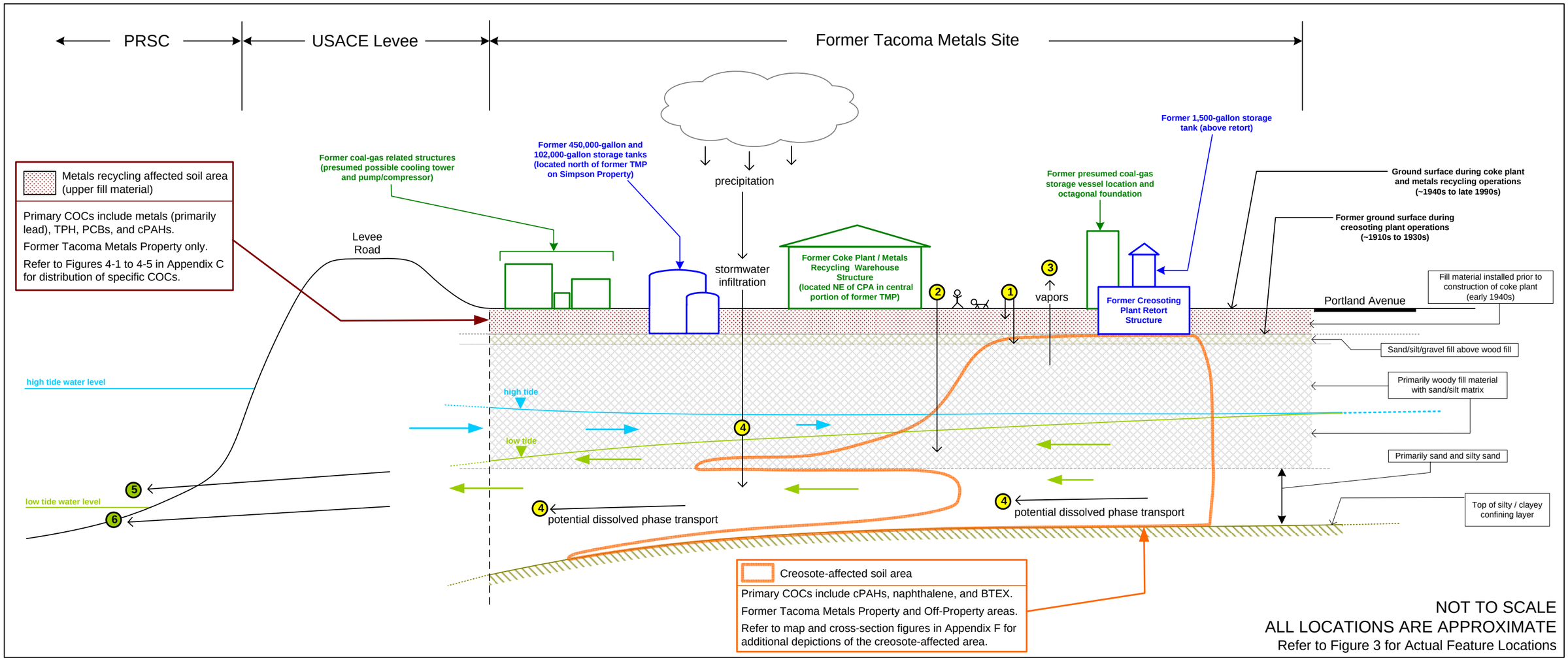
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

SAMPLE LOCATION AND AFFECTED SOIL AREA MAP

996098.00\2013 RI UPDATE\FIG_03

FIGURE 3



Summary of Potential Exposure Pathways

	Potential Pathway	Potential Receptors	Exposure Scenarios
1	Direct Contact Soil	Workers, Ecological Receptors	Possible direct contact/ingestion by workers doing invasive work; direct contact/ ingestion by wildlife.
2	Direct Contact Groundwater	Workers	Possible direct contact by workers doing invasive work; ingestion pathway incomplete because shallow groundwater is not a potable water source.
3	Vapor Inhalation	Workers	Possible inhalation by workers; vapor migration upward through unpaved surfaces and possibly through building foudations/slabs.
4	Soil to Groundwater Leaching	Aquatic Organisms in PRSC	Infiltration of stormwater through unpaved site surfaces; transport toward PRSC. Infiltration pathway will be eliminated by cleanup action.
5	Groundwater to Surface Water	Aquatic Organisms in PRSC	Incomplete Pathway. Groundwater discharge to surface water in PRSC; possible ingestion by aquatic organisms; possible ingestion or aquatic organisms by recreational users.
6	Groundwater to Sediment	Aquatic Organisms in PRSC	Incomplete Pathway. Groundwater discharge through to sediment in PRSC; possible ingestion by aquatic organisms; possible ingestion by aquatic organisms; possible ingestion or aquatic organisms by recreational users.

Legend:

- Shallow groundwater gradient (high tide)
- Shallow groundwater gradient (low tide)
- Shallow groundwater potentiometric surface (high tide)
- Shallow groundwater potentiometric surface (low tide)
- 1 Potential exposure pathways (complete) (summarized in table)
- 5 Potential exposure pathways (incomplete) (summarized in table)
- Former creosoting plant features (generalized approximate locations)
- Former coke plant and coal gas features (generalized approximate locations)

Acronyms:

BTEX – Benzene, Toluene, Ethylbenzene, and Xylenes
COCs – Contaminants of Concern
CPA – Creosoting Plant Area
cPAHs – Carcinogenic Polycylclic Aromatic Hydrocarbons
PCBs – Polychlorinated Biphenyls
PRSC – Puyallup River Side Channel
TMP – Tacoma Metals Property
TPH – Total Petroleum Hydrocarbons
USACE – United States Army Corps of Engineers

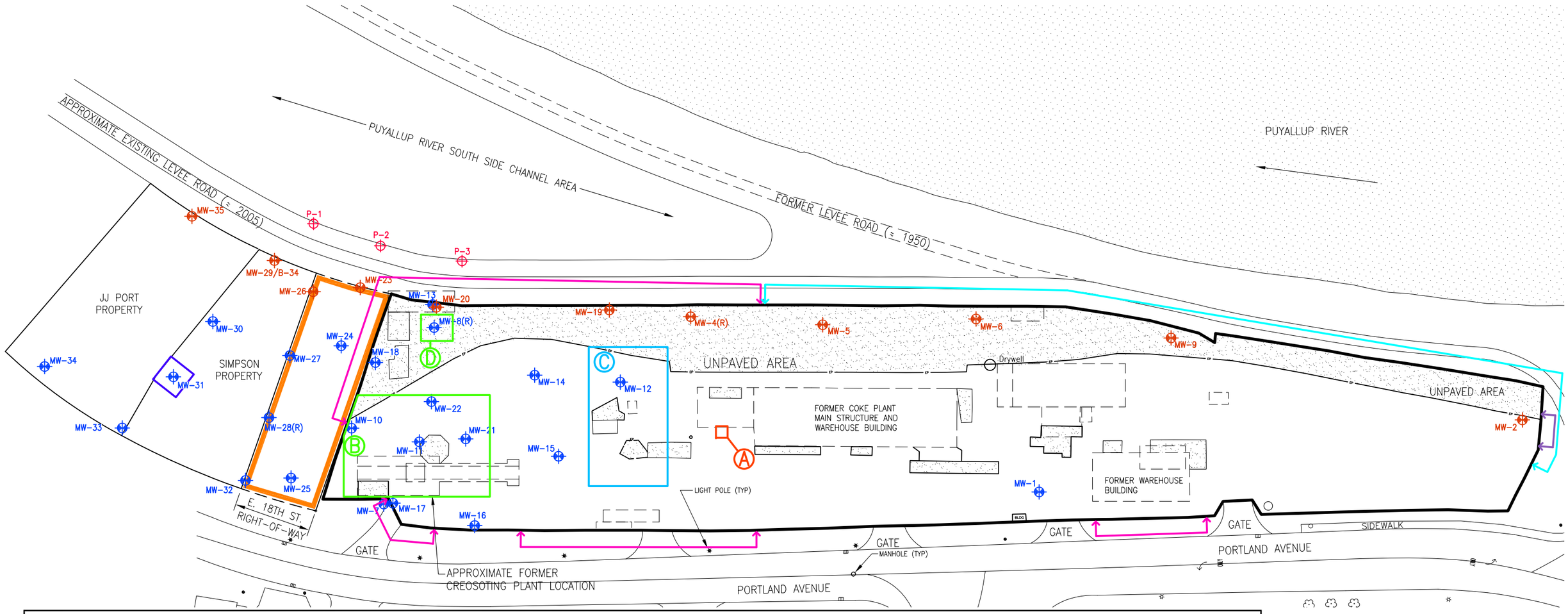
Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

GENERALIZED CONCEPTUAL SITE MODEL

996098*00/SiteModel.VSD

FIGURE 4



SOURCE CONTROL EXCAVATION AREAS (APPROXIMATE)

- (A) LEAD–ACID BATTERY CASINGS AND ASSOCIATED IMPACTED SOIL (10 CU YD APPROXIMATE) APPROXIMATELY 10 FT LONG X 10 FT WIDE X 3 FT DEEP.
- (B) CREOSOTE IMPACTED SOIL (5,444 CU YD APPROXIMATE) APPROXIMATELY 150 FT LONG X 100 FT WIDE X 10 FT DEEP.
- (C) PETROLEUM–HYDROCARBON IMPACTED SOIL (4,444 CU YD APPROXIMATE) APPROXIMATELY 150 FT LONG X 80 FT WIDE X 10 FT DEEP.
- (D) CREOSOTE IMPACTED SOIL (333 CU YD APPROXIMATE) APPROXIMATELY 30 FT LONG X 30 FT WIDE.
- (E) PETROLEUM–HYDRO CARBON IMPICTED SOIL. ESTIMATED 30 FT LONG X 30 FT WIDE x 10 FT DEEP (333 CU YD) ACTUAL EXTENT TO BE DETERMINED.

FORMER TACOMA METALS PROPERTY BOUNDARY METALS – IMPACTED SOIL EXCAVATION AREAS (BUFFER ZONE)

- 5 FT WIDE X 1 FT DEEP (APPROXIMATE)(172 CU YD APPROXIMATE)
- 5 FT WIDE X 3 FT DEEP (APPROXIMATE)(511 CU YD APPROXIMATE)
- 5 FT WIDE X ADDITIONAL 3 FT DEEP (APPROXIMATE)(17 CU YD APPROXIMATE)

APPROXIMATE AREA TO BE BACKFILLED TO 15' ABOVE AFFECTED SOIL (TYPICALLY 2–4' OF FILL DEPENDING ON EXISTING SURFACE ELEVATION BUT MAY EXCEED 4' LOCALLY) (UP TO 80'x240')

LEGEND:

- MW-26 — PROPOSED POINT OF COMPLIANCE MONITORING WELLS AND PIEZOMETERS
- P-1 — PROPOSED POINT OF COMPLIANCE MONITORING WELLS AND PIEZOMETERS
- MW-26 — OTHER MONITORING WELL LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS) REFER TO FIGURE 1–2 IN APPENDIX C FOR ADDITIONAL INFORMATION

NOTES:

1. WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.
2. BASED ON REVISED REMEDIAL ALTERNATIVE #2.
3. PROPOSED EXCAVATION AREAS FROM RI/FS ARE SHOWN ON FIGURE 9–1 IN APPENDIX G.

N

0 50 100

SCALE: 1=100

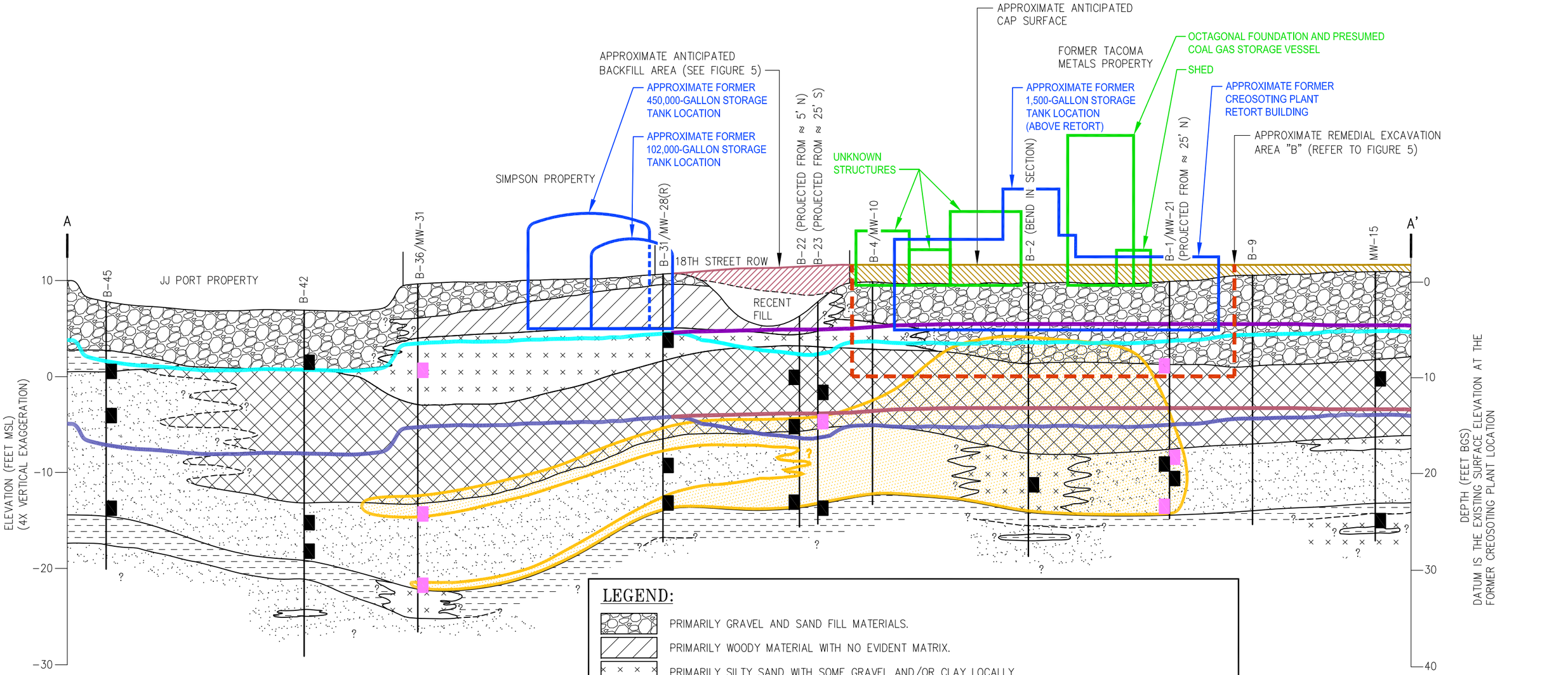
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

REVISED PROPOSED REMEDIAL ACTION EXCAVATION AND BACKFILL AREAS

996098.00\2013 RI UPDATE\FIG_05

FIGURE 5



NOTES:

1. REFER TO FIGURE 3 FOR CROSS SECTION LOCATION.
2. ALL LOCATIONS AND DEPTHS ARE APPROXIMATE.
3. MSL = FEET ABOVE MEAN SEA LEVEL (NGVD 1929).
4. BGS = BELOW GROUND SURFACE.

APPROX. SCALE: 1=40 HORIZONTAL (0, 20, 40)

APPROX. SCALE: 1=10 VERTICAL (0, 5, 10)

LEGEND:

- PRIMARILY GRAVEL AND SAND FILL MATERIALS.
- PRIMARILY WOODY MATERIAL WITH NO EVIDENT MATRIX.
- PRIMARILY SILTY SAND WITH SOME GRAVEL AND/OR CLAY LOCALLY.
- PRIMARILY WOODY MATERIAL WITH SAND, SILT, AND/OR CLAY MATRIX.
- PRIMARILY SAND WITH SOME SILT LOCALLY.
- PRIMARILY CLAY AND SILT WITH SOME SAND LOCALLY.
- APPROXIMATE AREA OF FIELD INDICATION OF HEAVY SOIL IMPACTS.
- 6 FEET BELOW EXISTING GRADE.
- 6 FEET BELOW ANTICIPATED FINAL GRADE (WHERE DIFFERENT FROM EXISTING).
- 15 FEET BELOW EXISTING GRADE.
- 15 FEET BELOW ANTICIPATED FINAL GRADE (WHERE DIFFERENT FROM EXISTING).
- APPROXIMATE SOIL SAMPLE LOCATION WITH TOTAL CPAH CONCENTRATION BELOW PROPOSED CLEANUP LEVEL.
- APPROXIMATE SOIL SAMPLE LOCATION WITH TOTAL CPAH CONCENTRATION ABOVE PROPOSED CLEANUP LEVEL.
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3-5' ABOVE FORMER CREOSOTING PLANT FEATURES)

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FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT AREA GENERALIZED CROSS SECTION A-A' DEPTH OF SOIL IMPACTS AND REMEDIATION AREAS

996098.00\2013 RI UPDATE\FIG_06

FIGURE 6

Appendix A

Generalized Geologic Cross Sections, RI/FS
and Creosoting Plant Area Investigation

Appendix A: Generalized Geologic Cross Sections, RI/FS and Creosoting Plant Area Investigation

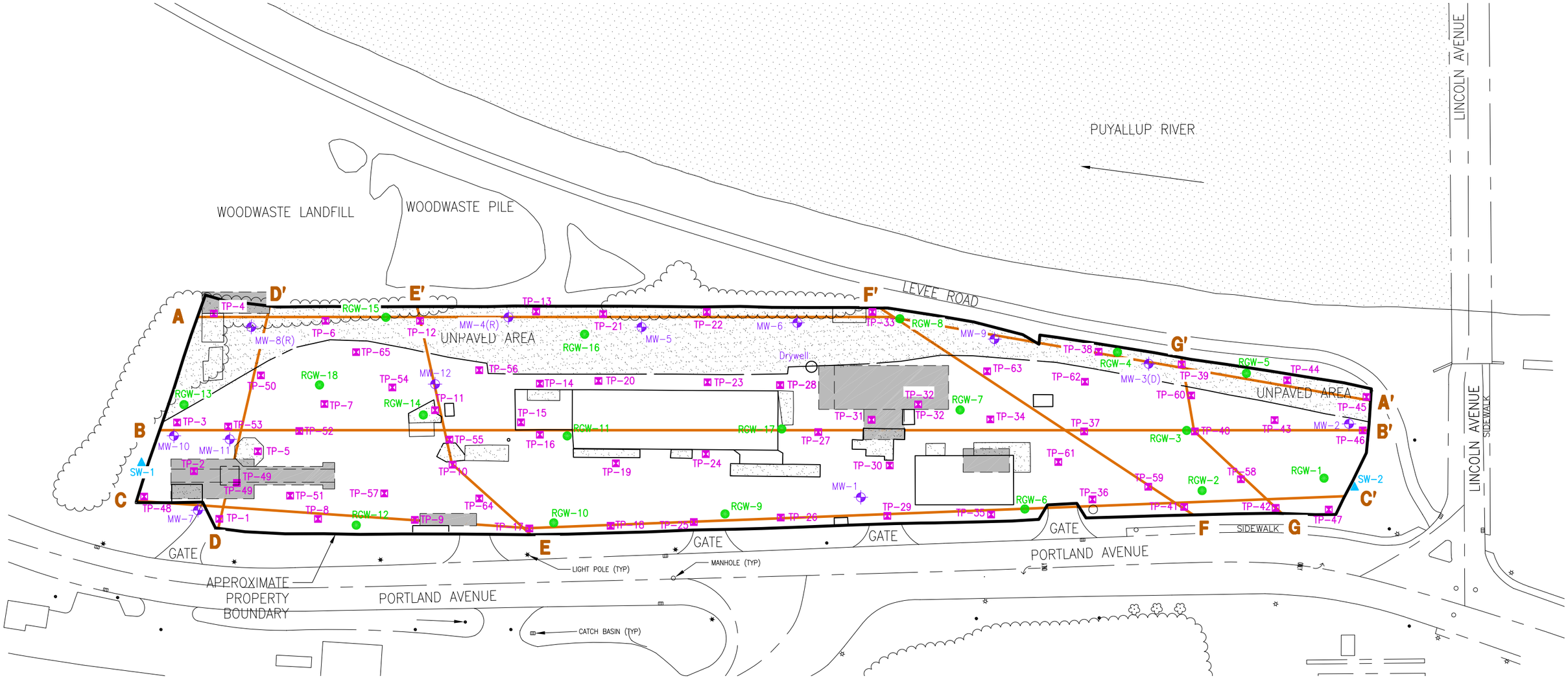
Table of Contents

(NOTE: Figure and table designations are from multiple previous reports and may be duplicated. Figures and tables are presented in the order listed below)

Materials included in Appendix A are from the following reports (as indicated in parentheses following the title for each item):

2001 = Remedial Investigation / Feasibility Study Report (Kennedy/Jenks Consultants 2001)

2008 = *Soil and Groundwater Investigation Results – Data Transmittal; October 2007-April 2008 Investigation* (Kennedy/Jenks Consultants 2008)



LEGEND:

- MW–10 — MONITORING WELL LOCATIONS
  (R) = REPLACEMENT
  (D) = DEMOLISHED
- RGW–12 — RECONNAISSANCE GROUNDWATER SAMPLING LOCATIONS
- TP–64 — TEST PIT SAMPLING LOCATIONS
- SW–1 — SURFACE WATER SAMPLING LOCATIONS
- CROSS SECTION LINES
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

METAL DEBRIS FILL – ABUNDANT MIXED METAL AND OTHER DEBRIS WITH SOIL MATRIX. DEBRIS INCLUDES CABLE, WIRE, SHEET METAL, SPRINGS, MACHINE PARTS, SCRAP METAL, RUBBER, GLASS, BRICK, CONCRETE, AND OTHER MATERIAL. MATRIX MATERIAL IS TYPICALLY SAND AND GRAVEL MIXTURE.

MIXED FILL – VARIABLE FILL MATERIAL TYPICALLY INCLUDING WELL GRADED SAND AND GRAVEL, POORLY GRADED SAND, SILTY SAND AND GRAVEL, AND SOME SILT AND CLAY. COMMONLY CONTAINS SOME METAL, GLASS, BRICK, CONCRETE, AND OTHER DEBRIS.

WOOD FILL – MIXED WOOD DEBRIS INCLUDES LOGS, BOARDS, BARK, CHIPS, WOOD DUST, PLANKS, AND PILINGS. MATRIX MATERIAL INCLUDES MEDIUM TO FINE, SAND, SILT, AND CLAY MIXTURES. MATRIX CONTENT IS TYPICALLY 0–20%.

NATIVE MATERIAL – APPARENTLY NATIVE DELTAIC AND ALLUVIAL DEPOSITS INCLUDING CLAYEY SANDY SILT WITH ORGANIC PLANT MATERIAL, AND POORLY GRADED SAND WITH FINE GRAVEL MATERIAL.

N

0 50 100
SCALE: 1=100

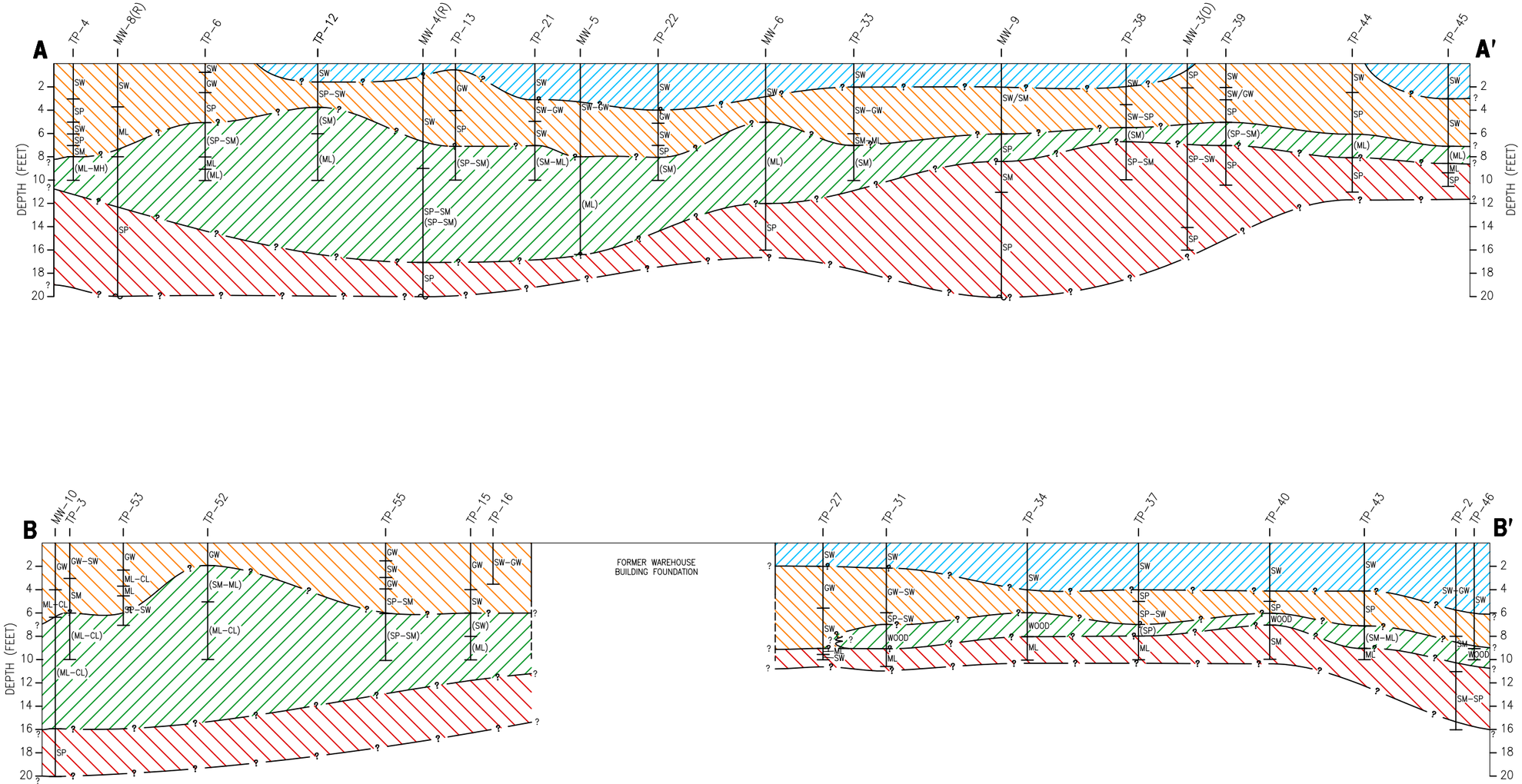
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

GEOLOGIC CROSS SECTION LOCATIONS AND LEGEND

996098.00/P01SK003–1

FIGURE 3-1



NOTES:

1. REFER TO FIGURE 3-1 FOR LEGEND AND NOTES.
2. SOIL CLASSIFICATIONS IN PARENTHESES INDICATE THE MATRIX MATERIAL IN THE WOOD FILL UNIT.

USCS SOIL CLASSIFICATION

SP	POORLY-GRADED SAND
SW	WELL-GRADED SAND
GW	WELL-GRADED GRAVEL
ML	SILT
SM	SILTY SAND
CL	LEAN CLAY

N

0 50 100
HORIZONTAL SCALE: 1=100

0 5 10
VERTICAL SCALE: 1=10

VERTICAL EXAGGERATION 10x

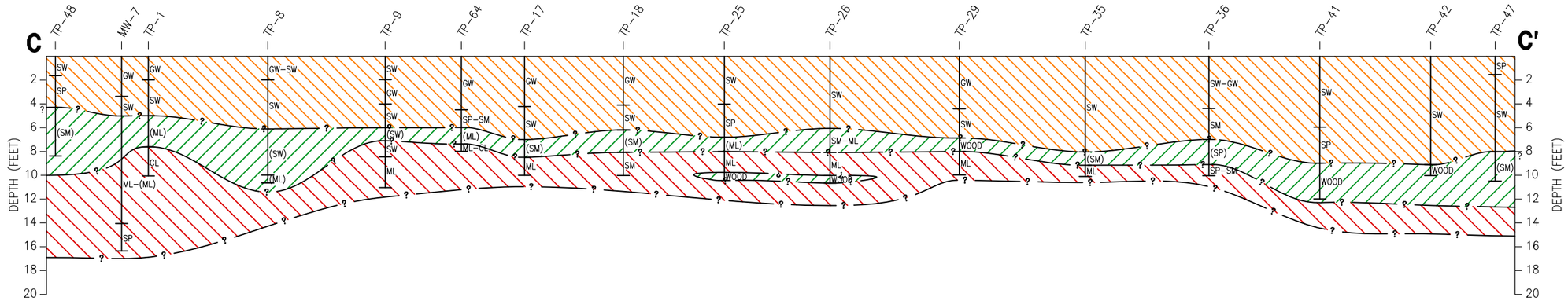
Kennedy/Jenks Consultants

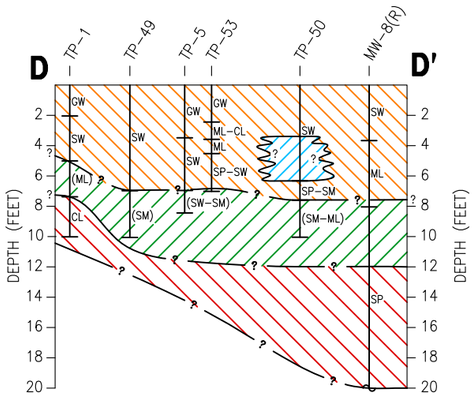
FORMER TACOMA METALS FACILITY
TACOMA, WA

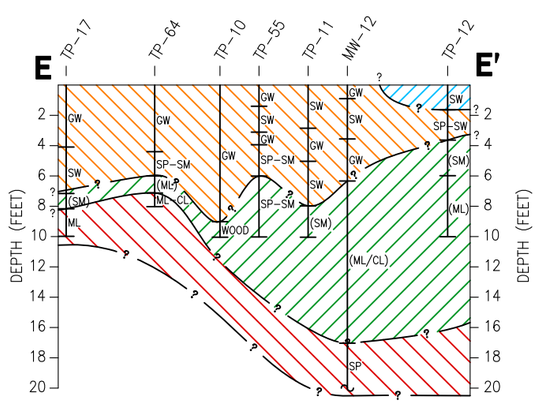
GEOLOGIC CROSS SECTIONS A-A' AND B-B'

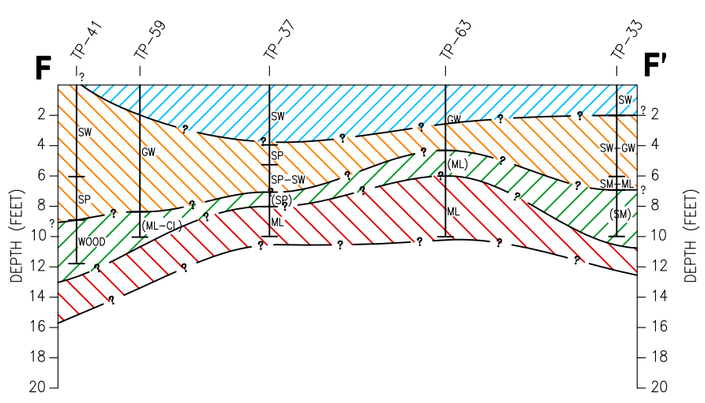
996098.00/P01SK003-2

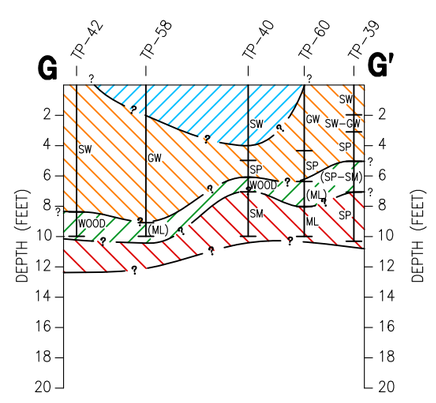
FIGURE 3-2











NOTES:

1. REFER TO FIGURE 3-1 FOR LEGEND AND NOTES.
2. SOIL CLASSIFICATIONS IN PARENTHESES INDICATE THE MATRIX MATERIAL IN THE WOOD FILL UNIT.

USCS SOIL CLASSIFICATION

SP	POORLY-GRADED SAND
SW	WELL-GRADED SAND
GW	WELL-GRADED GRAVEL
ML	SILT
SM	SILTY SAND
CL	LEAN CLAY

N

0 50 100
HORIZONTAL SCALE: 1=100

0 5 10
VERTICAL SCALE: 1=10

VERTICAL EXAGGERATION 10x

Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

GEOLOGIC CROSS SECTIONS
C-C', D-D', E-E', F-F' AND G-G'

996098.00/P01SK003-3

FIGURE 3-3

LEGEND:

- B-18 — SOIL BORING LOCATION
- MW-12 — MONITORING WELL LOCATION
- APPROXIMATE FIRST SILT/CLAY LAYER ELEVATION CONTOUR (CONTOUR INTERVAL=2 FEET) (DASHED WHERE UNCERTAIN) (NGVD 29)
- −12.3 — APPROXIMATE FIRST SILT/CLAY LAYER ELEVATION (NGVD 29)
- A — A' — GENERALIZED GEOLOGIC SECTION LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

JJ PORT PROPERTY

SIMPSON PROPERTY

FORMER TACOMA METALS SITE

E. 18TH ST. RIGHT-OF-WAY

GATE

PORTLAND AVENUE

SCALE: 1=40

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. NGVD 29 = NATIONAL GEODETIC VERTICAL DATUM 1929.
3. * – ELEVATION UNCERTAIN.

Kennedy/Jenks Consultants

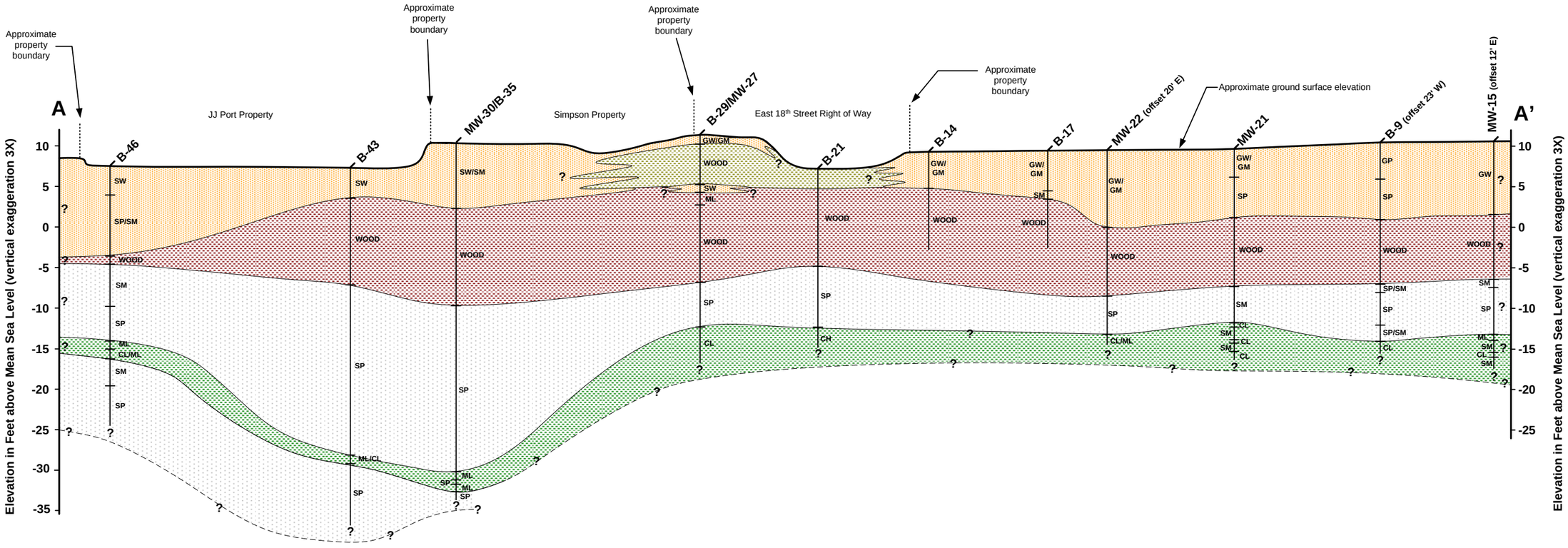
FORMER TACOMA METALS FACILITY
TACOMA, WA

APPROXIMATE TOPOGRAPHY OF FIRST ENCOUNTERED SILT/CLAY LAYER

996098.00\2008 DATA SUMMARY\FIG_04dwg

FIGURE 4

Generalized North-South Geologic Cross Section A-A’



LEGEND:

- Primarily gravely and sandy fill material, some silt
- Primarily woody material (wood chips with no evident matrix)
- Primarily woody material (woody material typically with sand, silt, and/or clay matrix)
- Primarily sand and silty sand material
- Primarily clay, silt, and fine sand material, typically layered

NOTES:

1. All locations and depths are approximate.
2. Offset directions indicate the offset of the boring from the cross section line.

0 20 40
Approximate Horizontal Scale in Feet

0 5 10
Approximate Vertical Scale in Feet

Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

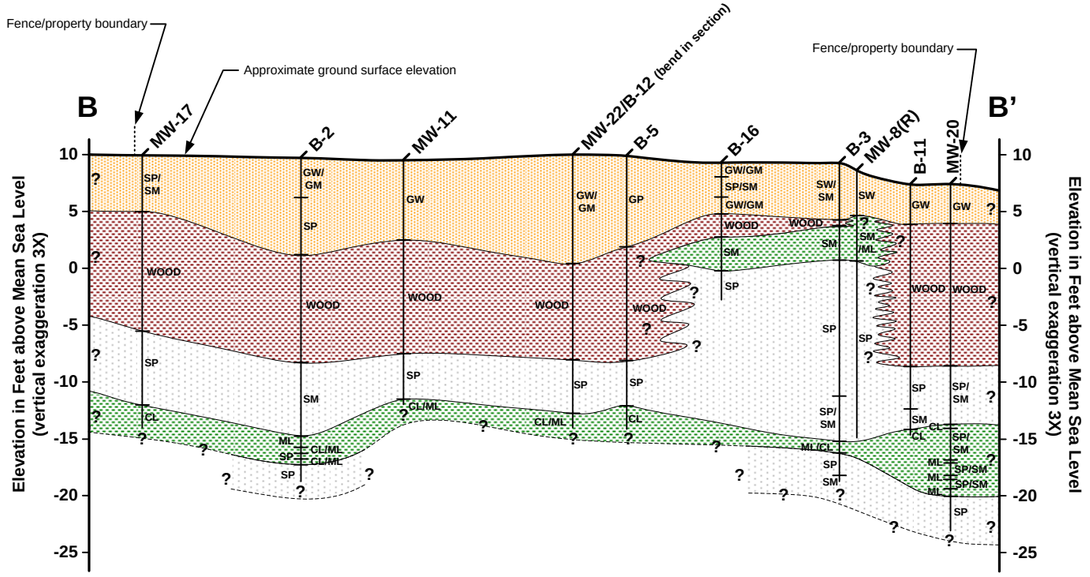
GENERALIZED GEOLOGIC CROSS SECTION A-A’

996098.00/2008/FIGURE5.VSD

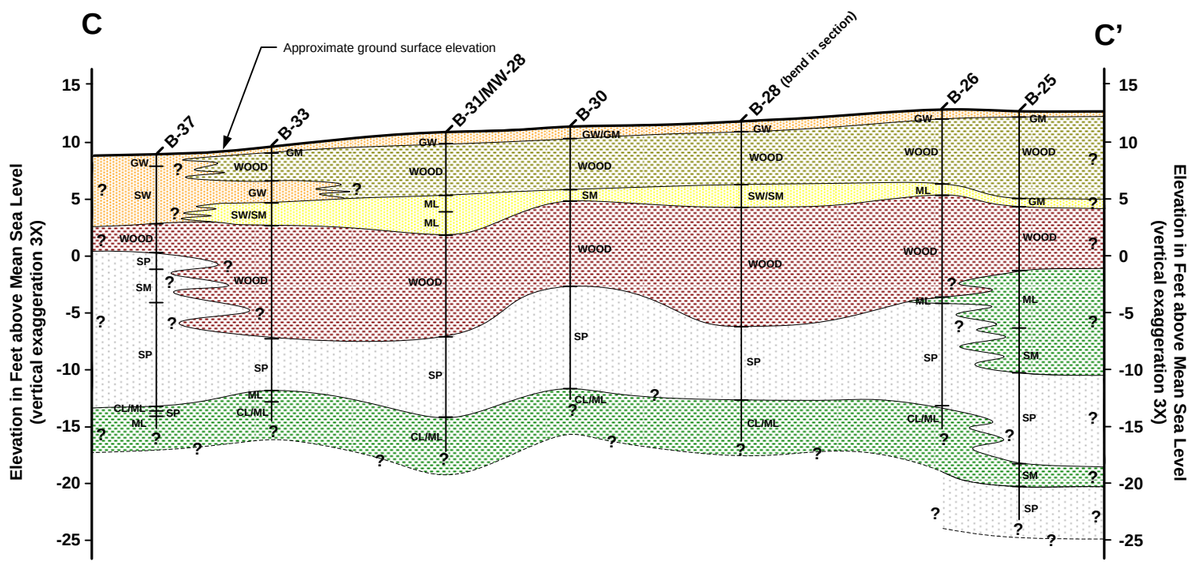
FIGURE 5

Generalized West-East Geologic Cross Sections

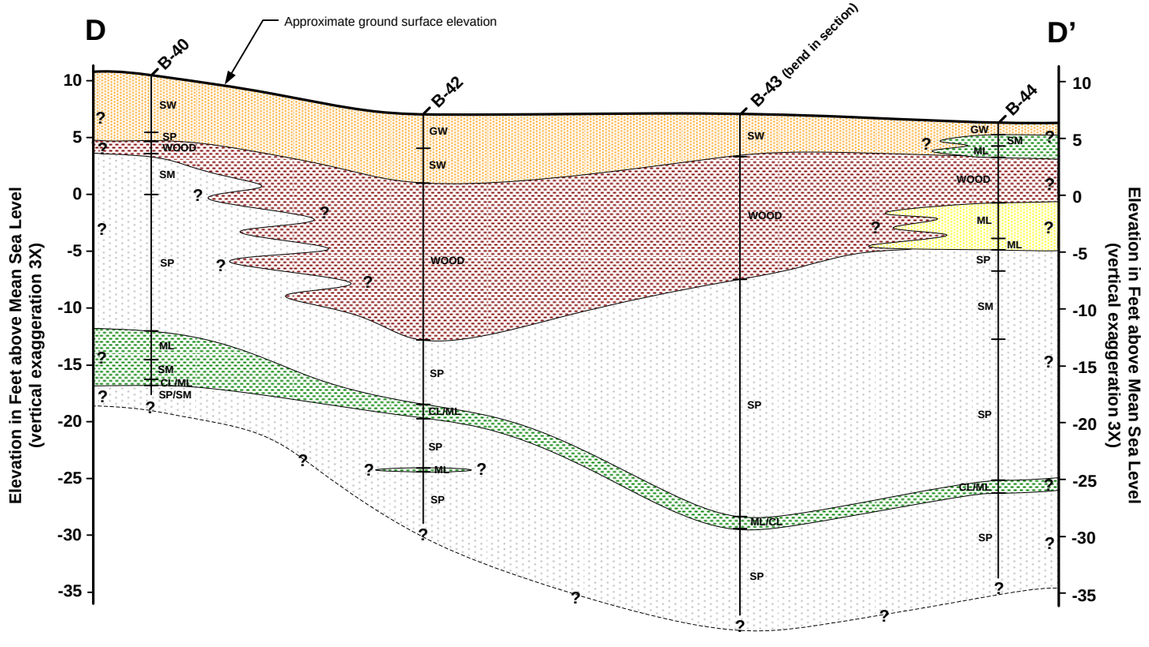
Cross Section B-B'



Cross Section C-C'



Cross Section D-D'



LEGEND:

- Primarily gravely and sandy fill material, some silt
- Primarily woody material (wood chips with no evident matrix)
- Primarily silty material mixed with sand and gravel, some woody material
- Primarily woody material (woody material typically with sand, silt, and/or clay matrix)
- Primarily sand and silty sand material
- Primarily clay, silt, and fine sand material, typically layered

NOTES:

1. All locations and depths are approximate.

Approximate Horizontal Scale in Feet: 0, 20, 40

Approximate Vertical Scale in Feet: 0, 5, 10

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FORMER TACOMA METALS FACILITY
TACOMA, WA

GENERALIZED GEOLOGIC CROSS SECTIONS B-B' AND C-C'

996098.00/2008/FIGURE6.VSD

FIGURE 6

Appendix B

Groundwater Gradient Maps and Elevation Data Tables
for 2006 and 2008

Appendix B: Groundwater Gradient Maps and Elevation Data Tables for 2006 and 2008

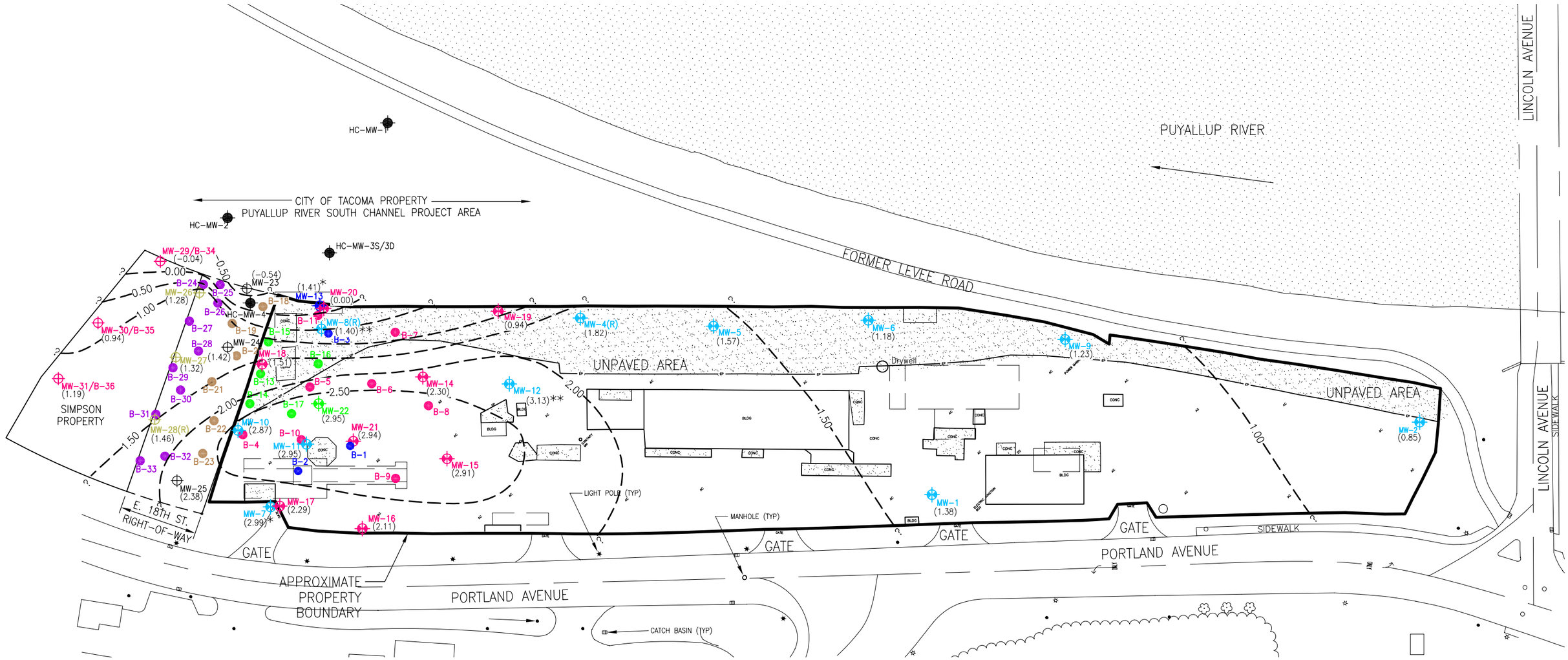
Table of Contents

(NOTE: Figure and table designations are from multiple previous reports and may be duplicated. Figures and tables are presented in the order listed below)

Materials included in Appendix B are from the following reports (as indicated in parentheses following the title for each item):

2007 = *Supplemental Data Summary Report* (Kennedy/Jenks Consultants 2007a)

2008 = *Soil and Groundwater Investigation Results – Data Transmittal; October 2007-April 2008 Investigation* (Kennedy/Jenks Consultants 2008)



LEGEND:

MW-29/B-34	OFF-PROPERTY MONITORING WELL AND SOIL BORING LOCATION (FEBRUARY 2006)
MW-26	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2005)
B-24	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2005)
MW-23	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2004)
B-18	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2004)
MW-12	MONITORING WELL LOCATION (REMEDIAL INVESTIGATION 2000-2001)
MW-13	MONITORING WELL LOCATION (JUNE – AUGUST 2002 INVESTIGATION)
MW-14	MONITORING WELL LOCATION (FEBRUARY – MARCH 2003 INVESTIGATION)
MW-22	MONITORING WELL LOCATION (NOVEMBER – DECEMBER 2003 INVESTIGATION)
HC-MW-4	FORMER OFF-PROPERTY MONITORING WELL LOCATION INSTALLED BY HART-CROWSER (JUNE 2003)
B-1	HOLLOW-STEM AUGER BORING LOCATION (JUNE – AUGUST 2002 INVESTIGATION)
B-4	GEOPROBE BORING LOCATION (FEBRUARY – MARCH 2003 INVESTIGATION)
B-12	GEOPROBE BORING LOCATION (NOVEMBER – DECEMBER 2003 INVESTIGATION)
	UNPAVED AREA
	APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
(1.32)	GROUDWATER ELEVATION IN MONITORING WELLS (FEET NGVD)
2.50	POTENTIOMETRIC SURFACE CONTOURS (FEET NGVD) CONTOUR INTERVAL IS 0.50 FEET.

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
3. WATER LEVELS MEASURED ON 18 APRIL 2006 DURING LOW TIDAL CONDITIONS.
4. * WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON SCREENED INTERVALS PRIMARILY IN THE WOOD DEBRIS MATERIAL.
5. ** WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED

N

0 50 100
SCALE: 1=100

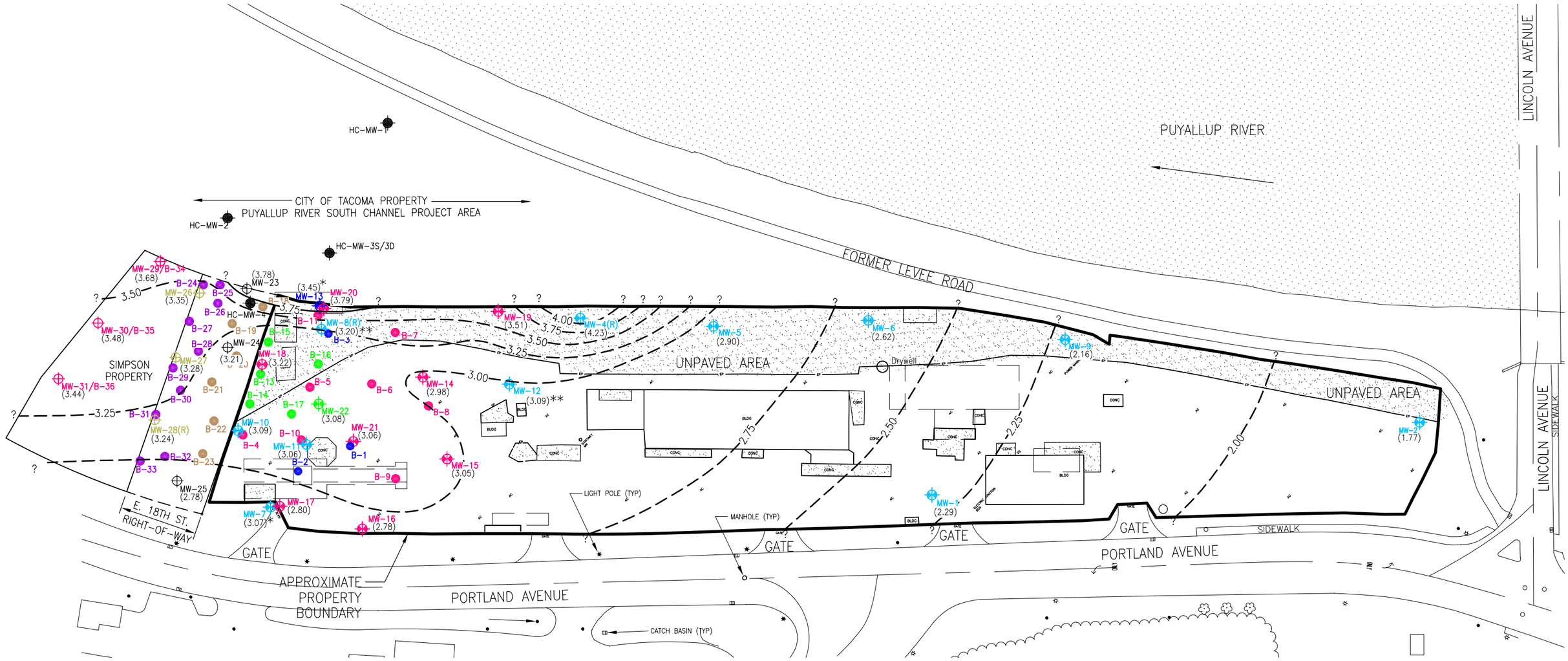
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

POTENTIOMETRIC SURFACE
©
Ξ - 18 APRIL 2006

996098.00\2006 DATA SUMMARY\FIG_5

FIGURE 5



LEGEND:

MW-29/B-34	OFF-PROPERTY MONITORING WELL AND SOIL BORING LOCATION (FEBRUARY 2006)
MW-26	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2005)
B-24	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2005)
MW-23	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2004)
B-18	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2004)
MW-12	MONITORING WELL LOCATION (REMEDIAL INVESTIGATION 2000-2001)
MW-13	MONITORING WELL LOCATION (JUNE - AUGUST 2002 INVESTIGATION)
MW-14	MONITORING WELL LOCATION (FEBRUARY - MARCH 2003 INVESTIGATION)
MW-22	MONITORING WELL LOCATION (NOVEMBER - DECEMBER 2003 INVESTIGATION)
HC-MW-4	FORMER OFF-PROPERTY MONITORING WELL LOCATION INSTALLED BY HART-CROWSER (JUNE 2003)
B-1	HOLLOW-STEM AUGER BORING LOCATION (JUNE - AUGUST 2002 INVESTIGATION)
B-4	GEOPROBE BORING LOCATION (FEBRUARY - MARCH 2003 INVESTIGATION)
B-12	GEOPROBE BORING LOCATION (NOVEMBER - DECEMBER 2003 INVESTIGATION)
	UNPAVED AREA
	APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
(2.29)	GROUDWATER ELEVATION IN MONITORING WELLS (FEET NGVD)
2.25	POTENTIOMETRIC SURFACE CONTOURS (FEET NGVD) CONTOUR INTERVAL IS 0.25 FEET.

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
3. WATER LEVELS MEASURED ON 18 APRIL 2006 DURING LOW TIDAL CONDITIONS.
4. * WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON SCREENED INTERVALS PRIMARILY IN THE WOOD DEBRIS MATERIAL.
5. ** WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED

N

0 50 100
SCALE: 1=100

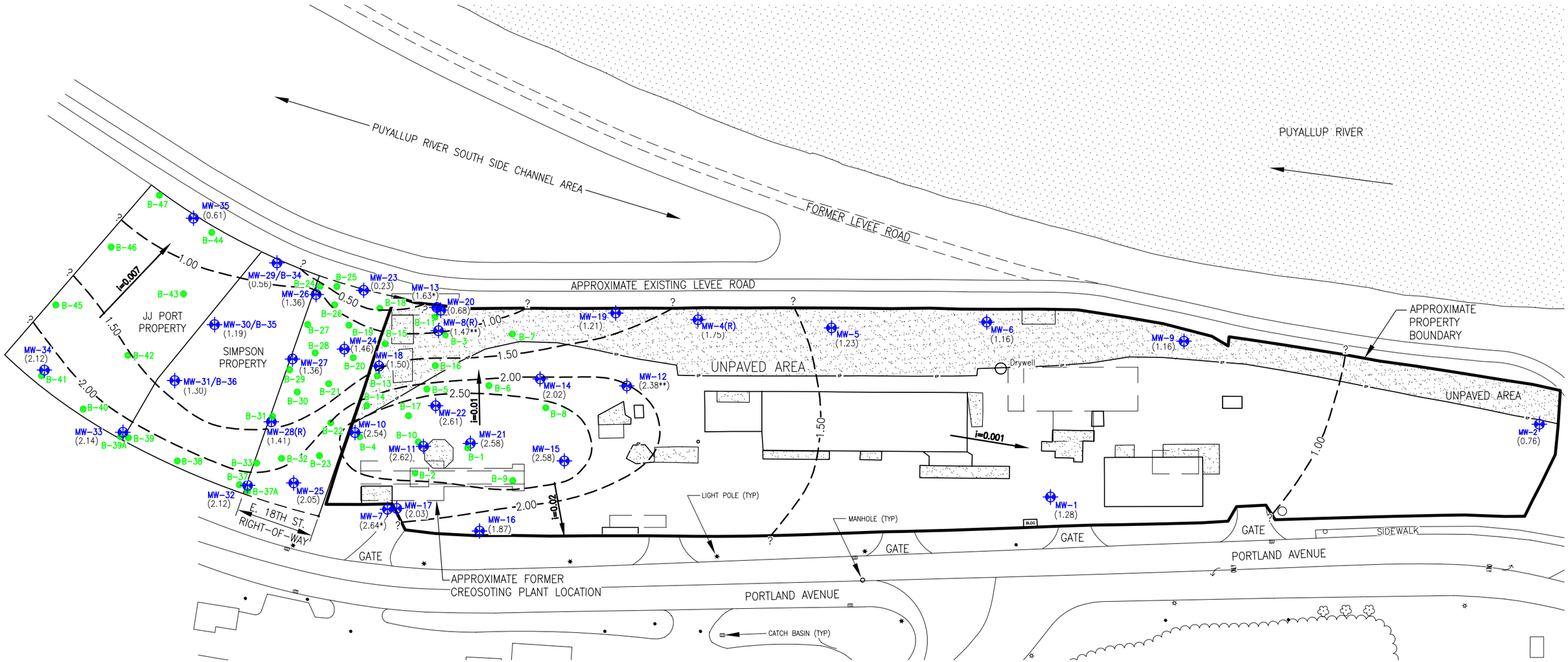
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

POTENTIOMETRIC SURFACE CONTOUR MAP
HIGH TIDE - 18 APRIL 2006

996098.00\2006 DATA SUMMARY\FIG_6

FIGURE 6



LEGEND:

- B-1 — SOIL BORING LOCATION
- MW-26 — MONITORING WELL LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
- (1.32) — GROUDWATER ELEVATION IN MONITORING WELLS (FEET NGVD)
- 2.50 — POTENTIOMETRIC SURFACE CONTOURS (FEET NGVD) CONTOUR INTERVAL IS 0.50 FEET.
- i=0.004 — APPROXIMATE GROUNDWATER GRADIENT DIRECTION AND MAGINTUDE (FEET PER FOOT)

NOTES:

1. BORING AND WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.
2. ALL LOCATIONS ARE APPROXIMATE.
3. WATER LEVELS MEASURED ON 11 APRIL 2008 DURING LOW TIDAL CONDITIONS.
4. * WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON SCREENED INTERVALS PRIMARILY IN THE WOOD DEBRIS MATERIAL.
5. ** WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON THE PRESENCE OF LNAPL.

N

0 50 100
SCALE: 1=100

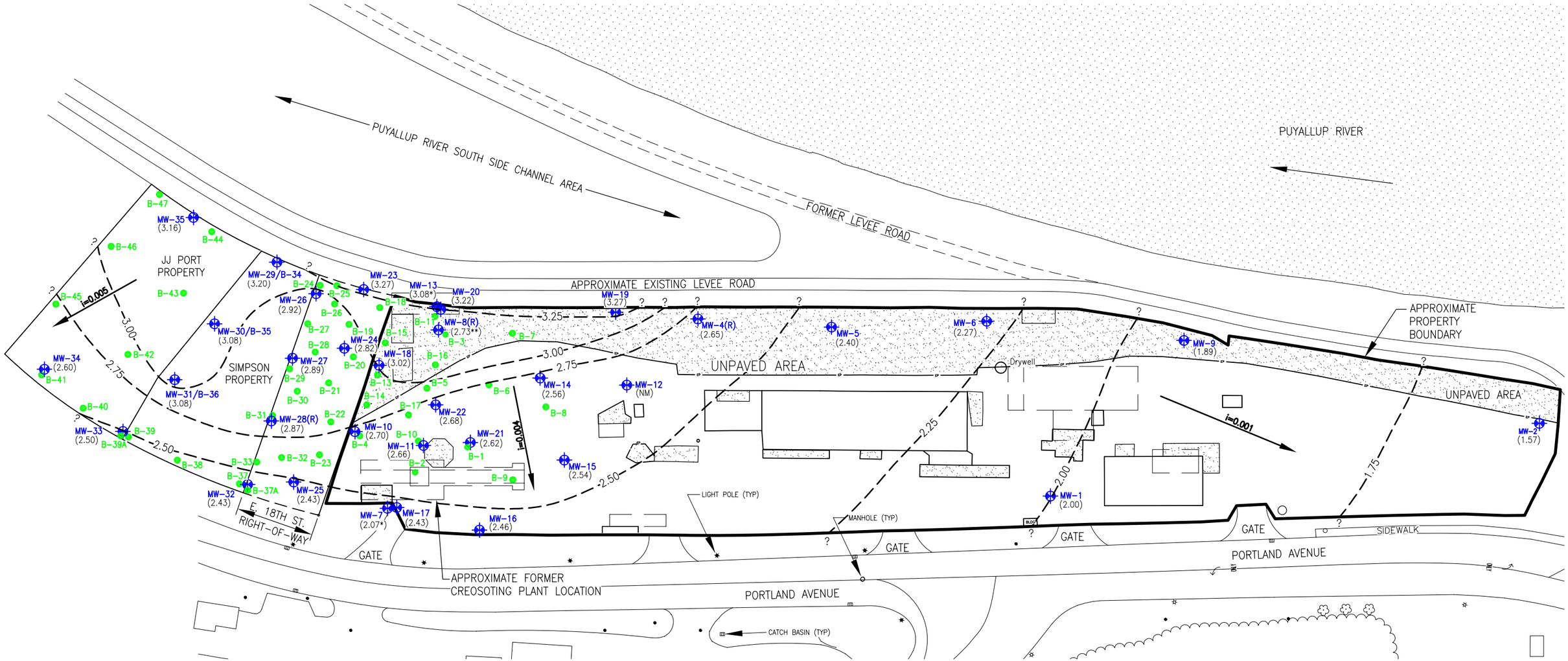
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

POTENTIOMETRIC SURFACE CONTOUR MAP
LOW TIDE - 11 APRIL 2008

996098.00\2008 DATA SUMMARY\FIG_07

FIGURE 7



LEGEND:

- B-1 — SOIL BORING LOCATION
- MW-26 — MONITORING WELL LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
- (1.32) — GROUDWATER ELEVATION IN MONITORING WELLS (FEET NGVD)
- 2.50 — POTENTIOMETRIC SURFACE CONTOURS (FEET NGVD) CONTOUR INTERVAL IS 0.25 FEET.
- i=0.004 — APPROXIMATE GROUNDWATER GRADIENT DIRECTION AND MAGINTUDE (FEET PER FOOT)

NOTES:

1. BORING AND WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.
2. ALL LOCATIONS ARE APPROXIMATE.
3. WATER LEVELS MEASURED ON 11 APRIL 2008 DURING LOW TIDAL CONDITIONS.
4. * WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON SCREENED INTERVALS PRIMARILY IN THE WOOD DEBRIS MATERIAL.
5. ** WATER LEVELS IN WELLS NOT INCLUDED IN POTENTIOMETRIC CONTOUR MAP BASED ON THE PRESENCE OF LNAPL.
6. NM INDICATES THAT THE WATER LEVEL WAS NOT MEASURED.

N

0 50 100
SCALE: 1=100

Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

POTENTIOMETRIC SURFACE CONTOUR MAP
HIGH TIDE - 11 APRIL 2008

996098.00\2008 DATA SUMMARY\FIG_08

FIGURE 8

TABLE 4

GROUNDWATER ELEVATION MONITORING - 11 APRIL 2008
Former Tacoma Metals Facility

Well Number	Top of Well Casing Elevation (feet)[a]	Depth to Groundwater at Low-Tide (feet)	Groundwater Elevation Low-Tide (feet)	Depth to Groundwater at High-Tide (feet)	Groundwater Elevation High-Tide (feet)
MW-1	12.23	10.95	1.28	10.23	2.00
MW-2	12.04	11.28	0.76	10.47	1.57
MW-4(R)	12.55	10.80	1.75	9.90	2.65
MW-5	10.90	9.67	1.23	8.50	2.40
MW-6	10.07	8.91	1.16	7.80	2.27
MW-7	9.45	6.81	2.64	6.78	2.67
MW-8(R)[b]	11.12	9.65	1.47	8.39	2.73
MW-9	13.61	12.45	1.16	11.72	1.89
MW-10	9.39	6.85	2.54	6.69	2.70
MW-11	9.47	6.85	2.62	6.81	2.66
MW-12[b]	10.80	8.42	2.38	NM[d]	NM
MW-13	9.84	8.21	1.63	6.76	3.08
MW-14	9.77	7.75	2.02	7.21	2.56
MW-15	10.49	7.91	2.58	7.95	2.54
MW-16	9.72	7.85	1.87	7.26	2.46
MW-17	9.57	7.54	2.03	7.14	2.43
MW-18	11.79	10.29	1.50	8.77	3.02
MW-19	10.78	9.57	1.21	7.51	3.27
MW-20	10.21	9.53	0.68	6.99	3.22
MW-21	9.47	6.89	2.58	6.85	2.62
MW-22	9.51	6.90	2.61	6.83	2.68
MW-23	14.35	14.12	0.23	11.08	3.27
MW-24	10.58	9.12	1.46	7.76	2.82
MW-25	11.24	9.19	2.05	8.81	2.43
MW-26	12.52	11.16	1.36	9.60	2.92
MW-27	11.06	9.70	1.36	8.17	2.89
MW-28(R)[c]	10.42	9.01	1.41	7.55	2.87
MW-29	11.12	10.56	0.56	7.92	3.20
MW-30	10.05	8.86	1.19	6.97	3.08
MW-31	9.38	8.08	1.30	6.30	3.08
MW-32	9.26	7.14	2.12	6.83	2.43
MW-33	9.24	7.10	2.14	6.74	2.50
MW-34	9.62	7.50	2.12	7.02	2.60
MW-35	7.95	7.34	0.61	4.79	3.16

Notes:

(a) Vertical elevation (NGVD 29) is based on well surveys performed by Earth Tech, Inc. on 28 March 2000, 21 November 2000, 13 March 2003, 31 December 2003, 14 April 2004, 21 April 2005, 29 March 2006, and 11 April 2008.

(b) Free product [light non-aqueous phase liquid (LNAPL)] present on water table.

(c) MW-28 was abandoned and replaced with MW-28(R) in February 2006.

(d) "NM" denotes that the water level was not measured in the indicated well.

TABLE 9

GROUNDWATER ELEVATION MONITORING SUMMARY
Former Tacoma Metals Facility

Well Number	Top of Well Casing Elevation (feet)[a]	Depth to Groundwater at Low-Tide (feet)	Groundwater Elevation Low-Tide (feet)	Depth to Groundwater at High-Tide (feet)	Groundwater Elevation High-Tide (feet)
30 December 2003					
MW-1	12.23	10.86	1.37	9.87	2.36
MW-2	12.04	11.42	0.62	10.19	1.85
MW-4(R)	12.55	10.83	1.72	9.22	3.33
MW-5	10.90	9.13	1.77	7.62	3.28
MW-6	10.07	9.02	1.05	7.05	3.02
MW-7	9.45	5.91	3.54	5.82	3.63
MW-8(R)[b]	11.12	9.23	1.89	7.75	3.37
MW-9	13.61	12.48	1.13	11.31	2.30
MW-10	9.39	6.09	3.30	5.76	3.63
MW-11	9.47	5.94	3.53	5.87	3.60
MW-12[b]	10.80	7.33	3.47	7.32	3.48
MW-13	9.84	7.38	2.46	5.99	3.85
MW-14	9.77	6.88	2.89	6.45	3.32
MW-15	10.49	7.15	3.34	7.00	3.49
MW-16	9.72	7.46	2.26	6.82	2.90
MW-17	9.57	7.10	2.47	6.63	2.94
MW-18	11.79	9.90	1.89	8.27	3.52
MW-19	10.78	9.32	1.46	7.04	3.74
MW-20	10.21	8.89	1.32	6.15	4.06
MW-21	9.47	6.26	3.21	5.89	3.58
MW-22	9.51	6.00	3.51	5.90	3.61
1 June 2004					
MW-1	12.23	10.75	1.48	9.96	2.27
MW-2	12.04	8.56	3.48	10.03	2.01
MW-4(R)	12.55	10.65	1.90	9.34	3.21
MW-5	10.90	9.22	1.68	8.01	2.89
MW-6	10.07	8.59	1.48	7.17	2.90
MW-7	9.45	6.70	2.75	6.74	2.71
MW-8(R)[b]	11.12	9.16	1.96	8.16	2.96
MW-9	13.61	12.19	1.42	11.35	2.26
MW-10	9.39	6.70	2.69	6.55	2.84
MW-11	9.47	6.73	2.74	6.72	2.75
MW-12[b]	10.80	8.07	2.73	8.04	2.76
MW-13	9.84	7.68	2.16	6.45	3.39
MW-14	9.77	7.55	2.22	6.92	2.85
MW-15	10.49	6.72	3.77	7.69	2.80
MW-16	9.72	7.46	2.26	7.23	2.49
MW-17	9.57	7.16	2.41	7.11	2.46
MW-18	11.79	9.70	2.09	8.69	3.10
MW-19	10.78	8.89	1.89	7.18	3.60
MW-20	10.21	8.65	1.56	6.46	3.75
MW-21	9.47	6.83	2.64	6.69	2.78
MW-22	9.51	6.77	2.74	6.74	2.77
MW-23	14.39	12.82	1.57	10.76	3.63
MW-24	10.67	8.42	2.25	7.55	3.12
MW-25	11.26	8.78	2.48	8.62	2.64

TABLE 9

GROUNDWATER ELEVATION MONITORING SUMMARY
Former Tacoma Metals Facility

Well Number	Top of Well Casing Elevation (feet)[a]	Depth to Groundwater at Low-Tide (feet)	Groundwater Elevation Low-Tide (feet)	Depth to Groundwater at High-Tide (feet)	Groundwater Elevation High-Tide (feet)
12 May 2005					
MW-1	12.23	10.67	1.56	10.00	2.23
MW-2	12.04	10.96	1.08	10.27	1.77
MW-4(R)	12.55	10.55	2.00	9.57	2.98
MW-5	10.90	9.38	1.52	8.19	2.71
MW-6	10.07	8.62	1.45	7.58	2.49
MW-7	9.45	6.51	2.94	6.46	2.99
MW-8(R)[b]	11.12	9.04	2.08	8.06	3.06
MW-9	13.61	12.22	1.39	11.48	2.13
MW-10	9.39	6.47	2.92	6.38	3.01
MW-11	9.47	6.54	2.93	6.49	2.98
MW-12[b]	10.80	7.89	2.91	7.84	2.96
MW-13	9.84	7.51	2.33	6.72	3.12
MW-14	9.77	7.31	2.46	6.84	2.93
MW-15	10.49	7.80	2.69	7.55	2.94
MW-16	9.72	7.49	2.23	6.96	2.76
MW-17	9.57	7.20	2.37	6.81	2.76
MW-18	11.79	9.72	2.07	8.73	3.06
MW-19	10.78	8.94	1.84	7.61	3.17
MW-20	10.21	8.75	1.46	6.87	3.34
MW-21	9.47	6.63	2.84	6.48	2.99
MW-22	9.51	6.57	2.94	6.53	2.98
MW-23	14.39	13.18	1.21	11.13	3.26
MW-24	10.67	8.71	1.96	7.63	3.04
MW-25	11.26	8.86	2.40	8.51	2.75
MW-26	12.49	10.60	1.89	9.43	3.06
MW-27	11.15	9.22	1.93	8.09	3.06
MW-28	10.43	8.46	1.97	7.37	3.06

TABLE 9

GROUNDWATER ELEVATION MONITORING SUMMARY
Former Tacoma Metals Facility

Well Number	Top of Well Casing Elevation (feet)[a]	Depth to Groundwater at Low-Tide (feet)	Groundwater Elevation Low-Tide (feet)	Depth to Groundwater at High-Tide (feet)	Groundwater Elevation High-Tide (feet)
18 April 2006					
MW-1	12.23	10.85	1.38	9.94	2.29
MW-2	12.04	11.19	0.85	10.27	1.77
MW-4(R)	12.55	10.73	1.82	8.32	4.23
MW-5	10.90	9.33	1.57	8.00	2.90
MW-6	10.07	8.89	1.18	7.45	2.62
MW-7	9.45	6.46	2.99	6.38	3.07
MW-8(R)[b]	11.12	9.72	1.40	7.92	3.20
MW-9	13.61	12.38	1.23	11.45	2.16
MW-10	9.39	6.52	2.87	6.30	3.09
MW-11	9.47	6.52	2.95	6.41	3.06
MW-12[b]	10.80	7.67	3.13	7.71	3.09
MW-13	9.84	8.43	1.41	6.39	3.45
MW-14	9.77	7.47	2.30	6.79	2.98
MW-15	10.49	7.58	2.91	7.44	3.05
MW-16	9.72	7.61	2.11	6.94	2.78
MW-17	9.57	7.28	2.29	6.77	2.80
MW-18	11.79	10.28	1.51	8.57	3.22
MW-19	10.78	9.84	0.94	7.27	3.51
MW-20	10.21	10.21	0.00	6.42	3.79
MW-21	9.47	6.53	2.94	6.41	3.06
MW-22	9.51	6.56	2.95	6.43	3.08
MW-23	14.35	14.89	-0.54	10.57	3.78
MW-24	10.58	9.16	1.42	7.37	3.21
MW-25	11.24	8.86	2.38	8.46	2.78
MW-26	12.52	11.24	1.28	9.17	3.35
MW-27	11.06	9.74	1.32	7.78	3.28
MW-28(R)[c]	10.42	8.96	1.46	7.18	3.24
MW-29	11.12	11.16	-0.04	7.44	3.68
MW-30	10.05	9.11	0.94	6.57	3.48
MW-31	9.38	8.19	1.19	5.94	3.44

Notes:

(a) Vertical elevation (NGVD 29) is based on well surveys performed by Earth Tech, Inc on 28 March 2000, 21 November 2000, 13 March 2003, 31 December 2003, 14 April 2004, 21 April 2005, and 29 March 2006.

(b) Free product [light non-aqueous phase liquid (LNAPL)] present on water table.

(c) MW-28 was abandoned and replaced with MW-28(R) in February 2006.

TABLE 10

SUMMARY OF LNAPL[(a)] AND DNAPL[(b)] MONITORING WELLS MW-8(R) AND MW-28(R)
Former Tacoma Metals Facility

MW-8(R) LNAPL Measurement History		MW-28(R) DNAPL Measurement History	
Date	**LNAPL Thickness (feet)**	**Date**	**DNAPL Thickness (feet)**
16-Dec-03	1.15[(c)]	---	---
8-Jan-04	0.01	---	---
16-Jan-04	0.07	---	---
28-Jan-04	0.07	---	---
20-Feb-04	0.40	---	---
10-Mar-04	0.25	---	---
10-Jun-04	0.12	---	---
17-Sep-04	<0.01[(d)]	24-Feb-06	0.46[(c)]
10-Dec-04	0.08	1-Mar-06	0.49
30-Mar-05	0.03	29-Mar-06	0.63
9-Jun-05	0.90	18-Apr-06	0.60
23-Oct-05	<0.01	22-Jun-06	0.61
2-Feb-06	0.22	5-Oct-06	0.61
12-Dec-06	0.18	12-Dec-06	0.59

Notes:

(a) LNAPL = Light non-aqueous phase liquid.
(b) DNAPL = Dense non-aqueous phase liquid.
(c) LNAPL / DNAPL bailed or pumped from well after measurement.
(d) "<" denotes that LNAPL was not detected.

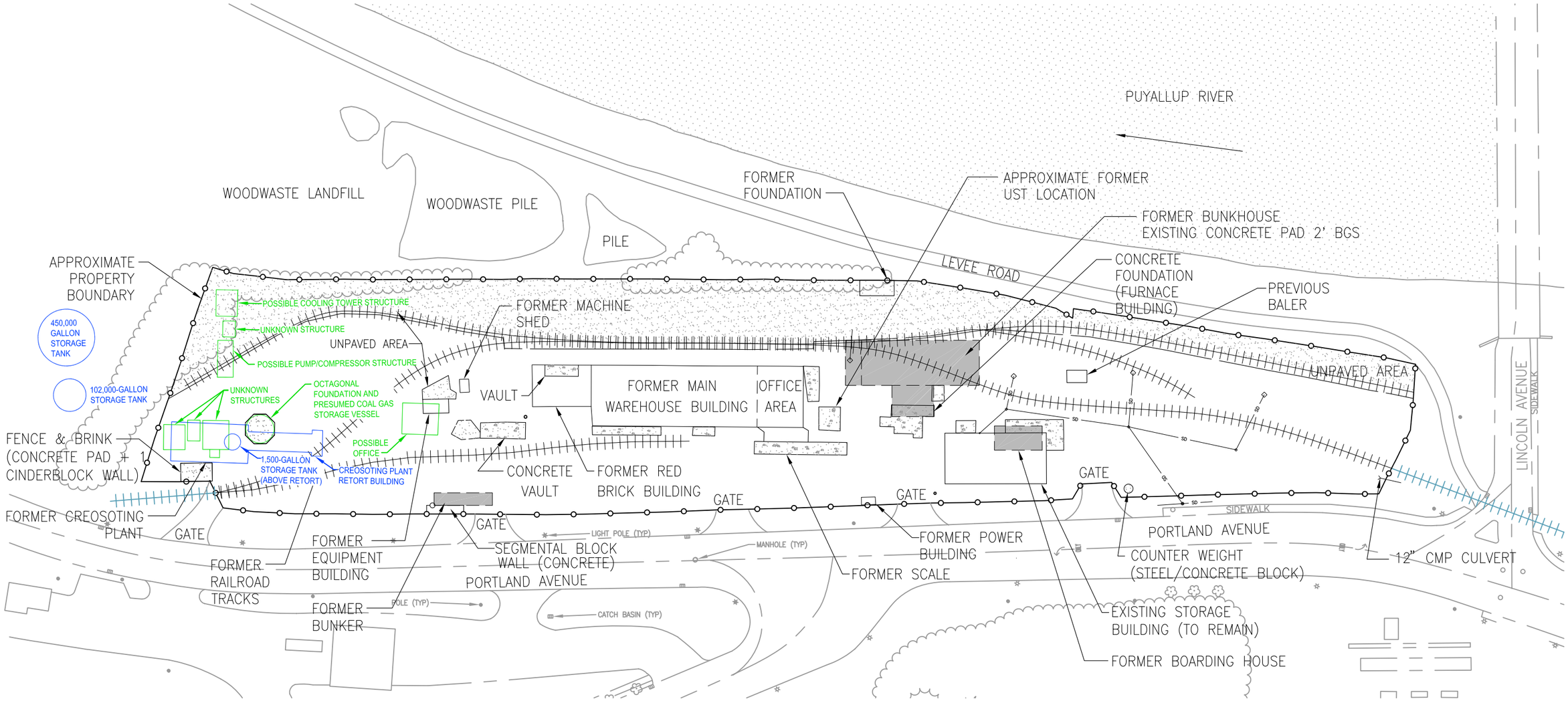
Appendix C

RI/FS Site Maps, Sample Maps, and Data Tables

Appendix C: RI/FS Site and Sample Maps and Data Tables

Table of Contents

All materials included in Appendix C are from *Remedial Investigation / Feasibility Study Report* (Kennedy/Jenks Consultants 2001)



LEGEND:

- CATCHBASIN
- SD — STORMDRAIN LINES
- 8' CHAINLINK FENCE W/BARBED WIRE
- FORMER RAILROAD TRACK LOCATION
- EXISTING RAILROAD TRACK LOCATION
- UNPAVED AREA
- CONCRETE
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3–5' ABOVE FORMER CREOSOTING PLANT FEATURES)

NOTES:

1. LOCATIONS SHOWN WITHIN PROPERTY BOUNDARIES ARE BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. INFORMATION SHOWN OUTSIDE OF PROPERTY BOUNDARIES IS BASED ON 1993 CITY OF TACOMA GEOGRAPHIC INFORMATION SYSTEM, TACOMA AREA MAPS.
3. PREVIOUS TRUNCATED RAILROAD SPUR LOCATION IS APPROXIMATE.
4. PROPERTY AREA = 249,223± sq.ft. (5.72± AC.)
5. THIS FIGURE WAS MODIFIED FROM THE ORIGINAL (2001) RI AT ECOLOGY'S REQUEST.

N

0 50 100

APPROX. SCALE: 1=100

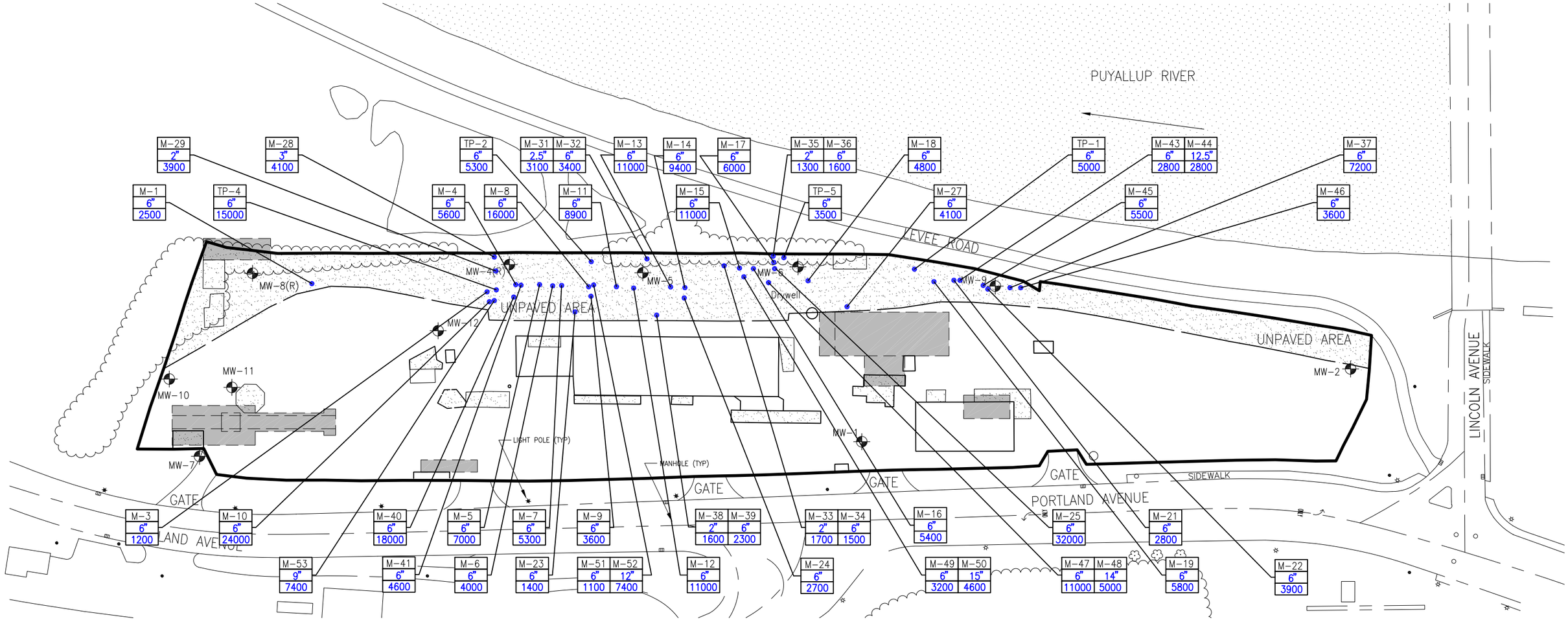
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

SITE OVERVIEW MAP

996098.00/P01SK001–2

FIGURE 1-2



LEGEND:

MW-1 MONITORING WELL LOCATION
(R) = REPLACEMENT

● SOIL CONCENTRATIONS EXCEEDING MTCA METHOD A INDUSTRIAL SOIL CLEANUP LEVEL (LEAD 1000 mg/kg).

HART-CROWSER SURFACE SOIL SAMPLES (1990)

MORRIS ENVIRONMENTAL SERVICES SURFACE SOIL SAMPLES (1991)

TP-4	M-1
6"	6"
15000	2500

DEPTH(ft)

CONCENTRATION(mg/kg)

UNPAVED AREA

APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

NOTES:

1. MAP IS BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. FIGURE SHOWS LEAD CONCENTRATIONS GREATER THAN OR EQUAL TO 1000 mg/kg.

N

0 50 100
SCALE: 1=100

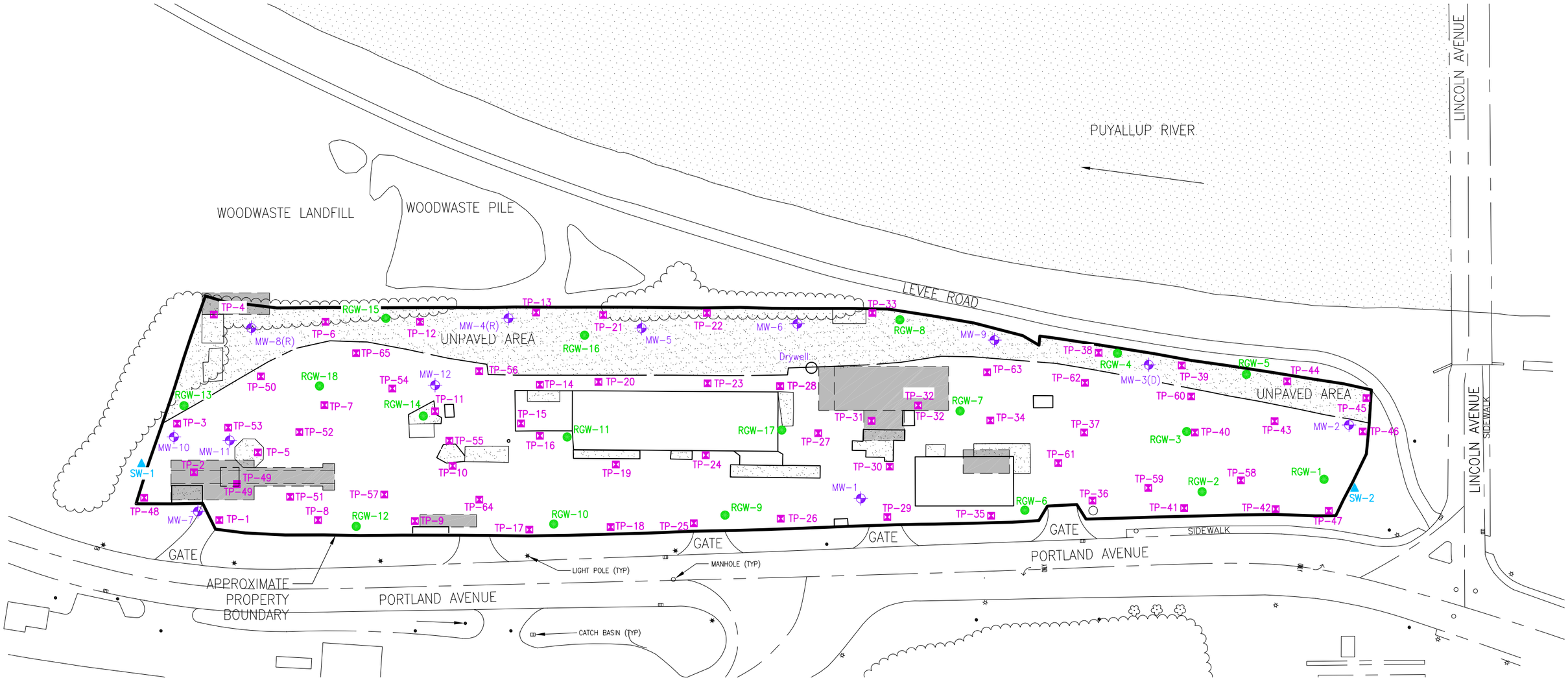
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

PREVIOUS INVESTIGATIONS
LEAD CONCENTRATIONS IN SOIL

996098.00/P01SK001-3

FIGURE 1-3



LEGEND:

- MW-10 — MONITORING WELL LOCATIONS
  (R) = REPLACEMENT
  (D) = DEMOLISHED
- RGW-12 — RECONNAISSANCE GROUNDWATER SAMPLING LOCATIONS
- TP-64 — TEST PIT SAMPLING LOCATIONS
- SW-1 — SURFACE WATER SAMPLING LOCATIONS
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

NOTES:

1. LOCATIONS SHOWN WITHIN PROPERTY BOUNDARIES ARE BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. INFORMATION SHOWN OUTSIDE OF PROPERTY BOUNDARIES IS BASED ON 1993 CITY OF TACOMA GEOGRAPHIC INFORMATION SYSTEM, TACOMA AREA MAPS.
3. PROPERTY AREA = 249,223± sq.ft. (5.72± AC.)

N

0 50 100
SCALE: 1=100

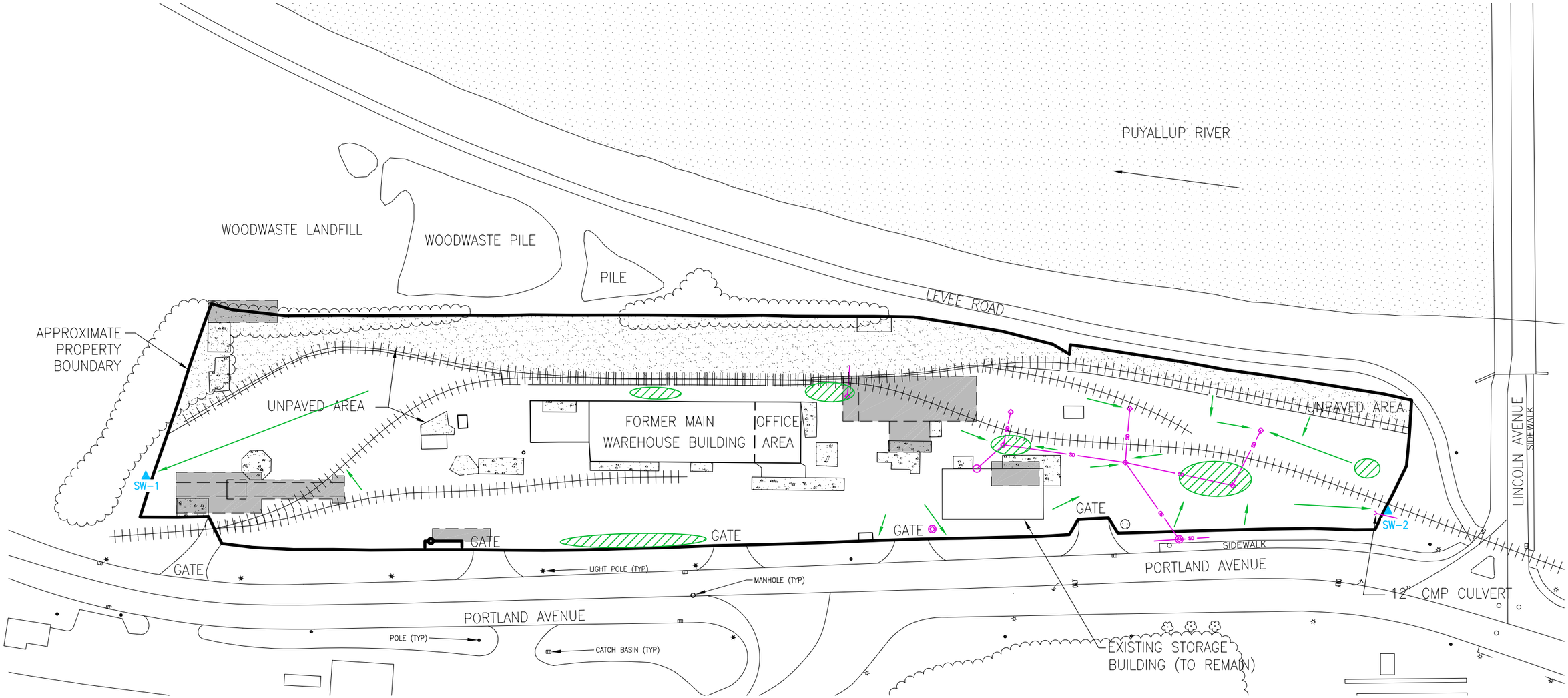
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

SAMPLE LOCATION SUMMARY MAP

996098.00/P01SK002-1

FIGURE 2-1



LEGEND:

- CATCHBASIN
- SD — STORM DRAIN LINES
- ▲ SW-1 — SURFACE WATER SAMPLING LOCATIONS
- APPROXIMATE SURFACE DRAINAGE FLOWLINES
- APPROXIMATE SURFACE WATER PONDING AREAS
- FORMER RAILROAD TRACK LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

NOTES:

1. LOCATIONS SHOWN WITHIN PROPERTY BOUNDARIES ARE BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. INFORMATION SHOWN OUTSIDE OF PROPERTY BOUNDARIES IS BASED ON 1993 CITY OF TACOMA GEOGRAPHIC INFORMATION SYSTEM, TACOMA AREA MAPS.

N

0 50 100

SCALE: 1=100

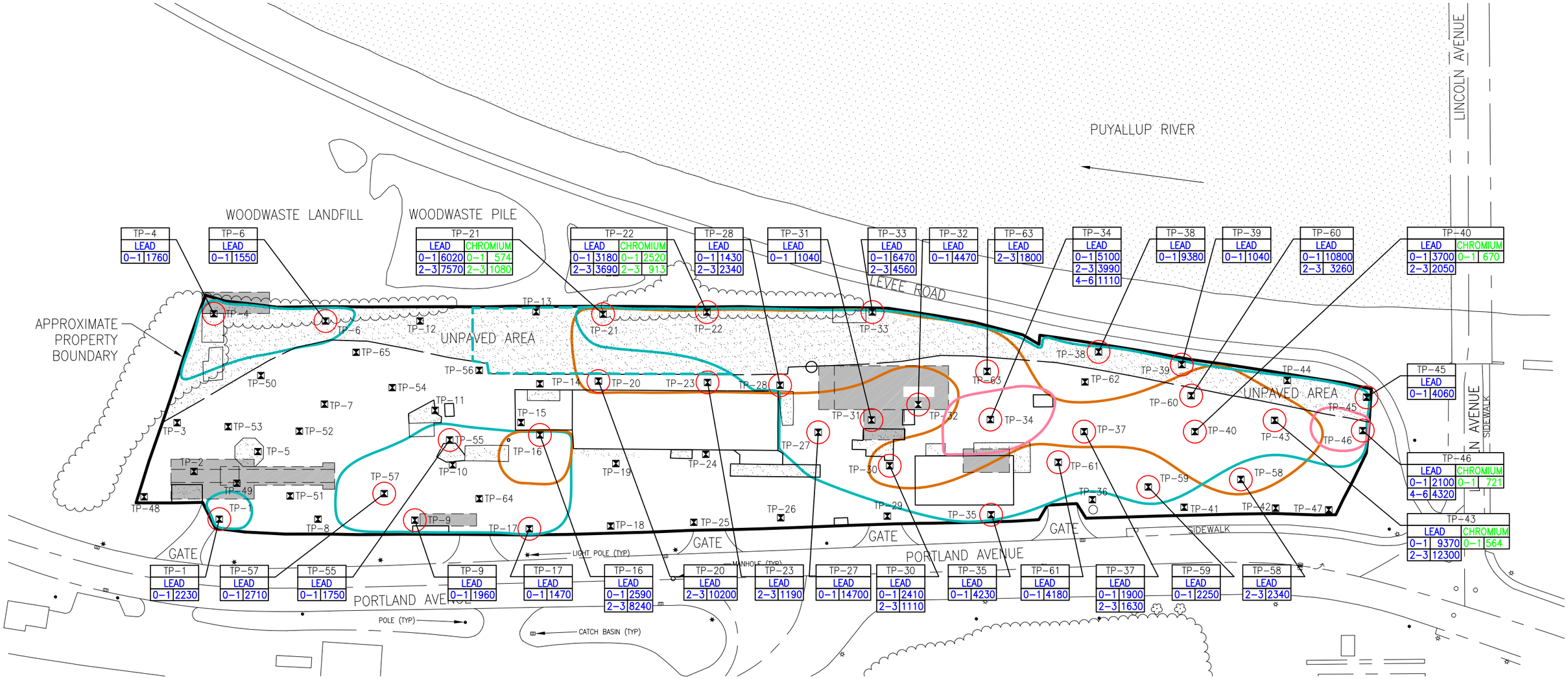
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

SURFACE WATER FLOW AND SAMPLING MAP

996098.00/P01SK003-8

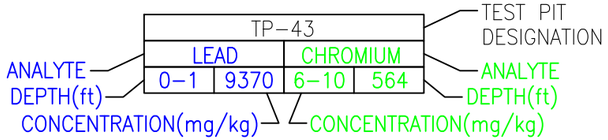
FIGURE 3-8



LEGEND:

TP-1 TEST PIT LOCATION

SOIL CONCENTRATIONS EXCEEDING MTCA METHOD A INDUSTRIAL SOIL CLEANUP LEVELS (LEAD 1000 mg/kg, CHROMIUM 500 mg/kg).



UNPAVED AREA

APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

0–1 ft bgs

0–1 ft bgs (previous investigations)

2–3 ft bgs

4–6 ft bgs

APPROXIMATE LEAD CLEANUP LEVEL EXCEEDANCE AREAS. (MTCA METHOD A, 1000 mg/kg)

NOTES:

1. MAP IS BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. FIGURE SHOWS LEAD CONCENTRATIONS GREATER THAN OR EQUAL TO 1000 mg/kg AND CHROMIUM CONCENTRATIONS GREATER THAN OR EQUAL TO 500 mg/kg.
3. SOIL SAMPLES WERE ANALYZED FOR RCRA METALS AND COPPER BY EPA METHODS 6010/7000 SERIES.
4. WHERE DUPLICATE SAMPLES WERE ANALYZED, THE HIGHER CONCENTRATION IS SHOWN.

N

0 50 100

SCALE: 1=100

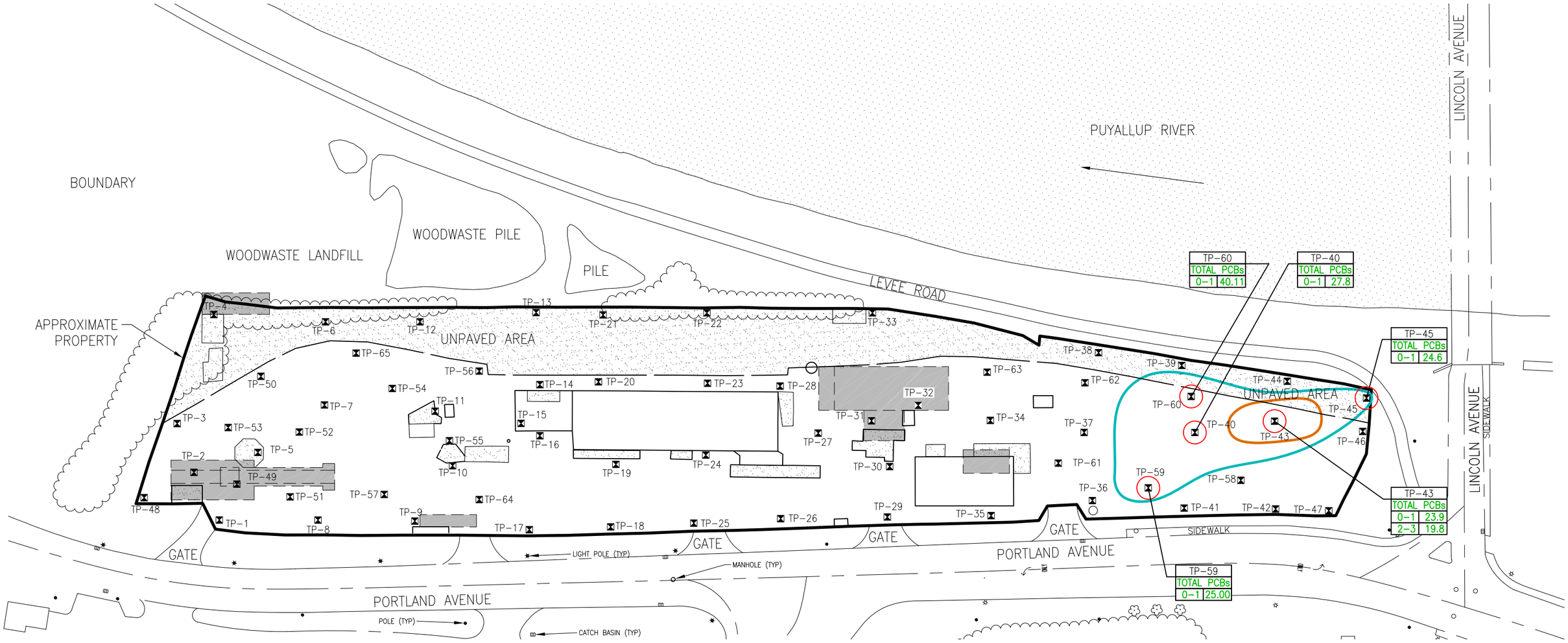
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

METAL CONCENTRATIONS IN SOIL

996098.00/P01SK004–1

FIGURE 4-1



LEGEND:

- TP-1 — TEST PIT LOCATION
- TOTAL PCB CONCENTRATIONS EXCEEDING THE MTCA METHOD C INDUSTRIAL SOIL CLEANUP LEVEL OF 17 mg/kg
- TP-59 / TOTAL PCBs / 0–1 | 25.00 — TEST PIT DESIGNATION; ANALYTE; DEPTH(ft); CONCENTRATION(mg/kg)
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
- 0–1 ft bgs — APPROXIMATE TOTAL PCB CLEANUP LEVEL EXCEEDANCE AREAS. (MTCA METHOD C, 17 mg/kg)
- 2–3 ft bgs

NOTES:

1. MAP IS BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. FIGURE SHOWS PCB CONCENTRATIONS GREATER THAN OR EQUAL TO 17 mg/kg.
3. PCBs WERE ANALYZED BY EPA METHOD 8082.
4. WHERE DUPLICATE SAMPLES WERE ANALYZED, THE HIGHER CONCENTRATION IS SHOWN.

N

0 50 100
SCALE: 1=100

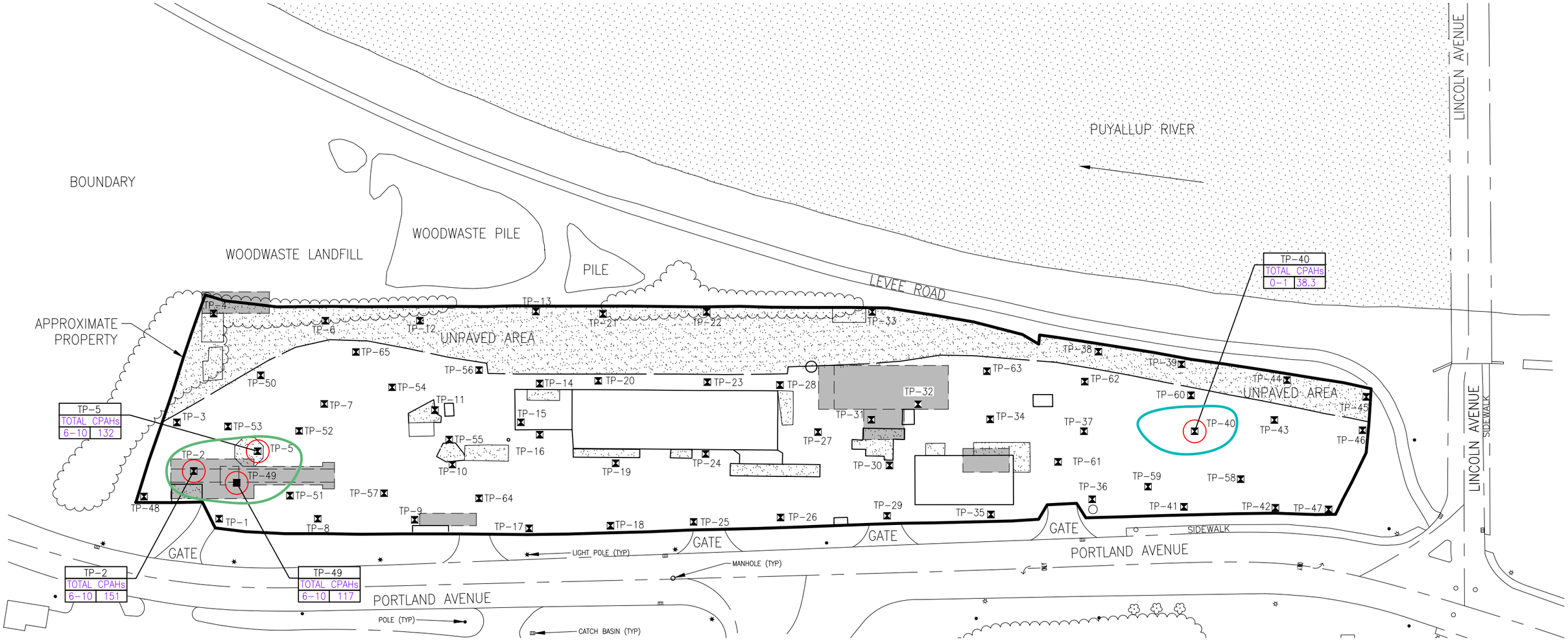
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

TOTAL PCB CONCENTRATIONS IN SOIL

996098.00/P01SK004-2

FIGURE 4-2



LEGEND:

- TP-1 — TEST PIT LOCATION
- TOTAL CPAHs CONCENTRATIONS EXCEEDING MTCA METHOD C INDUSTRIAL SOIL CLEANUP LEVEL OF 18 mg/kg
- TP-49 / TOTAL CPAHs / 6-10 / 117 — TEST PIT DESIGNATION; ANALYTE; DEPTH(ft); CONCENTRATION(mg/kg)
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
- 0-1 ft bgs — APPROXIMATE TOTAL CPAH CLEANUP LEVEL
- 6-10 ft bgs — 18 mg/kg)

NOTES:

1. MAP IS BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. FIGURE SHOWS TOTAL CPAH CONCENTRATIONS GREATER THAN OR EQUAL TO 18 mg/kg.
3. SAMPLES WERE ANALYZED FOR POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) BY EPA METHOD 8270B GC/MS-SIM. TOTAL CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS (CPAHs) WERE CALCULATED BY SUMMING THE CONCENTRATIONS OF ALL PROBABLE CPAHs USING TEF METHODOLOGY. IF A PROBABLE CPAH WAS NOT DETECTED IN THE SAMPLE, A VALUE EQUAL TO 1/2 THE DETECTION LIMIT WAS USED.
4. WHERE DUPLICATE SAMPLES WERE ANALYZED, THE HIGHER CONCENTRATION IS SHOWN.
5. THIS MAP WAS UPDATED IN JULY 2013 AT ECOLOGY'S REQUEST BASED ON REVISED TOTAL CPAH VALUES CALCULATED USING TEF METHODOLOGY [WAC 173-340-708(8)(e)] WHICH WAS NOT REQUIRED WHEN THE ORIGINAL RI\FI WAS PERFORMED.

N

0 50 100
SCALE: 1=100

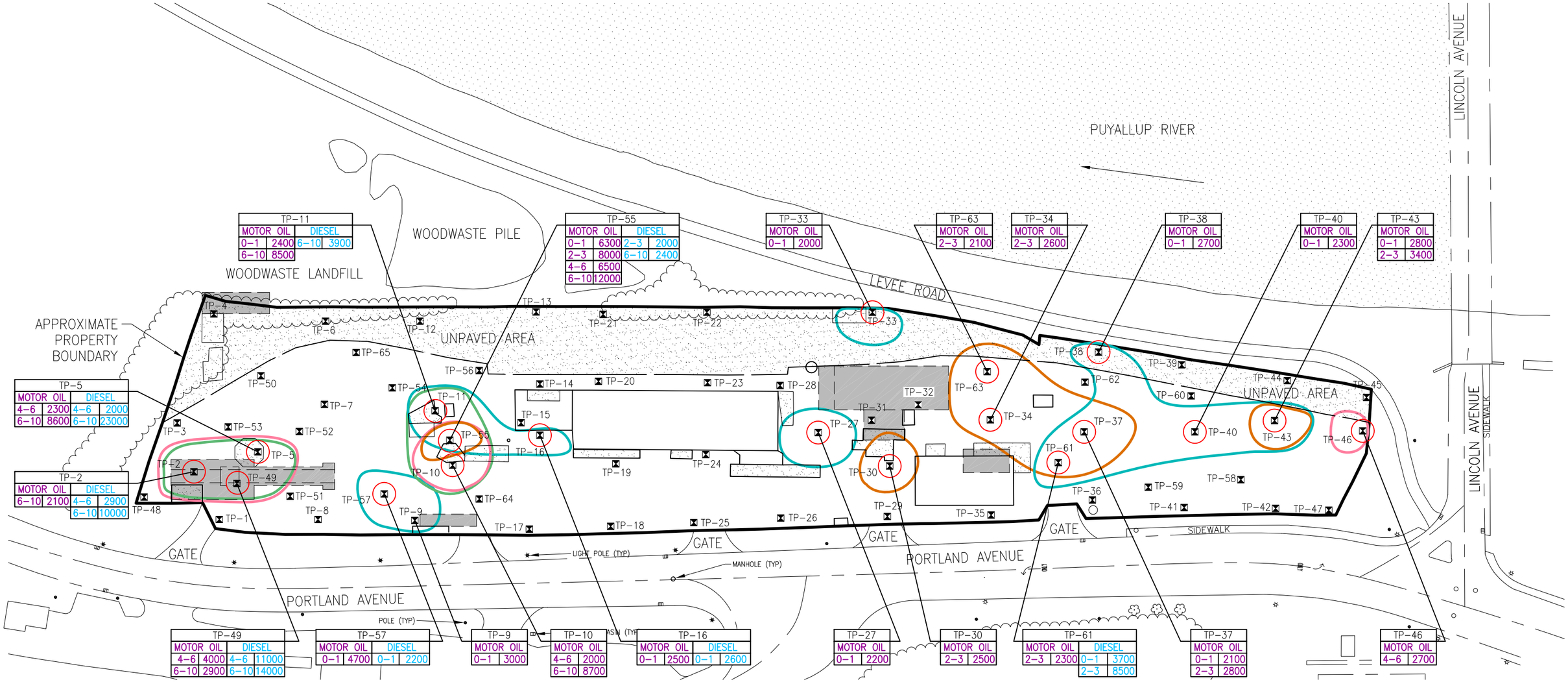
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

TOTAL CPAH CONCENTRATIONS IN SOIL

996098.00\2013 RI UPDATE\FIG_04-3

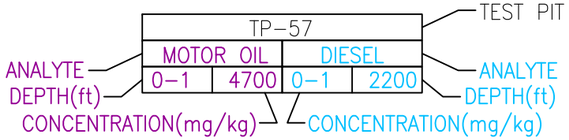
FIGURE 4-3



LEGEND:

TP-1 TEST PIT LOCATION

CONCENTRATIONS EXCEEDING THE TPH SCREENING LEVEL CONCENTRATION OF 2000 mg/kg



UNPAVED AREA

APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

0-1 ft bgs
2-3 ft bgs
4-6 ft bgs
6-10 ft bgs

APPROXIMATE TPH SCREENING LEVEL EXCEEDANCE AREAS. (2000 mg/kg)

NOTES:

1. MAP IS BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. FIGURE SHOWS TPH CONCENTRATIONS GREATER THAN OR EQUAL 2000 mg/kg.
3. WHERE DUPLICATE SAMPLES WERE ANALYZED, THE HIGHER CONCENTRATION IS SHOWN.
4. SAMPLES WERE ANALYZED FOR DIESEL- AND OIL-RANGE PETROLEUM HYDROCARBONS BY ECOLOGY METHOD NWTPH-DIESEL (EXTENDED).

N

0 50 100
SCALE: 1=100

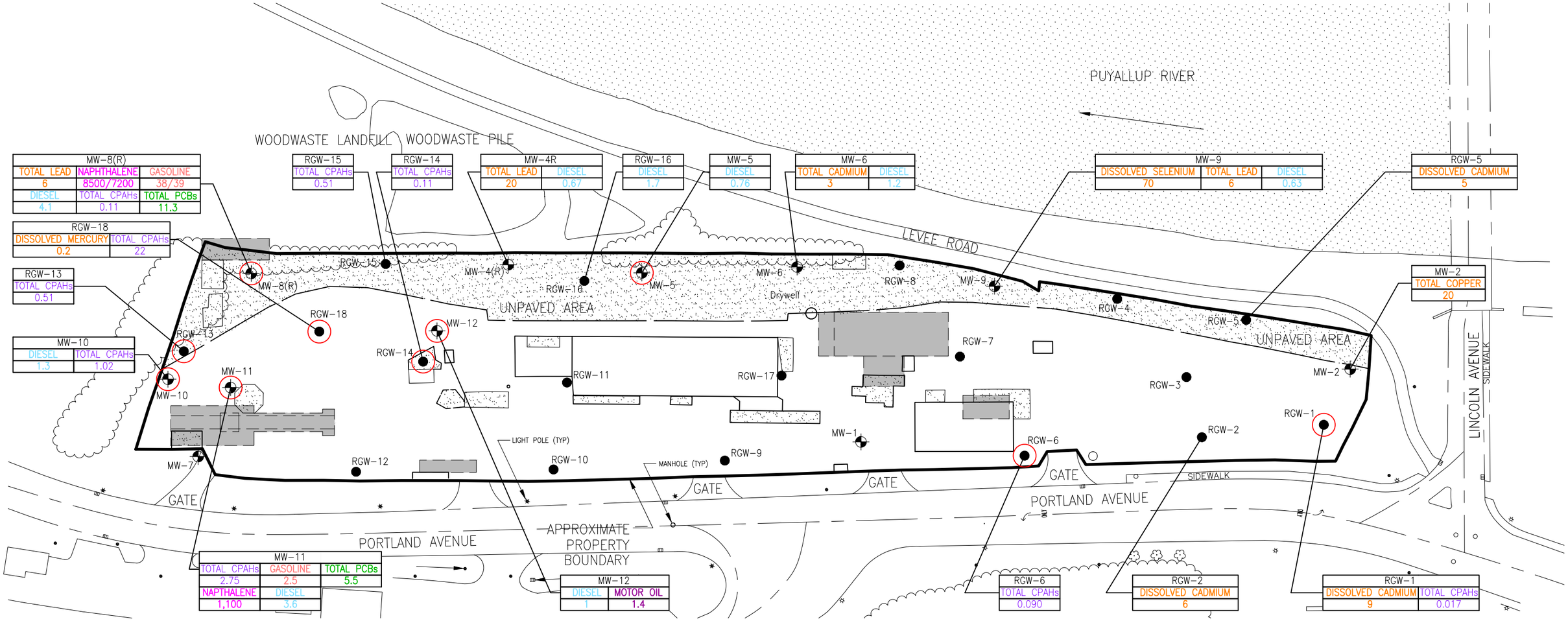
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

PETROLEUM HYDROCARBON CONCENTRATIONS IN SOIL

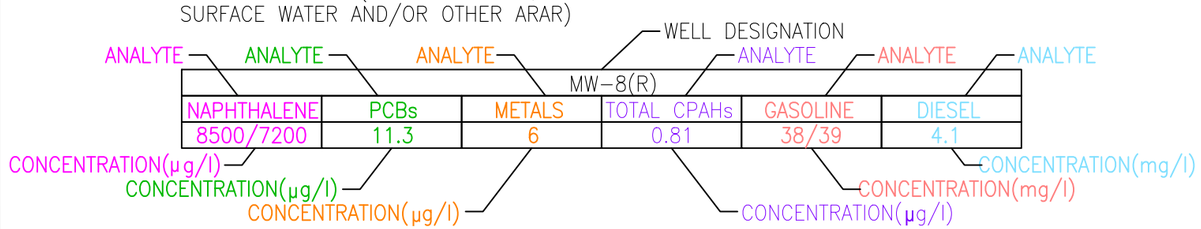
996098.00/P01SK004-4

FIGURE 4-4



LEGEND:

- MW-1 — MONITORING WELL LOCATION
  (R) = REPLACEMENT
- RECONNAISSANCE GROUNDWATER SAMPLING LOCATION
- GROUNDWATER CONCENTRATIONS EXCEEDING CLEANUP LEVELS (MTCA METHOD B, ECOLOGY'S TPH SURFACE WATER AND/OR OTHER ARAR)



- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

NOTES:

1. MAP IS BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. WHERE TWO RESULTS ARE PRESENTED, THE SECOND VALUE IS A DUPLICATE SAMPLE. (FIGURE SHOWS ONLY CONCENTRATIONS EXCEEDING CLEANUP LEVELS.)
3. ANALYTE CONCENTRATIONS REPRESENT THE MAXIMUM DETECTED VALUE REPORTED DURING THE MONITORING EVENTS.
4. THIS MAP WAS UPDATED IN JULY 2013 AT ECOLOGY'S REQUEST BASED ON REVISED TOTAL CPAH VALUES CALCULATED USING TEF METHODOLOGY [WAC 173-340-708(8)(E)] WHICH WAS NOT REQUIRED WHEN THE ORIGINAL RI\FI WAS PERFORMED.

N

0 50 100
SCALE: 1=100

Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (WELLS AND RECONNAISSANCE SAMPLES)

996098.00\2013 RI UPDATE\FIG_05-1

FIGURE 5-1

TABLE 4-1
REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - METALS
Former Tacoma Metals Facility

Sample Designation	Sample Depth	Sample Date	Total Metals (mg/kg)[a]								
			Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
TP-1	0-1'	9/27/2000	40	290	8.5	76	873	***2,230***	1.53	<10	1.4
	2-3'	9/27/2000	---[b]	---	---	---	---	120	0.11	---	---
	4-6'	9/27/2000	---	---	---	---	---	90	---	---	---
	6-10'	9/27/2000	---	---	---	---	---	30	---	---	---
TP-2	0-1'	9/27/2000	<10[c]	404	18.2	67	1,090	831	0.88	<10	0.9
	2-3'	9/27/2000	<5	47.2	<0.2	18.6	20	10	0.04	<5	<0.3
	4-6'	9/27/2000	<6	58.1	<0.2	15.4	35.2	85	<0.06	<6	0.4
	6-10'	9/27/2000	<6	53.8	1.1	18.6	79.6	72	0.13	<6	<0.4
TP-3	0-1'	9/27/2000	<5	63.5	2.7	26.9	44.1	46	0.13	<5	<0.3
	2-3'	9/27/2000	---	---	---	---	---	---	---	---	---
	4-6'	9/27/2000	7	63.8	0.4	15.4	33.2	106	0.21	<7	<0.4
	6-10'	9/27/2000	<10	110	<0.5	18	42.4	93	0.13	<10	<0.7
TP-4	0-1'	9/27/2000	30	609	21.6	82	4,650	***1,760***	0.55	<10	1.2
	2-3'	9/27/2000	---	---	8	---	---	443	---	---	---
	4-6'	9/27/2000	---	---	---	---	---	160	---	---	---
	6-10'	9/27/2000	<7	60.1	<0.3	16.9	24.6	9	<0.06	<7	<0.4
TP-5	0-1'	10/4/2000	<5	59.4	<0.2	59.9	28	8	<0.05	5	0.4
	2-3'	10/4/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/4/2000	<6	67.7	<0.3	38.2	37.3	56	0.20	<6	<0.4
	6-10'	10/4/2000	<10	52.3	<0.5	24	56.1	248	0.3	<10	<0.8
TP-6/600[d]	0-1'	10/4/2000	30/30	196/208	5.6/4.9	92/59	711/237	***1,550/***867	0.5/0.45	20/20	1.9/2.1
	2-3'	10/4/2000	---	---	---	---	---	54	---	---	---
	4-6'	10/4/2000	---	---	---	---	---	40	---	---	---
	6-10'	10/4/2000	---	---	---	---	---	60	---	---	---
TP-7	0-1'	10/4/2000	10	697	12.3	103	361	796	0.88	8	1.5
	2-3'	10/4/2000	---	---	9	---	---	---	---	---	---
	4-6'	10/4/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/4/2000	---	---	---	---	---	---	---	---	---
TP-8	0-1'	10/4/2000	<5	235	0.9	33.9	41	31	<0.05	<5	0.3
	2-3'	10/4/2000	---	---	---	---	---	---	---	---	---
TP-8/800	4-6'	10/4/2000	<6/<5	38.4/42.1	0.3/<0.2	17.5/15.7	29.6/47.8	25/26	<0.06/<0.05	<6/<5	<0.4/0.7
	6-10'	10/4/2000	---	---	---	---	---	---	---	---	---
TP-9	0-1'	10/5/2000	40	1,990	59	132	1,260	***1,960***	0.90	<30	<2
	2-3'	10/5/2000	---	---	---	---	---	20	---	---	---
	4-6'	10/5/2000	<6	224	2.1	24.2	59.9	93	<0.05	<6	<0.4
	6-10'	10/5/2000	---	---	---	---	---	---	---	---	---
TP-10	0-1'	10/5/2000	<5	218	4.2	49.2	217	460	0.54	7	0.5
	2-3'	10/5/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/5/2000	<5	61	0.7	32.2	60.3	72	0.07	<5	0.3
	6-10'	10/5/2000	<6	49.5	0.4	28.8	29.3	15	<0.06	<6	<0.4
MTCA Method C Industrial Soil Cleanup Levels [e]			219	245,000	3,500	500[f]	130,000	1,000[f]	1,050	17,500	17,500

Analytes detected in samples at concentrations exceeding respective cleanup levels are shown in bold and italics.

TABLE 4-1
REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - METALS
Former Tacoma Metals Facility

Sample Designation	Sample Depth	Sample Date	Total Metals (mg/kg)[a]								
			Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
TP-11	0-1'	10/5/2000	<5	254	5.7	54.4	157	202	0.27	5	0.3
	2-3'	10/5/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/5/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/5/2000	<9	164	<0.3	18.4	31.5	57	0.1	<9	<0.5
TP-12	0-1'	10/5/2000	<5	37.5	3.3	19.4	21.3	17	<0.04	<5	<0.3
	2-3'	10/5/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/5/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/5/2000	---	---	---	---	---	---	---	---	---
TP-13	0-1'	10/5/2000	<5	96	3	49.3	266	167	0.71	<5	1
	2-3'	10/5/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/5/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/5/2000	---	---	---	---	---	---	---	---	---
TP-14	0-1'	10/6/2000	<5	41.8	<0.2	22.2	13	8	<0.05	<5	<0.3
	2-3'	10/6/2000	---	---	---	---	---	560	---	---	---
	4-6'	10/6/2000	---	---	---	---	---	20	---	---	---
	6-10'	10/6/2000	<6	84.9	2.3	35.3	78.6	152	0.07	<6	<0.4
TP-15	0-1'	10/6/2000	<5	42.6	<0.2	32.8	29.4	79	<0.04	<5	0.3
	2-3'	10/6/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/6/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/6/2000	---	---	---	---	---	---	---	---	---
TP-16/160	0-1'	10/6/2000	40/30	999/592	45/22	105/85	804/1,210	***2,590/2,040***	1.82/2.19	<30/<30	2/2
	2-3'	10/6/2000	---	---	68	---	---	***8,240***	---	---	---
TP-17	0-1'	10/6/2000	60	272	15	120	2,930	***1,470***	0.4	<50	<3
	2-3'	10/6/2000	---	---	---	---	---	30	---	---	---
	4-6'	10/6/2000	---	---	---	---	---	30	---	---	---
	6-10'	10/6/2000	---	---	---	---	---	20	---	---	---
TP-18	0-1'	10/10/2000	8	107	3.3	26.3	451	311	0.88	<5	0.9
	2-3'	10/10/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/10/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	---	---	---	---
TP-19	0-1'	10/10/2000	20	111	4	46	1,060	204	1.35	<10	3.4
	2-3'	10/10/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/10/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	---	---	---	---
TP-20	0-1'	10/10/2000	<6	35.9	<0.2	22	17.2	6	<0.06	6	<0.3
TP-20/2000[g]	2-3'	10/10/2000	20/<10	304/292	17/26.2	84/83	6,970/4,350	***6,790/10,200***	0.94/0.95	<30/<10	<2/2.8
	4-6'	10/10/2000	---	---	1	---	---	540	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	230	---	---	---
MTCA Method C Industrial Soil Cleanup Levels [e]			219	245,000	3,500	500[f]	130,000	1,000[f]	1,050	17,500	17,500

Analytes detected in samples at concentrations exceeding respective cleanup levels are shown in bold and italics.

TABLE 4-1
REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - METALS
Former Tacoma Metals Facility

Sample Designation	Sample Depth	Sample Date	Total Metals (mg/kg)[a]								
			Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
TP-21	0-1'	10/10/2000	70	1,580	66	***574***	12,800	***6,020***	22.4	<30	31
	2-3'	10/10/2000	<300	4,190	130	***1,080***	13,200	***7,570***	10.2	<300	90
	4-6'	10/10/2000	---	---	<1	42	---	20	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	50	---	---	---
TP-22	0-1'	10/10/2000	30	372	51	***2,520***	13,000	***3,180***	5.3	<30	36
	2-3'	10/10/2000	<60	464	52	***913***	20,200	***3,690***	5.1	<60	198
	4-6'	10/10/2000	---	---	---	47	---	360	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	80	---	---	---
TP-23	0-1'	10/11/2000	<5	40.4	<0.2	25.1	21.9	11	<0.04	<5	<0.3
	2-3'	10/11/2000	30	376	15.3	127	1,560	***1,190***	1.21	<10	1.4
	4-6'	10/11/2000	---	---	---	---	---	140	0.19	---	---
	6-10'	10/11/2000	---	---	---	---	---	130	---	---	---
TP-24	0-1'	10/11/2000	6	105	2.3	34.3	539	438	0.7	6	0.5
	2-3'	10/11/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/11/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/11/2000	---	---	---	---	---	---	---	---	---
TP-25	0-1'	10/11/2000	<5	52.5	0.3	28.4	151	48	0.14	<5	<0.3
	2-3'	10/11/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/11/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/11/2000	---	---	---	---	---	---	---	---	---
TP-26	0-1'	10/11/2000	<5	47.4	0.3	30.3	21.6	9	<0.05	<5	<0.3
	2-3'	10/11/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/11/2000	<6	272	0.2	20.8	40.9	17	<0.05	<6	<0.3
	6-10'	10/11/2000	<7	80.1	<0.3	17.3	31.1	13	<0.06	<7	<0.4
TP-27/270	0-1'	10/11/2000	30/40	261/259	6.8/8.4	99/119	577/806	***5,000/14,700***	1.83/1.62	<10/<10	1.2/1.7
	2-3'	10/11/2000	<10	217	6.2	49	3,130	575	1.82	<10	1.3
	4-6'	10/11/2000	---	---	---	---	---	---	<0.06	---	---
	6-10'	10/11/2000	---	---	---	---	---	---	---	---	---
TP-28	0-1'	10/11/2000	20	382	16.5	91	789	***1,430***	1.56	10	1.5
	2-3'	10/11/2000	20	444	16.5	88	3,000	***2,340***	1.12	<10	1.8
	4-6'	10/11/2000	---	---	<1	---	---	<10	<0.05	---	---
	6-10'	10/11/2000	---	---	---	---	---	7	---	---	---
TP-29	0-1'	10/12/2000	5	67.9	0.2	29.7	24.6	16	<0.04	<5	<0.3
	2-3'	10/12/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/12/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/12/2000	---	---	---	---	---	---	---	---	---
TP-30	0-1'	10/12/2000	30	733	59.5	108	1,960	***2,410***	2.06	<10	2.6
	2-3'	10/12/2000	20	805	21.2	90	540	***1,110***	0.57	<10	1.4
	4-6'	10/12/2000	---	---	<1	---	---	<10	---	---	---
	6-10'	10/12/2000	---	---	---	---	---	50	---	---	---
MTCA Method C Industrial Soil Cleanup Levels [e]			219	245,000	3,500	500[f]	130,000	1,000[f]	1,050	17,500	17,500

Analytes detected in samples at concentrations exceeding respective cleanup levels are shown in bold and italics.

TABLE 4-1
REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - METALS
Former Tacoma Metals Facility

Sample Designation	Sample Depth	Sample Date	Total Metals (mg/kg)[a]								
			Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
TP-31	0-1'	10/12/2000	<10	558	19.3	58	417	***1,040***	0.63	<10	1
	2-3'	10/12/2000	<10	189	6.4	40	182	387	0.42	<10	0.7
	4-6'	10/12/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/12/2000	---	---	---	---	---	---	---	---	---
TP-32	0-1'	10/12/2000	30	2,010	84	271	3,720	***4,470***	2.36	<30	3
TP-33	0-1'	10/12/2000	40	3,070	89	353	2,970	***6,470***	2.91	<30	5
	2-3'	10/12/2000	---	---	---	---	---	***4,560***	1.69	---	---
	4-6'	10/12/2000	---	---	---	---	---	10	---	---	---
	6-10'	10/12/2000	---	---	---	---	---	70	---	---	---
TP-34/340	0-1'	10/12/2000	<10/<30	196/1,740	4/42	65.6/92	4,030/1,640	***1,530/5,100***	0.93/1.23	<10/<30	1.6/<2
	2-3'	10/12/2000	30	1,400	52	91	1,570	***3,990***	1.08	<30	<2
	4-6'	10/12/2000	---	---	---	---	---	***1,110***	<0.05	---	---
	6-10'	10/12/2000	---	---	---	---	---	40	---	---	---
TP-35	0-1'	10/13/2000	<10	290	8.4	153	1,260	***4,230***	0.52	<10	2.2
	2-3'	10/13/2000	---	---	---	---	---	240	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	30	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	20	---	---	---
TP-36	0-1'	10/13/2000	<10	54.5	0.9	31	39.3	36	0.12	<10	<0.6
	2-3'	10/13/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	<10	31.7	0.5	19	25.3	15	0.06	<10	<0.8
TP-37	0-1'	10/13/2000	30	979	26.6	124	625	***1,900***	4.18	10	1.1
	2-3'	10/13/2000	20	1,630	24.7	112	483	***1,630***	2.66	<10	<0.6
	4-6'	10/13/2000	---	---	<1	---	---	20	<0.05	---	---
	6-10'	10/13/2000	---	---	---	---	---	30	---	---	---
TP-38	0-1'	10/13/2000	60	2,710	125	263	3,320	***9,380***	14.3	30	6
	2-3'	10/13/2000	---	---	---	---	---	70	0.12	---	---
	4-6'	10/13/2000	---	---	---	---	---	50	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	11	---	---	---
TP-39/390	0-1'	10/13/2000	10/<10	110/134	13.2/16.8	30/27	1,100/107	***1,040/***374	0.21/0.24	<10/<10	<0.8/<0.7
	2-3'	10/13/2000	---	---	10.4	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---
TP-40	0-1'	10/13/2000	60	738	36	***670***	2,530	***3,700***	15	<50	4
	2-3'	10/13/2000	<30	851	40	212	1,240	***2,050***	3.19	<30	3
	4-6'	10/13/2000	<10	126	3.7	31	94	192	0.22	<10	<0.7
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---
MTCA Method C Industrial Soil Cleanup Levels [e]			219	245,000	3,500	500[f]	130,000	1,000[f]	1,050	17,500	17,500

Analytes detected in samples at concentrations exceeding respective cleanup levels are shown in bold and italics.

TABLE 4-1
REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - METALS
Former Tacoma Metals Facility

Sample Designation	Sample Depth	Sample Date	Total Metals (mg/kg)[a]								
			Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
TP-41	0-1'	10/16/2000	<30	38	<1	39	20	20	5.5	<30	<2
	2-3'	10/16/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/16/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/16/2000	---	---	---	---	---	---	---	---	---
TP-42	0-1'	10/16/2000	<30	78	2	31	98	130	4.33	<30	<2
	2-3'	10/16/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/16/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/16/2000	---	---	---	---	---	---	---	---	---
TP-43/430	0-1'	10/16/2000	90/80	1,620/1,400	53/54	***564/566***	5,620/5,000	***5,840/9,370***	47/41	<30/<30	5/6
	2-3'	10/16/2000	80	1,280	46	259	2,520	***12,300***	21	<30	5
	4-6'	10/16/2000	---	---	<1	---	---	10	<0.04	---	---
	6-10'	10/16/2000	---	---	---	---	---	70	---	---	---
TP-44	0-1'	10/13/2000	<10	27.2	0.4	17.2	21.5	13	<0.05	<10	<0.6
	2-3'	10/13/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---
TP-45	0-1'	10/16/2000	100	774	30	368	3,560	***4,060***	47	30	7
	2-3'	10/16/2000	---	---	15	---	---	950	16	---	---
	4-6'	10/16/2000	---	---	---	---	---	180	---	---	---
	6'-10'	10/16/2000	---	---	---	---	---	80	---	---	---
TP-46	0-1'	10/16/2000	40	302	15	***721***	1,820	***2,100***	10.6	<30	69
	2-3'	10/16/2000	---	---	9	104	---	970	2.88	---	---
	4-6'	10/16/2000	50	1,910	93	93	1,180	***4,320***	0.83	<30	2
	6'-10'	10/16/2000	---	---	---	0.9	---	82	---	---	---
TP-47	0-1'	10/16/2000	<30	33	<1	25	13	<10	<0.05	<30	<2
	2-3'	10/16/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/16/2000	---	---	---	---	---	---	---	---	---
	6'-10'	10/16/2000	---	---	---	---	---	---	---	---	---
TP-48	0-1'	10/17/2000	40	232	8	52	588	630	0.45	<30	<2
	2-3'	10/17/2000	---	---	---	---	---	---	---	---	---
	4-6'	10/17/2000	---	---	---	---	---	---	---	---	---
	6'-8.5'	10/17/2000	<70	67	<3	18	45	40	<0.1	<70	<4
TP-49	0-1'	10/17/2000	<30	71	1	33	78	150	0.13	<30	<2
	2-3'	10/17/2000	<30	64	<1	20	20	10	<0.05	<30	<2
	4-6'	10/17/2000	<30	78	<1	15	20	150	0.44	<30	<2
	6'-10'	10/17/2000	<50	51	<2	23	942	430	0.12	<50	<3
MTCA Method C Industrial Soil Cleanup Levels [e]			219	245,000	3,500	500[f]	130,000	1,000[f]	1,050	17,500	17,500

Analytes detected in samples at concentrations exceeding respective cleanup levels are shown in bold and italics.

TABLE 4-1
REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - METALS
Former Tacoma Metals Facility

Sample Designation	Sample Depth	Sample Date	Total Metals (mg/kg)[a]								
			Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
TP-50/500	0-1'	10/17/2000	<30/<30	208/293	8/18	37/55	1,100/530	380/570	0.49/0.61	<30/<30	<2/<2
	2-3'	10/17/2000	<30	69	<1	44	29	150	<0.05	<30	<2
	4-6'	10/17/2000	---	---	---	---	---	---	---	---	---
	6'-10'	10/17/2000	---	---	---	---	---	---	---	---	---
TP-51	0-1'	11/14/2000	<30	73	<1	34	61	100	0.05	<30	<2
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	---	---	---	---
	6'-10'	11/14/2000	---	---	---	---	---	---	---	---	---
TP-52	0-1'	11/14/2000	<20	50	<1.0	27	38.2	38	0.06	<20	<1
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	---	---	---	---
	6'-10'	11/14/2000	---	---	---	---	---	---	---	---	---
TP-53	0-1'	11/14/2000	<30	63	<1	31	40	20	0.05	<30	<2
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	---	---	---	---
	6'-10'	11/14/2000	---	---	---	---	---	---	---	---	---
TP-54	0-1'	11/14/2000	<30	242	8	48	273	410	0.98	<30	<2
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	---	---	---	---
	6'-10'	11/14/2000	---	---	---	---	---	---	---	---	---
TP-55	0-1'	11/14/2000	<30	1,080	29	117	465	***1,750***	0.83	<30	<2
	2-3'	11/14/2000	---	---	21.1	---	---	772	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	106	---	---	---
	6'-10'	11/14/2000	---	---	---	---	---	70	---	---	---
TP-56	0-1'	11/14/2000	<30	63	2	31	88	70	0.12	<30	<2
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	---	---	---	---
	6'-10'	11/14/2000	---	---	---	---	---	---	---	---	---
TP-57	0-1'	11/14/2000	60	2,740	70	145	7,410	***2,710***	0.6	40	<2
	2-3'	11/14/2000	---	---	1.7	---	---	28	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	80	---	---	---
	6'-10'	11/14/2000	---	---	---	---	---	23	---	---	---
TP-58	0-1'	11/15/2000	<30	45	<1	29	21	<10	0.06	<30	<2
	2-3'	11/15/2000	<30	602	17	105	2,070	***2,340***	62	<30	<2
	4-6'	11/15/2000	---	---	<0.5	---	---	9	---	---	---
	6'-10'	11/15/2000	---	---	---	---	---	70	---	---	---
TP-59	0-1'	11/15/2000	40	871	34	173	3,010	***2,250***	1.55	<30	2
	2-3'	11/15/2000	<30	194	9	35	388	350	0.22	<30	<2
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---
MTCA Method C Industrial Soil Cleanup Levels [e]			219	245,000	3,500	500[f]	130,000	1,000[f]	1,050	17,500	17,500

Analytes detected in samples at concentrations exceeding respective cleanup levels are shown in bold and italics.

TABLE 4-1
REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - METALS
Former Tacoma Metals Facility

Sample Designation	Sample Depth	Sample Date	Total Metals (mg/kg)[a]								
			Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
TP-60	0-1'	11/15/2000	50	1,050	30	225	2,330	***10,800***	77	40	2
	2-3'	11/15/2000	<30	1,410	20	99	773	***3,260***	1.41	<30	<2
	4-6'	11/15/2000	---	---	0.9	---	---	116	0.08	---	---
	6-10'	11/15/2000	---	---	---	---	---	49	---	---	---
TP-61	0-1'	11/15/2000	<30	377	10	53	356	***4,180***	0.76	<30	<2
	2-3'	11/15/2000	<30	352	1	25	40	80	0.23	<30	<2
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---
TP-62	0-1'	11/15/2000	<30	201	5	72	208	420	0.92	<30	2
	2-3'	11/15/2000	<30	265	11	283	407	800	2.05	<30	<2
	4-6'	11/15/2000	---	---	<0.5	---	---	---	<0.04	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---
TP-63	0-1'	11/15/2000	<30	584	38	61	304	700	0.37	<30	<2
	2-3'	11/15/2000	<30	637	50	64	299	***1,800***	0.24	30	<2
	4-6'	11/15/2000	---	---	0.7	---	---	123	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	102	---	---	---
TP-64	0-1'	11/15/2000	<30	163	5	31	459	450	0.98	<30	<2
	2-3'	11/15/2000	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---
TP-65	0-1'	11/15/2000	<30	58	<1	28	19	<10	0.05	<30	<2
	2-3'	11/15/2000	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---
MTCA Method C Industrial Soil Cleanup Levels [e]			219	245,000	3,500	500[f]	130,000	1,000[f]	1,050	17,500	17,500

Analytes detected in samples at concentrations exceeding respective cleanup levels are shown in bold and italics.

Notes
(a) Soil samples were analyzed for total metals by EPA Methods 6010/7000 series.
(b) "---" Sample not tested for selected analyte.
(c) "<" denotes analyte was not detected at the indicated reporting limit.
(d) Second number signifies analysis of duplicate sample.
(e) MTCA Method C industrial soil cleanup levels are based on CLARC II, dated February 1996.
(f) Method A industrial soil cleanup levels (WAC 173-340-745) used where Method C soil industrial cleanup levels are not available.
(g) TP-20/2000-2-3 was re-analyzed for lead and arsenic due to suspected sample homogeneity issues. (The re-analysis result is presented in this table).

mg/kg - milligrams per kilogram

TABLE 4-2
REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - PCBs
Former Tacoma Metals Facility

Sample Designation	Sample Depth	PCBs (mg/kg)[a]							Total PCBs[b]
		Aroclor 1016	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1221	Aroclor 1232	
TP-1	0-1'	<0.036[c]	<0.036	<0.036	0.64	0.50	<0.073	<0.036	1.25
TP-3	0-1'	<0.035	<0.035	<0.035	0.17	0.061	<0.070	<0.035	0.336
TP-4	0-1'	<0.037	<0.037	1.1	4.7	2.4	<0.073	<0.037	8.3
	2-3'	<0.035	<0.035	0.390	1.4	0.970	<0.071	<0.035	2.85
TP-5	0-1'	<0.036	<0.036	<0.036	<0.036	<0.036	<0.073	<0.036	0.145
TP-6	0-1'	<0.036	<0.036	0.110	0.360	0.300	<0.073	<0.036	0.86
	2-3'	<0.035	<0.035	0.018J	0.050	0.028J	<0.069	<0.035	0.183
TP-7	0-1'	<0.370	<0.370	4.3	7.7	2.7	<0.740	<0.370	0.186
	2-3'	<0.036	<0.036	2.1	5.2	1.9	<0.071	<0.036	9.28
TP-9	0-1'	<0.040	0.53	<0.040	0.87	1.1	<0.081	<0.040	2.6
TP-10	0-1'	<0.037	<0.037	0.56	0.65	0.29	<0.073	<0.037	1.6
	2-3'	<0.037	<0.037	<0.037	0.045	<0.037	<0.074	<0.037	0.17
TP-11	0-1'	<0.036	<0.036	0.52	1.5Y	1.1	<0.073	<0.036	3.21
TP-12	0-1'	<0.035	<0.035	0.031J	0.063	0.030J	<0.069	<0.035	0.211
	2-3'	<0.034	<0.034	0.150	0.430	0.170	<0.068	<0.034	0.835
TP-13	0-1'	<0.034	<0.034	<0.034	1	2	<0.069	<0.034	3.1
TP-14	0-1'	<0.034	<0.034	<0.034	<0.034	<0.034	<0.069	<0.034	0.14
	2-3'	<0.037	<0.037	0.098Y	0.60	0.26	<0.073	<0.037	1.05
TP-15	0-1'	<0.035	<0.035	<0.035	0.043	0.058	<0.070	<0.035	0.206
TP-16/160[d]	0-1'	<1.1/<0.040	<1.1/<0.040	1.0J/0.39	3.1/1.9	4.6/2.7	<2.3/<0.080	<1.1/<0.040	11.5/5.09
TP-17	0-1'	<0.035	<0.035	0.43	0.67	1.6	<0.071	<0.035	2.79
TP-19	0-1'	<0.038	<0.038	<0.038	0.057	0.060	<0.076	<0.038	0.231
TP-20	0-1'	<0.035	<0.035	<0.035	0.020J	0.023J	<0.070	<0.035	0.148
	2-3'	<0.036	<0.036	0.180Y	0.970	0.320	<0.072	<0.036	1.56
TP-21	0-1'	<0.041	<0.041	1.4	6.9	5.2	<0.082	<0.041	13.6
	2-3'	<0.040	0.088	<0.040	2.3	1.1	<0.080	<0.040	3.6
TP-22	0-1'	<0.042	<0.042	0.43Y	1.4	0.66	<0.083	<0.042	2.59
	2-3'	<0.041	<0.041	0.520Y	1.3	0.990	<0.083	<0.041	2.91
TP-23	0-1'	<0.035	<0.035	<0.035	0.019J	0.020J	<0.070	<0.035	0.144
TP-25	0-1'	<0.036	<0.036	0.042	0.043	0.048	<0.072	<0.036	0.223
TP-27/270[d]	0-1'	<0.038/<0.039	<0.038/<0.039	0.14/0.14	0.53/0.49	0.94/0.93	<0.077/<0.077	<0.038/<0.039	1.7/1.66
TP-29	0-1'	<0.036	<0036	<0.036	<0.036	0.024J	<0.071	<0.036	0.15
TP-31	0-1'	<0.037	<0.037	0.15	0.71	0.76	<0.074	<0.037	1.71
TP-33	0-1'	<0.037	<0.037	0.52	1.7	1.2	<0.075	<0.037	3.51
TP-34[e]	0-1'	<0.040	<0.040	0.12	0.57	0.5	<0.080	<0.040	1.3
	2-3'	<0.041	<0.041	0.11	0.51	0.40	<0.081	<0.041	1.12
TP-35	0-1'	<0.036	<0.036	<0.036	0.21	0.30	<0.073	<0.036	0.619
TP-36	0-1'	<0.037	<0.037	0.031J	0.056	0.060	<0.074	<0.037	0.24
TP-37	0-1'	<0.037	<0.037	0.46	1.5	1.3	<0.074	<0.037	3.35
TP-39/390[d]	0-1'	<0.035/<0.042	<0.035<0.042	<0.035<0.042	2.7/1.5	<0.035/<0.042	<0.069/<0.084	<0.035/<0.042	2.82/1.65
TP-40	0-1'	<0.038	<0.038	3.7Y	18	6	<0.077	<0.038	***27.8***
	2-3'	<0.038	<0.038	0.600Y	3.2	1.7	<0.076	<0.038	5.6
MTCA Method C Industrial Soil Cleanup Levels[f]		NA[g]	NA	NA	NA	NA	NA	NA	**17**

Analytes detected in samples at concentrations exceeding cleanup levels or comparison values are shown in bold and italics.

TABLE 4-2
REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - PCBs
Former Tacoma Metals Facility

Sample Designation	Sample Depth	PCBs (mg/kg)[a]							Total PCBs[b]
		Aroclor 1016	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1221	Aroclor 1232	
TP-41	0-1'	<0.035	<0.035	<0.035	0.049	0.021J	<0.070	<0.035	0.175
TP-43/430[d]	0-1'	<0.48/<0.46	<0.48/<0.46	2.6Y/2.2Y	14/11	6.8/5.8	<0.95/<0.92	<0.48/<0.46	***23.9/20.2***
	2-3'	<0.47	<0.47	1.9Y	8.1	8.6	<0.93	<0.47	***19.8***
	4-6'	<0.036	<0.036	<0.036	0.036J	<0.036	<0.072	<0.036	0.162
TP-44	0-1'	<0.035	<0.035	<0.035	<0.035	<0.035	<0.070	<0.035	0.14
TP-45	0-1'	<0.46	<0.46	1.9Y	12	9.5	<0.92	<0.46	***24.6***
	2-3'	<0.88	<0.88	<0.88	7	4.6	<1.8	<0.88	14.26
TP-46	0-1'	<0.036	<0.036	0.90Y	8.3	4.3	<0.073	<0.036	13.6
	2-3'	<0.038	<0.038	<0.038	0.051	<0.038	<0.076	<0.038	0.184
TP-47	0-1'	<0.037	<0.037	<0.037	<0.037	<0.037	<0.075	<0.037	0.149
TP-49	0-1'	<0.035	<0.035	<0.035	0.190	0.130	<0.070	<0.035	0.425
TP-50	0-1'	<0.036	<0.036	0.87	5.3	1.3	<0.071	<0.036	7.6
	2-3'	<0.037	<0.037	<0.037	0.036J	<0.037	<0.073	<0.037	0.165
TP-51	0-1'	<0.036	<0.036	0.043	0.14	0.14	<0.072	<0.036	0.413
TP-53	0-1'	<0.035	<0.035	<0.035	0.054	0.046	<0.070	<0.035	0.205
TP-55	0-1'	<0.036	<0.036	0.83	3	1.5	<0.073	<0.036	5.42
TP-57	0-1'	0.71Y	<0.041	1.4	1.2	0.29	<0.082	<0.041	3.68
TP-59	0-1'	<0.038	<0.038	13	9.8	2.1	<0.076	<0.038	***25***
	2-3'	<0.036	<0.036	0.38	0.55	0.20	<0.072	<0.036	1.22
TP-60	0-1'	<0.93	<0.93	<0.93	29	8.3	<1.9	<0.93	***40.11***
	2-3'	<0.045	<0.045	0.12Y	1.1	0.58	<0.090	<0.045	1.913
TP-61	0-1'	<0.036	<0.036	0.71	1.9	0.83	<0.072	<0.036	3.53
TP-63	0-1'	<0.036	<0.036	0.33Y	2.6	0.35	<0.072	<0.036	3.37
TP-65	0-1'	<0.036	<0.036	<0.036	0.020J	<0.036	<0.071	<0.036	0.146
MTCA Method C Industrial Soil Cleanup Level[f]		NA[g]	NA	NA	NA	NA	NA	NA	**17**

Analytes detected in samples at concentrations exceeding cleanup levels or comparison values are shown in bold and italics.

Notes:
(a) Samples were analyzed for polychlorinated biphenyls (PCBs) by EPA Method 8082.
(b) The total PCBs were calculated by summing the concentrations of all the probable PCBs. If a probable PCB was not detected, a value equal to one-half the reporting limit was used.
(c) "<" denotes analyte was not detected at the indicated reporting limit.
(d) Duplicate sample.
(e) Analytical report reads TP-34 as TP-340.
(f) MTCA Method C industrial soil cleanup levels based on CLARC II, dated February 1996.
(g) "NA" = No cleanup level available.

Qualifiers:
J - Indicates as estimated value of analyte found and confirmed by analyst but with low spectral match.
Y - Indicates raised reporting limit due to background interference.

mg/kg - milligrams per kilogram

TABLE 4-3

REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - PAHs
Former Tacoma Metals Facility

Sample Designation	Sample Date	PAHs (mg/kg)[a]									cPAHs(mg/kg)[a][b]							
		Naphth-alene	Acenaph-thlyene	Acenaph-thene	Fluorene	Phenan-threne	Anth-racene	Fluoran-thene	Pyrene	Benzo (g,h,i) perylene	Chrysene	Benzo (b)-fluoranthene	Benzo (k)-fluoranthene	Benzo (a)-pyrene	Indeno (1,2,3-cd) pyrene	Dibenz (a,h)-anthracene	Benzo (a)-anthracene	Total cPAHs[b]
TP-2-6-10	9/27/2000	440	7.1	240	200	460	380	370	430	34	***230***	***90***	***110***	***110***	***33***	17	***140***	***151***
TP-5-6-10	10/4/2000	41	19	260	360	750	750	470	400	39	***190***	***93***	***80***	***95***	***35***	16	***130***	***132***
TP-9-0-1	10/4/2000	0.35	0.014J	0.028	0.028	0.16	0.067	0.27	0.24	0.17	0.28	0.17	0.12	0.14	0.094	0.035	0.15	0.200
TP-10-6-10	10/5/2000	0.011J	0.0068J	0.023	0.014J	0.023	0.014J	0.032M	0.018J	0.041M	0.038	0.036M	0.023MJ	0.025	0.018JM	0.0091MJ	0.020MJ	0.0360
TP-11-6-10	10/5/2000	0.7J	0.16J	1.6	1.4	2.7	0.86M	4.6	2.8	0.55J	1.8	1	0.78J	0.94	0.55J	0.16MJ	1.2	1.33
TP-16-0-1	10/6/2000	0.99	18	1.8	1	2.2	1.8	6.9	6.2	3.5	4.3	4.5	5.6	7	3.8	1.4	3.8	8.95
TP-27-0-1	10/11/2000	0.08	0.025	0.011MJ	0.011J	0.13	0.034	0.15	0.19	0.22	0.27	0.19	0.12	0.14	0.16	0.048	0.11	0.206
TP-30-2-3	10/12/2000	0.14	0.11	0.053J	0.091	0.5	0.2	0.84	0.95	0.49	1.9	0.82	0.44	0.52	0.38	0.12	0.5	0.765
TP-33-0-1	10/12/2000	0.31	0.067J	0.075	0.097	0.51	0.17	0.6	0.94	0.49	0.65	0.46	0.39	0.49	0.34	0.12	0.36	0.664
TP-34-2-3	10/12/2000	0.95	0.1	1.9	0.91	4.3	1.3	4.7	4	0.93	4.2	2	1.1	1.3	0.79	0.24	1.9	1.95
TP-37-2-3	10/13/2000	0.3	0.094	0.078	0.2	1.1	0.34	1.9	2	1.2	1.2	1.1	0.75	1	0.87	0.27	0.81	1.39
TP-38-0-1	10/13/2000	0.3	0.24	0.59	0.51	4.2	1	5.1	4.9	2	3.2	2	2.1	2.4	2	0.59	2.5	3.35
TP-40-0-1	10/13/2000	0.98	3.8	0.74	1.4	17	4.7	43	51	13	***41***	***24***	***23***	***28***	14	4.8	***33***	***38.3***
TP-43-2-3	10/16/2000	0.29	0.34	0.31	0.25	2.3	0.83	3.6	2.6	1.3	2.2	1.5M	1.4	1.7	1.1	0.44	1.6	2.33
TP-46-4-6	10/16/2000	0.21	0.055J	0.055J	0.063J	0.35	0.11	0.62	0.43	0.35	0.45	0.3M	0.3M	0.31M	0.2	0.094	0.25	0.429
TP-49-6-10	10/17/2000	8.4	16	440	390	1,300	250	810	620	38	***230***	***73***	***54***	***82***	***31***	14M	***150***	***117***
TP-55-6-10	11/14/2000	<1.3[c]	<1.3	3.9	3.6	7.0	1.4	4.6	3.1	<1.3	1.7M	<1.3	<1.3	<1.3	<1.3	<1.3	<1.3	0.992
TP-57-0-1	11/14/2000	0.68	<0.081	<0.081	<0.081	0.26	<0.081	0.53	0.63	0.31M	0.32M	0.31M	0.22	0.25	0.19	<0.081	0.22	0.351
TP-61-2-3	11/15/2000	2.8	0.67	0.68M	1.7	7.2	2.5M	9.3	7.8	1.1	4.9	2.9	2.7	2.9	1.6	0.61M	4.1	4.14
MTCA Method C Industrial Soil Cleanup Level[d]		1.40E+05	NA[e]	2.10E+05	1.40E+05	NA	1.05E+06	1.40E+05	1.05E+05	NA	18	18	18	18	18	18	18	18

Analytes detected in samples at concentrations exceeding cleanup levels or comparison values are shown in bold and italics.

Notes:
(a) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270B GC/MS-SIM.
(b) Total cPAHs were calculated using the toxicity equivalency factor (TEF) methodology described in MTCA [WAC 173-340-708(8)(e)].
For non-detected cPAH analytes, the TEF factor (listed below) was applied to a value of one-half the laboratory reporting limit prior to summation.
TEF = 1.0 for benzo(a)pyrene
TEF = 0.1 for benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(a)-fluoranththene, and benzo(k)- fluoranththene
TEF = 0.01 for chrysene
(c) "<" denotes analyte was not detected at the indicated reporting limit.
(d) MTCA Method C industrial soil cleanup levels based on CLARC II, dated February 1996.
(e) "NA" = No cleanup level is available.
mg/kg = milligrams per kilogram

Qualifiers:
M - Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match.
J - Indicates an estimated concentration when the value is less than the calculated reporting limit.

NOTE: This table was upated in July 2013 at Ecology's request based on the revised methodology (i.e., TEF summation) for calculation of total cPAHs which was not required when the original RI/FS was performed. No values other than total cPAHs were revised from the orginal table produced in October 2001.

TABLE 4-4

REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

			TPHs (mg/kg)[a]		Volatile Organic Compounds (µg/kg)[b]																			
Sample Designation	Sample Depth (ft)	Collection Date	TPH-Diesel	TPH-motor oil	Benzene	Toluene	Ethyl-benzene	Total[c] Xylenes	Acetone	1,1-Di-chloro-ethene	1,1-Di-chloro-ethane	Cis-1,2-di-chloro-ethene	Chloro-form	2-Butanone	1,1,1-Tri-chloro-ethane	Trichloro-ethene	Tetrachloro-ethene	1,1,2-Tri-chloro-fluoroethane	1,3,5-Tri-methyl-benzene	1,2,4-Tri-methyl-benzene	Hexa-chlorobut-adiene	4-Isopropyl-toluene	Styrene	Naphthalene	Isopropy-benzene
TP-1	0-1'	9/27/2000	560	1,200	---[d]	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	9/27/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	9/27/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	9/27/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-2	0-1'	9/27/2000	130	400	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	9/27/2000	1,700	1,200	3.6	120	6	14.4	200B	<1.2[e]	<1.2	<1.2	<1.2	47	<1.2	<1.2	<1.2	<1.2	3	7.1	<6	<1.2	2.4	120	<1.2
	4-6'	9/27/2000	***2,900***	1,700	58	850	140	410	460B	<1.5	<1.5	<1.5	<1.5	120	<1.5	<1.5	<1.5	<1.5	520	1,400	<7.3	91	12M	120,000	55
	6-10'	9/27/2000	***10,000***	***2,100***	73	430	870	3,600	940J	<1.6	<1.6	<1.6	<1.6	110	<1.6	<1.6	<1.6	<1.6	2,800	6,200	<7.9	1,600	<1.6	390,000	480
TP-3	0-1'	9/27/2000	14	26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	9/27/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	9/27/2000	1,300	1,200	<1.8	830	<1.8	<38	530	<1.8	<1.8	<1.8	<1.8	73	<1.8	<1.8	<1.8	<1.8	<19	<19	<9.2	<1.8	<19	130	<1.8
	6-10'	9/27/2000	280	240	<3.3	8	4.60	27	200	<3.3	<3.3	<3.3	<3.3	27	<3.3	<3.3	<3.3	<3.3	18	42	<17	27	<3.3	210	12
TP-4	0-1'	9/27/2000	270	530	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	9/27/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	9/27/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	9/27/2000	67	31	<1.7	7.30	<1.7	<3.4	<8.6	<1.7	<1.7	<1.7	<1.7	<8.6	<1.7	<1.7	<1.7	<1.7	<1.7	<1.7	<8.6	<1.7	<1.7	8.60	<1.7
TP-5	0-1'	10/4/2000	18	21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/4/2000	81	75	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/4/2000	***2,000***	***2,300***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/4/2000	***23,000***	***8,600***	<230	1,200	<230	<230	<1,200	<230	<230	<230	<230	<1,200	<230	<230	<230	<230	360	660	<1,200	750	<230	26,000	<230
TP-6/600[f]	0-1'	10/4/2000	160/190	210/220	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/4/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/4/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/4/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-7	0-1'	10/4/2000	330	760	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/4/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/4/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/4/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-8	0-1'	10/4/2000	440	1,200	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/4/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-8/800[f]	4-6'	10/4/2000	32/34	49/70	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/4/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-9	0-1'	10/4/2000	1,900	***3,000***	<140	98J	<140	<140	<700	<140	<140	<140	<140	<700	<140	<140	<140	<140	490	220	<700	74J	<140	710	<140
	2-3'	10/4/2000	54	72	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/4/2000	160	250	<7.0	130	<7.0	<7.0	<35	<7.0	<7.0	<7.0	<7.0	<35	<7.0	<7.0	<7.0	<7.0	6.9J	6.8J	<35	<7.0	<7.0	<35	<7.0
	6-10'	10/4/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-10	0-1'	10/4/2000	64	260	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/5/2000	43	280	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/5/2000	440	***2,000***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/5/2000	1,400	***8,700***	<150	1,800	<150	<150	<770	<150	<150	<150	<150	<770	<150	<150	<150	<150	<150	<150	<770	<150	<150	<770	<150
TP-11	0-1'	10/5/2000	800	***2,400***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/5/2000	440	540	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/5/2000	870	610	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/5/2000	***3,900***	***8,500***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-12	0-1'	10/5/2000	17	17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/5/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/5/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/5/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MTCA Method C Industrial[g] Soil Cleanup Levels			2,000[h]	2,000[h]	4.53E+06	7.00E+08	3.50E+08	7.00E+09	3.50E+08	2.19E+05	3.50E+08	3.50E+07	2.15E+07	NA[i]	3.15E+09	1.19E+04	2.57E+06	NA	NA	NA	7.00E+05	NA	4.38E+06	1.40E+05	NA

Analytes detected in samples at concentrations exceeding cleanup levels or comparison values are shown in bold and italics.

TABLE 4-4

REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

			TPHs (mg/kg)[a]		Volatile Organic Compounds (µg/kg)[b]																				
Sample Designation	Sample Depth (ft)	Collection Date	TPH-Diesel	TPH-motor oil	Benzene	Toluene	Ethyl-benzene	Total[c] Xylenes	Acetone	1,1-Di-chloro-ethene	1,1-Di-chloro-ethane	Cis-1,2-di-chloro-ethene	Chloro-form	2-Butanone	1,1,1-Tri-chloro-ethane	Trichloro-ethene	Tetrachloro-ethene	1,1,2-Tri-chloro-fluoroethane	1,3,5-Tri-methyl-benzene	1,2,4-Tri-methyl-benzene	Hexa-chlorobut-adiene	4-Isopropyl-toluene	Styrene	Naphthalene	Isopropy-benzene
TP-13	0-1'	10/5/2000	27	59	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/5/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/5/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/5/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-14	0-1'	10/6/2000	<5.2	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/6/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/6/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/6/2000	48	110	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-15	0-1'	10/6/2000	13	30	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/6/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/6/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/6/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-16/160[f]	0-1'	10/6/2000	***2,600/*** 300	***2,500/*** 890	<9.9/<9.1	720/380	15/<9.1	20/<9.1	140B/<45	<9.9/<9.1	<9.9/<9.1	<9.9/<9.1	<9.9/<9.1	<49/<45	<9.9/<9.1	<9.9/<9.1	<9.9/<9.1	<9.9/<9.1	83/<9.1	90/<9.1	<49/<45	44/<9.1	<9.9/<9.1	400Y/<45	<9.9/<9.1
	2-3'	10/6/2000	940	1,400	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-17	0-1'	10/6/2000	300	1,200	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/6/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/6/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/6/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-18	0-1'	10/10/2000	55	160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-19	0-1'	10/10/2000	75	220	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-20	0-1'	10/10/2000	<5.2	<10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-20/2000[f]	2-3'	10/10/2000	130/140	380/410	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-21	0-1'	10/10/2000	200	660	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/10/2000	100	240	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-22	0-1'	10/10/2000	60	250	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/10/2000	48	170	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/10/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-23	0-1'	10/11/2000	<5.2	17	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/11/2000	260	970	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-24	0-1'	10/11/2000	28	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MTCA Method C Industrial[g] Soil Cleanup Levels			2,000[h]	2,000[h]	4.53E+06	7.00E+08	3.50E+08	7.00E+09	3.50E+08	2.19E+05	3.50E+08	3.50E+07	2.15E+07	NA[i]	3.15E+09	1.19E+04	2.57E+06	NA	NA	NA	7.00E+05	NA	4.38E+06	1.40E+05	NA

Analytes detected in samples at concentrations exceeding cleanup levels or comparison values are shown in bold and italics.

TABLE 4-4

REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

			TPHs (mg/kg)[a]		Volatile Organic Compounds (µg/kg)[b]																			
Sample Designation	Sample Depth (ft)	Collection Date	TPH-Diesel	TPH-motor oil	Benzene	Toluene	Ethyl-benzene	Total[c] Xylenes	Acetone	1,1-Di-chloro-ethene	1,1-Di-chloro-ethane	Cis-1,2-di-chloro-ethene	Chloro-form	2-Butanone	1,1,1-Tri-chloro-ethane	Trichloro-ethene	Tetrachloro-ethene	1,1,2-Tri-chloro-fluoroethane	1,3,5-Tri-methyl-benzene	1,2,4-Tri-methyl-benzene	Hexa-chlorobut-adiene	4-Isopropyl-toluene	Styrene	Naphthalene	Isopropy-benzene
TP-25	0-1'	10/11/2000	58	380	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-26	0-1'	10/11/2000	6.4	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/11/2000	120	470	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/11/2000	26	78	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-27/270[f]	0-1'	10/11/2000	610/670	***2,000/2,200***	<5.7/<5.0	320/270	<5.7/<5.0	<11.4/<10	<28/<25	<5.7/<5.0	<5.7/<5.0	<5.7/<5.0	<5.7/<5.0	<28/<25	<5.7/<5.0	<5.7/<5.0	<5.7/<5.0	<5.7/<5.0	<5.7/<5.0	<5.7/<5.0	<28/<25	<5.7/<5.0	<5.7/<5.0	<28/<25	<5.7/<5.0
	2-3'	10/11/2000	120	430	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-28	0-1'	10/11/2000	190	940	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/11/2000	930	1,000	<5.5	150	<5.5	<11	<28	<5.5	<5.5	<5.5	<5.5	<28	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<28	<5.5	<5.5	<28	<5.5
	4-6'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/11/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-29	0-1'	10/12/2000	39	320	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/12/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/12/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/12/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-30	0-1'	10/12/2000	330	1,800	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/12/2000	700	***2,500***	<4.8	640	<4.8	16.4	130	<4.8	<4.8	<4.8	<4.8	<24	<4.8	<4.8	<4.8	<4.8	150	180	<24	<4.8	<4.8	<24	35
	4-6'	10/12/2000	8.5	15	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/12/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-31	0-1'	10/12/2000	490	1,300	<4.7	640	<4.7	<9.4	92	<4.7	<4.7	<4.7	<4.7	<23	<4.7	<4.7	<4.7	<4.7	<4.7	<4.7	<23	7.6	<4.7	<23	<4.7
	2-3'	10/12/2000	290	610	<5.5	170	<5.5	6.6	76	<5.5	<5.5	<5.5	<5.5	<27	<5.5	<5.5	<5.5	<5.5	14	22	<27	<5.5	<5.5	<27	<5.5
	4-6'	10/12/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/12/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-32	0-1'	10/12/2000	450	1,700	<5.1	780	<5.1	13.7	300	<5.1	<5.1	<5.1	<5.1	45	<5.1	<5.1	<5.1	<5.1	9	12	<25	<5.1	<5.1	<25	<5.1
TP-33	0-1'	10/12/2000	970	***2,000***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/12/2000	420	1,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/12/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/12/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-34/340[f]	0-1'	10/12/2000	350/460	1,100/1,400	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/12/2000	710	***2,600***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/12/2000	59	160	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/12/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-35	0-1'	10/13/2000	190	350	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-36	0-1'	10/13/2000	15	56	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	280	220	<4.3	84	3.0J	<8.6	30B	<4.3	<4.3	<4.3	<4.3	<22	<4.3	<4.3	<4.3	<4.3	10	6.2	<22	7.4	<4.3	150	2.2J
MTCA Method C Industrial[g] Soil Cleanup Levels			2,000[n]	2,000[n]	4.53E+06	7.00E+08	3.50E+08	7.00E+09	3.50E+08	2.19E+05	3.50E+08	3.50E+07	2.15E+07	NA[i]	3.15E+09	1.19E+04	2.57E+06	NA	NA	NA	7.00E+05	NA	4.38E+06	1.40E+05	NA

Analytes detected in samples at concentrations exceeding cleanup levels or comparison values are shown in bold and italics.

TABLE 4-4

REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

			TPHs (mg/kg)[a]		Volatile Organic Compounds (µg/kg)[b]																				
Sample Designation	Sample Depth (ft)	Collection Date	TPH-Diesel	TPH-motor oil	Benzene	Toluene	Ethyl-benzene	Total[c] Xylenes	Acetone	1,1-Di-chloro-ethene	1,1-Di-chloro-ethane	Cis-1,2-di-chloro-ethene	Chloro-form	2-Butanone	1,1,1-Tri-chloro-ethane	Trichloro-ethene	Tetrachloro-ethene	1,1,2-Tri-chloro-fluoroethane	1,3,5-Tri-methyl-benzene	1,2,4-Tri-methyl-benzene	Hexa-chlorobut-adiene	4-Isopropyl-toluene	Styrene	Naphthalene	Isopropy-benzene
TP-37	0-1'	10/13/2000	810	***2,100***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	970	***2,800***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	60	84	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-38	0-1'	10/13/2000	1,400	***2,700***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	68	88	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-39/390[f]	0-1'	10/13/2000	81/83	340/350	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-40	0-1'	10/13/2000	1,100	***2,300***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	670	1,600	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	100	230	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-41	0-1'	10/13/2000	<5.2	16	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-42	0-1'	10/13/2000	42	130	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-43/430[f]	0-1'	10/13/2000	1,000/1,000	***2,500/2,800***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	1,500	***3,400***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	<5.3	<11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	
TP-44	0-1'	10/13/2000	19	28	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/13/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-45	0-1'	10/16/2000	450	1,100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/16/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/16/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/16/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-46	0-1'	10/16/2000	140	450	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/16/2000	170	510	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/16/2000	1,000	***2,700***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/16/2000	45	150	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-47	0-1'	10/16/2000	6.2	<11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/16/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/16/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/16/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MTCA Method C Industrial[g] Soil Cleanup Levels			2,000[h]	2,000[h]	4.53E+06	7.00E+08	3.50E+08	7.00E+09	3.50E+08	2.19E+05	3.50E+08	3.50E+07	2.15E+07	NA[i]	3.15E+09	1.19E+04	2.57E+06	NA	NA	NA	7.00E+05	NA	4.38E+06	1.40E+05	NA

Analytes detected in samples at concentrations exceeding cleanup levels or comparison values are shown in bold and italics.

TABLE 4-4

REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

			TPHs (mg/kg)[a]		Volatile Organic Compounds (µg/kg)[b]																				
Sample Designation	Sample Depth (ft)	Collection Date	TPH-Diesel	TPH-motor oil	Benzene	Toluene	Ethyl-benzene	Total[c] Xylenes	Acetone	1,1-Di-chloro-ethene	1,1-Di-chloro-ethane	Cis-1,2-di-chloro-ethene	Chloro-form	2-Butanone	1,1,1-Tri-chloro-ethane	Trichloro-ethene	Tetrachloro-ethene	1,1,2-Tri-chloro-fluoroethane	1,3,5-Tri-methyl-benzene	1,2,4-Tri-methyl-benzene	Hexa-chlorobut-adiene	4-Isopropyl-toluene	Styrene	Naphthalene	Isopropy-benzene
TP-48	0-1'	10/17/2000	130	290	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/17/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	10/17/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-8.5'	10/17/2000	630	870	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-49	0-1'	10/17/2000	220	1,500	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	10/17/2000	29	50	<1.1	3.7	<1.1	<2.2	<5.7	<1.1	<1.1	<1.1	<1.1	<5.7	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<5.7	<1.1	<1.1	<5.7	<1.1
	4-6'	10/17/2000	***11,000***	***4,000***	<9.0	1,600	27	78	510	<9.0	<9.0	<9.0	<9.0	120	<9.0	<9.0	<9.0	<9.0	580	950	<45	200	<7.8	16,000	17
	6-10'	10/17/2000	***14,000***	***2,900***	<22	270	24	142	530	<22	<22	<22	<22	120	<22	<22	<22	<22	490	820	<110	250	<22	8,800	39
TP-50/500[f]	0-1'	10/17/2000	90/110	190/230	1.2/1.3	430/610	<1.1/<1.1	<2.2/<2.2	90/94	<1.1/<1.1	<1.1/<1.1	<1.1/<1.1	<1.1/<1.1	12/12	<1.1/<1.1	<1.1/<1.1	<1.1/<1.1	<1.1/<1.1	<1.1/<1.1	<1.1/<1.1	<5.4/<5.7	<1.1/<1.1	<1.1/<1.1	<5.4/<5.7	<1.1/<1.1
	2-3'	10/17/2000	39	54	<10	270	<1.1	<2.2	49	<1.1	<1.1	<1.1	<1.1	<5.6	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<5.6	<1.1	<1.1	<5.6	<1.1
	4-6'	10/17/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	10/17/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-51	0-1'	11/14/2000	35B	100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-8'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-52	0-1'	11/14/2000	86B	440	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	240	140	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/14/2000	730	870	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-53	0-1'	11/14/2000	690B	700	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-54	0-1'	11/14/2000	160B	310	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-55	0-1'	11/14/2000	1,700B	***6,300***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/14/2000	***2,000***	***8,000***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	1,700	***6,500***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/14/2000	***2,400***	***12,000***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-56	0-1'	11/14/2000	16B	54	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/14/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-57	0-1'	11/14/2000	***2,200B***	***4,700***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/14/2000	66	98	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/14/2000	170	200	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/14/2000	88	350	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-58	0-1'	11/15/2000	11B	<10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MTCA Method C Industrial[g] Soil Cleanup Levels			2,000[h]	2,000[h]	4.53E+06	7.00E+08	3.50E+08	7.00E+09	3.50E+08	2.19E+05	3.50E+08	3.50E+07	2.15E+07	NA[i]	3.15E+09	1.19E+04	2.57E+06	NA	NA	NA	7.00E+05	NA	4.38E+06	1.40E+05	NA

Analytes detected in samples at concentrations exceeding cleanup levels or comparison values are shown in bold and italics.

TABLE 4-4

REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

			TPHs (mg/kg)[a]		Volatile Organic Compounds (µg/kg)[b]																				
Sample Designation	Sample Depth (ft)	Collection Date	TPH-Diesel	TPH-motor oil	Benzene	Toluene	Ethyl-benzene	Total[c] Xylenes	Acetone	1,1-Di-chloro-ethene	1,1-Di-chloro-ethane	Cis-1,2-di-chloro-ethene	Chloro-form	2-Butanone	1,1,1-Tri-chloro-ethane	Trichloro-ethene	Tetrachloro-ethene	1,1,2-Tri-chloro-fluoroethane	1,3,5-Tri-methyl-benzene	1,2,4-Tri-methyl-benzene	Hexa-chlorobut-adiene	4-Isopropyl-toluene	Styrene	Naphthalene	Isopropy-benzene
TP-59	0-1'	11/15/2000	520B	1,200	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-60	0-1'	11/15/2000	980B	1,700	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-61	0-1'	11/15/2000	***3,700B***	1,900	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/15/2000	***8,500B***	***2,300***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	120	87	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-62	0-1'	11/15/2000	320B	910	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-63	0-1'	11/15/2000	340B	1,100	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/15/2000	860B	***2,100***	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	240	640	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-64	0-1'	11/15/2000	150B	330	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TP-65	0-1'	11/15/2000	<5.3	<11	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	2-3'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	4-6'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	6-10'	11/15/2000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
MTCA Method C Industrial[g] Soil Cleanup Levels			2,000[h]	2,000[h]	4.53E+06	7.00E+08	3.50E+08	7.00E+09	3.50E+08	2.19E+05	3.50E+08	3.50E+07	2.15E+07	NA[i]	3.15E+09	1.19E+04	2.57E+06	NA	NA	NA	7.00E+05	NA	4.38E+06	1.40E+05	NA

Analytes detected in samples at concentrations exceeding cleanup levels or comparison values are shown in bold and italics.

Notes:

(a) Total diesel- and motor oil-range hydrocarbons were analyzed by Ecology Method NWTPH-Diesel (Extended).
(b) Samples were analyzed for volatile organic compounds (VOCs) by EPA Method 8260.
(c) Total xylenes were calculated by summing the concentrations of m,p- and o-xylene isomers.
(d) "---" = Sample not tested for selected analyte.
(e) "<" denotes analyte was not detected at the indicated reporting limit.
(f) Duplicate sample.
(g) MTCA Method C industrial soil cleanup levels are based on CLARC II, dated February 1996.
(h) Total petroleum hydrocarbon (TPH) screening level. Samples exceeding the screening level were evaluated using Ecology's TPH Interim Policy for compliance with MTCA standards (Ecology 1997a).
(i) "NA" = No cleanup level is available.

Qualifiers:
J - Indicates an estimated value below the calculated detection limit.
B - Indicates compound also detected in method blank.

mg/kg - milligrams per kilogram
µg/kg - micrograms per kilogram

TABLE 4-5

SUMMARY OF EXTRACTABLE PETROLEUM HYDROCARBONS ANALYTICAL RESULTS
Former Tacoma Metals Facility

Analytes	Sample Designation									
	TP-2-6-10	TP-5-6-10	TP-9-0-1	TP-10-6-10	TP-11-6-10	TP-16-0-1	TP-27-0-1	TP-30-2-3	TP-33-0-1	TP-34-2-3
EXTRACTABLE PETROLEUM HYDROCARBONS (mg/kg)[a]										
Aliphatics										
C8-C10	<50[b]	<65.9	<50	<50	<50	<20	<50	<50	<50	<50
C10-C12	<50	<65.9	137	<50	<50	96	<50	<50	<50	<50
C12-C16	150	419	145	<50	241	280	137	<50	85.5	<50
C16-C21	122	442	463	231	1,830	145	133	202	366	94.1
C21-C34	150	278	2,290	4,580	6,720	475	1,250	1,980	1,200	740
Aromatics										
C10-C12	376	73.2	<50	<50	<5	36	<50	<50	<50	<50
C12-C16	1,260	2,300	<50	<50	<50	106	<50	<50	<50	<50
C16-C21	3,030	5,590	88.8	<50	178	208	<50	53	75.6	<50
C21-C34	3,280	4,950	396	468	761	438	389	295	309	199

Analytes	Sample Designation								
	TP-37-2-3	TP-38-0-1	TP-40-0-1	TP-43-2-3	TP-46-4-6	TP-49-6-10	TP-55-6-10	TP-57-0-1	TP-61-2-3
EXTRACTABLE PETROLEUM HYDROCARBONS (mg/kg)[a]									
Aliphatics									
C8-C10	<10	<50	<20	<50	<50	<119	<28	<50	<10
C10-C12	<10	<50	<20	<50	<50	<119	<28	<50	12
C12-C16	20	<50	<20	<50	<50	319	151	<50	695
C16-C21	163	106	151	339	304	243	1,540	386	3,160
C21-C34	925	948	861	1,520	2,120	172	10,100	2,430	1,190
Aromatics									
C10-C12	<10	<50	<20	<50	<50	<119	<28	<50	<10
C12-C16	19	<50	41.8	55.7	<50	1,960	93	<50	65
C16-C21	95	71.2	265	267	74.6	4,270	308	94	521
C21-C34	559	360	632	670	521	3,260	3,360	676	495

Notes:

(a) Results for analysis of extractable petroleum hydrocarbons (EPHs) by methods identified in Ecology's TPH Interim Policy, dated January 1997.

(b) "<" denotes analyte was not detected at the indicated reporting limit.

mg/kg - milligrams per kilogram

TABLE 4-6

SUMMARY OF TPH INTERIM POLICY CALCULATIONS
Former Tacoma Metals Facility

Sample	Hazard Index	Total Carcinogenic Risk Factor	Concentration at Well	
			DF=20[(a)]	DF=1[(b)]
TP-2-6-10	0.08	***4.06E-04***	---	***3.2***
TP-5-6-10	0.13	***3.55E-04***	---	***1.8***
TP-9-0-1	0.01	5.50E-07	0.0	---
TP-10-6-10	0.01	7.47E-08	---	***4.2***
TP-11-6-10	0.02	3.38E-06	---	0.0
TP-16-0-1	0.01	***1.69E-05***	0.1	---
TP-27-0-1	0.00	5.77E-07	0.0	---
TP-30-2-3	0.00	2.60E-06	0.1	---
TP-33-0-1	0.01	1.56E-06	0.0	---
TP-34-2-3	0.00	6.41E-06	0.0	---
TP-37-2-3	0.01	3.34E-06	0.0	---
TP-38-0-1	0.00	8.23E-06	0.0	---
TP-40-0-1	0.01	***9.33E-05***	0.0	---
TP-43-2-3	0.01	5.53E-06	0.0	---
TP-46-4-6	0.01	1.06E-06	0.0	---
TP-49-6-10	0.09	***3.53E-04***	---	***1.7***
TP-55-6-10	0.04	3.12E-06	---	0.2
TP-57-0-1	0.01	8.62E-07	0.0	---
TP-61-2-3	0.03	***1.10E-05***	0.0	---
Exceedence Levels	1	1x10E-05	1 mg/l	1 mg/l

Notes:

(a) Dilution factor (DF) of 20 was used to evaluate samples collected from above the saturated or groundwater smear zone.

(b) Dilution factor (DF) of 1 was used to evaluate samples collected from the groundwater smear zone.

mg/l - milligrams per liter

TABLE 4-7

REMEDIAL INVESTIGATION
SOIL ANALYTICAL RESULTS - TNT/DNT
Former Tacoma Metals Facility

Sample Designation	Sample Depth	Sample Date	TNT/DNT (mg/kg)[a]				
			2,4-Dinitri-toluene	2,6-Dinitro-toluene	2,4,6-Trinitro-toluene	4-Amino-2,6-Dinitrotoluene	2-Amino-4,6-Dinitrotoluene
TP-39	0-1'	10/13/2000	<50[b]	<50	<50	<50	<50
TP-390[c]	0-1'	10/13/2000	<50	<50	<50	<50	<50
TP-39	2-3'	10/13/2000	<50	<50	<50	<50	<50
TP-39	4-6'	10/13/2000	<50	<50	<50	<50	<50
TP-39	6-10'	10/13/2000	<50	<50	<50	<50	<50
TP-44	0-1'	10/13/2000	<50	<50	<50	<50	<50
MTCA Method C Industrial Soil Cleanup Levels [d]			7,000	3,500	N/A[e]	N/A	N/A

Notes

(a) Samples were analyzed for trinitrotoluene/dinitrotoluene (TNT/DNT) by EPA Method 8330.
(b) "<" denotes analyte was not detected at the indicated reporting limit.
(c) Duplicate sample.
(d) MTCA Method C industrial soil cleanup levels are based on CLARC II, dated February 1996.
(e) "NA" = No cleanup level available.

mg/kg - milligrams per kilogram

TABLE 4-8A

REMEDIAL INVESTIGATION
SPLP AND TCLP ANALYTICAL RESULTS - METALS[a]
Former Tacoma Metals Facility

Analyte	Analysis	Sample Designation/Depth														Criteria
		TP-1-0-1	TP-14-6-10	TP-16-2-3	TP-21-2-3	TP-22-2-3	TP-33-2-3	TP-38-0-1	TP-39-0-1	TP-40-2-3	TP-43-2-3	TP-45-0-1	TP-55-0-1	TP-60-0-1	TP-61-0-1	
Arsenic	Total (mg/kg)	40	<6[b]	---[c]	<300	<60	---	60	10	<30	80	100	<30	50	<30	219[d]
	TCLP (mg/l)	---	---	---	---	---	---	---	---	---	---	<0.05	---	---	---	5.0[e]
	SPLP (mg/l)	---	---	---	---	---	---	---	---	---	---	<0.05	---	---	---	NA[f]
Barium	Total (mg/kg)	290	84.9	---	4,190	464	---	2,710	110	851	1,280	774	1,080	1,050	377	245,000[d]
	TCLP (mg/l)	---	---	---	6.99	---	---	---	---	---	---	---	---	---	---	100.0[e]
	SPLP (mg/l)	---	---	---	0.672	---	---	---	---	---	---	---	---	---	---	NA
Cadmium	Total (mg/kg)	8.5	2.3	68	130	52	---	125	13.2	40	46	30	29	30	10	3,500[d]
	TCLP (mg/l)	---	---	---	0.94	---	---	---	---	---	---	---	---	---	---	1.0[e]
	SPLP (mg/l)	---	---	---	<0.002	---	---	---	---	---	---	---	---	---	---	NA
Chromium	Total (mg/kg)	76	35.3	---	***1,080***	913	---	263	30	212	259	368	117	225	53	500[g]
	TCLP (mg/l)	---	---	---	<0.05	---	---	---	---	---	---	---	---	---	---	1.0[e]
	SPLP (mg/l)	---	---	---	<0.005	---	---	---	---	---	---	---	---	---	---	NA
Copper	Total (mg/kg)	873	78.6	---	13,200	20,200	---	3,320	1,100	1,240	2,520	3,560	465	2,330	356	130,000[d]
	TCLP (mg/l)	---	---	---	---	66.2	---	---	---	---	---	---	---	---	---	NA
	SPLP (mg/l)	---	---	---	---	0.005	---	---	---	---	---	---	---	---	---	NA
Lead	Total (mg/kg)	***2,230***	152	***8,240***	***7,570***	***3,690***	***4,560***	***9,380***	***1,040***	***2,050***	***12,300***	***4,060***	***1,750***	***10,800***	***4,180***	1,000[g]
	TCLP (mg/l)	***11.7***	<0.1	3.3	***74.7***	---	***22.4***	***20.6***	0.13	***6.9***	***63.6***	---	***26.5***	---	***12.2***	5.0[e]
	SPLP (mg/l)			<0.02	---	---	---	---	0.03	<0.02	0.03	---	---	---	0.07	NA
Mercury	Total (mg/kg)	1.53	0.07	---	10.2	5.1	1.69	14.3	0.21	3.19	21	47	0.83	77	0.76	1,050[d]
	TCLP (mg/l)	---	---	---	---	---	---	---	---	---	---	---	---	0.0005	---	0.2[e]
	SPLP (mg/l)	---	---	---	---	---	---	---	---	---	---	---	---	0.0021	---	NA
Selenium	Total (mg/kg)	<10	<6	---	<300	<60	---	30	<10	<30	<30	30	<30	40	<30	17,500[d]
	TCLP (mg/l)	---	---	---	---	---	---	---	---	---	---	---	---	<0.2	---	1.0[e]
	SPLP (mg/l)	---	---	---	---	---	---	---	---	---	---	---	---	<0.05	---	NA
Silver	Total (mg/kg)	1.4	<0.4	---	90	198	---	6	<0.8	3	5	7	<2	2	<2	17,500[d]
	TCLP (mg/l)	---	---	---	---	<0.02	---	---	---	---	---	---	---	---	---	5.0[e]
	SPLP (mg/l)	---	---	---	---	<0.003	---	---	---	---	---	---	---	---	---	NA

Analytes detected in samples at concentrations exceeding criteria are shown in bold and italics.

Notes:

(a) Samples were analyzed for TCLP and SPLP Metals by EPA Methods 1311/1312/6010.
(b) "<" denotes analyte was not detected at the indicated reporting limit.
(c) "---" Sample not tested for selected analyte.
(d) MTCA Method C industrial soil cleanup levels are based on CLARC II, dated February 1996.
(e) Toxicity characteristics based on Dangerous Waste Criteria (WAC 173-303-100).
(f) "NA" = No criteria available.
(g) Method A industrial soil cleanup levels (WAC 173-340-745) used where Method C industrial soil cleanup levels are not available.

mg/kg - milligrams per kilogram
mg/l - milligrams per liter

TABLE 4-8B

REMEDIAL INVESTIGATION
SPLP AND TCLP ANALYTICAL RESULTS - PAHs
Former Tacoma Metals Facility

Sample Designation	Sample Depth	Totals	PAHs[a]									cPAHs[a][b]							
			Naphth-alene	Acenaph-thlyene	Acenaph-thene	Fluorene	Phenan-threne	Anth-racene	Fluoran-thene	Pyrene	Benzo (g,h,i) perylene	Chrysene	Benzo (b)-fluoranthene	Benzo (k)-fluoranthene	Benzo (a)-pyrene	Indeno (1,2,3-cd) pyrene	Dibenz (a,h)-anthracene	Benzo (a)-anthracene	Total cPAHs[b]
TP-40	0-1	Total (mg/kg)	0.98	3.8	0.74	1.4	17	4.7	43	51	13	41	24	23	28	14	4.8	33	38.3
		TCLP (µg/l)	<10[c]	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	7.6
		SPLP (µg/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	7.6
TP-49	6-10	Total (mg/kg)	8.4	16	440	390	1,300	250	810	620	38	230	73	54	82	31	14M	150	117
		TCLP (µg/l)	<10	<10	300	180	190	20	28	18	<10	<10	<10	<10	<10	<10	<10	<10	7.6
		SPLP (µg/l)	<10	<10	230	140	150	15	23	18	<10	<10	<10	<10	<10	<10	<10	<10	7.6
TP-61	2-3	Total (mg/kg)	2.8	0.67	0.68M	1.7	7.2	2.5M	9.3	7.8	1.1	4.9	2.9	2.7	2.9	1.6	0.61M	4.1	4.14
		TCLP (µg/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	7.6
		SPLP (µg/l)	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	7.6

Notes:

(a) Samples were analyzed for TCLP and SPLP polycyclic aromatic hydrocarbons (PAHs) by EPA Methods 1311/1312/8270.

(b) Total cPAHs were calculated using the toxicity equivalency factor (TEF) methodology described in MTCA [WAC 173-340-708(8)(e)].
For non-detected cPAH analytes, the TEF factor (listed below) was applied to a value of one-half the laboratory reporting limit prior to summation.
TEF = 1.0 for benzo(a)pyrene
TEF = 0.1 for benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(a)-fluoranththene, and benzo(k)- fluoranththene
TEF = 0.01 for chrysene

(c) "<" denotes analyte was not detected at the indicated reporting limit.

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

Qualifiers:
M - Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match.

NOTE: This table was upated in July 2013 at Ecology's request based on the revised methodology (i.e., TEF summation) for calculation of total cPAHs which was not required when the original RI/FS was performed. No values other than total cPAHs were revised from the orginal table produced in October 2001.

TABLE 5-1

REMEDIAL INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - DISSOLVED METALS
Former Tacoma Metals Facility

Sample Designation	Sample Date	Dissolved Metals (µg/l)[a][b]							
		Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
RGW -1	5/25/2000	<5[c]	61	***9***	<10	<4	<0.2	<50	<7
RGW -2	5/25/2000	<5	49	***6***	<10	<4	<0.2	<50	<7
RGW -3	5/25/2000	<5	62	<5	<10	<4	<0.2	<50	<7
RGW -4	5/25/2000	<5	33	<5	<10	<4	<0.2	<50	<7
RGW -5	5/25/2000	<5	44	***5***	<10	<4	<0.2	<50	<7
RGW -6	5/25/2000	<5	14	<5	<10	<4	<0.2	<50	<7
RGW -7	5/25/2000	<5	23	<5	<10	<4	<0.2	<50	<7
RGW -8	5/25/2000	<5	120	<5	<10	<4	<0.2	<50	<7
RGW -9	5/25/2000	<5	30	<5	<10	<4	<0.2	<50	<7
RGW -10	5/25/2000	<5	17	<5	<10	<4	<0.2	<50	<7
RGW -11	5/25/2000	<5	9	<5	<10	<4	<0.2	<50	<7
RGW -12	5/25/2000	<5	10	<5	<10	<4	<0.2	<50	<7
RGW -13	5/26/2000	<5	11	<5	<10	<4	<0.2	<50	<7
RGW -14	5/26/2000	<5	4	<5	<10	<4	<0.2	<50	<7
RGW -15	5/26/2000	<5	4	<5	<10	<4	<0.2	<50	<7
RGW -16	5/26/2000	<5	12	<5	<10	<4	<0.2	<50	<7
RGW -17	5/26/2000	<5	14	<5	<10	<4	<0.2	<50	<7
RGW -18	5/26/2000	<5	7	<5	<10	<4	***0.2***	<50	<7
MTCA Method B Surface Water Cleanup Level[d]		0.0982 (1)	NA[e]	20.3	NA	NA	NA	NA	25,900
MTCA Method C Surface Water Cleanup Level[d]		2.46 (1)	NA	50.6	NA	NA	NA	NA	64,800
Ecology Chronic Freshwater Surface Water Cleanup Level[f]		190	NA	1.59[g]	288.07[g,h]	4.74[g] (1)	0.012 (1)	5 (1)	NA
National Toxics Rule for Consumption of Organisms[i]		1.4 (1)	NA	NA	NA	NA	1.5 (1)	NA	NA

Analytes detected in samples at concentrations exceeding one or more of the comparison values are shown in bold and italics.

TABLE 5-1

REMEDIAL INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - DISSOLVED METALS
Former Tacoma Metals Facility

Notes:

(a) Reconnaissance groundwater samples were analyzed for dissolved metals by EPA Methods 6010/7000 series.
(b) All groundwater samples were field filtered. All concentrations are dissolved.
(c) "<" denotes analyte was not detected at the indicated reporting limit.
(d) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.
(e) "NA" = No cleanup level available.
(f) Ecology Chronic Freshwater Surface Water Standard (WAC 173-201A).
(g) Surface Water Quality Standard is based on an average groundwater hardness of 180 mg/l.
(h) Chromium as chromium III (CAS# 7440-47-3).
(i) National Toxics Rule for consumption of organisms only based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.

(1) Denotes practical quantification limit (PQL) is greater than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs) (Ecology 1993).

mg/l - milligrams per liter
µg/l - micrograms per liter

TABLE 5-2

REMEDIAL INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - PCBs
Former Tacoma Metals Facility

Sample Designation	Sample Date	PCBs (µg/l)[a]							Total PCBs[c]
		Aroclor 1016	Aroclor 1221	Aroclor 1232	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	
RGW-1	5/25/2000	<0.2[b]	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7
RGW-2	5/25/2000	<1	<1	<1	<1	<1	<1	<1	3.5
RGW-3	5/25/2000	<1	<1	<1	<1	<1	<1	<1	3.5
RGW-4	5/25/2000	<1	<1	<1	<1	<1	<1	<1	3.5
RGW-5	5/25/2000	<2	<2	<2	<2	<2	<2	<2	7.0
RGW-6	5/25/2000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
RGW-7	5/25/2000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
RGW-8	5/25/2000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
RGW-9	5/25/2000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7
RGW-10	5/25/2000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7
RGW-11	5/25/2000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7
RGW-12	5/25/2000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7
RGW-13	5/26/2000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
RGW-14	5/26/2000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
RGW-15	5/26/2000	<1	<1	<1	<1	<1	<1	<1	3.5
RGW-16	5/26/2000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7
RGW-17	5/26/2000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7
RGW-18	5/26/2000	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.7
MTCA Method B Surface Water Cleanup Level[d]		NA[e]	NA	NA	NA	NA	NA	NA	2.70E-05 (1)
MTCA Method C Surface Water Cleanup Level[d]		NA	NA	NA	NA	NA	NA	NA	6.74E-04 (1)
Ecology Chronic Freshwater Surface Water Quality Standard[f]		NA	NA	NA	NA	NA	NA	NA	0.014 (1)
National Toxics Rule for Consumption of Organisms[g]		NA	NA	NA	NA	NA	NA	NA	0.0017 (1)

TABLE 5-2

REMEDIAL INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - PCBs
Former Tacoma Metals Facility

Notes:
(a) Samples were analyzed for polychlorinated biphenyls (PCBs) by EPA Method 8082.
(b) "<" denotes analyte was not detected at the indicated reporting limit.
(c) The total PCBs were calculated by summing the concentrations of all the probable PCBs. If a probable PCB was not detected, a value equal to one-half the reporting limit was used.
(d) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.
(e) "NA" = No cleanup level available.
(f) Ecology Chronic Freshwater Surface Water Quality Standards (WAC 173-201A).
(g) National Toxics Rule for consumption of organisms only based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.

(1) Denotes practical quantification limit (PQL) is greater than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs) (Ecology 1993).

µg/l - micrograms per liter

TABLE 5-3

REMEDIAL INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - PAHs
Former Tacoma Metals Facility

Sample Designation	Sample Date	PAHs (µg/l)[a]									cPAHs (µg/l)[a][b]							
		Naphth-alene	Acenaph-thlyene	Acenaph-thene	Fluorene	Phenan-threne	Anth-racene	Fluoran-thene	Pyrene	Benzo (g,h,i) perylene	Chrysene	Benzo (b)-fluoranthene	Benzo (k)-fluoranthene	Benzo (a)-pyrene	Indeno (1,2,3-cd) pyrene	Dibenz (a,h)-anthracene	Benzo (a)-anthracene	Total cPAHs
RGW -1	5/25/2000	<0.02[c]	<0.02	0.24	0.23	0.09	0.07	0.22	0.14	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	***0.03***	0.017
RGW -2	5/25/2000	<0.02	<0.02	***1100***	0.05	0.03	0.03	0.08	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -3	5/25/2000	<0.02	<0.02	0.17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -4	5/25/2000	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -5	5/25/2000	0.02	<0.02	<0.02	0.04	0.06	<0.02	0.07	0.06	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -6	5/25/2000	<0.02	<0.02	0.16	<0.02	0.04	<0.02	0.09	0.16	0.07	***0.55***	***0.21***	***0.09***	***0.04***	***0.04***	<0.02	***0.09***	***0.090***
RGW -7	5/25/2000	0.02	<0.02	0.55	0.4	1.2	0.18	0.38	0.25	<0.02	***0.04***	<0.02	<0.02	<0.02	<0.02	<0.02	***0.05***	0.019
RGW -8	5/25/2000	<0.02	<0.02	0.02	<0.02	0.09	<0.02	0.05	0.06	<0.02	***0.03***	<0.02	<0.02	0.02	<0.02	<0.02	0.02	0.016
RGW -9	5/25/2000	0.02	<0.02	0.04	<0.02	0.06	<0.02	0.03	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -10	5/25/2000	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -11	5/25/2000	0.13	<0.02	1.4	0.03	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -12	5/25/2000	0.02	<0.02	0.1	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -13	5/26/2000	34	0.61	140	57	31	2.4	4.4	3.1	0.24	***0.47***	***0.27***	***0.23***	***0.38***	***0.21***	***0.07***	***0.43***	***0.51***
RGW -14	5/26/2000	8.6	0.05	3.6	2.2	2.2	0.64	2.7	1.6	0.03	***0.22***	***0.07***	***0.07***	***0.06***	***0.03***	<0.02	***0.28***	***0.11***
RGW -15	5/26/2000	110	0.37	64	38	27	5.3	9.2	7.1	0.18	***0.54***	***0.26***	***0.23***	***0.38***	***0.15***	<0.02	***0.59***	***0.51***
RGW -16	5/26/2000	0.21	0.01	0.13	0.1	0.2	0.04	0.05	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -17	5/26/2000	0.22	<0.02	0.19	0.03	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
RGW -18	5/26/2000	45	0.82	66	47	130	26	88	79	7.4	***19***	***13***	***13***	***16***	***6.6***	***2.4***	***26***	***22***
MTCA Method B Surface Water Cleanup Level[d]		9,880	NA[e]	643	3,460	NA	25,900	90.2	2,590	NA	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)
MTCA Method C Surface Water Cleanup Level[d]		24,700	NA	1,610	8,640	NA	64,800	225	6,480	NA	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)
Ecology Chronic Freshwater Surface Water Quality Standard[f]		620	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
National Toxics Rule for Consumption of Organisms[g]		NA	NA	NA	$1.4x10^5$	NA	$1.1x10^6$	3,700	$1.1x10^5$	NA	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.

Notes:

(a) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270B GC/MS-SIM.

(b) Total cPAHs were calculated using the toxicity equivalency factor (TEF) methodology described in MTCA [WAC 173-340-708(8)(e)].
For non-detected cPAH analytes, the TEF factor (listed below) was applied to a value of one-half the laboratory reporting limit prior to summation.
TEF = 1.0 for benzo(a)pyrene
TEF = 0.1 for benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(a)-fluoranththene, and benzo(k)- fluoranththene
TEF = 0.01 for chrysene

(c) "<" denotes analyte was not detected at the indicated reporting limit.

(d) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.

(e) "NA" = No cleanup level is available.

(f) Ecology Chronic Freshwater Surface Water Quality Standards (WAC 173-201A).

(g) National Toxics Rule for consumption of organisms only based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.

(1) Denotes practical quantification limit (PQL) is greater than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs) (Ecology 1993).

µg/l = micrograms per liter

NOTE: This table was upated in July 2013 at Ecology's request based on the revised methodology (i.e., TEF summation) for calculation of total cPAHs which was not required when the original RI/FS was performed. No values other than total cPAHs were revised from the orginal table produced in October 2001.

TABLE 5-4

REMDIAL INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

Sample Designation	Sample Date	TPHs (mg/l)[a]			Volatile Organic Compounds (µg/l)[b]				
		TPH-Gas	TPH-Diesel	TPH-Motor Oil	Benzene	Toluene	Ethylbenzene	Total xylenes	Naphthalene
RGW -1	5/25/2000	<0.05[c]	<0.25	<0.5	<2	3	<2	<6	<2
RGW -2	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -3	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -4	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -5	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -6	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -7	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -8	5/25/2000	<0.05	<0.25	<0.5	<2	2	<2	<6	<2
RGW -9	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -10	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -11	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -12	5/25/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -13	5/26/2000	0.33	0.88	<0.5	<2	<2	2	<6	33
RGW -14	5/26/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	23
RGW -15	5/26/2000	0.2	0.96	0.96	<2	<2	<2	<6	210
RGW -16	5/26/2000	<0.05	***1.7***	<0.5	<2	<2	<2	<6	<2
RGW -17	5/26/2000	<0.05	<0.25	<0.5	<2	<2	<2	<6	<2
RGW -18	5/26/2000	0.09	0.86	<0.5	<2	<2	<2	<6	77
MTCA Method B Surface Water Cleanup Level[d]		NA[e]	NA	NA	43	48,500	6,910	NA	9,880
MTCA Method C Surface Water Cleanup Level[d]		NA	NA	NA	1,070	121,000	17,300	NA	24,700
Ecology Chronic Freshwater Surface Water Quality Standard[f]		NA	NA	NA	NA	NA	NA	NA	620
National Toxics Rule for Consumption of Organisms[g]		NA	NA	NA	710	2,000,000	290,000	NA	NA
MTCA Method A Groundwater Cleanup Level[h]		1	1	1	NA	NA	NA	NA	NA

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.

TABLE 5-4

REMDIAL INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

Notes:

(a) Samples were analyzed for total petroleum hydrocarbons (TPHs) by the appropriate Ecology Methods NWTPH-Gas and NWTPH-Diesel (extended).
(b) Soil and groundwater samples were analyzed for volatile organic compounds (VOCs) by EPA Method 8260.
(c) "<" denotes analyte was not detected at the indicated reporting limit.
(d) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.
(e) "NA" = No cleanup level available.
(f) Ecology Chronic Freshwater Surface Water Quality Standards (WAC 173-201A).
(g) National Toxics Rule for consumption of organisms only based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.
(h) MTCA Method A groundwater cleanup level based on WAC 173-340-720(2), Table 1 (Ecology 1996A).

mg/l - milligrams per liter
µg/l - micrograms per liter

TABLE 5-5

REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS
Former Tacoma Metals Facility

Sample Designation	Sample Date	Total Metals (µg/l)[a]								
		Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
MW-1	3/14/2000	<5[b]	12	<5	30	---[c]	<4	<0.2	<50	<7
	11/21/2000	<50	9	<2	<5	11	<20	<0.1	<50	<3
	3/5/2001	<50	13	<2	<5	<2	<20	<0.1	<50	<3
MW-2	3/14/2000	<5	5	<5	190	---	<4	<0.2	<50	<7
	11/21/2000	<50	28	<2	<5	***20***	<20	<0.1	<50	<3
	3/5/2001	<50	13	<2	<5	<2	<20	<0.1	<50	<3
MW-4(R)[d]	5/11/2000	<5	8	<5	<10	---	***20***	<0.2	<50	<7
	11/20/2000	<50	12	<2	<5	<2	<20	<0.1	<50	<3
	3/5/2001	<50	14	<2	<5	8	<20	<0.1	<50	<3
MW-5	3/14/2000	<5	18	<5	30	---	<4	<0.2	<50	<7
	11/21/2000	<50	2	<2	<5	4	<20	<0.1	<50	<3
	3/5/2001	<50	21	<2	<5	3	<20	<0.1	<50	<3
MW-6	3/14/2000	<5	24	<5	70	---	<4	<0.2	<50	<7
	11/21/2000	<50	3	<2	<5	5	<20	<0.1	<50	<3
	3/5/2001	<50	22	***3***	<5	<2	<20	<0.1	<50	<3
MW-7	3/14/2000	<5	23	<5	20	---	<4	<0.2	<50	<7
	11/21/2000	<50	31	<2	<5	8	<20	<0.1	<50	<3
	3/6/2001	<50	34	<2	<5	<2	<20	<0.1	<50	<3
MW-8(R)/MW-800[e]	5/12/2000	<5	15	<5	<10	---	***6***	<0.2	<50	<7
	11/20/2000	<50/<50	13/11	<2/<2	<5/<5	2/<2	<20/<20	<0.1/<0.1	<50/<50	<3/<3
	3/6/2001	<50/<50	14/15	<2/<2	<5/<5	<2/<2	<20/<20	<0.1/<0.1	<50/<50	<3/<3
MW-9	5/11/2000	<5	17	<5	<10	---	***6***	<0.2	<50	<7
	11/21/2000	<50	16	<2	<5	<2	<20	<0.1	<50	<3
	3/5/2001	<50	90	<2	<5	<2	<20	<0.1	<50	<3
MW-10	11/20/2000	<50	10	<2	<5	3	<20	<0.1	<50	<3
	3/6/2001	<50	9	<2	<5	4	<20	<0.1	<50	<3
MW-11	11/20/2000	<50	9	<2	<5	3	<20	<0.1	<50	<3
	3/6/2001	<50	8	<2	<5	<2	<20	<0.1	<50	<3
MW-12	11/20/2000	<50	3	<2	<5	<2	<20	<0.1	<50	<3
	3/6/2001	<50	31	<2	<5	<2	<20	<0.1	<50	<3
MTCA Method B Surface Water Cleanup Level[f]		0.00982 (1)	NA[g]	20.3	NA	2,660	NA	NA	NA	25,900
MTCA Method C Surface Water Cleanup Level[f]		2.46 (1)	NA	50.6	NA	6,660	NA	NA	NA	64,800
Ecology Chronic Freshwater Surface Water Cleanup Level[h]		190	NA	1.59[i]	288.07[i,j]	18.76[i]	4.74[i] (1)	0.012 (1)	5 (1)	NA
National Toxics Rule for Consumption of Organisms[k]		1.4 (1)	NA	NA	NA	NA	NA	1.5 (1)	NA	NA

TABLE 5-5

REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS
Former Tacoma Metals Facility

Notes:

(a) Groundwater samples were analyzed for metals by EPA Methods 6010/7000 series.
(b) "<" denotes analyte was not detected at the indicated reporting limit.
(c) "---" Sample not analyzed for indicated analyte.
(d) "R" = Replacement well.
(e) Sample MW-800 is a duplicate sample collected from well MW-8(R).
(f) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.
(g) "NA" = No cleanup level available.
(h) Ecology Chronic Freshwater Surface Water Standard (WAC 173-201A).
(i) Surface Water Quality Standard is based on an average groundwater hardness of 180 mg/l.
(j) Chromium as chromium III, (CAS# 7440-47-3).
(k) National Toxics Rule for consumption of organisms only based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.

(1) Denotes practical quantification limit (PQL) is greater than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs) (Ecology 1993).

µg/l - micrograms per liter
mg/l - milligrams per liter

TABLE 5-6

REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - DISSOLVED METALS
Former Tacoma Metals Facility

Sample Designation	Sample Date	Dissolved Metals (µg/l)[a][b]								
		Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
MW-1	11/21/2000	<50[c]	19	<2	<5	<2	<20	<0.1	<50	<3
	3/5/2001	<50	14	<2	<5	<2	<20	<0.1	<50	<3
MW-2	11/21/2000	<50	11	<2	<5	<2	<20	<0.1	<50	<3
	3/5/2001	<50	10	<2	<5	<2	<20	<0.1	<50	<3
MW-4(R)[d]	11/20/2000	<50	13	<2	<5	<2	<20	<0.1	<50	<3
	3/5/2001	<50	10	<2	<5	<2	<20	<0.1	<50	<3
MW-5	11/21/2000	<50	35	<2	<5	<2	<20	<0.1	<50	<3
	3/5/2001	<50	21	<2	<5	<2	<20	<0.1	<50	<3
MW-6	11/21/2000	<50	34	<2	<5	<2	<20	<0.1	<50	<3
	3/5/2001	<50	22	<2	<5	<2	<20	<0.1	<50	<3
MW-7	11/21/2000	<50	39	<2	<5	3	<20	<0.1	<50	<3
	3/6/2001	<50	34	<2	<5	<2	<20	<0.1	<50	<3
MW-8(R)/MW-800[e]	11/20/2000	<50/<50	15/15	<2/<2	<5/<5	<2/<2	<20/<20	<0.1/<0.1	<50/<50	<3/<3
	3/6/2001	<50/<50	19/19	<2/<2	<5/<5	<2/<2	<2/<2	<0.1/<0.1	<50/<50	<3/<3
MW-9	11/21/2000	<50	102	<2	<5	<2	<20	<0.1	***70***	<3
	3/5/2001	<50	97	<2	<5	<2	<20	<0.1	<50	<3
MW-10	11/20/2000	<50	12	<2	<5	<2	<20	<0.1	<50	<3
	3/6/2001	<50	11	<2	<5	<2	<20	<0.1	<50	<3
MW-11	11/20/2000	<50	10	<2	<5	<2	<20	<0.1	<50	<3
	3/6/2001	<50	9	<2	<5	<2	<20	<0.1	<50	<3
MW-12	11/20/2000	<50	35	<2	<5	<2	<20	<0.1	<50	<3
	3/6/2001	<50	33	<2	<5	<2	<20	<0.1	<50	<3
MTCA Method B Surface Water Cleanup Level[f]		0.00982 (1)	NA[g]	20.3	NA	2,660	NA	NA	NA	25,900
MTCA Method C Surface Water Cleanup Level[f]		2.46 (1)	NA	50.6	NA	6,660	NA	NA	NA	64,800
Ecology Chronic Freshwater Surface Water Cleanup Level[h]		190	NA	1.59[i]	288.07[i,j]	18.76[i]	4.74[i] (1)	0.012 (1)	5 (1)	NA
National Toxics Rule for Consumption of Organisms[k]		1.4 (1)	NA	NA	NA	NA	NA	1.5 (1)	NA	NA

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.

TABLE 5-6

REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - DISSOLVED METALS
Former Tacoma Metals Facility

Notes:

(a) Groundwater samples were analyzed for metals by EPA Methods 6010/7000 series.
(b) All groundwater samples were field filtered. All concentrations are dissolved.
(c) "<" denotes analyte was not detected at the indicated reporting limit.
(d) "R" = Replacement well.
(e) Sample MW-800 is a duplicate sample collected from well MW-8(R).
(f) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.
(g) "NA" = No cleanup level available.
(h) Ecology Chronic Freshwater Surface Water Standard (WAC 173-201A).
(i) Surface Water Quality Standard is based on an average groundwater hardness of 180 mg/l.
(j) Chromium as chromium III, (CAS # 7440-47-3).
(k) National Toxics Rule for consumption of organisms only based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.

(1) Denotes practical quantification limit (PQL) is greater than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs) (Ecology 1993).

mg/l - milligrams per liter
µg/l - micrograms per liter

TABLE 5-7

REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - PCBs
Former Tacoma Metals Facility

Sample Designation	Sample Date	PCBs (µg/l)[a]							Total PCBs[b]
		Aroclor 1016	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1221	Aroclor 1232	
MW-1	3/14/2000	<0.1[c]	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
	11/21/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
	3/5/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MW-2	3/14/2000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
	11/21/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
	3/5/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MW-4(R)[d]	5/11/2000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
	11/20/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
	3/5/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MW-5	3/14/2000	<0.1	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	1.25
	11/21/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
	3/5/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MW-6	3/14/2000	<0.1	<0.1	<0.1	<1.0	<1.0	<0.1	<0.1	1.25
	11/21/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
	3/5/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MW-7	3/14/2000	<0.5	<0.5	<0.5	<2.0	<2.0	<0.5	<0.5	3.25
	11/21/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
	3/6/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MW-8(R)/MW-800[e]	5/12/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<20	<5	15
	11/20/2000	<1.0/<1.0	<1.0/5.6Y[f]	<1.0/1.9Y	<1.0/1.3Y	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	4.0***/11.3***
	3/6/2001	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<1.0/<1.0	<2.0/<2.0	<1.0/<1.0	4.0/4.0
MW-9	5/11/2000	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.35
	11/21/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
	3/5/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MW-10	11/20/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
	3/6/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MW-11	11/20/2000	<1.0	2.0Y	<1.0	<1.0	<1.0	<2.0	<1.0	***5.5***
	3/6/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MW-12	11/20/2000	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
	3/6/2001	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	<1.0	4.0
MTCA Method B Surface Water Cleanup Level[g]		NA[h]	NA	NA	NA	NA	NA	NA	2.70E-05 (1)
MTCA Method C Surface Water Cleanup Level[g]		NA	NA	NA	NA	NA	NA	NA	6.74E-04 (1)
Ecology Chronic Freshwater Surface Water Quality Standard[i]		NA	NA	NA	NA	NA	NA	NA	0.014 (1)
National Toxics Rule for Consumption of Organisms[j]		NA	NA	NA	NA	NA	NA	NA	0.0017 (1)

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.

TABLE 5-7

REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - PCBs
Former Tacoma Metals Facility

Notes:

(a) Samples were analyzed for polychlorinated biphenyls (PCBs) by EPA Method 8082.
(b) The total PCBs were calculated by summing the concentrations of all the probable PCBs. If a probable PCB was not detected, a value equal to one-half the reporting limit was used.
(c) "<" denotes analyte was not detected at the indicated reporting limit.
(d) "R" Replacement well.
(e) Sample MW-800 is a duplicate sample collected from well MW-8(R).
(f) "Y" indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration.
(g) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.
(h) "NA" = No cleanup level available.
(i) Ecology Chronic Freshwater Surface Water Quality Standards (WAC 173-201A).
(j) National Toxics Rule for consumption of organisms only based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.

(1) Denotes practical quantification limit (PQL) is greater than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs) (Ecology 1993).

µg/l - micrograms per liter

TABLE 5-8

REMDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - PAHs
Former Tacoma Metals Facility

Sample Designation	Sample Date	PAHs (µg/l)[a]									cPAHs (ug/l)[a][b]							
		Naphth-alene	Acenaph-thlyene	Acenaph-thene	Fluorene	Phenan-threne	Anth-racene	Fluoran-thene	Pyrene	Benzo (g,h,i) perylene	Chrysene	Benzo (b)-fluoranthene	Benzo (k)-fluoranthene	Benzo (a)-pyrene	Indeno (1,2,3-cd) pyrene	Dibenz (a,h)-anthracene	Benzo (a)-anthracene	Total cPAHs[b]
MW-1	3/14/2000	<0.02[c]	<0.02	0.09	<0.02	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
	11/21/2000	0.09J	<0.10	0.26	<0.10	0.09J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
	3/5/2001	<0.10	<0.10	0.22	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MW-2	3/14/2000	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
	11/21/2000	0.08J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
	3/5/2001	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MW-4(R)[d]	5/11/2000	<0.02	<0.02	0.30	0.05	<0.02	<0.02	0.04	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
	11/20/2000	2.4	<0.10	0.54	0.17	0.21	0.05J	0.10	0.06J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
	3/5/2001	0.13	<0.10	0.34	0.08J	0.10	<0.10	0.10	0.06J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MW-5	3/14/2000	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
	11/21/2000	0.40	<0.10	0.06J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
	3/5/2001	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MW-6	3/14/2000	0.17	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
	11/21/2000	0.12	<0.10	0.09J	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
	3/5/2001	0.10	<0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MW-7	3/14/2000	<0.02	<0.02	0.25	0.11	<0.02	0.03	0.08	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
	11/21/2000	0.19	<0.10	0.79	0.28	0.06J	0.13	0.26	0.16	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
	3/6/2001	0.12	<0.10	0.72	0.28	0.06J	0.13	0.20	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MW-8(R)/MW-800[e]	5/12/2000	***6200***	2.1	130	68	50	38	3.9	2.5	<0.02	***0.32***	***0.05***	***0.06***	***0.06***	<0.02	<0.02	***0.30***	***0.11***
	11/20/2000	***6,200/5,600***	3/2.9	220/200	100/95	70/65	5.2/4.9	5.9/6.2	2.9/2.8	<0.10/<0.10	***0.17/0.18***	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	<0.10/<0.10	***0.18/0.19***	***0.090 / 0.090***
	3/6/2001	***4,500/4,000***	3.6M/3.6M	210/190	88/79	60/54	5.0/4.9	5.4/4.7	3.0/2.5	<0.10/<0.10	***0.21M/0.13***	***0.06J***/<0.10	***0.05J***/<0.10	***0.06MJ***/<0.10	<0.10/<0.10	<0.10/<0.10	***0.29/0.19***	***0.11 / 0.091***
	5/14/01[f]	***4,900***	2.8	140	<50	<50	2.7	1.1	0.57	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MW-9	5/11/2000	0.07	<0.02	0.46	0.06	0.15	0.07	0.12	0.10	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
	11/21/2000	28	<0.10	3.9	1.1	0.77	0.15	0.32	0.22	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
	3/5/2001	4.9	<0.10	1.4	0.37	0.60	0.20	0.40	0.30	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MW-10	11/20/2000	63	0.44	96	50	66	8	10	7.9	0.11	***0.59***	***0.27***	***0.21***	***0.28***	***0.11***	<0.10	***0.70***	***0.42***
	3/6/2001	7	0.86M	68	36	46	6.9	8.5	8.9	0.31	***1.2***	***0.56***	***0.63***	***0.71***	***0.26***	***0.09MJ***	***1.4***	***1.02***
	5/14/01[f]	3.7	<0.10	18	9.9	9.9	1.4	1.2	0.76	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	***0.11***	***0.082***
MW-11	11/20/2000	0.46M	2.4Y	340	190	230	26	38	30	0.75	***4.0M***	***1.8***	***1.5***	***1.8***	***0.72***	***0.23***	***4.8***	***2.75***
	3/6/2001	280	2.2M	210	140	170	16	18	18	0.26	***1.1***	***0.52***	***0.51***	***0.65***	***0.23***	***0.07MJ***	***1.8***	***0.97***
	5/14/01[f]	0.28	<0.10	0.23	<0.10	<0.10	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MW-12	11/20/2000	1.3	<0.10	2.3	0.83	0.25	0.14	0.24	0.14	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
	3/6/2001	2.1	<0.10	2	0.82	0.11	0.13	0.18	0.11	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.076
MTCA Method B Surface Water Cleanup Level[g]		9,880	NA[h]	643	3,460	NA	25,900	90.2	2,590	NA	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)	0.0296 (1)
MTCA Method C Surface Water Cleanup Level[g]		24,700	NA	1,610	8,640	NA	64,800	225	6,480	NA	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)	0.740 (1)
Ecology Chronic Freshwater Surface Water Quality Standard[i]		620	NA	520	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
National Toxics Rule for Consumption of Organisms[j]		NA	NA	NA	$1.4x10^5$	NA	$1.1x10^6$	3,700	$1.1x10^5$	NA	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)	0.31 (1)

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.

Notes:

(a) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270B GC/MS-SIM.

(b) Total cPAHs were calculated using the toxicity equivalency factor (TEF) methodology described in MTCA [WAC 173-340-708(8)(e)].
For non-detected cPAH analytes, the TEF factor (listed below) was applied to a value of one-half the laboratory reporting limit prior to summation.
TEF = 1.0 for benzo(a)pyrene
TEF = 0.1 for benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(a)-fluoranththene, and benzo(k)- fluoranththene
TEF = 0.01 for chrysene

(c) "<" denotes analyte was not detected at the indicated reporting limit.

(d) "R" replacement well.

(e) Sample MW-800 is a duplicate sample collected from well MW-8(R).

(f) Samples were field filtered.

(g) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.

(h) "NA" = No cleanup level is available.

(i) Ecology Chronic Freshwater Surface Water Quality Standards (WAC 173-201A).

(j) National Toxics Rule for consumption of organisms only based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.

(1) Denotes practical quantification limit (PQL) is greater than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs) (Ecology 1993).

µg/l = micrograms per liter

Qualifiers:

J - Indicates an estimated concentration when the value is less than the calculated reporting limit.

M - Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match.

NOTE: This table was upated in July 2013 at Ecology's request based on the revised methodology (i.e., TEF summation) for calculation of total cPAHs which was not required when the original RI/FS was performed. No values other than total cPAHs were revised from the orginal table produced in October 2001.

TABLE 5-9

REMEDIAL INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

Sample Designation	Sample Date	TPHs (mg/l)[a]			Volatile Organic Compounds (µg/l)[b]																			
		TPH-Gas	TPH-Diesel	TPH-Motor Oil	Benzene	Toluene	Ethyl-benzene	Total xylenes	Naphth-alene	Chloro-benzene	Carbon Disulfide	Acetone	Methylene Chloride	P-Isopropy -toluene	1,1,1,2-Tetra chloroethane	1,3,5 Trimethyl benzene	1,2,4 Trimethyl benzene	Isopropyl-benzene	n-Propyl benzene	4-Isopropy toluene	n-Butyl benzene	Styrene	1,4, Dichloro-benzene	1,1 Dichloro-ethane
MW-1	3/14/2000	<0.05[c]	<0.25	<0.50	<5	<5	<5	<15	<5	<5	---	<150	<5	<5	<5	<5	<5	<5	<5	---	<5	<5	<5	<5
	11/21/2000	<0.25	<0.25	<0.50	<0.2	<0.2	<0.2	<0.6	<0.5	<0.2	<0.2	1.8	<0.3	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	3/5/2001	<0.25	<0.25	<0.50	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-2	3/14/2000	<0.05	<0.25	<0.50	<5	<5	<5	<15	<5	<5	---	<150	<5	<5	<5	<5	<5	<5	<5	---	<5	<5	<5	<5
	11/21/2000	<0.25	<0.25	<0.50	<0.2	<0.2	<0.2	<0.6	<0.5	<0.2	<0.2	<1.0	<0.3	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.2
	3/5/2001	<0.25	<0.25	<0.50	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-4(R)[d]	5/11/2000	---[e]	0.42	<0.50	<2	<2	<2	<6	<2	<2	---	<20	<2	5	<2	<2	<2	<2	<2	---	<2	<2	<2	<2
	11/20/2000	<0.25	*0.56*	<0.50	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	10	<1.0	<1.0	<1.0	<1.0
	3/5/2001	<0.25	*0.67*	<0.50	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-5	3/14/2000	<0.05	<0.25	<0.50	<5	<5	<5	<15	<5	<5	---	<150	<5	<5	<5	<5	<5	<5	<5	---	<5	<5	<5	<5
	11/21/2000	<0.25	*0.62*	<0.50	<0.2	<0.2	<0.2	<0.6	<0.5	<0.2	<0.2	1.7	<0.3	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	3/5/2001	<0.25	*0.76*	<0.50	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-6	3/14/2000	<0.05	<0.25	<0.50	<5	<5	<5	<15	<5	36	---	<150	<5	<5	<5	<5	<5	<5	<5	---	<5	<5	<5	<5
	11/21/2000	<0.25	***1.2***	<0.50	<0.2	<0.2	<0.2	<0.6	<5.0	72	0.3	1.3	<0.3	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.4	<0.2
	3/5/2001	<0.25	***1.0***	<0.50	<1.0	<1.0	<1.0	<2.0	<5.0	88	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-7	3/14/2000	<0.05	<0.25	<0.50	<5	<5	<5	<15	<5	<5	---	<150	<5	<5	<5	<5	<5	<5	<5	---	<5	<5	<5	<5
	11/21/2000	<0.25	0.44	<0.50	<0.2	<0.2	<0.2	<0.6	<0.5	<0.2	<0.2	1.1	<0.3	---	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	3/6/2001	<0.25	0.33	<0.50	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-8(R)/MW-800[f]	5/12/2000	---	***4.1***	<0.50	23	47	220	880	***2,000***	<2	---	<20	<2	38	<2	120	<2	58	<2	---	10	<20	<2	<2
	11/20/2000	***29/30***	***4/3.8***	<0.50/<0.50	23/25	98/100	280/280	1,560/1,680	***8,500/7,200***	<0.2/<0.2	<0.2/<0.2	4.2/4.5	<0.3/<0.3	---	<0.2/<0.2	170/180	520/540	59/59	12/12	45/44	12M/<0.2	<0.2/<0.2	<0.2/<0.2	<0.2/<0.2
	3/6/2001	***38/39***	***3.8/3.7***	<0.50/<0.50	24/25	70/61	190/190	1,070/1,000	***5,600/6,000***	<10/<10	<10/<10	<50/<50	<20/<20	---	<10/<10	150/150	430/420	44/44	<10/<10	34/34	<10/<10	<10/<10	<10/<10	<10/<10
MW-9	5/11/2000	---	<0.25	<0.50	<2	<2	<2	<6	<2	16	---	<20	<2	<2	<2	<2	<2	<2	<2	---	<2	<2	<2	<2
	11/21/2000	<0.25	*0.52*	<0.50	<0.2	<0.2	1.8	2.4	43	11	<0.2	<1.0	<0.3	---	<0.2	0.2	1.5	0.4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
	3/5/2001	<0.25	*0.63*	<0.50	<1.0	<1.0	<1.0	<2.0	6.0	19	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-10	11/20/2000	0.42	***1.3***	<0.50	0.6	0.4	0.6	2.1	96	<0.2	<0.2	1.5	<0.3	---	<0.2	0.6	1.8	0.9	0.3	5.8	<0.2	<0.2	<0.2	<0.2
	3/6/2001	0.39	***1.1***	<0.50	1.2	<1.0	<1.0	1.6	29	<1.0	<1.0	<5.0	<2.0	---	<1.0	<1.0	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MW-11	11/20/2000	***1.9***	***3.6***	<0.50	1.5	1.4	6.6	12.5	***1,100***	<0.2	<0.2	3.7	<0.3	---	<0.2	6.0	17	3.8	2.2	14	<0.2	<0.2	<0.2	<0.2
	3/6/2001	***2.5***	***3.1***	<0.50	<5.0	<5.0	7.6	12.1	550	<5.0	<5.0	<25	<10	---	<5.0	<5.0	14	<5.0	<5.0	28	<5.0	<5.0	<5.0	<5.0
MW-12	11/20/2000	<0.25	*0.64*	<0.50	<1.0	<1.0	<1.0	<2.0	11	<1.0	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	4.5	<1.0	<1.0	<1.0	<1.0
	3/6/2001	<0.25	***1.0***	***1.4***	<1.0	<1.0	<1.0	<2.0	<5.0	<1.0	<1.0	<5.0	<2.0	---	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
MTCA Method B Surface Water Cleanup Level[g]		NA[h]	NA	NA	43	48,500	6,910	NA	9,880	5,030	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4.86	NA
MTCA Method C Surface Water Cleanup Level[g]		NA	NA	NA	1,070	121,000	17,300	NA	24,700	12,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	121	NA
Ecology Chronic Freshwater Surface Water Quality Standard[i]		NA	NA	NA	NA	NA	NA	NA	620	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
National Toxics Rule for Consumption of Organisms[j]		NA	NA	NA	710	2,000,000	290,000	NA	NA	210,000	NA	NA	16,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	26,000	NA
MTCA Method A Groundwater Cleanup Level[k]		1	1	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.

Notes:
(a) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-Gas and NWTPH-Diesel (extended).
(b) Groundwater samples were analyzed for volatile organic compounds (VOCs) by EPA Method 8260.
(c) "<" denotes analyte was not detected at the indicated reporting limit.
(d) "R" Replacement well.
(e) "---" Sample not tested for indicated analyte.
(f) Sample MW-800 is a duplicate sample collected from well MW-8(R).
(g) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.
(h) "NA" = No cleanup level available.
(i) Ecology Chronic Freshwater Surface Water Quality Standards (WAC 173-201A).
(j) National Toxics Rule for consumption of organisms only based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.
(k) MTCA Method A groundwater cleanup level based on WAC 173-340-720(2), Table 1 (Ecology 1996a).

mg/l - milligrams per liter
µg/l - micrograms per liter

TABLE 6-1

REMEDIAL INVESTIGATION
SURFACE WATER ANALYTICAL RESULTS
Former Tacoma Metals Facility

Analyte	Sample Designation				MTCA Method B[a]	MTCA Method C[a]	Ecology SWQS[b]	National Toxics Rule[c]	Ecology NPDES[d]
	SW-1		SW-2						
Total Metals (µg/l)[e]	**3/13/2001**	**4/29/2001**	**3/13/2001**	**4/29/2001**					
Arsenic	<50[f]	<50	<50	<50	0.00982 (1)	2.46 (1)	190	1.4 (1)	NA
Barium	175	49	57	27	NA[g]	NA	NA	NA	NA
Cadmium	***8***	***2***	***8***	***5***	20.3	50.6	0.43[h] (1)	NA	NA
Chromium	***127***	8	7	<5	NA	NA	68.21[h] (1)	NA	NA
Copper	***2,070***	***437***	***410***	***231***	2,660	6,660	4.17[h] (1)	NA	NA
Lead	***8,090***	***360***	***250***	<20	NA	NA	0.69[h] (1)	NA	NA
Mercury	***9.4***	***0.9***	***0.7***	***0.3***	NA	NA	0.012 (1)	1.5 (1)	NA
Selenium	<50	<50	<50	<50	NA	NA	5 (1)	NA	NA
Silver	6	<3	<3	<3	25,900	64,800	NA	NA	NA
Dissolved Metals (µg/l)[i]									
Arsenic	<50	<50	<50	<50	0.00982 (1)	2.46 (1)	190	1.4 (1)	NA
Barium	12	21	35	27	NA	NA	NA	NA	NA
Cadmium	<2	<2	***8***	***5***	20.3	50.6	0.43[h] (1)	NA	NA
Chromium	<5	<5	<5	<5	NA	NA	68.21[h] (1)	NA	NA
Copper	***90***	***181***	***172***	***240***	2,660	6,660	4.17[h] (1)	NA	NA
Lead	<20	<20	<20	<20	NA	NA	0.69[h] (1)	NA	NA
Mercury	<0.1	***0.2***	***0.1***	***0.2***	NA	NA	0.012 (1)	1.5 (1)	NA
Selenium	<50	<50	<50	<50	NA	NA	5 (1)	NA	NA
Silver	<3	<3	<3	<3	25,900	64,800	NA	NA	NA
PCBs (µg/l)[j]									
Aroclor 1016	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
Aroclor 1242	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
Aroclor 1248	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
Aroclor 1254	2.7	1.8	1.0	<1.0	NA	NA	NA	NA	NA
Aroclor 1260	2.1	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
Aroclor 1221	<2.0	<2.0	<2.0	<2.0	NA	NA	NA	NA	NA
Aroclor 1232	<1.0	<1.0	<1.0	<1.0	NA	NA	NA	NA	NA
Total PCBs[k]	***7.8***	***5.3***	***4.5***	4	0.000027 (1)	0.000674 (1)	0.014 (1)	0.0017 (1)	NA
TPH (mg/l)[l]									
Diesel	*1.8*	*3.2*	*2*	*2.8*	NA	NA	NA	NA	10
Motor Oil	*2.9*	*3.2*	*2.6*	*1.4*	NA	NA	NA	NA	10
PAHs (µg/l)[m]									
Naphthalene	0.63	0.5	0.12	<0.10	9,880	24,700	620	NA	NA
2-Methylnaphthalene	0.33	0.24	<0.10	<0.10	NA	NA	NA	NA	NA
Acenaphthylene	0.33	0.24	<0.10	<0.10	NA	NA	NA	NA	NA
Acenaphthene	0.37	0.33	0.15	<0.10	643	1,610	520	NA	NA
Fluorene	0.36	0.27	0.1	<0.10	3,460	8,640	NA	140,000	NA
Phenanthrene	0.99	0.74	0.24	<0.10	NA	NA	NA	NA	NA
Anthracene	0.81	0.69	<0.10	<0.10	25,900	64,800	NA	1,100,000	NA
Fluoranthene	2.0	1.1	0.26	<0.10	90.2	225	NA	3,700	NA
Benzo(g,h,i)perylene	0.59	0.36	<0.10	<0.10	NA	NA	NA	NA	NA
Dibenzofuran	0.39	0.29	0.08J[n]	<0.10	NA	NA	NA	NA	NA
Pyrene	2.1	1.2	0.17	<0.10	2,590	6,480	NA	110,000	NA
Benzo(a)anthracene[o]	***0.71***	***0.34***	***0.08J***	<0.10	0.0296 (1)	0.740 (1)	NA	0.31 (1)	NA
Chrysene[o]	***1.8***	***1.4***	***0.11***	<0.10	0.0296 (1)	0.740 (1)	NA	0.31 (1)	NA
Benzo(b)fluoranthene[o]	***1.0***	***0.73***	<0.10	<0.10	0.0296 (1)	0.740 (1)	NA	0.31 (1)	NA
Benzo(k)fluoranthene[o]	***1.2***	***0.70***	<0.10	<0.10	0.0296 (1)	0.740 (1)	NA	0.31 (1)	NA
Benzo(a)pyrene[o]	***1.0***	***0.44***	<0.10	<0.10	0.0296 (1)	0.740 (1)	NA	0.31 (1)	NA
Indeno(1,2,3-cd)pyrene[o]	***0.71***	***0.36***	<0.10	<0.10	0.0296 (1)	0.740 (1)	NA	0.31 (1)	NA
Dibenz(a,h)anthracene[o]	***0.2***	***0.12***	<0.10	<0.10	0.0296 (1)	0.740 (1)	NA	0.31 (1)	NA
Total cPAHs[o,p]	***1.4***	***0.68***	***0.079***	0.076	0.0296 (1)	0.740 (1)	NA	0.31 (1)	NA

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.

TABLE 6-1

REMEDIAL INVESTIGATION
SURFACE WATER ANALYTICAL RESULTS
Former Tacoma Metals Facility

Notes:

(a) MTCA Method B and C surface water cleanup levels based on CLARC II, dated February 1996.
(b) Ecology Chronic Freshwater Surface Water Quality Standards (WAC 173-201A).
(c) National Toxics Rule based on 40 CFR 131.36 for a risk level of $1x10^{-5}$.
(d) Ecology Model National Pollutant Discharge Elimination System (NPDES) Permit Standard for discharges to surface water from leaking underground storage tank (LUST) cleanups where gasoline and diesel fuel are the pollutants of concern (WAC 173-226).
(e) Surface water samples were analyzed for total metals by EPA Methods 6010/7000 series.
(f) "<" denotes analyte was not detected at the indicated reporting limit.
(g) "NA" = No cleanup level is available.
(h) Surface Water Quality Standard is based on an average groundwater hardness of 31 mg/l.

(i) Surface water samples for dissolved metals were field filtered and analyzed by EPA Methods 6010/7000 series.
(j) Surface water samples were analyzed for polychlorinated biphenyls (PCBs) by EPA Method 8082.
(k) The total polychlorinated biphenyls (PCBs) were calculated by summing the concentrations of all the probable PCBs. If a probable PCB was not detected, a value equal to one-half the reporting limit was used.
(l) Suface water samples were analyzed for TPHs by the Ecology Method NWTPH-Diesel (extended).
(m) Surface water samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270B GC/MS-SIM.
(n) "J" Indicates an estimated concentration when the value is less than the calculated reporting limit.
(o) Carcinogenic polycyclic aromatic hydrocarbons (cPAHs).
(p) Total cPAHs were calculated using the toxicity equivalency factor (TEF) methodology described in MTCA [WAC 173-340-708(8)(e)]. For non-detected cPAH analytes, the TEF factor (listed below) was applied to a value of one-half the laboratory reporting limit prior to summation.
TEF = 1.0 for benzo(a)pyrene
TEF = 0.1 for benzo(a)anthracene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, benzo(a)-fluoranththene, and benzo(k)- fluoranththene
TEF = 0.01 for chrysene
(1) Denotes practical quantification limit (PQL) is greater than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs) (Ecology 1993).

mg/l = milligrams per liter
µg/l = micrograms per liter

NOTE: This table was upated in July 2013 at Ecology's request based on the revised methodology (i.e. TEF summation) for calculation of total cPAHs which was not required when the original RI/FS was performed. No values other than total cPAHs were revised from the orginal table produced in October 2001.

Appendix D

Creosoting Plant Area Site Maps, Sample Maps, and Data Tables

Appendix D: Creosoting Plant Area Site Maps, Sample Maps, and Data Tables

Table of Contents

(NOTE: Figure and table designations are from multiple previous reports and may be duplicated. Figures and tables are presented in the order listed below)

19) Table 5A November-December 2003 Investigation Soil Analytical Results – TPH and PAHs (2007)

20) Table 5B November-December 2003 Investigation Groundwater Analytical Results – TPH and PAHs (2007)

21) Table 5C November-December 2003 Investigation Groundwater Analytical Results – Dissolved PAHs (2007)

22) Table 5D December 2003 Groundwater Analytical Results – Total Metals (RCRA 8 + Copper) (2007)

23) Table 5E December 2003 Groundwater Analytical Results – Dissolved Metals (RCRA 8 + Copper) (2007)

24) Table 6A February-March 2003 Investigation Soil Analytical Results (2007)

25) Table 6B February-March 2003 Investigation Groundwater Analytical Results (2007)

26) Table 6C February-March 2003 Investigation Groundwater Analytical Results – Dissolved PAHs (2007)

27) Table 7A June-August 2002 Investigation Soil Analytical Results (2007)

28) Table 7B June-August 2002 Investigation Groundwater Analytical Results – SVOCs (2007)

29) Table 7C June-August 2002 Investigation Groundwater Analytical Results – PAHs (2007)

30) Table 7D June-August 2002 Investigation Groundwater Analytical Results – TPHs and VOCs (2007)

31) Table 7E June-August 2002 Investigation Groundwater Analytical Results – PCBs (2007)

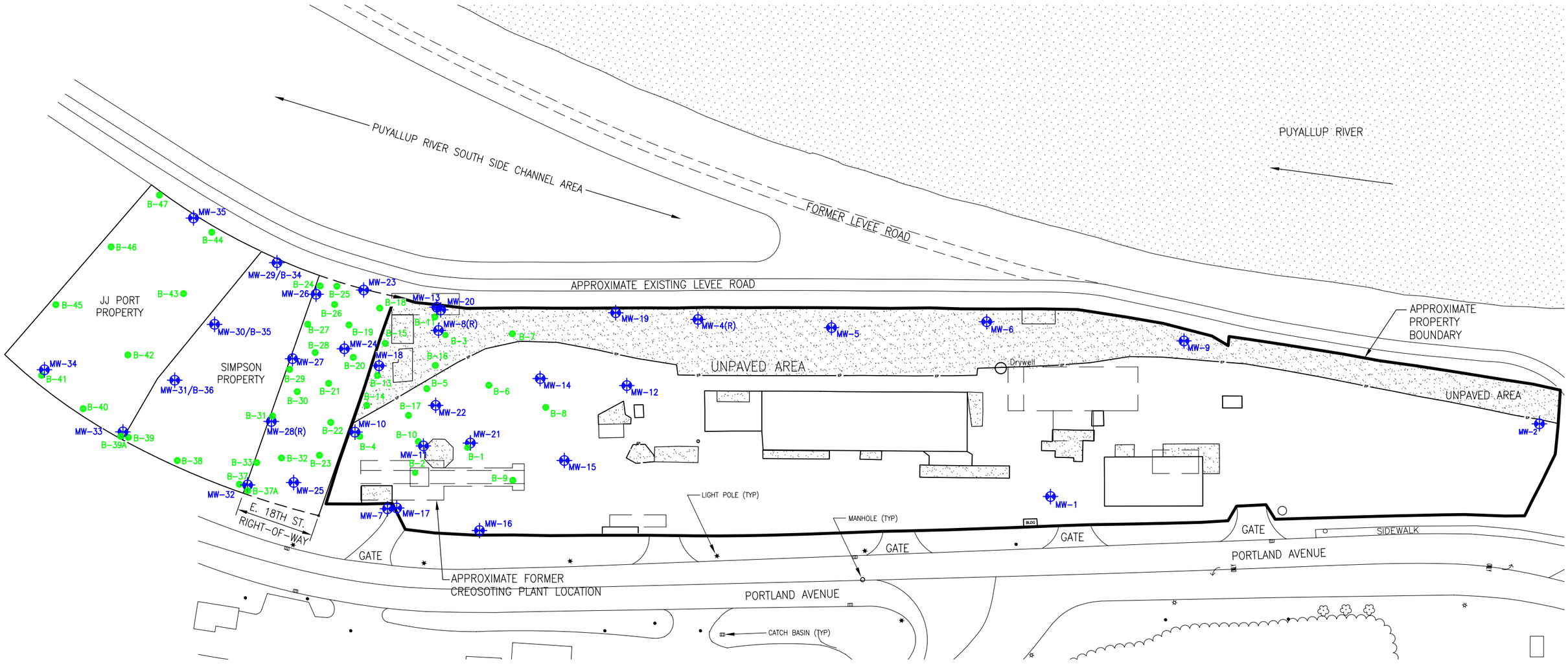
32) Table 7F June-August 2002 Investigation Groundwater Analytical Results – Total and Dissolved Metals (2007)

33) Table 8 October 2001 Groundwater Analytical Results – Dissolved Lead (2007)

Materials included in Appendix D are from the following reports (as indicated in parentheses following the title for each item):

2007 = *Supplemental Data Summary Report* (Kennedy/Jenks Consultants 2007a)

2008 = *Soil and Groundwater Investigation Results – Data Transmittal; October 2007-April 2008 Investigation* (Kennedy/Jenks Consultants 2008)



LEGEND:

B-1	SOIL BORING LOCATION
MW-26	MONITORING WELL LOCATION
	UNPAVED AREA
	APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

NOTES:

1. BORING AND WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.

N

0 50 100

SCALE: 1=100

Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

MONITORING WELL AND BORING LOCATION MAP

996098.00\2008 DATA SUMMARY\FIG_01

FIGURE 1

PUYALLUP RIVER SOUTH SIDE CHANNEL AREA

FORMER LEVEE ROAD

PUYALLUP RIVER

APPROXIMATE EXISTING LEVEE ROAD

APPROXIMATE PROPERTY BOUNDARY

JJ PORT PROPERTY

SIMPSON PROPERTY

UNPAVED AREA

UNPAVED AREA

Drywell

0.1

??

MW-35 (<0.02)
MW-29/B-34 (0.085)
MW-26 (0.020)
MW-23 (0.060)
MW-13
MW-20 (0.15)
MW-8(R) (0.22)
MW-19 (<0.02)
MW-4(R)
MW-5
MW-6
MW-9
MW-24 (0.097)
MW-18 (0.15)
MW-27 (0.0072)
MW-30/B-35 (0.011)
MW-31/B-36 (0.28)
MW-34 (<0.02)
MW-14 (0.0074)
MW-12
MW-22 (0.16)
MW-21 (0.75)
MW-33 (0.0035)
MW-28(R) (0.28)
MW-10 (0.24)
MW-11 (0.23)
MW-15 (0.0050)
MW-1
MW-2
MW-32 (<0.02)
MW-25 (<0.02)
MW-7
MW-17 (0.0053)
MW-16 (<0.02)

B-47, B-46, B-44, B-45, B-43, B-42, B-41, B-40, B-39, B-39A, B-38, B-37, B-37A, B-33, B-32, B-31, B-30, B-29, B-28, B-27, B-26, B-25, B-24, B-23, B-22, B-21, B-20, B-19, B-18, B-17, B-16, B-15, B-14, B-13, B-11, B-10, B-8, B-7, B-6, B-5, B-4, B-3, B-2, B-1, B-9

E. 18TH ST. RIGHT-OF-WAY

GATE

GATE

GATE

GATE

LIGHT POLE (TYP)

MANHOLE (TYP)

BLDG

SIDEWALK

PORTLAND AVENUE

PORTLAND AVENUE

APPROXIMATE FORMER CREOSOTING PLANT LOCATION

CATCH BASIN (TYP)

LEGEND:

- B-1 — SOIL BORING LOCATION
- MW-26 — MONITORING WELL LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

(0.085) TOTAL CPAH CONCENTRATION IN MICROGRAMS PER LITER (µg/l)

0.1 TOTAL CPAH CONCENTRATION CONTOUR (APPROXIMATE) IN µg/l

CPAH – CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS

µg/l – MICROGRAMS PER LITER

NOTES:

1. BORING AND WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.

N

0 50 100

SCALE: 1=100

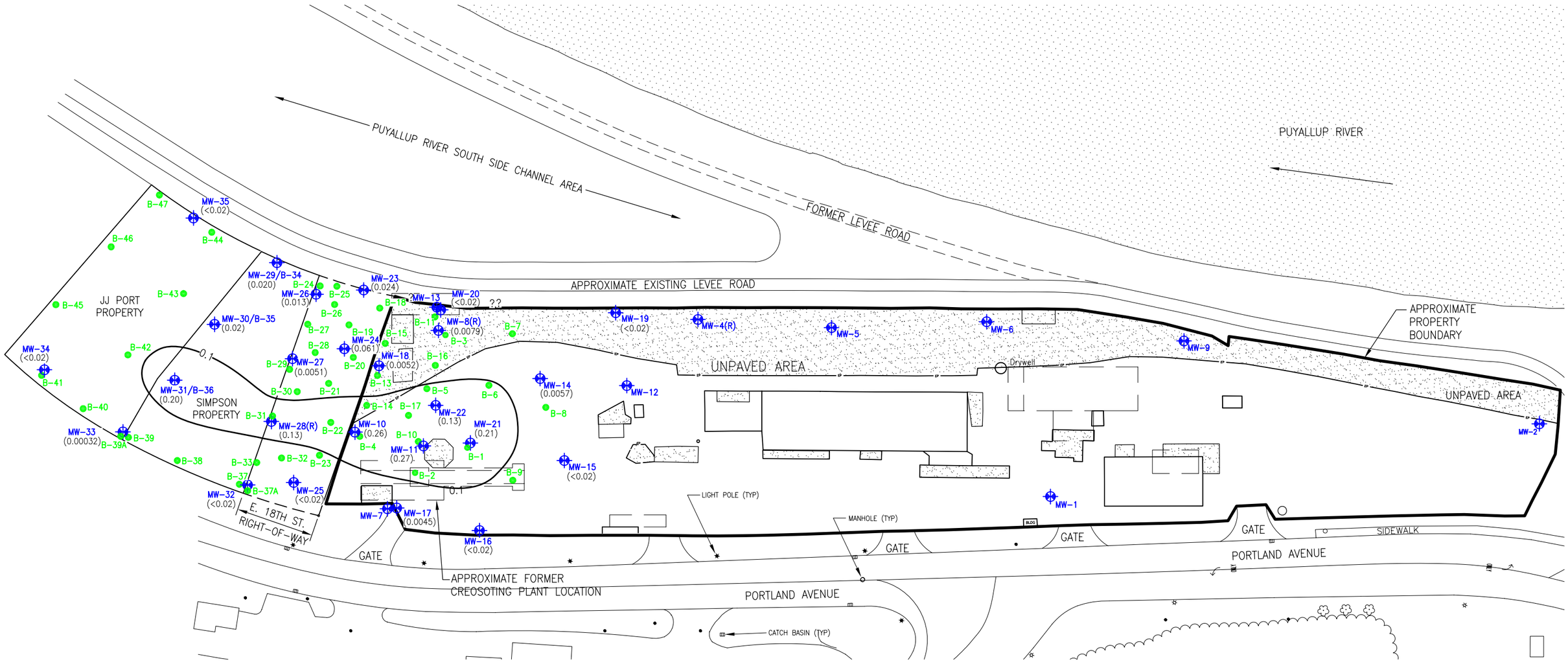
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

TOTAL CPAH GROUNDWATER CONCENTRATION MAP - MARCH 2008

996098.00\2008 DATA SUMMARY\FIG_02A

FIGURE 2A



LEGEND:

- B-1 — SOIL BORING LOCATION
- MW-26 — MONITORING WELL LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

(0.085) DISSOLVED (FILTERED) CPAH CONCENTRATION IN MICROGRAMS PER LITER (µg/l)

0.1 DISSOLVED CPAH CONCENTRATION CONTOUR (APPROXIMATE) IN µg/l

CPAH – CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS

µg/l – MICROGRAMS PER LITER

NOTES:

1. BORING AND WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.

N

0 50 100

SCALE: 1=100

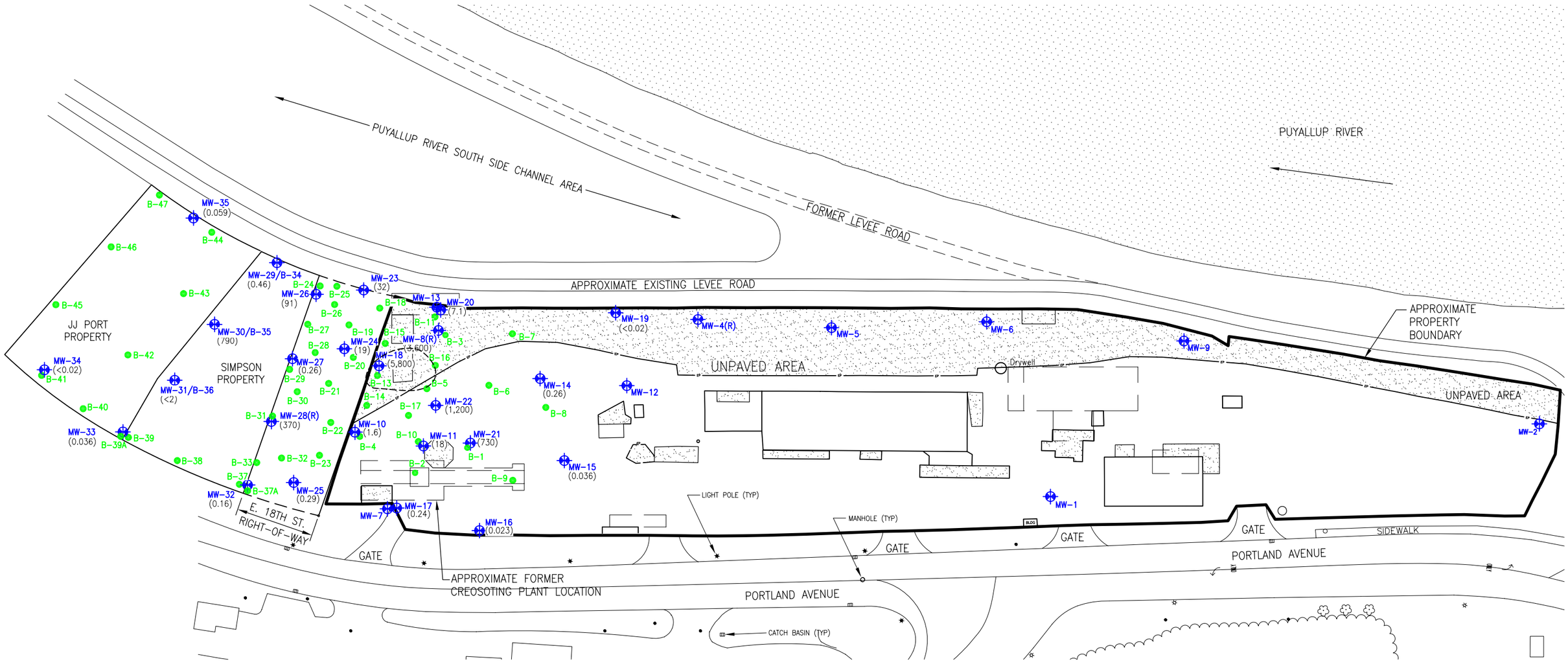
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

DISSOLVED CPAH GROUNDWATER CONCENTRATION MAP - MARCH 2008

996098.00\2008 DATA SUMMARY\FIG_02B

FIGURE 2B



LEGEND:

- B-1 — SOIL BORING LOCATION
- MW-26 — MONITORING WELL LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
- (730) — NAPHTHALENE CONCENTRATION IN MICROGRAMS PER LITER (µg/l)
- 4,940 — MTCA METHOD B SURFACE WATER CLEANUP LEVEL CONTOUR (APPROXIMATE) IN µg/l
- µg/l – MICROGRAMS PER LITER

NOTES:

1. BORING AND WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.

N

0 50 100

SCALE: 1=100

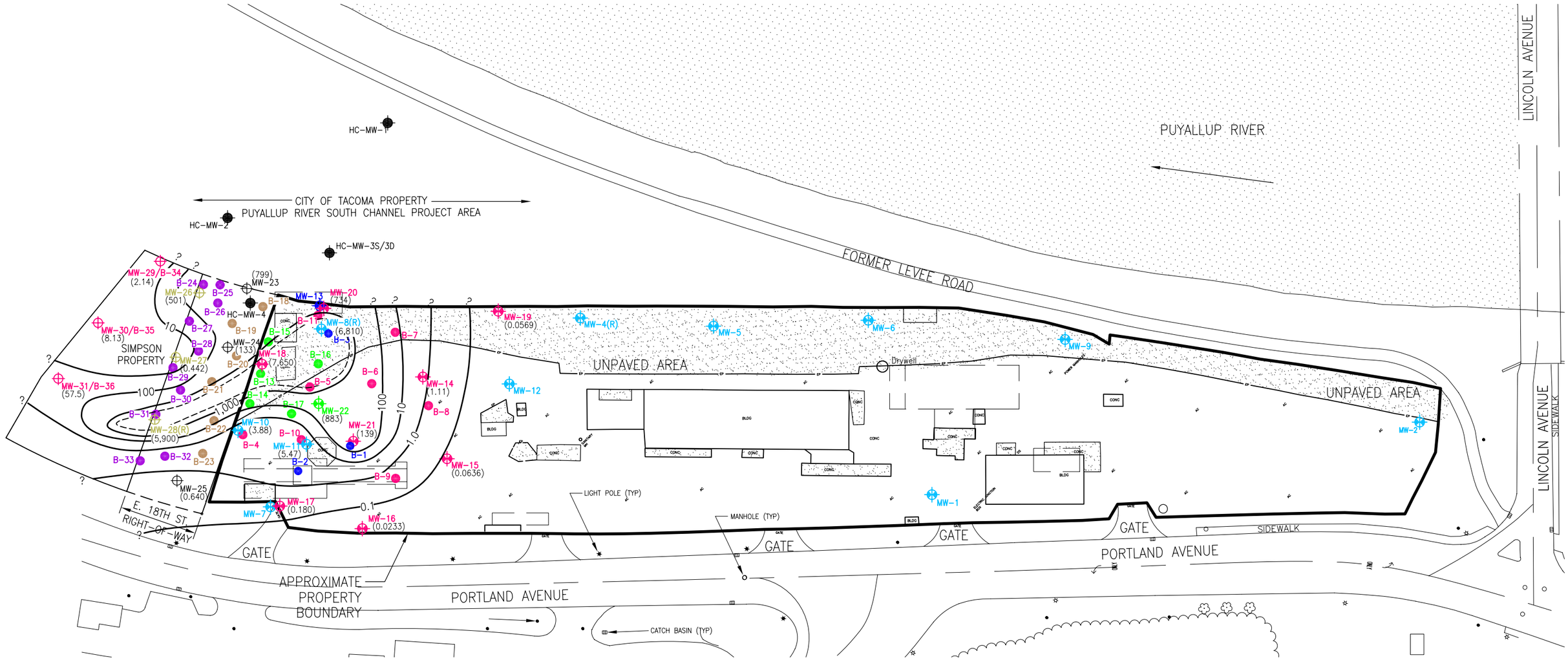
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

NAPHTHALENE GROUNDWATER CONCENTRATION MAP - MARCH 2008

996098.00\2008 DATA SUMMARY\FIG_03

FIGURE 3



LEGEND:

MW-29/B-34	OFF-PROPERTY MONITORING WELL AND SOIL BORING LOCATION (FEBRUARY 2006)
MW-26	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2005)
B-24	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2005)
MW-23	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2004)
B-18	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2004)
MW-12	MONITORING WELL LOCATION (REMEDIAL INVESTIGATION 2000-2001)
MW-13	MONITORING WELL LOCATION (JUNE - AUGUST 2002 INVESTIGATION)
MW-14	MONITORING WELL LOCATION (FEBRUARY - MARCH 2003 INVESTIGATION)
MW-22	MONITORING WELL LOCATION (NOVEMBER - DECEMBER 2003 INVESTIGATION)
HC-MW-4	FORMER OFF-PROPERTY MONITORING WELL LOCATION INSTALLED BY HART-CROWSER (JUNE 2003)
B-1	HOLLOW-STEM AUGER BORING LOCATION (JUNE - AUGUST 2002 INVESTIGATION)
B-4	GEOPROBE BORING LOCATION (FEBRUARY - MARCH 2003 INVESTIGATION)
B-12	GEOPROBE BORING LOCATION (NOVEMBER - DECEMBER 2003 INVESTIGATION)
	UNPAVED AREA
	APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
(799)	NAPHTHALENE CONCENTRATION IN MICROGRAMS PER LITER (μg/l)
10	NAPHTHALENE CONCENTRATION CONTOUR (APPROXIMATE) IN μg/l
4,940	MTCA METHOD B SURFACE WATER CLEANUP LEVEL CONTOUR (APPROXIMATE) IN μg/l

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.

N

0 50 100
SCALE: 1=100

DRAFT

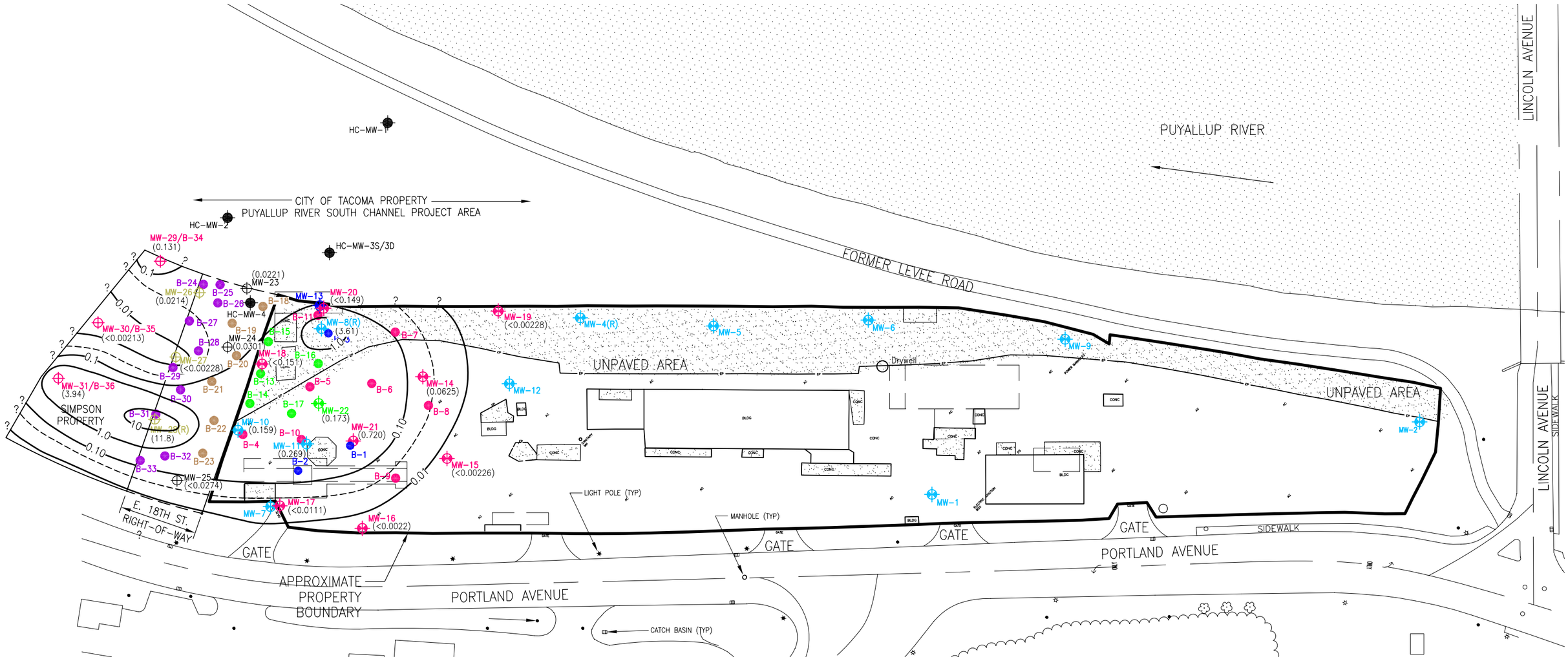
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

NAPHTHALENE GROUNDWATER CONCENTRATION MAP - FEBRUARY 2006

996098.00\2006 DATA SUMMARY\FIG_3

FIGURE 3



LEGEND:

MW-29/B-34	OFF-PROPERTY MONITORING WELL AND SOIL BORING LOCATION (FEBRUARY 2006)
MW-26	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2005)
B-24	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2005)
MW-23	OFF-PROPERTY MONITORING WELL LOCATION (MARCH 2004)
B-18	OFF-PROPERTY GEOPROBE BORING LOCATION (MARCH 2004)
MW-12	MONITORING WELL LOCATION (REMEDIAL INVESTIGATION 2000-2001)
MW-13	MONITORING WELL LOCATION (JUNE - AUGUST 2002 INVESTIGATION)
MW-14	MONITORING WELL LOCATION (FEBRUARY - MARCH 2003 INVESTIGATION)
MW-22	MONITORING WELL LOCATION (NOVEMBER - DECEMBER 2003 INVESTIGATION)
HC-MW-4	FORMER OFF-PROPERTY MONITORING WELL LOCATION INSTALLED BY HART-CROWSER (JUNE 2003)
B-1	HOLLOW-STEM AUGER BORING LOCATION (JUNE - AUGUST 2002 INVESTIGATION)
B-4	GEOPROBE BORING LOCATION (FEBRUARY - MARCH 2003 INVESTIGATION)
B-12	GEOPROBE BORING LOCATION (NOVEMBER - DECEMBER 2003 INVESTIGATION)
	UNPAVED AREA
	APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
(0.720)	TOTAL CPAH CONCENTRATION IN MICROGRAMS PER LITER (µg/l)
1.0	TOTAL CPAH CONCENTRATION CONTOUR (APPROXIMATE) IN µg/l
0.02	SURFACE WATER CLEANUP LEVEL CONTOUR (APPROXIMATE) IN µg/l BASED ON ECOLOGY PQL FOR TOTAL CPAHS

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.

N

0 50 100

SCALE: 1=100

DRAFT

Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

CPAH GROUNDWATER CONCENTRATION MAP - FEBRUARY 2006

996098.00\2006 DATA SUMMARY\FIG_4

FIGURE 4

TABLE 1

OCTOBER / NOVEMBER 2007 OFF-PROPERTY INVESTIGATION
SOIL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)												MTCA Method C Industrial Soil Cleanup Level[a]
	B37 5-6	B37 14-15	B37 21-22	B38 5-6	B38 14.5-15.5	B38 22.5-23.5	B39 5.5-6.5	B39 10-11	B39 21-22	B40 6.5-7.5	B40 14-15	B40 21.5-22.5	
TPHs (mg/kg)[b]													
Gasoline-range Hydrocarbon	<2[c]	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	100/30[d]
Diesel-range Hydrocarbon	<50	<50	<50	<50	<50	<50	120	<50	200	<50	<50	<50	2,000[d]
Oil-range Hydrocarbon	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	2,000[d]
PAHs (mg/kg)[e]													
Naphthalene	0.020	<0.01	<0.01	0.015	<0.01	<0.01	1.8	0.24	<0.01	<0.01	<0.01	<0.01	7.00E+04
Acenaphthylene	<0.01	<0.01	<0.01	0.011	<0.01	<0.01	0.12	<0.01	0.11	<0.01	<0.01	<0.01	NA[f]
Acenaphthene	<0.01	0.080	0.032	<0.01	0.10	0.41	0.51	1.1	0.41	<0.01	0.011	<0.01	2.10E+05
Fluorene	<0.01	<0.01	<0.01	<0.01	0.089	<0.01	0.39	1.3	0.40	<0.01	<0.01	<0.01	1.40E+05
Phenanthrene	0.011	<0.01	<0.01	0.034	0.13	0.060	1.3	1.90	2.1	0.019	<0.01	<0.01	NA
Anthracene	<0.01	<0.01	<0.01	0.040	0.033	0.015	0.61	0.47	2.6	<0.01	<0.01	<0.01	1.05E+06
Fluoranthene	0.016	<0.01	<0.01	0.21	0.049	0.017	1.2	1.3	18	<0.01	<0.01	<0.01	1.40E+05
Pyrene	0.016	<0.01	<0.01	0.44	0.027	0.028	1.1	0.77	15	<0.01	<0.01	<0.01	1.05E+05
Benzo(g,h,i)perylene	0.013	<0.01	<0.01	0.095	<0.01	<0.01	0.83	<0.01	1.5	<0.01	<0.01	<0.01	NA
cPAHs (mg/kg)[g]													
Benzo(a)anthracene	<0.01	<0.01	<0.01	0.18	<0.01	<0.01	0.99	0.019	6.7	<0.01	<0.01	<0.01	NA
Chrysene	0.016	<0.01	<0.01	0.27	<0.01	<0.01	1.7	0.012	9.4	<0.01	<0.01	<0.01	NA
Benzo(a)pyrene	<0.01	<0.01	<0.01	0.24	<0.01	<0.01	1.3	<0.01	4.2	<0.01	<0.01	<0.01	NA
Benzo(b)fluoranthene	0.018	<0.01	<0.01	0.33	<0.01	<0.01	2.0	<0.01	5.0	<0.01	<0.01	<0.01	NA
Benzo(k)fluoranthene	<0.01	<0.01	<0.01	0.13	<0.01	<0.01	0.62	<0.01	1.9	<0.01	<0.01	<0.01	NA
Indeno(1,2,3-cd)pyrene	0.011	<0.01	<0.01	0.12	<0.01	<0.01	1.0	<0.01	1.9	<0.01	<0.01	<0.01	NA
Dibenz(a,h)anthracene	<0.01	<0.01	<0.01	0.022	<0.01	<0.01	0.24	<0.01	0.58	<0.01	<0.01	<0.01	NA
Total cPAHs (mg/kg)[h]	0.0031	<0.01	<0.01	0.32	<0.01	<0.01	1.8	0.0020	5.9	<0.01	<0.01	<0.01	18

TABLE 1

OCTOBER / NOVEMBER 2007 OFF-PROPERTY INVESTIGATION
SOIL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)										MTCA Method C Industrial Soil Cleanup Level[a]
	B41 7-8	B41 11-12	B41 24.5-25.5	B42 5-6	B42 22-23	B42 24.5-25.5	B43 6-7	B43 14.5-15.5	B43 28.5-29.5	B43 34.5-35.5	
TPHs (mg/kg)[b]											
Gasoline-range Hydrocarbon	<2[c]	<2	<2	<2	<2	<2	<2	<2	<2	<2	100/30[d]
Diesel-range Hydrocarbon	<50	<50	<50	<50	<50	<50	130	<50	<50	69	2,000[d]
Oil-range Hydrocarbon	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	2,000[d]
PAHs (mg/kg)[e]											
Naphthalene	<0.01	<0.01	<0.01	0.028	<0.01	<0.01	0.028	0.26	0.91	0.43	7.00E+04
Acenaphthylene	<0.01	<0.01	<0.01	0.012	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA[f]
Acenaphthene	<0.01	<0.01	<0.01	<0.01	1.3	<0.01	0.015	0.033	1.4	1.0	2.10E+05
Fluorene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.017	0.012	0.98	0.63	1.40E+05
Phenanthrene	<0.01	<0.01	<0.01	0.052	0.015	<0.01	0.11	0.012	1.5	0.33	NA
Anthracene	<0.01	<0.01	<0.01	0.032	<0.01	<0.01	0.014	<0.01	0.11	0.078	1.05E+06
Fluoranthene	<0.01	<0.01	<0.01	0.067	<0.01	<0.01	0.026	<0.01	0.14	0.12	1.40E+05
Pyrene	<0.01	<0.01	<0.01	0.089	<0.01	<0.01	0.027	<0.01	0.062	0.053	1.05E+05
Benzo(g,h,i)perylene	<0.01	<0.01	<0.01	0.14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA
cPAHs (mg/kg)[g]											
Benzo(a)anthracene	<0.01	<0.01	<0.01	0.11	<0.01	<0.01	0.024	<0.01	<0.01	<0.01	NA
Chrysene	<0.01	<0.01	<0.01	0.23	<0.01	<0.01	0.036	<0.01	<0.01	<0.01	NA
Benzo(a)pyrene	<0.01	<0.01	<0.01	0.25	<0.01	<0.01	0.010	<0.01	<0.01	<0.01	NA
Benzo(b)fluoranthene	<0.01	<0.01	<0.01	0.36	<0.01	<0.01	0.013	<0.01	<0.01	<0.01	NA
Benzo(k)fluoranthene	<0.01	<0.01	<0.01	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA
Indeno(1,2,3-cd)pyrene	<0.01	<0.01	<0.01	0.17	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA
Dibenz(a,h)anthracene	<0.01	<0.01	<0.01	0.040	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	NA
Total cPAHs (mg/kg)[h]	<0.01	<0.01	<0.01	0.33	<0.01	<0.01	0.014	<0.01	<0.01	<0.01	18

TABLE 1

OCTOBER / NOVEMBER 2007 OFF-PROPERTY INVESTIGATION
SOIL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)												MTCA Method C Industrial Soil Cleanup Level[a]
	B44 2-3	B44 14-15	B44 31.5-32.5	B45 6.5-7.5	B45 11-12	B45 21-22	B46 6-7	B46 13-14	B46 21-22	B47 6-7	B47 13-14	B47 30.5-31.5	
TPHs (mg/kg)[b]													
Gasoline-range Hydrocarbon	<2[c]	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	100/30[d]
Diesel-range Hydrocarbon	<50	<50	<50	<50	<50	<50	<50	100	<50	78	<50	<50	2,000[d]
Oil-range Hydrocarbon	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	2,000[d]
PAHs (mg/kg)[e]													
Naphthalene	0.045	<0.01	0.052	<0.01	<0.01	<0.01	<0.01	0.022	<0.01	0.038	<0.01	<0.01	7.00E+04
Acenaphthylene	0.076	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.046	<0.01	<0.01	NA[f]
Acenaphthene	<0.01	<0.01	0.55	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2.10E+05
Fluorene	0.010	<0.01	0.23	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.016	<0.01	<0.01	1.40E+05
Phenanthrene	0.077	0.010	0.081	<0.01	<0.01	<0.01	0.015	0.085	<0.01	0.15	0.020	<0.01	NA
Anthracene	0.083	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.080	<0.01	<0.01	1.05E+06
Fluoranthene	0.23	0.016	<0.01	<0.01	<0.01	<0.01	<0.01	0.049	<0.01	0.27	0.023	<0.01	1.40E+05
Pyrene	0.40	0.023	<0.01	<0.01	<0.01	<0.01	<0.01	0.045	<0.01	0.47	0.022	<0.01	1.05E+05
Benzo(g,h,i)perylene	0.43	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.34	<0.01	<0.01	NA
cPAHs (mg/kg)[g]													
Benzo(a)anthracene	0.36	0.015	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	<0.01	0.37	0.011	<0.01	NA
Chrysene	0.67	0.013	<0.01	<0.01	<0.01	<0.01	<0.01	0.024	<0.01	0.73	0.013	<0.01	NA
Benzo(a)pyrene	0.73	0.014	<0.01	<0.01	<0.01	<0.01	<0.01	0.014	<0.01	0.62	<0.01	<0.01	NA
Benzo(b)fluoranthene	0.96	0.015	<0.01	<0.01	<0.01	<0.01	<0.01	0.019	<0.01	0.81	0.011	<0.01	NA
Benzo(k)fluoranthene	0.25	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.22	<0.01	<0.01	NA
Indeno(1,2,3-cd)pyrene	0.49	0.010	<0.01	<0.01	<0.01	<0.01	<0.01	0.011	<0.01	0.36	<0.01	<0.01	NA
Dibenz(a,h)anthracene	0.14	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.095	<0.01	<0.01	NA
Total cPAHs (mg/kg)[h]	0.97	0.018	<0.01	<0.01	<0.01	<0.01	<0.01	0.018	<0.01	0.81	0.0023	<0.01	18

Notes:

(a) Model Toxics Control Act (MTCA) Method C industrial soil cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) Samples were analyzed for diesel- and oil-range hydrocarbons by Ecology Method NWTPH-Dx with silica gel cleanup, and gasoline-range hydrocarbons by Ecology Method NWTPH-G.

(c) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(d) Total petroleum hydrocarbon (TPH) screening levels based on MTCA Method A industrial soil cleanup levels (Ecology 2001a). For gasoline mixtures without benzene and total ethylbenzene, toluene and xylenes less than 1% of the gasoline mixture the cleanup level is 100 mg/kg. For all other gasoline mixtures, the cleanup level is 30 mg/kg.

(e) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode (where appropriate).

(f) "NA" denotes cleanup level is either not available or not appropriate.

(g) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C using SIM mode (where appropriate).

(h) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table1A.

Analytes detected in samples at concentrations exceeding one or more cleanup levels or comparison levels are shown in bold and italics.

mg/kg = milligrams per kilogram

bgs = below ground surface

TABLE 1A

Summary of TEFs

Analyte	TEF
Benzo(a)anthracene	0.1
Chrysene	0.01
Benzo(a)pyrene	1
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Indeno(1,2,3-cd)pyrene	0.1
Dibenz(a,h)anthracene	0.1

TABLE 2

OCTOBER 2007 OFF-PROPERTY INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Reconnaissance Groundwater Sample Designation													Proposed Cleanup Level[a]
	B37 RGW	B37A RGW	B38 RGW	B39 RGW	B39A RGW	B40 RGW	B41 RGW	B42 RGW	B43 RGW	B44 RGW	B45 RGW	B46 RGW	B47 RGW	
TPHs (µg/l)[b]														
Gasoline-range hydrocarbons	<100[c]	<100	<100	<100	<100	<100	<100	120	<100	130	<100	<100	<100	NA[d]
Diesel-range hydrocarbons	64	<50	290	100	<50	<50	<50	95	<50	120	<50	<50	<50	NA
Oil-range hydrocarbons	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	NA
PAHs (µg/l)[e]														
Naphthalene	<0.1	<0.1	0.17	4.2	<0.1	0.36	<0.1	<0.1	0.96	2.0	<0.1	<0.1	<0.1	4,940[f]
Acenaphthylene	<0.1	<0.1	0.36	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Acenaphthene	3.7	2.6	59	5.5	0.91	0.34	<0.1	5.0	8.2	13	<0.1	<0.1	<0.1	643[f]
Fluorene	<0.1	<0.1	2.7	3.1	<0.1	0.24	<0.1	0.71	0.94	2.3	<0.1	<0.1	<0.1	3,460[f]
Phenanthrene	<0.1	<0.1	11	8.9	0.10	0.54	<0.1	0.58	0.26	0.50	<0.1	<0.1	<0.1	NA
Anthracene	<0.1	<0.1	1.6	1.6	<0.1	<0.1	<0.1	0.11	<0.1	<0.1	<0.1	<0.1	<0.1	25,900[f]
Fluoranthene	<0.1	<0.1	2.4	2.8	<0.1	0.13	<0.1	0.21	<0.1	<0.1	<0.1	<0.1	<0.1	90.2[f]
Pyrene	<0.1	<0.1	1.7	1.9	<0.1	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	<0.1	<0.1	2,590[f]
Benzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
cPAHs (µg/l)[g]														
Benzo(a)anthracene	<0.1	<0.1	<0.1	0.20	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Chrysene	<0.1	<0.1	<0.1	0.28	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Benzo(a)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Benzo(b)fluoranthene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Dibenz(a,h)anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA
Total cPAHs (µg/l)[h]	<0.1	<0.1	<0.1	0.023	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.24[i]

Notes:

(a) Proposed site cleanup levels based on Kennedy/Jenks Consultants' 2007 *Cleanup Level Evaluation* report submitted to Ecology under separate cover.

(b) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-G and NWTPH-Dx with silica gel cleanup.

(c) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.

(d) "NA" denotes cleanup level is either not available or not appropriate.

(e) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode (where appropriate).

(f) Cleanup level based on the Model Toxics Control Act (MTCA) (WAC 173-340) Method B surface water cleanup level based on Ecology's online CLARC database.

(g) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C using SIM mode (where appropriate).

(h) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 1A.

(i) Modified cleanup level for total cPAHs based on the Ambient Water Quality Criteria (AWQC) for consumption of organisms only (EPA 2004) pursuant to Section 304(a)(1) of the Clean Water Act discussed in Kennedy/Jenks Consultants' 2007 *Cleanup Level Evaluation* report.

Analytes detected in samples at concentrations exceeding the proposed cleanup level values are shown in bold and italics.

mg/l = milligrams per liter

µg/l = micrograms per liter

TABLE 2A

FEBRUARY 2006 OFF-PROPERTY INVESTIGATION
SOIL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)									MTCA Method C Industrial Soil Cleanup Level[a]
	B34 7-8	B34 18-19	B34 30-31	B35 6-7	B35 32-33	B35 39-40	B36 8-10	B36 23-24	B36 31-32	
TPHs (mg/kg)[b]										
Gasoline-range Hydrocarbons	<12.0[c]	<5.98	<5.22	<7.75	25.8[d]	<5.23	***1,110[e]***	***164[d]***	***464[d]***	100/30[f]
Diesel-range Hydrocarbons	58.6[g]	<13.7	18.5[h]	19.5[g]	18.6[h]	16.4[h]	1,060[h]	***14,900[h]***	***8,830[h]***	2,000[f]
Oil-range Hydrocarbons	305	<34.3	<31.1	138	<29.5	<29.2	1,690	***<3,100[h]***	<1,210[h]	2,000[f]
PAHs (mg/kg)[i]										
Naphthalene	<0.118	0.00992 J[j]	0.0539	0.0504 J	1.93	0.658	1.62 J	204	296	7.00E+04
1-Methylnaphthalene	<0.118	<0.0140	0.282	<0.148	1.02	0.363	<7.59	819	501	NA[k]
2-Methylnaphthalene	<0.118	<0.0140	<0.0127	<0.148	0.890	0.170	<7.59	<25.1	88.2	NA
Acenaphthylene	<0.118	<0.0140	<0.0127	0.0385 J	<0.0588	<0.0600	<7.59	<25.1	22.1 J	NA
Acenaphthene	<0.118	0.188	0.589	<0.148	1.34	1.00	16.9	1,600	1,490	2.10E+05
Fluorene	<0.118	0.0297	0.569	<0.148	1.08	0.725	<7.59	1,290	1,570	1.40E+05
Phenanthrene	0.401	0.0221	1.02	0.122 J	1.47	1.08	19.1	3,650	4,050	NA
Anthracene	<0.118	<0.0140	0.354	0.860 J	0.163	0.132	20.0	417	2,540	1.05E+06
Fluoranthene	1.12	0.0369	0.534	0.247	0.241	0.291	103	1,690	1,560	1.40E+05
Pyrene	0.671	0.0293	0.328	0.274	0.105	0.122	136	1,550	1,150	1.05E+05
Benzo(g,h,i)perylene	0.2440	0.00814 J	<0.0127	0.513	<0.0588	<0.0600	26.0	60.3	50.4	NA
cPAHs (mg/kg)[l]										
Chrysene	0.519	0.0300	0.0154	0.993	<0.0588	<0.0600	***114***	***281***	***507***	18
Benzo(b)fluoranthene	0.474	0.0217	0.00491 J	0.752	<0.0588	<0.0600	***73.2***	***215***	***145***	18
Benzo(k)fluoranthene	0.481	0.0225	0.00169 J	0.631	<0.0588	<0.0600	***78.0***	***245***	***135***	18
Benzo(a)anthracene	0.448	0.0217	0.0284	0.332	<0.0588	<0.0600	***71.7***	***403***	***296***	18
Benzo(a)pyrene	0.491	0.0158	0.0102 J	0.755	<0.0588	<0.0600	***88.8***	***271***	***151***	18
Indeno(1,2,3-cd)pyrene	0.330	0.0215	<0.0127	0.550	<0.0588	<0.0600	***31.7***	***82.7***	***101***	18
Dibenz(a,h)anthracene	0.229	0.0154	<0.0127	0.343	<0.0588	<0.0600	***22.1***	***58.3***	***97.7***	18
Total cPAHs (mg/kg)[m]	0.761	0.031	0.0139	1.13	<0.0588	<0.0600	***124***	***392***	***263***	18

Notes:

(a) Model Toxics Control Act (MTCA) Method C industrial soil cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) Samples were analyzed for diesel- and oil-range hydrocarbons by Ecology Method NWTPH-Dx(extended) with silica gel cleanup, and gasoline-range hydrocarbons by Ecology Method NWTPH-G.

(c) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(d) The total hydrocarbon result in this sample is primarily due to an individual compound eluting in the volatile hydrocarbon range (Laboratory note G-03).

(e) The chromatogram for this sample does not resemble a typical gasoline pattern (Laboratory note G-02).

(f) Total petroleum hydrocarbon (TPH) screening levels based on MTCA Method A industrial soil cleanup levels (Ecology 2001a). For gasoline mixtures without benzene and total ethylbenzene, toluene and xylenes less than 1% of the gasoline mixture the cleanup level is 100 mg/kg. For all other gasoline mixtures, the cleanup level is 30 mg/kg.

(g) Results in the diesel organics range are primarily due to overlap from a heavy oil range product (Laboratory note D-09).

(h) The sample chromatographic pattern does not resemble the fuel standard used for quantitation (Laboratory note D-06).

(i) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode (where appropriate).

(j) "J" denotes an analyte detected at a concentration between the method reporting limit (MRL) and the method detection limit (MDL).

(k) "NA" denotes no cleanup level established.

(l) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C using SIM mode (where appropriate).

(m) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

Analyte concentrations exceeding the indicated cleanup level are shown in bold and italics

mg/kg - milligrams per kilogram

bgs = below ground surface

TABLE 2A-A
Summary of TEFs

Chrysene	0.01
Benzo(b)fluoranthene	0.1
Benzo(k)fluoranthene	0.1
Benzo(a)anthracene	0.1
Benzo(a)pyrene	1
Indeno(1,2,3-cd)pyrene	0.1
Dibenz(a,h)anthracene	0.4

TABLE 2B

FEBRUARY 2006
GROUNDWATER MONITORING WELL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Groundwater Sample Designation														MTCA Method B Surface Water[b]	Human Health Consumption of Organisms[c]	Human Health Consumption of Organisms[d]
	MW-8(R)[a]		MW-10		MW-11		MW-14		MW-15		MW-16		MW-17				
	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered			
TPHs (mg/l)[e]																	
Gasoline-range hydrocarbons	41.8	---[f]	0.124	---	0.221	---	<0.050[g]	---	<0.050	---	<0.050	---	<0.050	---	NA[h]	NA	NA
Diesel-range hydrocarbons	8.12[i]	---	0.799	---	1.91	---	0.859[j]	---	0.903[j]	---	0.495[j]	---	0.429[j]	---	NA	NA	NA
Oil-range hydrocarbons	<2.60	---	<0.532	---	<0.562	---	<0.562	---	<0.568	---	<0.562	---	<0.526	---	NA	NA	NA
PAHs (µg/l)[k]																	
Naphthalene	***6,810***	2,370	3.38	1.37	5.47	1.49	1.11	1.02	0.0636 J[l]	0.334	0.0233 J	0.236	0.180 J	0.366	4,940	NA	NA
1-Methylnaphthalene	883	107	8.47	0.753	58.4	3.86	3.64	1.68	0.410	0.216	<0.0176	0.0706 J	0.264 J	0.0989 J	NA	NA	NA
2-Methylnaphthalene	1,420	56.7	0.158	0.114 J	<0.0478	0.114	0.326	0.139	<0.0276	0.0565 J	<0.0269	<0.0266	<0.136	0.0607 J	NA	NA	NA
Acenaphthylene	12.4 J	<10.5	0.238	<0.0512	0.878	0.159	0.115	<0.00980	0.0502 J	<0.0518	<0.00958	<0.00947	<0.0484	<0.0494	NA	NA	NA
Acenaphthene	280	28.6	28.1	0.828	72.4	2.73	9.54	2.06	2.63	0.635	0.280	0.201	5.05	0.211	643	990	NA
Fluorene	146	<7.86	14.0	0.193	53.0	0.507	3.71	0.222	1.22	0.113 J	<0.00749	0.0506 J	2.64	0.0854 J	3,460	5,300	14,000
Phenanthrene	188	<6.19	14.3	0.684	60.5	3.13	1.84	1.23	0.0899 J	0.842	<0.00506	0.600	0.388 J	0.888	NA	NA	NA
Anthracene	31.0	<8.33	2.87	0.598	14.7	2.12	0.566	0.299	0.279	0.146	0.172	0.186	0.297 J	0.142	25,900	40,000	110,000
Fluoranthene	38.6	<5.00	4.52	0.537	17.0	3.02	1.26	0.402	0.235	0.334	<0.00264	0.249	0.830	0.519	90.2	140	370
Pyrene	24.8	<5.95	2.91	0.428	10.7	2.38	0.786	0.363	0.188	0.240	<0.00414	0.199	0.615	0.369	2,590	4,000	11,000
Benzo(g,h,i)perylene	<7.86	<7.86	<0.0388	<0.0384	<0.0359	<0.0375	<0.0379	<0.00319	<0.00319	<0.0388	<0.00311	<0.00308	<0.0157	<0.0371	NA	NA	NA
cPAHs (µg/l)[m]																	
Chrysene	***6.52***	<0.107	***0.353***	***0.0953 J***	***0.678***	***0.450***	***0.115***	<0.00305	<0.00305	<0.0212	<0.00298	<0.00294	<0.0151	***0.0517 J***	0.0296	0.018 * / 0.02[n]	0.031
Benzo(b)fluoranthene	***2.12***	<0.482	***0.0988 J***	<0.0942	***0.137***	***0.148***	<0.0931	<0.00331	<0.00331	<0.0953	<0.00324	<0.00320	<0.0164	<0.0910	0.0296	0.018 * / 0.02[n]	0.031
Benzo(k)fluoranthene	***2.52***	<0.125	***0.0941 J***	<0.0244	***0.161***	***0.145***	***0.0437 J***	<0.00380	<0.00380	<0.0247	<0.00372	<0.00367	<0.0188	<0.0236	0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)anthracene	***6.00***	<0179	***0.320***	***0.105 J***	***0.739***	***0.455***	***0.110 J***	<0.00427	<0.00427	<0.0353	<0.00417	<0.00412	<0.0211	***0.0494 J***	0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)pyrene	***2.48***	<0.155	***0.104 J***	<0.0302	***0.159***	***0.125***	***0.0460 J***	<0.00226	<0.00226	<0.0306	<0.00220	<0.00218	<0.0111	<0.0292	0.0296	0.018 * / 0.02[n]	0.031
Indeno(1,2,3-cd)pyrene	<0.333	<0.167	<0.0329	<0.0326	<0.0304	<0.0318	<0.0322	<0.00258	<0.00258	<0.0329	<0.00252	<0.00249	<0.0128	<0.0315	0.0296	0.018 * / 0.02[n]	0.031
Dibenz(a,h)anthracene	<0.345	<0.173	<0.0341	<0.0337	<0.0315	<0.0330	<0.0333	<0.00295	<0.00295	<0.0341	<0.00289	<0.00285	<0.0146	<0.0326	0.0296	0.018 * / 0.02[n]	0.031
Total cPAHs[f]	***3.61***	<0.155	***0.159***	***0.0115***	***0.269***	***0.204***	***0.0625***	<0.00226	<0.00226	<0.0306	<0.0022	<0.00218	<0.0111	0.00546	0.0296	0.018 * / 0.02[n]	0.031

Analyte	Groundwater Sample Designation														MTCA Method B Surface Water[b]	Human Health Consumption of Organisms[c]	Human Health Consumption of Organisms[d]
	MW-18		MW-19		MW-20		MW-21		MW-22		MW-23		MW-24				
	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered			
TPHs (mg/l)[e]																	
Gasoline-range hydrocarbons	20.8	---	<0.250	---	3.77	---	2.69[o]	---	4.59[o]	---	5.03[p]	---	0.736[p]	---	NA	NA	NA
Diesel-range hydrocarbons	2.35	---	<0.272	---	1.70	---	4.74	---	2.95	---	2.66	---	0.479	---	NA	NA	NA
Oil-range hydrocarbons	<0.521	---	<0.543	---	<0.510	---	0.694[q]	---	<0.532	---	<0.510	---	<0.515	---	NA	NA	NA
PAHs (µg/l)[k]																	
Naphthalene	***7,650***	***6,280***	0.0569 J	0.629	734	658	139	202	883	301	799	191	133	18.0	4,940	NA	NA
1-Methylnaphthalene	334	143	0.722	0.300	282	186	264	30.8	334	36.1	287	31.4	25.7	2.62	NA	NA	NA
2-Methylnaphthalene	210	94.9	0.0308 J	0.130	268	140	31.0	1.63	197	4.36	219	5.68	11.6	0.703	NA	NA	NA
Acenaphthylene	2.34	0.831	<0.00992	<0.0100	<10.1	<10.0	1.60	0.215	1.79	0.106 J	1.20	<0.0506	0.294	<0.0473	NA	NA	NA
Acenaphthene	198	84.3	1.07	0.282	166	92.7	207	17.0	213	13.4	199	14.7	35.1	1.79	643	990	NA
Fluorene	106	3.51	0.103 J	0.0479 J	71.7	<7.50	116	1.18	110	0.209	72.7	<0.0379	18.4	0.140	3,460	5,300	14,000
Phenanthrene	113	0.371 J	<0.00524	0.123	55.2	<5.91	130	2.77	110	0.910	72.6	0.292	13.6	0.312	NA	NA	NA
Anthracene	12.1	0.236 J	0.0784 J	0.0753 J	<8.05	<7.95	12.6	1.63	12.3	0.499	5.67	0.159	2.82	0.185	25,900	40,000	110,000
Fluoranthene	8.19	0.315 J	<0.00273	0.124	<4.83	<4.77	16.3	1.53	12.6	0.616	7.75	0.262	5.89	0.249	90.2	140	370
Pyrene	4.65	0.247 J	<0.00428	0.145	<5.75	<5.68	10.4	1.20	7.37	0.463	4.07	0.195	3.51	0.189	2,590	4,000	11,000
Benzo(g,h,i)perylene	<0.192	<0.185	<0.00322	<0.00326	<7.59	<7.50	0.0744 J	<0.0347	<0.0375	<0.0371	<0.0375	<0.0379	<0.0371	<0.0355	NA	NA	NA
cPAHs (µg/l)[m]																	
Chrysene	<0.105	<0.101	<0.00308	<0.00312	<0.103	<0.102	***0.877***	***0.280***	***0.505***	***0.0989 J***	***0.214***	***0.0391 J***	***0.288***	***0.0301 J***	0.0296	0.018 * / 0.02[n]	0.031
Benzo(b)fluoranthene	<0.471	<0.455	<0.00335	<0.00339	<0.466	<0.460	***0.249***	***0.101 J***	***0.0955 J***	<0.0910	<0.0920	<0.0931	<0.0910	<0.0871	0.0296	0.018 * / 0.02[n]	0.031
Benzo(k)fluoranthene	<0.122	<0.118	<0.00385	<0.00389	<0.121	<0.119	***0.279***	***0.105***	***0.105 J***	<0.0236	<0.0239	<0.0241	<0.0236	<0.0226	0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)anthracene	<0.174	<0.169	<0.00432	<0.00437	<0.172	<0.170	***0.930***	***0.274***	***0.455***	***0.0966 J***	***0.200***	***0.0391 J***	***0.272***	***0.0344 J***	0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)pyrene	<0.151	<0.146	<0.00228	<0.00231	<0.149	<0.148	***0.291***	***0.109***	***0.102 J***	<0.0292	<0.0295	<0.0299	<0.0292	<0.0280	0.0296	0.018 * / 0.02[n]	0.031
Indeno(1,2,3-cd)pyrene	<0.163	<0.157	<0.00261	<0.00264	<0.161	<0.159	***0.0744 J***	<0.0295	<0.0318	<0.0315	<0.0318	<0.0322	<0.0315	<0.0301	0.0296	0.018 * / 0.02[n]	0.031
Dibenz(a,h)anthracene	<0.169	<0.163	<0.00299	<0.00302	<0.167	<0.165	***0.667***	<0.0305	<0.0330	<0.0326	<0.0330	<0.0333	<0.0326	<0.0312	0.0296	0.018 * / 0.02[n]	0.031
Total cPAHs[f]	<0.151	<0.146	<0.00228	<0.00231	<0.149	<0.148	***0.720***	***0.160***	***0.173***	0.0106	***0.0221***	0.00430	***0.0301***	0.00374	0.0296	0.018 * / 0.02[n]	0.031

TABLE 2B

FEBRUARY 2006
GROUNDWATER MONITORING WELL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Groundwater Sample Designation														MTCA Method B Surface Water[b]	Human Health Consumption of Organisms[c]	Human Health Consumption of Organisms[d]
	MW-25		MW-26		MW-27		MW-28(R)[a]		MW-29		MW-30		MW-31				
	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered			
TPHs (mg/l)[e]																	
Gasoline-range hydrocarbons	0.262	---[f]	1.37[o]	---	<0.050[g]	---	10.4[o]	---	0.323	---	0.586	---	0.446	---	NA[h]	NA	NA
Diesel-range hydrocarbons	0.300	---	1.65[i]	---	<0.278	---	3.53[i]	---	0.816[i]	---	1.76[i]	---	2.20[i]	---	NA	NA	NA
Oil-range hydrocarbons	<0.485	---	<0.526	---	<0.556	---	<0.490	---	<0.521	---	<0.505	---	<0.543	---	NA	NA	NA
PAHs (µg/l)[k]																	
Naphthalene	0.640	0.536	501	125	1.64	2.05	***5,900***	4,260	2.14	0.507	8.13	3.59	57.5	61.7	4,940	NA	NA
1-Methylnaphthalene	27.9	1.53	81.9	5.90	0.522	0.365	488	260	41.0	2.61	171	9.38	140	85.3	NA	NA	NA
2-Methylnaphthalene	1.29	0.0943 J[l]	79.6	0.736	0.0677 J	0.0821 J	574	233	6.60	0.0916 J	43.4	1.32	16.9	12.3	NA	NA	NA
Acenaphthylene	0.208	<0.115	<0.0102	<0.00958	<0.00992	0.0927 J	28.0	11.4	0.745	<0.00937	<0.00926	<0.00916	1.42	<0.00958	NA	NA	NA
Acenaphthene	39.1	1.23	129	3.23	14.2	1.71	439	184	66.6	1.84	225	8.06	211	71.3	643	990	NA
Fluorene	5.79	0.0644 J	84.7	0.0480 J	7.45	<0.00766	197	8.00	31.6	0.0468 J	65.3	2.84	80.3	4.14	3,460	5,300	14,000
Phenanthrene	0.446	0.163	76.9	0.110 J	0.280	0.0794 J	275	1.19 J	46.2	0.114	24.9	5.51	99.7	3.34	NA	NA	NA
Anthracene	0.229	0.170	4.62	0.253	2.33	1.15	32.1	1.41 J	7.81	0.271	1.94	0.652	16.3	1.01	25,900	40,000	110,000
Fluoranthene	0.0589 J	0.159	10.3	0.717 J	2.53	0.0695 J	68.4	0.527 J	8.16	0.0962 J	1.07	1.25	44.6	1.99	90.2	140	370
Pyrene	0.0379 J	0.113 J	4.66	0.0542 J	1.70	0.0547 J	48.0	<0.549	4.76	0.0635 J	0.724	0.965	29.5	1.97	2,590	4,000	11,000
Benzo(g,h,i)perylene	<0.0347	<0.0379	<0.00330	<0.00311	<0.00322	<0.00319	2.20	<0.725	0.0222 J	<0.00304	<0.00301	<0.00298	0.551 J	<0.00311	NA	NA	NA
cPAHs (µg/l)[m]																	
Chrysene	<0.0189	<0.0207	***0.103***	<0.00298	<0.00308	<0.00305	***10.6***	<0.396	***0.265***	<0.00291	<0.00288	***0.0853***	***3.76***	***0.187***	0.0296	0.018 * / 0.02[n]	0.031
Benzo(b)fluoranthene	<0.0853	<0.0931	***0.0327***	<0.00324	<0.00335	<0.00331	***5.58***	<1.78	***0.0951***	<0.00317	<0.00313	***0.0558***	***1.30***	***0.160***	0.0296	0.018 * / 0.02[n]	0.031
Benzo(k)fluoranthene	<0.0221	<0.0241	0.0142	<0.00372	<0.00385	<0.00380	***6.02***	<0.462	***0.0387***	<0.00363	<0.00359	0.0170	***1.96***	***0.0795***	0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)anthracene	<0.0316	<0.0345	***0.157***	<0.00417	<0.00432	<0.00427	***11.0***	<0.659	***0.392***	<0.00408	<0.00403	***0.134***	***3.87***	***0.336***	0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)pyrene	<0.0274	<0.0299	<0.00234	<0.00220	<0.00228	<0.00226	***6.51***	<0.571	***0.0698***	<0.00216	<0.00213	***0.0267***	***1.83***	***0.105***	0.0296	0.018 * / 0.02[n]	0.031
Indeno(1,2,3-cd)pyrene	<0.0295	<0.0322	<0.00267	<0.00252	<0.00261	<0.00258	***1.89***	<0.615	***0.0641***	<0.00247	<0.00244	<0.00241	***0.472 J***	<0.00252	0.0296	0.018 * / 0.02[n]	0.031
Dibenz(a,h)anthracene	<0.0305	<0.0333	<0.00306	<0.00289	<0.00299	<0.00295	***6.79***	<0.637	<0.00254	<0.00282	<0.00279	<0.00276	***3.27***	<0.00289	0.0296	0.018 * / 0.02[n]	0.031
Total cPAHs[r]	<0.0274	<0.0299	***0.0214***	<0.0022	<0.00228	<0.00226	***11.8***	<0.571	***0.131***	<0.00216	<0.00213	***0.0482***	***3.94***	***0.164***	0.0296	0.018 * / 0.02[n]	0.031

Notes:

(a) Well MW-8(R) was installed in May 2000 as a replacement for MW-8, which was damaged. Well MW-28(R) was installed in February 2006 as a replacement for MW-28, which was damaged during construction activities in the 18th Street right-of-way.

(b) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(c) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(d) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(e) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-G and NWTPH-Dx(extended) with silica gel cleanup.

(f) "---" Denotes sample was not analyzed for the listed analyte

(g) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.

(h) "NA" denotes no cleanup level established.

(i) Results in the diesel organics range are primarily due to overlap from a gasoline range product (Laboratory note D-08).

(j) The sample chromatographic pattern does not resemble the fuel standard used for quantitation (Laboratory note D-06).

(k) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode (where appropriate). Non-detected analytes are reported to the MDL.

(l) "J" denotes an analyte detected at a concentration between the method reporting limit (MRL) and the method detection limit (MDL).

(m) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C using SIM mode (where appropriate). Non-detected analytes are reported to the MDL.

(n) Practical quantitation limit (PQL) (Ecology 2001b).

(o) The total hydrocarbon result in this sample is primarily due to an individual compound eluting in the volatile hydrocarbon range (Laboratory note G-03).

(p) The chromatogram for this sample does not resemble a typical gasoline pattern (Laboratory note G-02).

(q) The heavy oil range organics present are due to hydrocarbons eluting primarily in the diesel range (Laboratory note D-10).

(r) Total cPAHs based on benzo(a)pyrene equivalent values. Individual cPAH concentrations were multiplied by toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). TEFs are summarized on Table 2A-A. Non-detected cPAH analytes were not included in the summation.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

mg/l = milligrams per liter

µg/l = micrograms per liter

TABLE 3

MARCH 2008
GROUNDWATER MONITORING WELL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Groundwater Sample Designation																		Proposed Cleanup Level[b]
	MW-8(R)[a]		MW-10		MW-11		MW-14		MW-15		MW-16		MW-17		MW-18		MW-19		
	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	
TPHs (mg/l)[c]																			
Gasoline-range hydrocarbons	17.0	---[d]	0.490	---	0.270	---	<0.100[e]	---	<0.100	---	<0.100	---	<0.100	---	6.50	---	<0.100	---	NA[f]
Diesel-range hydrocarbons	9.90[g]	---	4.30[g]	---	1.10[g]	---	0.071[g]	---	<0.050	---	<0.050	---	<0.050	---	9.50[g]	---	<0.050	---	NA
Oil-range hydrocarbons	<0.270	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	NA
PAHs (µg/l)[i]																			
Naphthalene	3,600	2,900	1.6	1.3	18	13	0.26	0.18	0.036	0.036	0.023	0.026	0.24	0.21	***5,800***	4,400	<0.02	0.042	4,940[k]
Acenaphthylene	5.9	3.8	0.19	0.24	0.84	0.55	0.084	0.071	0.025	0.023	<0.02	<0.02	0.047	0.046	1.4	1.2	<0.02	<0.02	NA
Acenaphthene	170	140	34	31	120	98	10	8.2	3.5	3.0	0.57	0.48	6.20	5.6	180	160	0.17	0.14	643[k]
Fluorene	71	59	18	16	84	73	4.1	3.4	1.8	1.6	<0.02	<0.02	2.8	2.6	84	78	<0.02	<0.02	3,460[k]
Phenanthrene	55	44	18	17	87	79	2.8	2.4	0.28	0.27	<0.02	<0.02	0.25	0.25	88	87	<0.02	<0.02	NA
Anthracene	7.1	3.7	3.2	3.8	16	12	0.45	0.35	0.17	0.12	<0.02	<0.02	0.39	0.32	9.3	8.0	<0.02	<0.02	25,900[k]
Fluoranthene	6.7	3.5	6.1	5.5	15	13	1.3	1.0	0.36	0.31	<0.02	<0.02	0.77	0.71	7.7	6.3	<0.02	<0.02	90.2[k]
Pyrene	4.2	2.1	4.1	3.7	10	8.3	0.84	0.68	0.23	0.19	<0.02	<0.02	0.51	0.46	4.3	3.3	<0.02	<0.02	2,590[k]
Benzo(g,h,i)perylene	<0.2	<0.02	0.032	0.031	<0.2	0.063	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	<0.02	NA
cPAHs (µg/l)[i]																			
Benzo(a)anthracene	0.59	0.072	0.41	0.40	0.68	0.50	0.067	0.052	0.026	<0.02	<0.02	<0.02	0.049	0.042	<0.2	0.048	<0.02	<0.02	NA
Chrysene	0.56	0.072	0.37	0.37	0.48	0.39	0.065	0.049	0.027	<0.02	<0.02	<0.02	0.043	0.032	<0.2	0.036	<0.02	<0.02	NA
Benzo(a)pyrene	<0.2	<0.02	0.16	0.18	<0.2	0.18	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	<0.02	NA
Benzo(b)fluoranthene	0.24	<0.02	0.21	0.21	0.23	0.22	<0.02	<0.02	0.021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	<0.02	NA
Benzo(k)fluoranthene	<0.2	<0.02	0.069	0.09	<0.2	0.089	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	<0.02	NA
Indeno(1,2,3-cd)pyrene	<0.2	<0.02	0.035	0.037	<0.2	0.068	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	<0.02	NA
Dibenz(a,h)anthracene	<0.2	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.2	<0.02	<0.02	<0.02	NA
Total cPAHs[m]	0.22	0.0079	0.24	0.26	0.23	0.27	0.0074	0.0057	0.0050	<0.02	<0.02	<0.02	0.0053	0.0045	0.15	0.0052	<0.02	<0.02	1.24[n]

Analyte	Groundwater Sample Designation																		Proposed Cleanup Level[b]
	MW-20		MW-21		MW-22		MW-23		MW-24		MW-25		MW-26		MW-27		MW-28(R)[a]		
	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	
TPHs (mg/l)[c]																			
Gasoline-range hydrocarbons	1.60	---	1.40	---	3.30	---	3.10	---	0.330	---	0.300	---	0.320	---	<0.100	---	0.640	---	NA[f]
Diesel-range hydrocarbons	2.10[g]	---	2.90[g]	---	0.220[g]	---	3.10	---	0.450	---	0.420	---	0.860	---	0.140	---	3.40	---	NA
Oil-range hydrocarbons	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	NA
PAHs (µg/l)[i]																			
Naphthalene	7.1	5.8	730	560	1,200	990	32	26	19	18	0.29	0.21	91	74.0	0.26	0.22	370	160	4,940[k]
Acenaphthylene	0.75	0.77	1.4	1.1	1.5	1.3	0.90	0.74	0.44	0.41	0.30	0.25	0.48	0.37	0.20	0.18	<2	1.4	NA
Acenaphthene	160	150	230	180	210	170	150	130	42	40	83	68	77	66	28	25	200	170	643[k]
Fluorene	82	75	120	100	110	95	56	49	23	22	15	13	48	42	10	9.0	100	92	3,460[k]
Phenanthrene	68	66	150	120	110	99	52	48	2.1	2.2	1.1	1.0	47	42	1.1	0.920	130	120	NA
Anthracene	3.4	3.4	14	9.5	16	13	5.5	4.5	4.0	3.6	0.14	0.096	4.1	2.7	<0.02	<0.02	13	11	25,900[k]
Fluoranthene	1.9	1.9	20	14	13	11	8.3	7	7.4	7.1	0.13	0.12	<10	<10	2.1	2.0	22	18	90.2[k]
Pyrene	0.88	0.86	14	9.5	8.0	6.9	5.1	5.0	4.8	5.0	0.087	0.078	4.7	4.2	1.3	1.2	14	11	2,590[k]
Benzo(g,h,i)perylene	<0.2	<0.02	<0.2	0.021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.026	<0.02	NA
cPAHs (µg/l)[i]																			
Benzo(a)anthracene	<0.2	<0.02	1.3	0.52	0.49	0.36	0.32	0.220	0.42	0.31	<0.02	<0.02	0.16	0.12	0.066	0.047	0.77	0.49	NA
Chrysene	<0.2	<0.02	1.0	0.39	0.47	0.35	0.30	0.21	0.34	0.31	<0.02	<0.02	0.15	0.11	0.061	0.035	0.56	0.36	NA
Benzo(a)pyrene	<0.2	<0.02	0.50	0.13	0.094	0.079	0.022	<0.02	0.043	0.023	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.17	0.067	NA
Benzo(b)fluoranthene	<0.2	<0.02	0.66	0.18	0.13	0.099	0.031	<0.02	0.061	0.038	<0.02	<0.02	0.026	<0.02	<0.02	<0.02	0.21	0.069	NA
Benzo(k)fluoranthene	<0.2	<0.02	0.26	0.055	0.041	0.036	<0.02	<0.02	0.025	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.077	0.035	NA
Indeno(1,2,3-cd)pyrene	<0.2	<0.02	<0.2	0.028	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.036	<0.02	NA
Dibenz(a,h)anthracene	<0.2	<0.02	<0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NA
Total cPAHs[m]	0.15	<0.02	0.75	0.21	0.16	0.13	0.060	0.024	0.097	0.061	<0.02	<0.02	0.020	0.013	0.0072	0.0051	0.28	0.13	1.24[n]

TABLE 3

MARCH 2008
GROUNDWATER MONITORING WELL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Groundwater Sample Designation																Proposed Cleanup Level[(b)]
	MW-29		MW-30		MW-31		MW-100 (MW-31 dup)		MW-32		MW-33		MW-34		MW-35		
	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered			
TPHs (mg/l)[(c)]																	
Gasoline-range hydrocarbons	0.220	---	2.60	---	0.200	---	0.210	---	0.210	---	<0.100	---	<0.100	---	<0.100	---	NA[(f)]
Diesel-range hydrocarbons	0.390	---	4.40[(g)]	---	1.80	---	1.90	---	0.180	---	<0.050	---	<0.050	---	<0.050	---	NA
Oil-range hydrocarbons	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	<0.250	---	NA
PAHs (µg/l)[(i)]																	
Naphthalene	0.46	0.34	790	630	<2	0.56	<2	0.54	0.16	0.12	0.036	0.041	<0.02	<0.02	0.059	0.053	4,940[(k)]
Acenaphthylene	0.32	0.28	1.8	1.9	<2	0.91	<2	0.87	<0.02	0.026	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NA
Acenaphthene	31	29	390	330	190	170	200	180	12	9.8	2.8	3.0	<0.02	<0.02	0.15	0.13	643[(k)]
Fluorene	12	12	140	120	98	90	100	93	0.026	0.021	0.051	0.054	<0.02	<0.02	<0.02	<0.02	3,460[(k)]
Phenanthrene	15	14.000	56	49	110	110	120	110	0.034	<0.02	0.39	0.43	<0.02	<0.02	<0.02	<0.02	NA
Anthracene	4.1	3.0	4.0	<10	14	12	14	13	<0.02	<0.02	0.18	0.11	<0.02	<0.02	<0.02	<0.02	25,900[(k)]
Fluoranthene	6.0	5.6	2.9	<10	22	19	23	21	<0.02	<0.02	0.38	0.41	<0.02	<0.02	<0.02	<0.02	90.2[(k)]
Pyrene	3.7	3.6	1.9	<10	15	13	16	15	<0.02	<0.02	0.43	0.46	<0.02	<0.02	0.041	0.037	2,590[(k)]
Benzo(g,h,i)perylene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NA
cPAHs (µg/l)[(l)]																	
Benzo(a)anthracene	0.26	0.18	<0.2	<0.02	0.77	0.57	0.87	0.62	<0.02	<0.02	0.031	<0.02	<0.02	<0.02	<0.02	<0.02	NA
Chrysene	0.25	0.18	<0.2	<0.02	0.46	0.37	0.55	0.39	<0.02	<0.02	0.040	0.032	<0.02	<0.02	<0.02	<0.02	NA
Benzo(a)pyrene	0.048	<0.02	<0.02	<0.02	0.11	0.082	0.16	0.11	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NA
Benzo(b)fluoranthene	0.057	<0.02	<0.02	<0.02	0.15	0.10	0.22	0.15	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NA
Benzo(k)fluoranthene	0.025	<0.02	<0.02	<0.02	0.052	0.038	0.073	0.045	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NA
Indeno(1,2,3-cd)pyrene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NA
Dibenz(a,h)anthracene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NA
Total cPAHs[(m)]	0.085	0.020	0.011	<0.02	0.21	0.16	0.28	0.20	<0.02	<0.02	0.0035	0.00032	<0.02	<0.02	<0.02	<0.02	1.24[(n)]

Notes:

(a) Well MW-8(R) was installed in May 2000 as a replacement for MW-8, which was damaged. Well MW-28(R) was installed in February 2006 as a replacement for MW-28, which was damaged during construction activities in the 18th Street right-of-way.
(b) Proposed site cleanup levels based on Kennedy/Jenks Consultants' 2007 *Cleanup Level Evaluation* report submitted to Ecology under separate cover.
(c) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-G and NWTPH-Dx with silica gel cleanup.
(d) "---" Denotes sample was not analyzed for the listed analyte
(e) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.
(f) "NA" denotes cleanup level is either not available or not appropriate.
(g) Laboratory note 'x': "The pattern of peaks present is not indicative of diesel".
(i) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode (where appropriate). Non-detected analytes are reported to the MDL.
(k) Cleanup level based on the Model Toxics Control Act (MTCA) (WAC 173-340) Method B surface water cleanup level based on Ecology's online CLARC database.
(l) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C using SIM mode (where appropriate).
(m) Total cPAHs based on benzo(a)pyrene equivalent values. Individual cPAH concentrations were multiplied by toxicity equivalency factors (TEFs, see Table 1A) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation if the reporting limit was at the practical quantitation limit (PQL) of 0.02. A value of one-half the reporting limit was used (prior to TEF adjustment) for non-detected analytes with reporting limits above the PQL.
(n) Modified cleanup level for total cPAHs based on the Ambient Water Quality Criteria (AWQC) for consumption of organisms only (EPA 2004) pursuant to Section 304(a)(1) of the Clean Water Act discussed in Kennedy/Jenks Consultants' 2007 *Cleanup Level Evaluation* report.

Analytes detected in samples at concentrations exceeding the proposed cleanup level values are shown in bold and italics.

mg/l = milligrams per liter
µg/l = micrograms per liter

TABLE 3A

MARCH 2005 OFF-PROPERTY INVESTIGATION
SOIL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)														MTCA Method C Industrial Soil Cleanup Level[a]
	B24 9-10	B24 15-16	B24 30.5-31.5	B25 14-15	B25 30-31	B26 6.5-7.5	B26 18-19	B26 25-26	B27 7-8	B27 22-23	B27 24.5-25.5	B28 6-7	B28 11-12	B28 23.5-24.5	
TPHs (mg/kg)[b]															
Gasoline-range Hydrocarbon	<5.00[c]	***309*** [d]	<5.00	<5.00	***83.8*** [d]	<5.00	<5.00	***69.6*** [d]	<5.00	<5.00	***2,720*** [d]	<5.00	28.6[d]	***172*** [d]	100/30[e]
Diesel-range Hydrocarbon	<10.0	409	22.3	16.9	***9,790***	162[f]	801	142	92.3[f]	68.7	***8,750***	686[f]	24.7	238	2,000[e]
Oil-range Hydrocarbon	<25.0	<250	<25.0	<25.0	1,570	268	173	<25.0	258	<25.0	<1,940	1,620	<25.0	<49.3	2,000[e]
PAHs (mg/kg)[h]															
Naphthalene	<0.0100	50.9	0.239	0.344	25.7	0.181	7.63	13.7	0.0910	0.561	2,410	<0.330	1.16	33.5	7.00E+04
1-Methylnaphthalene	<0.0100	45.3	0.606	0.609	97.5	0.0366	5.57	3.07	0.123	0.541	437	<0.330	0.623	13.4	NA[i]
2-Methylnaphthalene	<0.0100	62.6	0.380	0.0166	162	0.0616	1.40	5.79	0.181	0.700	872	<0.330	0.229	20.1	NA
Acenaphthylene	<0.0100	0.363	<0.0500	<0.0100	<1.65	0.0427	1.23	<0.330	0.0692	<0.0100	15.5	<0.330	0.0153	<0.656	NA
Acenaphthene	<0.0100	23.3	1.86	0.498	126	0.0122	19.4	3.82	0.160	0.571	597	<0.330	0.518	23.7	2.10E+05
Fluorene	<0.0100	16.8	2.08	0.170	108	0.0152	33.4	3.67	0.135	0.728	638	<0.330	0.161	29.2	1.40E+05
Phenanthrene	0.0215	32.4	4.59	0.0388	361	0.217	178	9.60	0.493	1.65	1,790	<0.330	0.180	85.7	NA
Anthracene	<0.0100	6.76	0.629	0.0145	58.2	0.0384	64.1	1.18	0.165	0.0771	163	<0.330	0.0784	7.00	1.05E+06
Fluoranthene	0.0162	9.13	1.72	0.0186	148	0.250	137	2.69	0.513	0.0623	626	0.543	0.106	30.0	1.40E+05
Pyrene	0.0127	7.50	1.28	0.0209	134	0.228	101	2.18	0.587	0.0308	450	0.952	0.0831	16.7	1.05E+05
Benzo(g,h,i)perylene	0.0216	<0.330	<0.0500	<0.0100	7.29	0.0397	7.75	<0.330	0.272	<0.0100	11.2	0.344	<0.0100	<0.656	NA
cPAHs (mg/kg)[j]															
Chrysene	0.0280	1.27	0.262	0.0190	***35.5***	0.148	***48.7***	0.531	0.505	<0.0100	***92.8***	1.05	0.0248	3.53	18
Benzo(b)fluoranthene	0.0239	0.366	0.118	<0.0100	15.6	0.116	15.9	<0.330	0.447	<0.0100	***33.1***	0.759	0.0134	0.915	18
Benzo(k)fluoranthene	0.0299	0.383	0.151	0.0203	17.9	0.0939	17.1	<0.330	0.471	<0.0100	***34.0***	0.883	0.0229	0.858	18
Benzo(a)anthracene	<0.0100	1.41	0.264	<0.0100	***36.9***	0.0595	***34.6***	0.539	0.300	<0.0100	***102***	0.711	0.0182	3.91	18
Benzo(a)pyrene	0.0143	0.501	0.0951	<0.0100	***21.1***	0.0668	***20.3***	<0.330	0.409	<0.0100	***37.3***	1.58	0.0153	0.824	18
Indeno(1,2,3-cd)pyrene	0.0174	<0.330	<0.0500	<0.0100	6.64	0.0341	7.90	<0.330	0.253	<0.0100	10.8	1.04	<0.0100	<0.656	18
Dibenz(a,h)anthracene	<0.0100	<0.330	<0.0500	<0.0100	3.11	0.0131	3.44	<0.330	0.112	<0.0100	4.86	<0.330	<0.0100	<0.656	18
Total cPAHs (mg/kg)[k]	0.0217	0.730	0.151	0.0022	***30.4***	0.104	***29.7***	0.0591	0.606	<0.0100	***58.2***	1.93	0.0210	1.43	18

TABLE 3A

MARCH 2005 OFF-PROPERTY INVESTIGATION
SOIL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)															MTCA Method C Industrial Soil Cleanup Level[a]
	B29 6.5-7.5	B29 11-12	B29 22.5-23.5	B30 5.5-6.5	B30 11-12	B30 22-23	B31 6-7	B31 19-20	B31 24-25	B32 6-7	B32 11-12	B32 19-20	B33 6-7	B33 18-19	B33 20.5-21.5	
TPHs (mg/kg)[b]																
Gasoline-range Hydrocarbon	<5.00[c]	<5.00	***1,420*** [d]	<10.6	<5.00	14.4[d]	<5.00	24.7[d]	***50.8*** [d]	<5.00	<10.4	28.6[d]	<5.00	<5.00	<5.00	100/30[e]
Diesel-range Hydrocarbon	61.5[f]	291[f]	***3,920*** [g]	<21.1	25.2	159	163[f]	1,140	213	14.2	112[f]	***3,650*** [f]	16.3	<10.0	<10.0	2,000[e]
Oil-range Hydrocarbon	116	217	<1,000	<52.9	<25.0	<49.0	229	162	30.5	<25.0	119	1,310	<25.0	<25.0	<25.0	2,000[e]
PAHs (mg/kg)[h]																
Naphthalene	<0.330	1.20	415	0.0297	0.188	<0.643	<0.330	9.29	17.7	0.0741	0.327	8.27	0.0454	<0.0100	<0.0100	7.00E+04
1-Methylnaphthalene	0.0706	1.15	114	<0.0211	0.0468	5.97	<0.330	22.9	4.91	0.0356	0.144	31.1	0.0683	0.0381	0.0593	NA[i]
2-Methylnaphthalene	<0.330	0.711	168	<0.0211	0.0572	5.25	<0.330	2.10	7.77	0.0300	0.0947	25.3	0.0492	0.0151	<0.0100	NA
Acenaphthylene	<0.330	0.536	<6.51	<0.0211	0.0181	<0.643	0.351	1.27	0.360	<0.0100	0.0521	<6.56	<0.0100	<0.0100	<0.0100	NA
Acenaphthene	<0.330	3.06	123	<0.0211	0.0290	14.9	<0.330	50.6	8.30	0.0909	0.193	83.2	<0.0100	0.0876	0.408	2.10E+05
Fluorene	<0.330	2.80	138	<0.0211	0.0363	15.8	<0.330	58.9	7.31	0.0542	0.102	43.7	<0.0100	0.0986	<0.0100	1.40E+05
Phenanthrene	<0.330	5.20	376	0.0552	0.0869	47.5	0.734	215	26.2	0.0634	0.463	755	0.0702	0.0547	<0.0100	NA
Anthracene	<0.330	12.9	45.7	0.0447	0.0285	13.7	1.19	66.4	4.31	0.0262	0.157	255	0.0124	0.0244	<0.0100	1.05E+06
Fluoranthene	0.570	7.53	134	0.0914	0.0612	22.0	2.87	101	11.5	0.0653	0.362	1,000	0.0293	0.0269	<0.0100	1.40E+05
Pyrene	1.04	7.31	97.3	0.0972	0.0344	16.5	5.02	80.8	10.2	0.0366	0.411	813	0.0279	0.0164	<0.0100	1.05E+05
Benzo(g,h,i)perylene	0.576	2.57	<6.51	0.0361	<0.0100	0.763	4.53	3.37	0.577	0.0222	0.934	82.3	0.0162	<0.0100	<0.0100	NA
cPAHs (mg/kg)[j]																
Chrysene	1.17	7.10	***23.2***	0.0689	0.0244	4.26	7.16	***18.1***	2.93	0.0273	0.369	***318***	0.0323	<0.0100	<0.0100	18
Benzo(b)fluoranthene	0.896	3.57	7.83	0.0533	0.0125	1.72	5.85	8.02	1.30	0.0240	0.350	***153***	0.0243	<0.0100	<0.0100	18
Benzo(k)fluoranthene	0.657	3.57	7.32	0.0652	0.0249	1.82	4.65	8.36	1.35	0.0345	0.248	***170***	0.0340	<0.0100	<0.0100	18
Benzo(a)anthracene	0.723	4.33	***25.1***	0.0423	0.0154	4.47	3.69	***19.2***	2.72	0.0156	0.171	***279***	0.0211	<0.0100	<0.0100	18
Benzo(a)pyrene	0.832	4.79	8.18	0.0383	0.0119	2.20	6.37	10.6	1.69	0.0184	0.241	***202***	0.0227	<0.0100	<0.0100	18
Indeno(1,2,3-cd)pyrene	0.520	2.11	<6.51	0.0298	<0.0100	0.698	3.84	3.44	0.542	0.0166	0.371	***76.2***	0.0144	<0.0100	<0.0100	18
Dibenz(a,h)anthracene	<0.330	0.808	<6.51	<0.0211	<0.0100	<0.643	1.53	1.70	<0.330	<0.0100	0.0990	***32.2***	<0.0100	<0.0100	<0.0100	18
Total cPAHs (mg/kg)[k]	1.12	6.54	12.4	0.0580	0.0174	3.11	8.86	15.4	2.31	0.0277	0.398	***286***	0.0324	<0.0100	<0.0100	18

Notes:

(a) Model Toxics Control Act (MTCA) Method C industrial soil cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).
(b) Samples were analyzed for diesel- and oil-range hydrocarbons by Ecology Method NWTPH-Dx(extended) with silica gel cleanup, and gasoline-range hydrocarbons by Ecology Method NWTPH-G.
(c) "<" denotes analyte was not detected at the indicated laboratory reporting limit.
(d) Lab note G-02: The chromatogram for this sample does not resemble a typical gasoline pattern.
(e) Total petroleum hydrocarbon (TPH) screening levels based on MTCA Method A industrial soil cleanup levels (Ecology 2001a). For gasoline mixtures without benzene and total ethylbenzene, toluene and xylenes less than 1% of the gasoline mixture the cleanup level is 100 mg/kg. For all other gasoline mixtures, the cleanup level is 30 mg/kg.
(f) Lab note D-15: Hydrocarbon pattern most closely resembles a weathered Heavy Fuel Oil product.
(g) Lab note D-06: The sample chromatographic pattern does not resemble the fuel standard used for quantitation.
(h) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode (where appropriate).
(i) "NA" denotes no cleanup level established.
(j) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C using SIM mode (where appropriate).
(k) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

Analytes detected in samples at concentrations exceeding one or more cleanup levels or comparison levels are shown in bold and italics.
mg/kg = milligrams per kilogram
bgs = below ground surface

TABLE 3B

MARCH 2005 OFF-PROPERTY INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Reconnaissance Groundwater Sample Designation										MTCA Method B Surface Water[a]	NRWQC Human Health Consumption of Organisms[b]	NTR Human Health Consumption of Organisms[c]
	B24 RGW	B25 RGW	B26 RGW	B27 RGW	B28 RGW	B29 RGW	B30 RGW	B31 RGW	B32 RGW	B33 RGW			
TPHs (mg/l)[d]													
Gasoline-range hydrocarbons	0.354[e]	1.27[e]	0.134[e]	8.16[e]	2.78[e]	6.71[e]	0.227[e]	10.4[e]	<0.050[f]	0.537[e]	NA[g]	NA	NA
Diesel-range hydrocarbons	1.88	3.80	0.637	6.13	2.81	3.14	0.399	22.1	0.664	0.639	NA	NA	NA
Oil-range hydrocarbons	<0.500	<0.581	<0.500	<0.685	<0.500	<0.602	<0.500	3.10	<0.500	<0.500	NA	NA	NA
PAHs (µg/l)[h]													
Naphthalene	2.98	39.8	17.7	4,310	1,070	2,730	3.33	***17,400***	6.83	1.52	4,940	NA	NA
1-Methylnaphthalene	20.6	175	19.8	338	224	237	35.9	2,270	29.3	73.5	NA	NA	NA
2-Methylnaphthalene	13.3	203	5.59	462	199	322	15.7	3,340	15.1	5.76	NA	NA	NA
Acenaphthylene	<0.500	1.54	1.18	5.15	<10	4.43	0.980	206	1.39	1.21	NA	NA	NA
Acenaphthene	45.9	171	48.3	243	185	224	60.6	***3,120***	59.5	108	643	990	NA
Fluorene	39.7	103	34.2	120	109	121	18.5	2,480	18.2	18.1	3,460	5,300	14,000
Phenanthrene	83.2	229	51.8	115	121	122	18.7	8,590	61.3	2.42	NA	NA	NA
Anthracene	9.25	24.2	13.7	7.42	12.6	15.2	2.84	1,370	14.9	1.11	25,900	40,000	110,000
Fluoranthene	29.0	75.6	21.5	20.6	23.3	24.5	5.29	***4,170***	60.4	0.505	90.2	140	370
Pyrene	20.1	60.2	18.0	11.4	20.6	17.4	4.71	***3,390***	52.8	<0.500	2,590	4,000	11,000
Benzo(g,h,i)perylene	<0.500	1.54	1.18	<1.00	<10.0	<1.00	<0.500	285	3.37	<0.500	NA	NA	NA
cPAHs (µg/l)[i]													
Chrysene	***3.26***	***12.3***	***6.86***	***5.98***	<10.0	***2.93***	***2.75***	***928***	***12.7***	<0.500	0.0296	0.018 * / 0.02[j]	0.031
Benzo(b)fluoranthene	***1.39***	***7.03***	***3.53***	***2.06***	<10.0	<1.00	***1.08***	***510***	***8.71***	<0.500	0.0296	0.018 * / 0.02[j]	0.031
Benzo(k)fluoranthene	***2.48***	***8.13***	***2.16***	***1.03***	<10.0	<1.00	***0.686***	***519***	***8.22***	<0.500	0.0296	0.018 * / 0.02[j]	0.031
Benzo(a)anthracene	***3.52***	***9.89***	***3.92***	***2.06***	<10.0	***2.83***	***0.882***	***1,090***	***11.3***	<0.500	0.0296	0.018 * / 0.02[j]	0.031
Benzo(a)pyrene	***1.11***	***3.96***	***2.65***	<1.00	<10.0	<1.00	<0.500	***654***	***8.12***	<0.500	0.0296	0.018 * / 0.02[j]	0.031
Indeno(1,2,3-cd)pyrene	<0.500	***1.32***	***1.08***	<1.00	<10.0	<1.00	<0.500	***246***	***2.67***	<0.500	0.0296	0.018 * / 0.02[j]	0.031
Dibenz(a,h)anthracene	<0.500	<1.00	***0.784***	<1.00	<10.0	<1.00	<0.500	***100***	***1.39***	<0.500	0.0296	0.018 * / 0.02[j]	0.031
Total cPAHs (µg/l)[k]	***1.88***	***6.720***	***4.10***	***0.575***	<10.0	***0.312***	***0.292***	***940***	***11.90***	<0.500	0.0296	0.018 * / 0.02[j]	0.031

Notes:

(a) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(c) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(d) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-G and NWTPH-Dx(extended) with silica gel cleanup.

(e) Lab note G-02: The chromatogram for this sample does not resemble a typical gasoline pattern.

(f) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.

(g) "NA" denotes no cleanup level established.

(h) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode (where appropriate).

(i) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C using SIM mode (where appropriate).

(j) Practical quantitation limit (PQL) (Ecology 2001b).

(k) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

mg/l = milligrams per liter

µg/l = micrograms per liter

TABLE 3C

MARCH 2005 OFF-PROPERTY INVESTIGATION
GROUNDWATER MONITORING WELL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Groundwater Sample Designation						MTCA Method B Surface Water[a]	NRWQC Human Health Consumption of Organisms[b]	NTR Human Health Consumption of Organisms[c]
	MW-26		MW-27		MW-28				
	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered			
TPHs (mg/l)[d]									
Gasoline-range hydrocarbons	2.31[e]	---[f]	<0.0500[g]	---	0.19[e]	---	NA[h]	NA	NA
Diesel-range hydrocarbons	1.78[i]	---	<0.250	---	1.15[i]	---	NA	NA	NA
Oil-range hydrocarbons	<0.500	---	<0.500	---	<0.500	---	NA	NA	NA
PAHs (µg/l)[j]									
Naphthalene	987	990	1.58	1.33	23.1	14.8	4,940	NA	NA
1-Methylnaphthalene	169	99.1	0.596	0.177	81.6	33.5	NA	NA	NA
2-Methylnaphthalene	169	65.4	0.159	<0.100	6.09	2.00	NA	NA	NA
Acenaphthylene	<0.100	<0.100	<0.100	<0.100	<0.100	0.538	NA	NA	NA
Acenaphthene	179	80.6	12.7	0.352	126	39.6	643	990	NA
Fluorene	127	2.72	7.69	<0.100	66.4	4.84	3,460	5,300	14,000
Phenanthrene	134	0.922	0.748	<0.100	105	0.708	NA	NA	NA
Anthracene	10.9	0.443	1.26	0.198	11.5	0.617	25,900	40,000	110,000
Fluoranthene	15.9	0.621	2.00	0.133	15.3	0.508	90.2	140	370
Pyrene	8.49	0.460	1.36	0.118	9.23	0.362	2,590	4,000	11,000
Benzo(g,h,i)perylene	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	NA	NA	NA
cPAHs (µg/l)[k]									
Chrysene	***0.610***	***0.109***	<0.100	<0.100	***0.447***	<0.100	0.0296	0.018 * / 0.02[l]	0.031
Benzo(b)fluoranthene	***0.121***	<0.100	<0.100	<0.100	<0.100	<0.100	0.0296	0.018 * / 0.02[l]	0.031
Benzo(k)fluoranthene	***0.437***	<0.100	<0.100	<0.100	<0.100	<0.100	0.0296	0.018 * / 0.02[l]	0.031
Benzo(a)anthracene	***0.602***	***0.122***	***0.105***	<0.100	***0.480***	***0.140***	0.0296	0.018 * / 0.02[l]	0.031
Benzo(a)pyrene	***0.127***	<0.100	<0.100	<0.100	<0.100	<0.100	0.0296	0.018 * / 0.02[l]	0.031
Indeno(1,2,3-cd)pyrene	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	0.0296	0.018 * / 0.02[l]	0.031
Dibenz(a,h)anthracene	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	0.0296	0.018 * / 0.02[l]	0.031
Total cPAHs (µg/l)[m]	***0.249***	0.0133	0.0105	<0.100	***0.0525***	0.014	0.0296	0.018 * / 0.02[l]	0.031

Notes:

(a) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(c) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(d) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-G and NWTPH-Dx(extended) with silica gel cleanup.

(e) Lab note G-02: The chromatogram for this sample does not resemble a typical gasoline pattern.

(f) "---" Denotes sample was not analyzed for the listed analyte

(g) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.

(h) "NA" denotes no cleanup level established.

(i) Lab note D-06: The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

(j) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode (where appropriate).

(k) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C using SIM mode (where appropriate).

(l) Practical quantitation limit (PQL) (Ecology 2001b).

(m) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

mg/l - milligrams per liter

µg/l - micrograms per liter

TABLE 4A

MARCH 2004 OFF-PROPERTY INVESTIGATION
SOIL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)																		MTCA Method C Industrial Soil Cleanup Level[a]
	B-18 6-6.5	B-18 12-13	B-18 24-25	B-19 9-10	B-19 14-15	B-19 21-22	B-20 7-8	B-20 10-11	B-20 19-20	B-21 8-9	B-21 13-15	B-21 18-19	B-22 6-7	B-22 11-12	B-22 19-20	B-23 6.5-7.5	B-23 9-10	B-23 18-20	
TPHs (mg/kg)[b]																			
Diesel-range Hydrocarbon	19.0[c]	18.3[d]	<10.0[e]	180	15.1[c]	***5,990*** [f]	<20.4	38.1	36.3	30.6	<10.0	474	98.6	241	56.1[f]	49.9	***3,010***	<10.0	2000[g]
Oil-range Hydrocarbon	<25.0	32.6	<25.0	28.0	<25.0	680	<51.0	<25.0	<25.0	38.2	<25.0	43.9	79.9	63.5	<25.0	<25.0	912	<25.0	2000[g]
Gasoline-range Hydrocarbon	<5.00	<5.00	<5.00	***554*** [h]	19.5	***2,500*** [h]	26.9[h]	***430*** [h]	***1,270*** [h]	33.1[h]	<5.00	66.7[h]	<11.7	21.5[h]	63.0[i]	7.43	***235*** [i]	13.9[h]	100/30[g]
PAHs (mg/kg)[j]																			
Naphthalene	0.0872	0.873	0.332	8.66	0.375	1,160	0.235	17.2	7.89	0.402	0.234	45.2	0.731	0.918	<0.100	0.120	1.78	<0.100	7.00E+04
1-Methylnaphthalene	0.0521	0.262	2.84	3.66	0.411	360	<0.204	6.01	1.39	0.389	0.598	22.0	0.373	0.828	0.637	<0.100	0.801	<0.100	NA[k]
2-Methylnaphthalene	0.0612	0.376	0.728	3.10	0.672	642	<0.204	2.92	2.92	0.299	0.238	32.6	0.560	0.563	<0.100	<0.100	0.925	<0.100	NA
Acenaphthylene	<0.0100	0.221	<0.0100	0.0809	0.0105	<10.3	<0.204	0.0734	<0.0100	0.0267	<0.0100	0.346	2.04	0.282	0.136	<0.100	1.07	<0.100	NA
Acenaphthene	<0.0100	0.841	1.92	2.37	0.348	384	<0.204	3.32	1.22	0.284	0.550	29.5	0.326	1.26	8.62	<0.100	1.73	0.174	2.10E+05
Fluorene	0.0143	0.817	0.702	1.13	0.600	341	<0.204	1.71	3.89	0.222	0.507	28.9	0.575	1.87	11.6	<0.100	1.25	<0.100	1.40E+05
Phenanthrene	0.0482	6.41	0.264	1.18	0.784	920	<0.204	2.40	5.23	0.407	0.554	73.7	1.24	5.15	33.6	<0.100	3.58	0.131	NA
Anthracene	<0.0100	1.25	0.0126	0.304	0.12	148	<0.204	0.702	1.33	0.146	0.0361	11.3	2.77	2.33	4.61	<0.100	5.82	<0.100	1.05E+06
Fluoranthene	0.0182	4.75	<0.0100	0.411	0.193	362	<0.204	1.20	1.61	0.276	0.0205	29.5	2.92	5.87	14.3	<0.100	27.0	0.105	1.40E+05
Pyrene	0.0273	5.52	<0.0100	0.377	0.131	301	<0.204	0.958	1.22	0.240	0.0238	24.0	4.17	3.92	8.80	<0.100	21.5	<0.100	1.05E+05
Benzo(g,h,i)perylene	0.0130	0.812	<0.0100	0.107	0.0158	16.1	<0.204	0.0683	0.015	0.0701	<0.0100	0.659	5.01	0.798	0.187	<0.100	20.4	<0.100	NA
cPAHs (mg/kg)[l]																			
Chrysene	0.0325	2.02	<0.0100	0.142	0.0412	***76.2***	<0.204	0.206	0.144	0.146	<0.0100	4.10	4.68	1.77	1.71	<0.100	***23.0***	<0.100	18
Benzo(b)fluoranthene	0.0521	2.10	<0.0100	0.194	0.057	***68.6***	<0.204	0.192	0.0967	0.181	<0.0100	5.00	9.09	1.55	0.959	<0.100	16.2	0.226	18
Benzo(k)fluoranthene	0.0299	0.597	<0.0100	0.0939	0.0245	***25.4***	<0.204	0.0557	0.0533	0.0709	<0.0100	2.72	3.64	0.319	0.340	<0.100	7.69	<0.100	18
Benzo(a)anthracene	0.0208	2.23	<0.0100	0.189	0.0482	***87.2***	<0.204	0.259	0.228	0.104	<0.0100	6.93	3.40	1.99	2.06	<0.100	12.8	<0.100	18
Benzo(a)pyrene	0.0286	1.74	<0.0100	0.186	0.043	***48.3***	<0.204	0.166	0.075	0.118	<0.0100	3.51	8.26	1.34	0.679	<0.100	15.8	0.122	18
Indeno(1,2,3-cd)pyrene	0.0156	0.867	<0.0100	0.115	0.0167	15.2	<0.204	0.0633	0.0175	0.0732	<0.0100	0.711	5.05	0.961	0.195	<0.100	17.6	<0.100	18
Dibenz(a,h)anthracene	0.0456	0.319	<0.0100	0.0678	0.0324	***31.3***	<0.204	0.0544	0.0317	0.0488	<0.0100	0.317	1.87	0.299	0.314	<0.100	<0.266	<0.100	18
Total cPAHs (mg/kg)[m]	0.059	2.47	<0.0100	0.274	0.071	***81.2***	<0.204	0.247	0.129	0.182	<0.0100	5.21	11.2	1.96	1.18	<0.100	***21.5***	0.145	18

Notes:

(a) Model Toxics Control Act (MTCA) Method C industrial soil cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) Samples were analyzed for diesel- and oil-range hydrocarbons by Ecology Method NWTPH-Dx(extended) with silica gel cleanup, and gasoline-range hydrocarbons by Ecology Method NWTPH-G.

(c) Hydrocarbon concentration result in this sample is partially due to one or more individual peaks eluting in the diesel/heavy oil range.

(d) Results in diesel organics range are primarily due to overlap from heavy oil range product.

(e) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(f) Sample chromatogram pattern does not resemble fuel standard used for quantitation.

(g) Total petroleum hydrocarbon (TPH) screening levels based on MTCA Method A industrial soil cleanup levels (Ecology 2001a). For gasoline mixtures without benzene and total ethylbenzene, toluene and xylenes less than 1% of the gasoline mixture the cleanup level is 100 mg/kg. For all other gasoline mixtures, the cleanup level is 30 mg/kg.

(h) Chromatogram for this sample does not resemble a typical gasoline pattern.

(i) Results reported in the gasoline range are primarily due to overlap from diesel range hydrocarbons.

(j) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.

(k) "NA" denotes no cleanup level established.

(l) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.

(m) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

Analytes detected in samples at concentrations exceeding one or more cleanup levels or comparison levels are shown in bold and italics.

mg/kg = milligrams per kilogram

bgs = below ground surface

TABLE 4B

MARCH 2004 OFF-PROPERTY INVESTIGATION
RECONNAISSANCE GROUNDWATER ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled						MTCA Method B Surface Water[a]	NRWQC Human Health Consumption of Organisms[b]	NTR Human Health Consumption of Organisms[c]
	B-18 3/10/2004	B-19 3/10/2004	B20 3/10/2004	B-21 3/11/2004	B-22 3/11/2004	B-23 3/11/2004			
TPHs (mg/l)[d]									
Gasoline-range hydrocarbons	2.91[e]	12.600[e]	22.500[e]	9.820[e]	2.410[e]	0.523[e]	NA[f]	NA	NA
Diesel-range hydrocarbons	1.28[g]	4.93[g]	12.20[g]	5.49[g]	4.21[g]	0.321[g]	NA	NA	NA
Oil-range hydrocarbons	<0.500[h]	<0.500	0.632[g]	<0.500	<0.500	<0.500	NA	NA	NA
PAHs (µg/l)[i]									
Naphthalene	36.0	***5,870***	***22,900***	4,330	1,100	74.0	4,940	NA	NA
1-Methylnaphthalene	275	<500	<1,000	<500	<200	66.1	NA	NA	NA
2-Methylnaphthalene	214	1,200	3,430	805	456	33.9	NA	NA	NA
Acenaphthylene	<10.0	<500	<1,000	<500	290	27.9	NA	NA	NA
Acenaphthene	159	***692***	***1,810***	554	***866***	76.9	643	990	NA
Fluorene	52.8	<500	1,220	<500	630	33.8	3,460	5,300	14,000
Phenanthrene	23.9	<500	3,440	644	1,790	30.1	NA	NA	NA
Anthracene	26.5	<500	<1,000	712	250	3.00	25,900	40,000	110,000
Fluoranthene	<10.0	<500	***1,080***	<500	***826***	5.07	90.2	140	370
Pyrene	<10.0	<500	<1,000	<500	635	3.40	2,590	4,000	11,000
Benzo(g,h,i)perylene	<10.0	<500	<1,000	<500	<200	<0.100	NA	NA	NA
cPAHs (µg/l)[j]									
Chrysene	<10.0	<500	<1,000	<500	<200	***0.253***	0.0296	0.018 * / 0.02[k]	0.031
Benzo(b)fluoranthene	<10.0	<500	<1,000	<500	<200	***0.0906***	0.0296	0.018 * / 0.02[k]	0.031
Benzo(k)fluoranthene	<10.0	<500	<1,000	<500	<200	***0.103***	0.0296	0.018 * / 0.02[k]	0.031
Benzo(a)anthracene	<10.0	<500	<1,000	<500	<200	***0.306***	0.0296	0.018 * / 0.02[k]	0.031
Benzo(a)pyrene	<10.0	<500	<1,000	<500	<200	***0.122***	0.0296	0.018 * / 0.02[k]	0.031
Indeno(1,2,3-cd)pyrene	<10.0	<500	<1,000	<500	<200	***0.0372***	0.0296	0.018 * / 0.02[k]	0.031
Dibenz(a,h)anthracene	<10.0	<500	<1,000	<500	<200	0.0180	0.0296	0.018 * / 0.02[k]	0.031
Total cPAHs (µg/l)[l]	<10.0	<500	<1,000	<500	<200	***0.185***	0.0296	0.018 * / 0.02[k]	0.031

Notes:

(a) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(c) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(d) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-G and NWTPH-Dx(extended) with silica gel cleanup.

(e) Chromatogram for this sample does not resemble a typical gasoline standard pattern.

(f) "NA" denotes no cleanup level established.

(g) Hydrocarbon concentration result in this sample is partially due to one or more individual peaks eluting in the diesel/heavy oil range.

(h) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.

(i) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.

(j) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.

(k) Practical quantitation limit (PQL) (Ecology 2001b).

(l) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

mg/l - milligrams per liter

µg/l - micrograms per liter

TABLE 4C

MARCH 2004 OFF-PROPERTY INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled				MTCA Method B Surface Water[a]	NRWQC Human Health Consumption of Organisms[b]	NTR Human Health Consumption of Organisms[c]
	MW-18 3/31/2004	MW-23 3/31/2004	MW-24 3/31/2004	MW-25 3/31/2004			
TPHs (mg/l)[d]							
Gasoline-range hydrocarbons	23.4	6.35	13.9	0.577	NA[e]	NA	NA
Diesel-range hydrocarbons	3.36	3.27	4.69	0.460	NA	NA	NA
Oil-range hydrocarbons	<0.500[f]	<0.500	<0.500	<0.500	NA	NA	NA
PAHs (µg/l)[g]							
Naphthalene	***7,490***	972	***6,600***	1.34	4,940	NA	NA
1-Methylnaphthalene	646	449	558	56.1	NA	NA	NA
2-Methylnaphthalene	684	488	868	6.56	NA	NA	NA
Acenaphthylene	2.08	1.33	6.29	<0.100[e]	NA	NA	NA
Acenaphthene	347	381	392	65.7	643	990	NA
Fluorene	148	137	168	11.4	3,460	5,300	14,000
Phenanthrene	124	135	168	0.744	NA	NA	NA
Anthracene	11.6	14.8	20.7	0.838	25,900	40,000	110,000
Fluoranthene	6.29	17.3	17.1	<0.100	90.2	140	370
Pyrene	3.46	9.75	12.2	<0.100	2,590	4,000	11,000
Benzo(g,h,i)perylene	<0.100	<0.100	<0.100	<0.100	NA	NA	NA
cPAHs (µg/l)[h]							
Chrysene	<0.100	***0.442***	***0.667***	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Benzo(b)fluoranthene	<0.100	***0.327***	***0.419***	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Benzo(k)fluoranthene	<0.100	<0.100	***0.152***	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Benzo(a)anthracene	<0.100	***0.577***	***0.800***	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Benzo(a)pyrene	<0.100	<0.100	<0.100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Indeno(1,2,3-cd)pyrene	<0.100	<0.100	<0.100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Dibenz(a,h)anthracene	<0.100	<0.100	<0.100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Total cPAHs[j]	<0.100	***0.0948***	***0.144***	<0.0100	0.0296	0.018 * / 0.02[i]	0.031

Notes:

(a) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(c) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(d) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-G and NWTPH-Dx(extended) with silica gel cleanup.

(e) "NA" denotes no cleanup level established.

(f) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.

(g) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.

(h) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.

(i) Practical quantitation limit (PQL) (Ecology 2001b).

(j) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.

Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

mg/l - milligrams per liter

µg/l - micrograms per liter

TABLE 4D

MARCH 2004 OFF-PROPERTY INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - DISSOLVED PAHs
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled				MTCA Method B Surface Water[a]	NRWQC Human Health Consumption of Organisms[b]	NTR Human Health Consumption of Organisms[c]
	MW-18 3/31/2004	MW-23 3/31/2004	MW-24 3/31/2004	MW-25 3/31/2004			
PAHs (µg/l)[d]							
Naphthalene	***5,360***	742	4,240	1.60	4,940	NA[e]	NA
1-Methylnaphthalene	305	252	221	10.4	NA	NA	NA
2-Methylnaphthalene	217	248	183	0.654	NA	NA	NA
Acenaphthylene	0.654	0.311	1.33	<0.100[f]	NA	NA	NA
Acenaphthene	142	177	103	10.5	643	990	NA
Fluorene	6.85	32.8	2.48	0.888	3,460	5,300	14,000
Phenanthrene	0.558	30.2	3.40	<0.100	NA	NA	NA
Anthracene	<0.100	2.29	0.827	0.786	25,900	40,000	110,000
Fluoranthene	<0.100	2.72	0.808	<0.100	90.2	140	370
Pyrene	<0.100	1.42	0.538	<0.100	2,590	4,000	11,000
Benzo(g,h,i)perylene	<0.100	<0.100	<0.100	<0.100	NA	NA	NA
cPAHs (µg/l)[g]							
Chrysene	<0.100	<0.100	<0.100	<0.0100	0.0296	0.018 * / 0.02[h]	0.031
Benzo(b)fluoranthene	<0.100	***0.194***	***0.231***	<0.0100	0.0296	0.018 * / 0.02[h]	0.031
Benzo(k)fluoranthene	<0.100	<0.100	<0.100	<0.0100	0.0296	0.018 * / 0.02[h]	0.031
Benzo(a)anthracene	<0.100	<0.100	<0.100	<0.0100	0.0296	0.018 * / 0.02[h]	0.031
Benzo(a)pyrene	<0.100	<0.100	<0.100	<0.0100	0.0296	0.018 * / 0.02[h]	0.031
Indeno(1,2,3-cd)pyrene	<0.100	<0.100	<0.100	<0.0100	0.0296	0.018 * / 0.02[h]	0.031
Dibenz(a,h)anthracene	<0.100	<0.100	<0.100	<0.0100	0.0296	0.018 * / 0.02[h]	0.031
Total cPAHs[i]	<0.100	0.0194	***0.0231***	<0.0100	0.0296	0.018 * / 0.02[i]	0.031

Notes:

(a) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(c) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(d) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode. Samples were field-filtered using a 0.45 micron cellulose acetate filter.

(e) "NA" denotes no cleanup level established.

(f) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.

(g) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM. Samples were field-filtered using a 0.45 micron cellulose acetate filter.

(h) Practical quantitation limit (PQL) (Ecology 2001b).

(i) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.
Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

µg/l - micrograms per liter

TABLE 5A

NOVEMBER-DECEMBER 2003 INVESTIGATION
SOIL ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)																	MTCA Method C Industrial Soil Cleanup Level[a]
	B-12 4-5	B-12 6.5-7.5	B-12 9-10	B-13 1-3	B-13 5-6	B-13 14-15	B-14 1-2	B-14 5-6	B-14 9-10	B-15 5-6	B-15 7-8	B-15 10-11	B-16 3-4	B-16 5-6	B-16 10-11	B-17 3-4	B-17 5-6	B-17 7-8	
TPHs (mg/kg)[b]																			
Diesel-range Hydrocarbon	1,910 (397)[c]	43.0 (21.8)	1,310 (866)	734 (264)	114 (41.8)	1,680 (1,020)[d]	374 (178)[d]	927 (279)[d]	436 (251)	266 (68.7)	12.8 (<10.0[e])	19.5 (<10.0)	<10.0 (<10.0)	457 (136)	139 (72.8)	<10.0 (<10.0)	138 (23.6)	361 (35.1)	2000[f]
Oil-range Hydrocarbon	***4,800*** (1,250)	64.7 (<25.0)	317 (<125)	1,080 (551)	159 (47.1)	166 (<98.0)	1,410 (705)	1,590 (349)	298 (91.7)	666 (217)	<25.0 (<25.0)	25.7 (<25.0)	<25.0 (<25.0)	642 (59.6)	29.4 (<25.0)	<25.0 (<25.0)	768 (73.5)	1,200 (<84.2)	2000[f]
Gasoline-range Hydrocarbon	8.84[g]	5.18	***331***[g]	<5.00[c]	<5.00	***469***[g]	<5.00	<13.5	14.5[g]	<11.5	<5.00	<5.00	<5.00	51.6[g]	***141***[g]	<5.00	<5.00	<16.8	100/30[f]
PAHs (mg/kg)[h]																			
Naphthalene	3.48	0.191	3.28	1.44	0.218	826	0.713	1.63	4.52	0.421	0.0605	0.0167	0.0725	11.0	22.3	0.0258	0.353	0.535	7.00E+04
Acenaphthylene	11.6	0.346	0.923	3.19	0.896	1.95	1.44	6.74	0.649	<0.115	<0.0100	0.0317	0.0178	0.208	0.217	0.0294	0.239	0.193	NA[i]
Acenaphthene	0.953	0.0577	17.4	<0.200	0.0565	140	<0.200	3.84	3.78	<0.115	<0.0100	0.0676	0.0220	4.05	4.08	0.0179	0.110	0.205	2.10E+05
Fluorene	2.42	<0.0500	14.1	0.592	0.262	115	0.238	4.67	2.97	<0.115	<0.0100	0.0626	0.0107	2.80	3.10	0.0129	0.105	0.193	1.40E+05
Phenanthrene	7.22	0.146	36.5	5.36	3.94	229	1.46	23.7	5.13	0.176	<0.0100	<0.0100	0.0554	3.15	4.73	0.0408	0.702	0.421	NA
Anthracene	5.72	0.457	9.96	1.91	1.32	60.2	0.699	23.3	3.00	0.130	<0.0100	0.0584	0.0185	0.806	1.15	0.0143	0.630	0.273	1.05E+06
Fluoranthene	35.3	0.129	22.3	12.5	10.4	106	4.61	54.7	4.42	0.352	<0.0100	0.0776	0.0469	1.20	1.37	0.0437	2.86	0.501	1.40E+05
Pyrene	23.7	0.169	19.4	11.2	17.3	97.2	3.95	71.8	4.30	0.566	0.0149	0.0759	0.0391	1.26	1.41	0.0430	3.99	0.614	1.05E+05
Benzo(g,h,i)perylene	12.6	0.271	0.982	4.77	4.33	2.30	2.24	14.5	1.16	1.06	0.0123	0.112	0.0171	0.117	<0.200	0.0315	0.998	0.216	NA
cPAHs (mg/kg)[j]																			
Chrysene	17.7	0.115	3.32	7.21	4.70	1.98	3.11	***29.6***	2.25	1.12	0.0526	0.0843	0.0206	0.911	1.10	0.0387	2.76	0.774	18
Benzo(b)fluoranthene	12.7	0.177	1.28	6.44	3.53	7.48	1.99	***18.9***	1.27	0.788	<0.0100	0.0826	0.0320	0.130	<0.200	0.0444	2.35	0.375	18
Benzo(k)fluoranthene	***19.0***	0.120	2.16	7.79	3.72	10.7	3.33	13.4	1.16	0.941	0.0307	0.0868	0.0156	0.494	0.512	0.0279	1.36	0.444	18
Benzo(a)anthracene	15.9	0.0843	4.26	7.32	4.65	***21.2***	2.50	***22.2***	1.38	0.474	<0.0100	0.0376	0.0156	0.221	0.264	0.0301	1.65	0.171	18
Benzo(a)pyrene	***19.5***	0.271	2.13	6.64	5.90	6.95	2.78	***22.7***	1.75	1.14	<0.0100	0.104	0.0320	0.143	<0.200	0.0494	1.66	0.250	18
Indeno(1,2,3-cd)pyrene	12.8	0.226	0.882	4.74	3.47	2.22	2.13	13.0	0.994	0.711	0.0123	0.108	0.0327	0.104	<0.200	0.0444	0.888	0.182	18
Dibenz(a,h)anthracene	5.83	0.0799	0.382	2.17	1.09	1.18	0.966	5.18	0.403	0.329	<0.0100	0.0384	<0.0100	<0.100	<0.200	0.150	0.406	<0.168	18
Total cPAHs (mg/kg)[k]	***28.0***	0.365	3.17	10.2	7.92	11.6	4.19	***31.8***	2.41	1.57	0.00482	0.152	0.0417	0.247	0.0886	0.124	2.47	0.375	18

Notes:

(a) Model Toxics Control Act (MTCA) Method C industrial soil cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) Samples were analyzed for diesel- and oil-range hydrocarbons by Ecology Method NWTPH-Dx(extended), and gasoline-range hydrocarbons by Ecology Method NWTPH-G.

(c) "( )" denotes samples were analyzed for diesel- and oil-range hydrocarbons by Ecology Method NWTPH-Dx(extended) with silica gel clean-up.

(d) Results in diesel organics range are primarily due to overlap from heavy oil range hydrocarbons.

(e) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(f) Total petroleum hydrocarbon (TPH) screening levels based on MTCA Method A industrial soil cleanup levels (Ecology 2001a). For gasoline mixtures without benzene and total ethylbenzene, toluene and xylenes less than 1% of the gasoline mixture the cleanup level is 100 mg/kg. For all other gasoline mixtures, the cleanup level is 30 mg/kg.

(g) Results reported in the gasoline range are primarily due to overlap from diesel range hydrocarbons.

(h) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.

(i) "NA" denotes no cleanup level established.

(j) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.

(k) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

Analytes detected in samples at concentrations exceeding one or more cleanup levels or comparison levels are shown in bold and italics.

mg/kg - milligrams per kilogram
bgs - below ground surface

TABLE 5B

NOVEMBER-DECEMBER 2003 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled								MTCA Method B Surface Water[a]	NRWQC Human Health Consumption of Organisms[b]	NTR Human Health Consumption of Organisms[c]
	MW-8(R) 12/2/2003	MW-10 12/3/2003	MW-11 12/2/2003	MW-12 12/2/2003	MW-13 12/2/2003	MW-14 12/1/2003	MW-15 12/1/2003	MW-16 12/1/2003			
TPHs (mg/l)[d]											
Gasoline-range hydrocarbons	32.600	0.0876[e]	0.436	<0.050[f]	0.0935	0.0729[e]	<0.050	<0.050	NA[g]	NA	NA
Diesel-range hydrocarbons	6.12 (3.14)[h][i]	0.806 (0.281)[j]	2.65 (1.51)[j]	1.40 (<0.250)	0.445 (<0.250)	1.11[k] (<0.250)	0.877[k] (<0.250)	0.455[k] (<0.250)	NA	NA	NA
Oil-range hydrocarbons	<0.500 (<0.500)	<0.500 (<0.500)	<0.500 (<0.500)	0.634 (<0.500)	<0.500 (<0.500)	<0.500 (<0.500)	<0.500 (<0.500)	<0.500 (<0.500)	NA	NA	NA
PAHs (µg/l)[l]											
Naphthalene	***8,710***	6.55	89.3	1.07	1.27	10.1	<0.100	<0.100	4,940	NA	NA
1-Methylnaphthalene	775	23.5	131	0.202	3.49	6.65	0.176	<0.100	NA	NA	NA
2-Methylnaphthalene	1,170	25.1	2.58	<0.100	0.147	0.830	<0.100	<0.100	NA	NA	NA
Acenaphthylene	11.1	1.44	1.74	<0.100	<0.100	0.327	<0.100	<0.100	NA	NA	NA
Acenaphthene	278	44.9	147	0.826	3.57	23.1	3.74	0.238	643	990	NA
Fluorene	139	27.8	108	0.223	1.44	10.6	1.62	<0.100	3,460	5,300	14,000
Phenanthrene	126	47.1	131	<0.100	0.773	14.6	<0.100	<0.100	NA	NA	NA
Anthracene	21.3	5.67	21.0	0.634	0.430	2.28	0.381	0.286	25,900	40,000	110,000
Fluoranthene	23.0	9.52	18.2	<0.100	0.253	5.05	0.287	<0.100	90.2	140	370
Pyrene	16.0	6.38	13.6	<0.100	0.147	3.08	0.167	<0.100	2,590	4,000	11,000
Benzo(g,h,i)perylene	0.394	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	NA	NA	NA
cPAHs (µg/l)[m]											
Chrysene	***2.90***	***0.403***	***0.615***	<0.0100	***0.0308***	***0.395***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[n]	0.031
Benzo(b)fluoranthene	***0.841***	***0.109***	***0.209***	<0.0100	0.0175	***0.144***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[n]	0.031
Benzo(k)fluoranthene	***0.885***	***0.0772***	***0.169***	<0.0100	0.0186	***0.118***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)anthracene	***3.09***	***0.533***	***0.851***	<0.0100	***0.0439***	***0.446***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)pyrene	***1.11***	***0.110***	***0.226***	<0.0100	<0.0100	***0.148***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[n]	0.031
Indeno(1,2,3-cd)pyrene	***0.363***	***0.0292***	***0.119***	<0.0100	<0.0100	***0.109***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[n]	0.031
Dibenz(a,h)anthracene	***0.186***	0.0118	***0.0661***	<0.0100	<0.0100	***0.0705***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[n]	0.031
Total cPAHs[o]	***1.73***	***0.194***	***0.393***	<0.0100	0.00830	***0.262***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[n]	0.031

TABLE 5B

NOVEMBER-DECEMBER 2003 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - TPH and PAHs
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled								MTCA Method B Surface Water[a]	NRWQC Human Health Consumption of Organisms[b]	NTR Human Health Consumption of Organisms[c]
	MW-17 12/1/2003	MW-18 12/3/2003	MW-19 12/2/2003	MW-20 12/2/2003	MW-21 12/3/2003	MW-22 12/3/2003	MW-22D[p] 12/3/2003				
TPHs (mg/l)[d]											
Gasoline-range hydrocarbons	<0.050[f]	16.100[e]	<0.050	1.560	1.990[e]	7.150[e]	7.010[e]		NA[g]	NA	NA
Diesel-range hydrocarbons	0.311[k] (<0.250)	5.09 (2.11)[i]	0.433 (<0.250)	2.34 (0.879)[j]	3.84 (1.57)[j]	4.04 (1.86)[j]	4.04 (1.84)[j]		NA	NA	NA
Oil-range hydrocarbons	<0.500 (<0.500)	0.609 (<0.500)	<0.500 (<0.500)	<0.500 (<0.500)	0.600 (<0.500)	<0.500 (<0.500)	<0.500 (<0.500)		NA	NA	NA
PAHs (µg/l)[l]											
Naphthalene	0.346	***5,970***	<0.100	13.6	678	1,940	2,170		4,940	NA	NA
1-Methylnaphthalene	<0.100	729	0.120	213	483	732	729		NA	NA	NA
2-Methylnaphthalene	<0.100	2.73	<0.100	164	174	904	921		NA	NA	NA
Acenaphthylene	<0.100	2.96	<0.100	<0.100	2.54	3.62	3.77		NA	NA	NA
Acenaphthene	0.437	244	0.417	145	206	249	240		643	990	NA
Fluorene	<0.100	83.7	<0.100	68.3	77.5	85.4	77.3		3,460	5,300	14,000
Phenanthrene	<0.100	121	<0.100	62.9	139	125	116		NA	NA	NA
Anthracene	0.136	11.1	0.136	3.49	18.1	15.2	14.9		25,900	40,000	110,000
Fluoranthene	<0.100	5.81	<0.100	2.85	25.5	12.0	11.5		90.2	140	370
Pyrene	<0.100	3.74	<0.100	1.30	17.7	7.65	7.42		2,590	4,000	11,000
Benzo(g,h,i)perylene	<0.100	<1.00	<0.100	<0.100	0.462	<0.100	<1.00		NA	NA	NA
cPAHs (µg/l)[m]											
Chrysene	0.0157	***0.162***	<0.0100	***0.0255***	***2.04***	***0.443***	***0.410***		0.0296	0.018 * / 0.02[n]	0.031
Benzo(b)fluoranthene	<0.0100	<0.100	<0.0100	<0.0100	***1.16***	***0.0863***	***0.103***		0.0296	0.018 * / 0.02[n]	0.031
Benzo(k)fluoranthene	<0.0100	<0.100	<0.0100	<0.0100	***0.999***	***0.0996***	<0.100		0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)anthracene	***0.0297***	***0.192***	<0.0100	***0.0415***	***2.52***	***0.521***	***0.498***		0.0296	0.018 * / 0.02[n]	0.031
Benzo(a)pyrene	<0.0100	<0.100	<0.0100	<0.0100	***1.25***	***0.117***	***0.134***		0.0296	0.018 * / 0.02[n]	0.031
Indeno(1,2,3-cd)pyrene	<0.0100	<0.100	<0.0100	<0.0100	***0.424***	***0.0303***	<0.100		0.0296	0.018 * / 0.02[n]	0.031
Dibenz(a,h)anthracene	<0.0100	<0.100	<0.0100	<0.0100	***0.231***	0.0123	<0.100		0.0296	0.018 * / 0.02[n]	0.031
Total cPAHs[o]	0.00313	***0.0208***	<0.0100	0.00441	***1.87***	***0.0200***	0.0198		0.0296	0.018 * / 0.02[n]	0.031

Notes:

(a) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(c) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(d) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-G and NWTPH-Dx(extended).

(e) Chromatogram for this sample does not resemble a typical gasoline standard pattern.

(f) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.

(g) "NA" denotes no cleanup level established.

(h) "( )" Denotes samples that were analyzed for total petroleum hydrocarbons by Ecology Method NWTPH-Dx with Acid/Silica Gel Clean-up.

(i) Results in diesel organics range are primarily due to overlap from gasoline oraganics range.

(j) Hydrocarbon concentration result in this sample is partially due to one or more individual peaks eluting in the diesel/heavy oil range.

(k) Sample chromatogram pattern does not resemble the fuel standard used for quantitation.

(l) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.

(m) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.

(n) Practical quantitation limit (PQL) (Ecology 2001b).

(o) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

(p) Duplicate sample of MW-22.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

mg/l - milligrams per liter

µg/l - micrograms per liter

TABLE 5C

NOVEMBER-DECEMBER 2003 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - DISSOLVED PAHs[a]
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled								MTCA Method B Surface Water[b]	NRWQC Human Health Consumption of Organisms[c]	NTR Human Health Consumption of Organisms[d]
	MW-8(R) 12/2/2003	MW-10 12/3/2003	MW-11 12/2/2003	MW-12 12/2/2003	MW-13 12/2/2003	MW-14 12/1/2003	MW-15 12/1/2003	MW-16 12/1/2003			
PAHs (µg/l)[e]											
Naphthalene	***6,770***	6.68	41.7	1.00	1.01	4.35	0.186	<0.100[f]	4,940	NA[g]	NA
1-Methylnaphthalene	498	10.2	43.1	0.347	2.13	2.28	<0.100	<0.100	NA	NA	NA
2-Methylnaphthalene	709	2.58	44.7	<0.100	0.128	<0.100	<0.100	<0.100	NA	NA	NA
Acenaphthylene	12.9	0.214	0.564	<0.100	<0.100	<0.100	<0.100	<0.100	NA	NA	NA
Acenaphthene	177	14.6	35.9	0.544	1.71	4.75	0.130	<0.100	643	990	NA
Fluorene	80.8	0.695	3.15	0.118	<0.100	<0.100	<0.100	<0.100	3,460	5,300	14,000
Phenanthrene	61.5	1.50	8.09	0.364	<0.100	0.111	<0.100	<0.100	NA	NA	NA
Anthracene	15.9	1.45	6.07	0.637	0.260	0.676	0.290	0.321	25,900	40,000	110,000
Fluoranthene	16.0	0.747	4.80	0.181	<0.100	0.184	<0.100	<0.100	90.2	140	370
Pyrene	11.1	0.561	3.81	0.110	<0.100	0.126	<0.100	<0.100	2,590	4,000	11,000
Benzo(g,h,i)perylene	0.114	<0.100	0.213	<0.100	<0.100	<0.100	<0.100	<0.100	NA	NA	NA
cPAHs (µg/l)[h]											
Chrysene	***0.646***	***0.114***	***0.925***	***0.0240***	<0.0100	***0.0536***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Benzo(b)fluoranthene	***0.277***	***0.0753***	***0.387***	<0.0100	<0.0100	0.0154	<0.0100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Benzo(k)fluoranthene	***0.219***	***0.0398***	***0.347***	<0.0100	<0.0100	0.0161	<0.0100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Benzo(a)anthracene	***0.710***	***0.164***	***0.892***	***0.0389***	<0.0100	***0.0624***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Benzo(a)pyrene	***0.292***	***0.0787***	***0.442***	<0.0100	<0.0100	0.0185	<0.0100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Indeno(1,2,3-cd)pyrene	***0.126***	***0.0320***	***0.185***	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Dibenz(a,h)anthracene	***0.0635***	0.0168	***0.128***	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031
Total cPAHs[j]	***0.457***	***0.118***	***0.684***	0.00413	<0.0100	***0.0253***	<0.0100	<0.0100	0.0296	0.018 * / 0.02[i]	0.031

TABLE 5C

NOVEMBER-DECEMBER 2003 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - DISSOLVED PAHs[a]
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled								MTCA Method B Surface Water[b]	NRWQC Human Health Consumption of Organisms[c]	NTR Human Health Consumption of Organisms[d]
	MW-17 12/1/2003	MW-18 12/3/2003	MW-19 12/2/2003	MW-20 12/2/2003	MW-21 12/3/2003	MW-22 12/3/2003	MW-22D[k] 12/3/2003				
PAHs (µg/l)[e]											
Naphthalene	0.195	***6,690***	0.270	3.76	241	752	1,970		4,940	NA[g]	NA
1-Methylnaphthalene	0.113	649	<0.100[f]	37.3	51.8	120	682		NA	NA	NA
2-Methylnaphthalene	<0.100	692	<0.100	9.06	5.87	28.0	845		NA	NA	NA
Acenaphthylene	<0.100	1.50	<0.100	0.106	0.425	0.579	3.02		NA	NA	NA
Acenaphthene	1.43	142	<0.100	18.1	29.9	33.4	184		643	990	NA
Fluorene	<0.100	9.86	<0.100	0.103	0.651	0.843	48.1		3,460	5,300	14,000
Phenanthrene	<0.100	<1.00	<0.100	0.231	1.99	1.81	5.90		NA	NA	NA
Anthracene	0.132	<1.00	0.141	0.107	2.24	1.38	1.74		25,900	40,000	110,000
Fluoranthene	<0.100	<1.00	<0.100	<0.100	1.10	0.863	0.764		90.2	140	370
Pyrene	<0.100	<1.00	<0.100	<0.100	0.790	0.622	0.581		2,590	4,000	11,000
Benzo(g,h,i)perylene	<0.100	<1.00	<0.100	<0.100	<0.100	<0.100	<0.100		NA	NA	NA
cPAHs (µg/l)[h]											
Chrysene	***0.0207***	<0.100	<0.0100	<0.0100	***0.174***	***0.121***	***0.105***		0.0296	0.018 * / 0.02[i]	0.031
Benzo(b)fluoranthene	0.0163	<0.100	<0.0100	<0.0100	***0.0650***	***0.0562***	***0.0489***		0.0296	0.018 * / 0.02[i]	0.031
Benzo(k)fluoranthene	0.0140	<0.100	<0.0100	<0.0100	***0.0708***	***0.0421***	***0.0212***		0.0296	0.018 * / 0.02[i]	0.031
Benzo(a)anthracene	***0.0335***	<0.100	<0.0100	<0.0100	***0.222***	***0.144***	***0.190***		0.0296	0.018 * / 0.02[i]	0.031
Benzo(a)pyrene	<0.0100	<0.100	<0.0100	<0.0100	***0.0891***	***0.0665***	***0.0536***		0.0296	0.018 * / 0.02[i]	0.031
Indeno(1,2,3-cd)pyrene	<0.0100	<0.100	<0.0100	<0.0100	***0.0231***	0.0169	0.0149		0.0296	0.018 * / 0.02[i]	0.031
Dibenz(a,h)anthracene	<0.0100	<0.100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100		0.0296	0.018 * / 0.02[i]	0.031
Total cPAHs[j]	0.00659	<0.100	<0.0100	<0.0100	***0.129***	***0.0936***	***0.0822***		0.0296	0.018 * / 0.02[i]	0.031

Notes:

(a) Samples field filtered using a 0.45 micron cellulose acetate filter.

(b) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(c) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(d) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(e) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.

(f) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(g) "NA" denotes no cleanup level established.

(h) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.

(i) Practical quantitation limit (PQL) (Ecology 2001b).

(j) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

(k) Duplicate sample of MW-22.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

µg/l - micrograms per liter

TABLE 5D

DECEMBER 2003
GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS (RCRA 8 + COPPER)
Former Tacoma Metals Facility

Sample Designation	Sample Date	Metals (µg/l)[a]								
		Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
MW-1	12/29/2003	0.69	20.7	<1[b]	5.05	1.41B1	0.51J	***0.179J***	2.24	<1
MW-2	12/29/2003	<1	11.8	<1	0.96J	0.76JB1	0.64J	***0.149J***	3.91	<1
MW-4(R)	12/29/2003	1.22	20.5	<1	2.5	2.25B1	1.34	***0.102J***	2.31	<1
MW-5	12/29/2003	<1	21.2	<1	1.72	3.16B1	2.44	***0.149J***	2.22	<1
MW-6	12/29/2003	***5.33***	56.8	<1	2.14	2.69B1	1.81	<0.2	3.67	<1
MW-7	12/29/2003	<1	35.6	<1	0.895J	1.88B1	0.91J	<0.2	1.02J	<1
MW-8(R)	12/26/2003	<1	32.1	<1	3.85	1.89	0.515J	***0.215***	<2	<1
MW-9	12/29/2003	***5.5***	140	<1	1.95	0.83JB1	<1	***0.258***	***10.5***	<1
MW-10	12/23/2003	0.78J	7.44	<1	2.07	7.76	3.05	<0.2	<2	<1
MW-11	12/26/2003	<1	31.5	<1	3.2	28.9	***40.8***	<0.2	<2	<1
MW-12	12/22/2003	0.665J	20.5	<1	<1	1.38	0.605J	<0.2	1.52J	<1
MW-13	12/22/2003	3.17	13.5	<1	6.9	4.94	1.26	<0.2	2.54	<1
MW-14	12/23/2003	<1	8.77	<1	3.99	2	0.785J	<0.2	1.52J	<1
MW-15	12/29/2003	1.59	31.1	<1	0.815J	7.23B1	1.95	<0.2	<2	<1
MW-16	12/29/2003	1.05	8.14	<1	2.48	0.925JB1	0.665J	<0.2	<2	<1
MW-17	12/23/2003	<1	23.9	<1	2.24	3.06	0.65J	<0.2	<2	<1
MW-18	12/22/2003	1.39	25.5	<1	2.73	0.88J	<1	<0.2	2	<1
MW-19 (MW-200)[c]	12/29/2003	<1 (<1)	23.5 (22.1)	<1 (<1)	5.42 (6.12)	14.1B2 (14.5B2)	***8.43 (8.7)***	***0.16J*** (<0.2)	<2 (1.27J)	<1 (<1)
MW-20	12/22/2003	3.65	7.96	<1	14.2	0.73J	<1	<0.2	***10.1***	<1
MW-21	12/23/2003	1.03	29.5	<1	1.31	3.11	1.61	<0.2	<2	<1
MW-22	12/23/2003	1.61	19.6	<1	1.21	2.36	0.91J	<0.2	<2	<1
MTCA Method B Surface Water Cleanup Level[d]		0.0982 ** / 5[e]	NA[f]	20.3	NA	2,660	NA	NA	2,700	25,900
NRWQC - Aquatic Organisms Chronic Freshwater Criterion[g]		150	NA	0.37 ***	119.94 ***	14.8 ***	4.74 ***	0.77	5.0	NA
NRWQC - Human Health Consumption of Organisms[h]		0.14 ** / 5[e]	NA	NA	NA	NA	NA	NA	4,200	NA
NTR - Aquatic Organisms Chronic Freshwater Criterion[i]		190	NA	1.59 ***	288.07 ***	18.76 ***	4.74 ***	0.012 * / 0.1[j]	5	NA
NTR - Human Health Consumption of Organisms[k]		0.14 ** / 5[e]	NA	NA	NA	NA	NA	0.15	NA	NA

TABLE 5D

DECEMBER 2003
GROUNDWATER ANALYTICAL RESULTS - TOTAL METALS (RCRA 8 + COPPER)
Former Tacoma Metals Facility

Notes:

(a) Samples were analyzed for metals by EPA Methods 6020/7470 series.
(b) "<" denotes analyte was not detected at the indicated laboratory reporting limit.
(c) "( )" denotes duplicate sample.
(d) Model Toxics Control Act (MTCA) Method B surface water cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).
(e) Natural background concentration (Ecology 2001b).
(f) "NA" denotes no cleanup level established.
(g) National Recommended Water Quality Criteria (NRWQC) chronic freshwater criterion (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.
(h) NRWQC for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with WAC 173-201A at a risk level of $1x10^{-6}$.
(i) National Toxics Rule (NTR) chronic freshwater criterion based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.
(j) Practical quantitation limit (PQL) (Ecology 2001b).
(k) NTR for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).
** Denotes natural background concentration is higher than MTCA cleanup levels and/or ARARs.
*** Freshwater criterion is expressed as a function of groundwater hardness. Average groundwater hardness at the site is 180 mg/l.

Qualifiers:

J: Estimated concentration above the method reporting limit (MRL) but below the PQL.
B1: Compound also detected in method blank. Analyte concentration was determined not to be significantly higher than associated method blank (i.e., <10 times the concentration reported in the blank).
B2: Compound also detected in method blank. Analyte concentration was determined to be significantly higher than associated method blank (i.e., >10 times the concentration reported in the blank).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the natural background concentration and/or PQL [WAC 173-340-730(5)(c)].

µg/l - micrograms per liter
mg/l - milligrams per liter

TABLE 5E

DECEMBER 2003

GROUNDWATER ANALYTICAL RESULTS - DISSOLVED METALS (RCRA 8 + COPPER)[a]

Former Tacoma Metals Facility

Sample Designation	Sample Date	Metals (µg/l)[b]								
		Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
MW-1	12/29/2003	0.945J	19.6	<1[c]	24.8	<1	<1	***0.195J***	2.38	<1
MW-2	12/29/2003	1.79	12.2	<1	6.77	<1	0.68J	***0.136J***	5	<1
MW-4(R)	12/29/2003	0.9J	20.6	<1	26.2	1.48	0.955J	<0.2	2.24	<1
MW-5	12/29/2003	0.58	21.2	<1	32.4	<1	<1	<0.2	1.2J	<1
MW-6	12/29/2003	4.7	54.8	<1	30.4	<1	<1	<0.2	3.28	<1
MW-7	12/29/2003	<1	31.9	<1	23.4	<1	<1	***0.182J***	<2	<1
MW-8(R)	12/26/2003	2.18	27.4	<1	15.7	<1	<1	<0.2	<2	<1
MW-9	12/29/2003	3.49	123	<1	30.7	0.755J	0.6J	<0.2	***11.5***	<1
MW-10	12/23/2003	<1	6.58	<1	9.53	0.98J	0.545J	<0.2	<2	<1
MW-11	12/26/2003	1.11	29.1	<1	14	1.52	1.93	<0.2	<2	<1
MW-12	12/22/2003	0.605J	19.6	<1	10.3	<1	0.505J	<0.2	<2	<1
MW-13	12/22/2003	2.13	13	<1	15.3	0.89J	<1	<0.2	<2	<1
MW-14	12/23/2003	0.6J	8.03	<1	15.6	<1	<1	***0.182J***	1.47J	<1
MW-15	12/29/2003	0.845J	28.8	<1	20.8	1.04	0.93J	<0.2	1.67J	<1
MW-16	12/29/2003	0.605J	8.51	<1	22.7	<1	0.7J	***0.297***	1.3J	<1
MW-17	12/23/2003	<1	23.4	<1	13.1	<1	<1	<0.2	<2	<1
MW-18	12/22/2003	1.59	24.3	<1	19.3	<1	<1	<0.2	<2	<1
MW-19 (MW-200)[d]	12/29/2003	1.25 (1.3)	21.4 (20.3)	<1 (<1)	25.3 (23.9)	<1.23 (<1.19)	0.95J (0.805J)	***0.283 (0.451)***	1.76J (1.34J)	<1 (<1)
MW-20	12/22/2003	2.85	8.84	<1	26.4	<1	<1	<0.2	6.11	<1
MW-21	12/23/2003	<1	28.9	<1	12.4	<1	<1	<0.2	<2	<1
MW-22	12/23/2003	<1	18.8	<1	15.5	<1	<1	***0.191J***	<2	<1
MTCA Method B Surface Water Cleanup Level[e]		0.0982 ** / 5[f]	NA[g]	20.3	NA	2,660	NA	NA	2,700	25,900
NRWQC - Aquatic Organisms Chronic Freshwater Criterion[h]		150	NA	0.37 ***	119.94 ***	14.8 ***	4.74 ***	0.77	5.0	NA
NRWQC - Human Health Consumption of Organisms[i]		0.14 ** / 5[f]	NA	NA	NA	NA	NA	NA	4,200	NA
NTR - Aquatic Organisms Chronic Freshwater Criterion[j]		190	NA	1.59 ***	288.07 ***	18.76 ***	4.74 ***	0.012 * / 0.1[k]	5	NA
NTR - Human Health Consumption of Organisms[l]		0.14 ** / 5[f]	NA	NA	NA	NA	NA	0.15	NA	NA

TABLE 5E

DECEMBER 2003

GROUNDWATER ANALYTICAL RESULTS - DISSOLVED METALS (RCRA 8 + COPPER)[a]

Former Tacoma Metals Facility

Notes:

(a) Samples were field filtered using a 0.45 micron filter.
(b) Samples were analyzed for metals by EPA Methods 6020/7470 series.
(c) "<" denotes analyte was not detected at the indicated laboratory reporting limit.
(d) "( )" denotes duplicate sample.
(e) Model Toxics Control Act (MTCA) Method B surface water cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).
(f) Natural background concentration (Ecology 2001b).
(g) "NA" denotes no cleanup level established.
(h) National Recommended Water Quality Criteria (NRWQC) chronic freshwater criterion (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.
(i) NRWQC for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with WAC 173-201A at a risk level of $1x10^{-6}$.
(j) National Toxics Rule (NTR) chronic freshwater criterion based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.
(k) Practical quantitation limit (PQL) (Ecology 2001b).
(l) NTR for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).
** Denotes natural background concentration is higher than MTCA cleanup levels and/or ARARs.
*** Freshwater criterion is expressed as a function of groundwater hardness. Average groundwater hardness at the site is 180 mg/l.

Qualifiers:

J: Estimated concentration above the method reporting limit (MRL) but below the PQL.

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the natural background concentration and/or PQL [WAC 173-340-730(5)(c)].

µg/l - micrograms per liter
mg/l - milligrams per liter

TABLE 6A

FEBRUARY-MARCH 2003 INVESTIGATION
SOIL ANALYTICAL RESULTS
Former Tacoma Metals Facility

Analyte	Sample Designation (Well ID - feet bgs)																Sample Designation (Boring ID - ft.bgs)			MTCA Method C Industrial Soil Cleanup Level [a]
	MW-14 14-14.5	MW-14 22-22.3	MW-14 23.8-24	MW-14 26-26.5	MW-15 11-11.5	MW-15 25-26	MW-16 7.5-8	MW-16 25-26	MW-17 12-16	MW-17 20.5-22	MW-18 11.5-12	MW-18 21.5-21.9	MW-19 16-18	MW-19 23.5-24	MW-20 24-24.3	MW-21 20.5-21.4	MW-21 22.5-23.3	B-6 23-23.2	B-8 23.5-24	B-8 26.5-27	
PAHs (mg/kg)[b]																				
Naphthalene	0.980	54.1	25.8	1.03	0.695	<0.0100 [c]	40.1	<0.0100	0.375	<0.0100	326	1,750	0.0798	<0.0100	0.631	100	0.664	1,850	103	0.432	7.00E+04
1-Methylnaphthalene	2.10	36.3	14.5	5.06	0.357	<0.0100	7.26	<0.0100	0.156	<0.0100	73.3	517	0.0819	0.184	0.694	106	1.23	645	262	0.0786	NA [d]
2-Methylnaphthalene	1.85	12.4	3.88	0.746	0.293	<0.0100	9.95	<0.0100	0.0790	<0.0100	25.9	759	0.0787	<0.0100	0.288	35.5	0.389	491	8.23	0.0761	NA
Acenaphthylene	0.137	0.642	1.37	<0.0100	0.0659	<0.0100	0.297	<0.0100	0.0571	<0.0100	<0.0299	16.2	<0.0100	<0.0100	0.0186	1.41	0.0380	5.64	3.13	<0.0100	NA
Acenaphthene	0.224	60.5	18.4	1.31	0.403	<0.0100	2.03	<0.0100	0.371	<0.0100	68.9	22.9	0.0539	0.462	0.433	456	0.788	596	281	0.581	2.10E+05
Fluorene	0.380	64.4	31.6	0.676	0.258	<0.0100	1.79	<0.0100	0.306	<0.0100	90.4	349	0.0725	0.232	0.238	639	0.876	455	239	0.617	1.40E+05
Phenanthrene	0.612	179	72.4	0.322	0.585	<0.0100	5.45	<0.0100	0.222	0.0137	240	976	0.194	0.123	0.226	1,970	2.43	1,590	822	1.98	NA
Anthracene	0.102	20.0	11.3	0.0324	0.128	<0.0100	1.61	<0.0100	0.254	<0.0100	107	146	0.0342	0.0267	0.0468	283	1.05	229	49.6	0.222	1.05E+06
Fluoranthene	0.622	61.5	25.1	0.0540	0.206	<0.0100	3.66	0.0333	0.997	0.0359	110	371	0.0591	0.0117	0.0678	978	1.30	570	277	0.386	1.40E+05
Pyrene	0.922	39.3	14.8	0.0332	0.268	<0.0100	4.19	<0.0100	0.995	<0.0100	79.6	308	<0.0100	<0.0100	0.0380	884	1.08	427	190	0.256	1.05E+05
Benzo(g,h,i)perylene	0.433	0.936	1.17	<0.0100	<0.0304	<0.0100	0.521	<0.0100	0.0588	<0.0100	1.95	5.50	<0.0100	<0.0100	<0.0100	26.6	0.0777	5.72	2.88	<0.0100	NA
cPAHs (mg/kg)[e]																					
Chrysene	0.578	8.62	3.41	<0.0100	0.0719	<0.0100	1.56	<0.0100	0.111	<0.0100	***27.9***	***75.4***	<0.0100	<0.0100	<0.0100	***130***	0.357	***111***	***52.1***	0.0107	18
Benzo(b)fluoranthene	0.507	3.41	0.783	<0.0100	<0.0304	<0.0100	0.864	<0.0100	0.0185	<0.0100	6.37	***43.8***	<0.0100	<0.0100	<0.0100	***59.0***	0.129	***30.7***	***21.0***	<0.0100	18
Benzo(k)fluoranthene	0.634	2.44	0.940	<0.0100	0.0319	<0.0100	1.13	<0.0100	0.0387	<0.0100	7.96	***42.3***	<0.0100	<0.0100	<0.0100	***60.5***	0.162	***65.8***	***24.8***	<0.0100	18
Benzo(a)anthracene	0.444	9.43	3.92	<0.0100	0.0799	<0.0100	1.64	<0.0100	0.146	<0.0100	***27.5***	***83.2***	<0.0100	0.0125	0.0323	***170***	0.312	***128***	***50.5***	0.0165	18
Benzo(a)pyrene	0.620	3.25	1.88	<0.0100	0.0739	<0.0100	1.14	<0.0100	0.0874	<0.0100	17.9	***42.8***	<0.0100	<0.0100	<0.0100	***59.5***	0.189	***65.8***	***21.1***	<0.0100	18
Indeno(1,2,3-cd)pyrene	0.451	0.925	0.862	<0.0100	<0.0304	<0.0100	0.513	<0.0100	0.0454	<0.0100	2.10	5.25	<0.0100	<0.0100	<0.0100	***24.4***	0.0684	***18.7***	7.91	<0.0100	18
Dibenz(a,h)anthracene	<0.0222	0.268	<0.500	<0.0100	<0.0304	<0.0100	<0.0586	<0.0100	<0.0148	<0.0100	1.39	3.54	<0.0100	<0.0100	<0.0100	4.34	<0.0100	8.28	3.86	<0.0100	18
Total cPAHs (mg/kg)[f]	0.829	5.06	2.56	<0.0100	0.0858	<0.0100	1.57	<0.0100	0.113	<0.0100	***23.1***	***62.4***	<0.0100	0.00125	0.00323	***93.9***	0.260	***94.5***	***33.6***	0.00176	18

Notes:

(a) Model Toxics Control Act (MTCA) Method C industrial soil cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.

(c) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(d) "NA" denotes no cleanup level established.

(e) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.

(f) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

Analytes detected in samples at concentrations exceeding one or more cleanup levels or comparison levels are shown in bold and italics.

mg/kg - milligrams per kilogram
bgs - below ground surface

TABLE 6B

FEBRUARY-MARCH 2003 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled									MTCA Method B Surface Water[b]	NRWQC Human Health Consumption of Organisms[c]	NTR Human Health Consumption of Organisms[d]
	MW-14 3/11/2003	MW-15 3/11/2003	MW-16 3/10/2003	MW-17 3/10/2003	MW-18 3/10/2003	MW-19 3/10/2003	MW-20 3/10/2003	MW-201[a] 3/10/2003	MW-21 3/11/2003			
TPHs (mg/l)[e]												
Gasoline-range hydrocarbons	0.253[f]	<0.050[g]	<0.050	<0.050	23.8	<0.050	1.8	1.83	2.91[f]	NA[h]	NA	NA
Diesel-range hydrocarbons	2.06	0.884	3.10	0.810	7.43	0.965	3.05	3.35	3.65	NA	NA	NA
Oil-range hydrocarbons	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	NA	NA	NA
VOCs (µg/l)[i] Only those VOCs detected are listed. See laboratory analytical reports for a complete list of VOCs analyzed.												
Naphthalene	120	<0.500	1.26	1.19	***10,600***	<0.500	31.7	31.6	2,040	4,940	NA	NA
1,2,4-Trimethylbenzene	<10.0	<0.200	<0.200	<0.200	353	<0.200	6.55	6.72	<100	NA	NA	NA
1,3,5-Trimethylbenzene	<10.0	<0.500	<0.500	<0.500	114	<0.500	<1.00	<1.00	<100	NA	NA	NA
Benzene	<10.0	<0.200	<0.200	<0.200	<100	<0.200	3.29	3.69	<100	22.7	51	71
Toluene	<10.0	<0.200	<0.200	0.448	<100	<0.200	<1.00	<1.00	<100	48,500	200,000	200,000
Ethylbenzene	<10.0	<0.200	<0.200	<0.200	246	<0.200	11.8	14.0	<100	6,910	29,000	29,000
m,p-Xylene	<10.0	<0.500	<0.500	<0.500	325	<0.500	12.2	12.7	<100	NA	NA	NA
o-Xylene	<10.0	<0.250	<0.250	<0.250	175	<0.250	3.97	4.19	<100	NA	NA	NA
Isopropylbenzene	<10.0	<0.500	<0.500	<0.500	<100	<0.500	15.4	15.5	<100	NA	NA	NA
n-Propylbenzene	<10.0	<0.500	<0.500	<0.500	<100	<0.500	3.96	4.00	<100	NA	NA	NA
p-Isopropyltoluene	<10.0	5.65	<0.200	5.70	<100	1.89	6.73	6.91	<100	NA	NA	NA
SVOCs (µg/l)[j] Only those SVOCs detected are listed. See laboratory analytical reports for a complete list of SVOCs analyzed.												
2-Methylnaphthalene	<10.0	<10.0	<10.0	<10.0	1,240E	<10.0	218	258	167	NA	NA	NA
2-Methylphenol	<10.0	<10.0	<10.0	<10.0	15.1	<10.0	<10.0	<10.0	<10.0	NA	NA	NA
2,4-Dimethylphenol	<10.0	<10.0	<10.0	<10.0	108	<10.0	<10.0	<10.0	<10.0	553	850	NA
3 & 4- Methylphenol	<10.0	<10.0	<10.0	<10.0	<10.0	80.6	<10.0	<10.0	<10.0	NA	NA	NA
Acenaphthene	63.6	<10.0	<10.0	<10.0	416E	<10.0	187	174	<500	643	990	NA
Anthracene	<10.0	<10.0	<10.0	<10.0	16.8	<10.0	<10.0	<10.0	22.5	25,900	40,000	110,000
Benzoic Acid	<20.0	<20.0	<20.0	<20.0	<20.0	26.0	<20.0	<20.0	23.8	NA	NA	NA
Carbazole	16.1	<10.0	<10.0	<10.0	259E	<10.0	107	110	146	NA	NA	NA
Dibenzofuran	34.9	<10.0	<10.0	<10.0	219E	<10.0	70.6	64.4	113	NA	NA	NA
Fluoranthene	13.5	<10.0	<10.0	<10.0	12.1	<10.0	<10.0	<10.0	20.0	90.2	140	370
Fluorene	<10.0	<10.0	<10.0	<10.0	173E	<10.0	96.3	101	<10.0	3,460	5,300	14,000
Naphthalene	109	<10.0	<10.0	<10.0	***11,900***	<10.0	<10.0	<10.0	1,600	4,940	NA	NA
Pyrene	<10.0	<10.0	<10.0	<10.0	12.7	<10.0	<10.0	<10.0	14.3	2,590	4,000	11,000
Phenanthrene	87.4	<10.0	<10.0	<10.0	137	<10.0	99.9	95.8	179	NA	NA	NA

TABLE 6B

FEBRUARY-MARCH 2003 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled									MTCA Method B Surface Water[b]	NRWQC Human Health Consumption of Organisms[c]	NTR Human Health Consumption of Organisms[d]
	MW-14 3/11/2003	MW-15 3/11/2003	MW-16 3/10/2003	MW-17 3/10/2003	MW-18 3/10/2003	MW-19 3/10/2003	MW-20 3/10/2003	MW-201[a] 3/10/2003	MW-21 3/11/2003			
PAHs (ug/l)[k]												
Naphthalene	28.3	0.235	0.877	0.793	***9,840E***	<0.100[g]	27.9	31.2	1,740	4,940	NA[h]	NA
1-Methylnaphthalene	60.7	0.569	0.447	<0.500	914	0.182	265E	273E	413	NA	NA	NA
2-Methylnaphthalene	8.87	<0.100	0.149	<0.500	1,060	<0.100	214E	223E	192	NA	NA	NA
Acenaphthylene	0.654	<0.100	<0.100	<0.500	<10.0	<0.100	63.9	<0.500	1.88	NA	NA	NA
Acenaphthene	39.5	4.35	1.07	4.62	410	1.08	183	186	328	643	990	NA
Fluorene	19.0	2.08	0.924	1.76	171	0.208	95.1	92.7	169	3,460	5,300	14,000
Phenanthrene	8.27	0.255	2.80	0.992	157	<0.100	88.8	89.6	192	NA	NA	NA
Anthracene	8.13	0.373	0.426	<0.500	<10.0	<0.100	<0.500	<0.500	43.3	25,900	40,000	110,000
Fluoranthene	13.5	0.294	0.781	1.05	11.8	<0.100	4.12	4.27	19.6	90.2	140	370
Pyrene	7.35	0.157	0.572	0.693	<10.0	<0.100	1.96	1.94	11.7	2,590	4,000	11,000
Benzo(g,h,i)perylene	0.154	<0.100	<0.100	<0.500	<10.0	<0.100	<0.500	<0.500	<0.100	NA	NA	NA
cPAHs (µg/l)[l]												
Chrysene	***1.08***	<0.100	***0.0812***	<0.0500	<10.0	<0.0100	<0.500	<0.500	***0.654***	0.0296	0.018 * / 0.02[m]	0.031
Benzo(b)fluoranthene	***0.308***	<0.100	<0.0100	<0.0500	<10.0	<0.0100	<0.500	<0.500	***0.154***	0.0296	0.018 * / 0.02[m]	0.031
Benzo(k)fluoranthene	***0.423***	<0.100	<0.0100	<0.0500	<10.0	<0.0100	<0.500	<0.500	***0.212***	0.0296	0.018 * / 0.02[m]	0.031
Benzo(a)anthracene	***1.10***	<0.100	***0.131***	<0.0500	<10.0	<0.0100	<0.500	<0.500	***0.981***	0.0296	0.018 * / 0.02[m]	0.031
Benzo(a)pyrene	***0.385***	<0.100	<0.0100	<0.0500	<10.0	<0.0100	<0.500	<0.500	***0.212***	0.0296	0.018 * / 0.02[m]	0.031
Indeno(1,2,3-cd)pyrene	***0.135***	<0.100	<0.0100	<0.0500	<10.0	<0.0100	<0.500	<0.500	<0.100	0.0296	0.018 * / 0.02[m]	0.031
Dibenz(a,h)anthracene	<0.100	<0.100	<0.0100	<0.0500	<10.0	<0.0100	<0.500	<0.500	<0.100	0.0296	0.018 * / 0.02[m]	0.031
Total cPAHs[n]	***0.592***	<0.100	0.0139	<0.0500	<10.0	<0.0100	<0.500	<0.500	***0.353***	0.0296	0.018 * / 0.02[m]	0.031

Notes:

(a) Duplicate sample for well MW-20.
(b) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).
(c) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.
(d) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.
(e) Samples were analyzed for total petroleum hydrocarbons (TPHs) by Ecology Methods NWTPH-G and NWTPH-Dx(extended).
(f) The chromatogram for this sample does not resemble a typical gasoline standard pattern.
(g) "<" denotes analyte was not detected at the indicated laboratory reporting limit.
(h) "NA" denotes no cleanup level established.
(i) Samples were analyzed for volatile organic compounds (VOCs) by EPA Method 8260B.
(j) Samples were analyzed for semivolatile organic compounds (SVOCs) by EPA Method 8270C.
(k) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.
(l) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.
(m) Practical quantitation limit (PQL) (Ecology 2001b).
(n) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

* PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Qualifiers:

E: Estimated result. The reported value exceeds the calibration range of the analysis.

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

mg/l - milligrams per liter
µg/l - micrograms per liter

TABLE 6C

FEBRUARY-MARCH 2003 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - DISSOLVED PAHs[a]
Former Tacoma Metals Facility

Analyte	Well Designation and Date Sampled									MTCA Method B Surface Water[c]	NRWQC Human Health Consumption of Organisms[d]	NTR Human Health Consumption of Organisms[e]
	MW-14 3/11/2003	MW-15 3/11/2003	MW-16 3/10/2003	MW-17 3/10/2003	MW-18 3/10/2003	MW-19 3/10/2003	MW-20 3/10/2003	MW-201[b] 3/10/2003	MW-21 3/11/2003			
PAHs (µg/l)[f]												
Naphthalene	66.4	1.720	0.194	0.157	***4,990***	<0.100[g]	24.3	14.2	1,290	4,940	NA[h]	NA
1-Methylnaphthalene	10.0	0.205	<0.100	<0.100	184	<0.100	190	38.7	201	NA	NA	NA
2-Methylnaphthalene	<1.00	0.206	<0.100	<0.100	127	<0.100	156	10.9	59.2	NA	NA	NA
Acenaphthylene	<1.00	<0.100	<0.100	<0.100	<10.0	<0.100	<5.0	<10	<50.0	NA	NA	NA
Acenaphthene	13.3	0.244	<0.100	0.229	72.9	<0.100	104	29.3	157	643	990	NA
Fluorene	<1.00	<0.100	<0.100	<0.100	<10.0	<0.100	28.6	<10	<50.0	3,460	5,300	14,000
Phenanthrene	<1.00	0.143	<0.100	<0.100	<10.0	<0.100	<5.0	<10	<50.0	NA	NA	NA
Anthracene	<1.00	0.157	<0.100	<0.100	<10.0	<0.100	<5.0	<10	<50.0	25,900	40,000	110,000
Fluoranthene	<1.00	<0.100	<0.100	<0.100	<10.0	<0.100	<5.0	<10	<50.0	90.2	140	370
Pyrene	<1.00	<0.100	<0.100	<0.100	<10.0	<0.100	<5.0	<10	<50.0	2,590	4,000	11,000
Benzo(g,h,i)perylene	<1.00	<0.100	<0.100	<0.100	<10.0	<0.100	<5.0	<10	<50.0	NA	NA	NA
cPAHs (µg/l)[i]												
Chrysene	<0.100	<0.0100	<0.0100	<0.0100	<1.0	<0.0100	<0.500	<1.0	<5.00	0.0296	0.018 * / 0.02[j]	0.031
Benzo(b)fluoranthene	<0.100	<0.0100	<0.0100	<0.0100	<1.0	<0.0100	<0.500	<1.0	<5.00	0.0296	0.018 * / 0.02[j]	0.031
Benzo(k)fluoranthene	<0.100	<0.0100	<0.0100	<0.0100	<1.0	<0.0100	<0.500	<1.0	<5.00	0.0296	0.018 * / 0.02[j]	0.031
Benzo(a)anthracene	<0.100	<0.0100	<0.0100	<0.0100	<1.0	<0.0100	<0.500	<1.0	<5.00	0.0296	0.018 * / 0.02[j]	0.031
Benzo(a)pyrene	<0.100	<0.0100	<0.0100	<0.0100	<1.0	<0.0100	<0.500	<1.0	<5.00	0.0296	0.018 * / 0.02[j]	0.031
Indeno(1,2,3-cd)pyrene	<0.100	<0.0100	<0.0100	<0.0100	<1.0	<0.0100	<0.500	<1.0	<5.00	0.0296	0.018 * / 0.02[j]	0.031
Dibenz(a,h)anthracene	<0.100	<0.0100	<0.0100	<0.0100	<1.0	<0.0100	<0.500	<1.0	<5.00	0.0296	0.018 * / 0.02[j]	0.031
Total cPAHs[k]	<0.100	<0.0100	<0.0100	<0.0100	<1.0	<0.0100	<0.500	<1.0	<5.00	0.0296	0.018 * / 0.02[j]	0.031

Notes:

(a) Samples field filtered using a 0.45 micron cellulose acetate filter.

(b) Duplicate sample.

(c) Model Toxics Control Act (MTCA) Method B surface water cleanup level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(d) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(e) National Toxic Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(f) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.

(g) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(h) "NA" denotes no cleanup level established.

(i) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.

(j) Practical quantitation limit (PQL) (Ecology 2001b).

(k) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

µg/l - micrograms per liter

TABLE 7A

JUNE-AUGUST 2002 INVESTIGATION
SOIL ANALYTICAL RESULTS
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)							MTCA Method C Industrial Soil Cleanup Level[a]
	B1-10.5	B1-20.5	B1-26	B2-21	B3-10	B3-21.5	MW13-17.5	
TPHs (mg/kg)[b]								
Diesel-Range Hydrocarbon	***5,500[c]***	***2,700[c]***	***7,300[c]***	1,600[c]	20[c]	180/250[c][d]	130/70[c][e]	2,000[f]
Oil-Range Hydrocarbon	***2,200***	640	1,600	420	<10[g]	<29/38[d]	80/20[e]	2,000[f]
Gasoline-Range Hydrocarbon	***2900[h]***	***360[h]***	***3300[h]***	***730[h]***	***120[h]***	***660[h]***	44[h]	100/30[f]
VOCs (µg/kg)[i] Only those VOCs detected are listed. See laboratory analytical reports for a complete list of VOCs analyzed.								
Acetone	<29,000	<1,600	<3,900	<1,700	73	<3,800	--[j]	3.50E+08
Ethylbenzene	<5,900	<310	<780	<340	59	<760	--	3.50E+08
m,p-xylene	<5,900	<310	<780	<340	130	<760	--	7.00E+09
o-xylene	<5,900	<310	<780	<340	160	<760	--	7.00E+09
1,3,5-Trimethylbenzene	<5,900	<310	740J	300J	150	970	--	NA[k]
1,2,4-Trimethylbenzene	4,300J	450	2,100	2,100	470	2,900	--	NA
Isopropylbenzene	<5,900	<310	<780	<340	39	<760	--	NA
4-Isopropyltoluene	5,200J	310	490J	250J	94	480J	--	NA
Naphthalene	210,000	120,000	420,000	280,000	6,800	310,000	--	7.00E+07
SVOCs (µg/kg)[l] Only those SVOCs detected are listed. See laboratory analytical reports for a complete list of SVOCs analyzed.								
4-Methylphenol	2,900	<2,600	<1,200	<620	<170	<77	<86	NA
Carbazole	73,000	34,000	90,000	14,000	<170	3,100	2,200	6.56E+06
bis(2-Ethylhexyl)phthalate	4,400	<2,600	11,000	4,800	270	690	130	9.38E+06
Naphthalene	220,000	94,000	290,000	52,000	5,400	24,000	--	7.00E+07
2-Methylnaphthalene	120,000	39,000	120,000	21,000	1,700	10,000	--	NA
Acenaphthylene	9,300	<2,600	4,200	<620	<170	<77	--	NA
Acenaphthene	210,000	66,000	180,000	50,000	900	12,000	--	2.10E+08
Dibenzofuran	110,000	35,000	87,000	26,000	580	9,400	--	NA
Fluorene	220,000	76,000	170,000	43,000	500	13,000	--	1.40E+08
Phenanthrene	500,000	150,000	420,000	94,000	390	25,000	--	NA
Anthracene	280,000	68,000	230,000	34,000	<170	2,700	--	1.05E+09
Fluoranthene	300,000	97,000	190,000	46,000	<170	8,400	--	1.40E+08
Pyrene	250,000	83,000	170,000	44,000	<170	6,100	--	1.05E+08
Benzo(a)anthracene	***79,000***	***19,000***	***48,000***	12,000	<170	1,300	--	18,000
Chrysene	***94,000***	***20,000***	***59,000***	14,000	<170	1,100	--	18,000
Benzo(b)fluoranthene	***41,000***	9,600	***25,000***	5,200	<170	320	--	18,000
Benzo(k)fluoranthene	***36,000***	7,900	***20,000***	5,000	<170	280	--	18,000
Benzo(a)pyrene	***40,000***	7,800	***22,000***	6,200	<170	250	--	18,000
Indeno(1,2,3-cd)pyrene	18,000	2,800	9,800	2,400	<170	<77	--	18,000
Dibenz(a,h)anthracene	4,400	<2,600	2,300	690	<170	<77	--	18,000
Benzo(g,h,i)perylene	19,000	3,400	8,700	2,300	<170	<77	--	NA
PAHs (µg/kg)[m]								
Naphthalene[n]	300,000B	110,000B	300,000B	58,000B	5,600B	26,000B	14,000	7.00E+07
2-Methylnaphthalene[n]	180,000B	41,000B	110,000B	20,000B	1,800B	11,000B	3,900	NA
Acenaphthylene	11,000	1,900	4,200	560	54	75	130	NA
Acenaphthene	200,000	49,000	130,000	33,000	700	8,300	7,700	2.10E+08
Fluorene	180,000	54,000	140,000	28,000	390	9,200	4,100	1.40E+08
Phenanthrene	520,000	140,000	390,000	84,000	390	23,000	4,000	NA
Anthracene	320,000	60,000	200,000	26,000	120	2,500	170	1.05E+09
Fluoranthene	290,000	86,000	170,000	35,000	150	7,400	78	1.40E+08
Pyrene	290,000	74,000	160,000	35,000	140	4,800	54	1.05E+08
Dibenzofuran	100,000	27,000	71,000	17,000	470	7,000	4,800	NA
Benzo(g,h,i)perylene	18,000	3,300	7,700	2,000	33	51	<8.6	NA

TABLE 7A

JUNE-AUGUST 2002 INVESTIGATION
SOIL ANALYTICAL RESULTS
Former Tacoma Metals Facility

Analyte	Sample Designation (Boring ID - feet bgs)							MTCA Method C Industrial Soil Cleanup Level[a]
	B1-10.5	B1-20.5	B1-26	B2-21	B3-10	B3-21.5	MW13-17.5	
cPAHs (µg/kg)[o]								
Chrysene	***100,000***	18,000	***51,000***	11,000	59	1,100	29	18,000
Benzo(b)fluoranthene	***34,000***	7,500	17,000	4,700	35	330	<8.6[g]	18,000
Benzo(k)fluoranthene	***52,000***	8,900	***20,000***	5,100	37	260	10	18,000
Benzo(a)anthracene	***79,000***	18,000	***43,000***	9,700	46	1,200	22	18,000
Benzo(a)pyrene	***53,000***	8,800	***22,000***	5,800	32	250	10	18,000
Indeno(1,2,3-cd)pyrene	17,000	3,400	7,900	2,200	33	59	<8.6	18,000
Dibenz(a,h)anthracene	8,100	1,300	4,200	1,100	<17	28	<8.6	18,000
Total cPAHs (µg/kg)[p]	***75,400***	13,300	***33,000***	8,520	47.7	457	13.5	18,000

Notes:

(a) Model Toxics Control Act (MTCA) Method C industrial soil cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(b) Samples were analyzed for diesel- and oil-range hydrocarbons by Ecology Method NWTPH-Dx(extended), and gasoline-range hydrocarbons by Ecology Method NWTPH-G.

(c) The chromatogram for this sample does not resemble a typical diesel standard pattern.

(d) Sample reanalysis.

(e) Laboratory control sample surrogate was outside designated control limits. Sample was re-extracted with acceptable surrogate recoveries; however, re-extracted data did not confirm original data, the original data was significantly higher. Both data sets are reported.

(f) Total petroleum hydrocarbon (TPH) screening levels based on MTCA Method A industrial soil cleanup levels (Ecology 2001a). For gasoline mixtures without benzene and total ethylbenzene, toluene and xylenes less than 1% of the gasoline mixture the cleanup level is 100 mg/kg. For all other gasoline mixtures, the cleanup level is 30 mg/kg.

(g) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(h) The chromatogram for this sample does not resemble a typical gasoline standard pattern.

(i) Samples were analyzed for volatile organic compounds (VOCs) by EPA Method 8260B. Only detected analytes have been listed.

(j) "--" denotes sample not evaluated for indicated analyte.

(k) "NA" denotes no cleanup level established.

(l) Samples were analyzed for semivolatile organic compounds (SVOCs) by EPA Method 8270C. Only detected analytes have been listed. Polycyclic aromatic hydrocarbons (PAHs) detected using EPA Method 8270C are not listed with SVOCs [see PAHs detected using selected ion monitoring (SIM) mode].

(m) Samples were analyzed for PAHs by EPA Method 8270C-SIM.

(n) Method blank values for naphthalene and 2-methylnaphthalene are 34 and 13 ug/l, respectively. All samples contained greater than 10 times the level found in the blank thus not significantly effecting the data.

(o) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C-SIM.

(p) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

Qualifiers:

B - Compound also detected in method blank.

J - Estimated concentration when the value is less than the calculated laboratory reporting limit.

Analytes detected in samples at concentrations exceeding one or more cleanup levels or comparison levels are shown in bold and italics.

µg/kg - micrograms per kilogram

mg/kg - milligrams per kilogram

bgs - below ground surface

TABLE 7B

JUNE-AUGUST 2002 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - SVOCs
Former Tacoma Metals Facility

Sample Designation	Sample Date	SVOCs (µg/l)[a] See analytical reports for complete list of SVOCs analyzed.						
		4-Methyl-phenol	Naphth-alene	2-Methyl-naphthalene	Acenaph-thene	Dibenzo-furan	Fluorene	Phenan-threne
MW-13	8/5/2002	440	8.4	3.2	15	3.8	5.1	2.9
MTCA Method B Surface Water Cleanup Level[b]		NA[c]	4,940	NA	643	NA	3,460	NA
NRWQC - Human Health Consumption of Organisms[d]		NA	NA	NA	990	NA	5,300	NA
NTR - Human Health Consumption of Organisms[e]		NA	NA	NA	NA	NA	14,000	NA

Notes:

(a) Samples were analyzed for semivolatile organic compounds (SVOCs) by EPA Method 8270C. Only detected analytes have been listed.

(b) Model Toxics Control Act (MTCA) Method B surface water cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(c) "NA" denotes no cleanup level establshed.

(d) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(e) National Toxics Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

µg/l - micrograms per liter

TABLE 7C

JUNE-AUGUST 2002 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - PAHs[a]
Former Tacoma Metals Facility

Sample Designation	Sample Date	PAHs (µg/l)											cPAHs (µg/l)							
		Naphth-alene	2-Methyl-naphthalene	Acenaph-thlyene	Acenaph-thene	Fluorene	Phenan-threne	Anth-racene	Fluoran-thene	Pyrene	Dibenzo-furan	Benzo (g,h,i) perylene	Chrysene	Benzo (b)-fluoranthene	Benzo (k)-fluoranthene	Benzo (a)-pyrene	Indeno (1,2,3-cd) pyrene	Dibenz (a,h)-anthracene	Benzo (a)-anthracene	Total cPAHs[h]
MW-13	8/5/2002	11	5.6	0.35M	17	6.2	3.0	0.65	0.52	0.42	4.2	<0.11[b]	***0.05MJ***	<0.11	<0.11	<0.11	<0.11	<0.11	***0.05J***	***0.0205***
MTCA Method B Surface Water Cleanup Level[c]		4,940	NA[d]	NA	643	3,460	NA	25,900	90.2	2,590	NA	NA	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296	0.0296
NRWQC - Human Health Consumption of Organisms[e]		NA	NA	NA	990	5,300	NA	40,000	140	4,000	NA	NA	0.018* / 0.02[f]	0.018* / 0.02[f]	0.018* / 0.02[f]	0.018* / 0.02[f]	0.018* / 0.02[f]	0.018* / 0.02[f]	0.018 * / 0.02[f]	0.018 * / 0.02[f]
NTR - Human Health Consumption of Organisms[g]		NA	NA	NA	NA	14,000	NA	110,000	370	11,000	NA	NA	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031

Notes:

(a) Samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode.

(b) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(c) Model Toxics Control Act (MTCA) Method B surface water cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(d) "NA" denotes no cleanup level is established.

(e) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(f) Practical quantitation limit (PQL) (Ecology 2001b).

(g) National Toxics Rule (NTR) for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(h) Total cPAHs are based on benzo(a)pyrene equivalent values. Individual detected cPAH concentrations were multiplied by benzo(a)pyrene toxicity equivalency factors (TEFs) prior to summation (per WAC 173-340-708). Non-detected cPAH analytes were not included in the summation. TEFs are tabulated on Table 2A-A.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

Qualifiers:

J: Indicates an estimated concentration when the value is less than the laboratory reporting limit.

M: Indicates an estimated value of analyte found and confirmed by analyst but with low spectral match.

Analytes detected in samples at concentrations exceeding one or more of the cleanup standards or comparison values are shown in bold and italics. Where appropriate, surface water standards have been adjusted upward to the PQL [WAC 173-340-730(5)(c)].

µg/l - micrograms per liter

TABLE 7D

JUNE-AUGUST 2002 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - TPHs AND VOCs
Former Tacoma Metals Facility

Sample Designation	Sample Date	TPHs (mg/l)[a]			VOCs (µg/l)[b] (See analytical reports for complete list of VOCs analyzed.)									
		Gasoline-Range Hydrocarbon	Diesel-Range Hydrocarbon	Oil-Range Hydrocarbon	Benzene	Ethyl-benzene	Total xylenes	Naphth-alene	Vinyl Chloride	Acetone	1,3,5 Trimethyl benzene	1,2,4 Trimethyl benzene	Isopropyl-benzene	4-Isopropyl toluene
MW-13	8/5/2002	1.0	0.76[c]	<0.50[d]	7.0	1.6	2.8	18	***6.2***	14	1.0	2.0	3.3	12
MTCA Method B Surface Water Cleanup Level[e]		NA[f]	NA	NA	22.7	6,910	NA	4,940	3.69	NA	NA	NA	NA	NA
NRWQC - Human Health Consumption of Organisms[g]		NA	NA	NA	51	29,000	NA	NA	530	NA	NA	NA	NA	NA
NTR - Human Health Consumption of Organisms[h]		NA	NA	NA	71	29,000	NA	NA	525	NA	NA	NA	NA	NA

Notes:

(a) Samples were analyzed for diesel- and oil-range hydrocarbons by Ecology Method NWTPH-Dx(extended), and gasoline-range hydrocarbons by Ecology Method NWTPH-G.

(b) Samples were analyzed for volatile organic compounds (VOCs) by EPA Method 8260B. Only detected analytes have been listed.

(c) The chromatogram for this sample does not resemble a typical diesel standard pattern.

(d) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(e) Model Toxics Control Act (MTCA) Method B surface water cleanups level based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(f) "NA" denotes no cleanup level established.

(g) National Recommended Water Quality Criteria (NRWQC) for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(h) National Toxics Rule (NTR) for consumption of organisms only based on 40 Code of Federal Regulations (CFR) 131.36 at a risk level of $1x10^{-6}$.

Analytes detected in samples at concentrations exceeding one or more of the cleanup levels or comparison values are shown in bold and italics.

mg/l - milligrams per liter

µg/l - micrograms per liter

TABLE 7E

JUNE-AUGUST 2002 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - PCBs
Former Tacoma Metals Facility

Sample Designation	Sample Date	PCBs (µg/l)[a]							Total PCBs[b]
		Aroclor 1016	Aroclor 1242	Aroclor 1248	Aroclor 1254	Aroclor 1260	Aroclor 1221	Aroclor 1232	
MW-13	8/5/2002	<1.1[c]	<1.1	<1.1	<1.1	<1.1	<2.2	<1.1	<4.4
MTCA Method B Surface Water Cleanup Level[d]		0.00582 * / 0.1[e]	NA[f]	NA	0.00166 * / 0.1[e]	NA	NA	NA	NA
NRWQC - Aquatic Organisms Chronic Freshwater Criterion[g]		NA	NA	NA	NA	NA	NA	NA	0.014 * / 0.1[e]
NRWQC - Human Health Consumption of Organisms[h]		NA	NA	NA	NA	NA	NA	NA	6.40E-05 * / 0.1[e]
NTR - Aquatic Organisms Chronic Freshwater Criterion[i]		0.014 * / 0.1[e]	0.014 * / 0.1[e]	0.014 * / 0.1[e]	0.014 * / 0.1[e]	0.014 * / 0.1[e]	0.014 * / 0.1[e]	0.014 * / 0.1[e]	NA
NTR - Human Health Consumption of Organisms[j]		NA	NA	NA	NA	NA	NA	NA	1.70E-04 * / 0.1[e]

Notes:

(a) Samples were analyzed for polychlorinated biphenyls (PCBs) by EPA Method 8082.

(b) Total PCBs were calculated by summing the concentrations of detected PCB Aroclors. If a PCB Aroclor was not detected, a value equal to one-half the laboratory reporting limit was used in the summation.

(c) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(d) Model Toxics Control Act (MTCA) Method B surface water cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(e) Practical quantitation limit (PQL) (Ecology 2001b).

(f) "NA" denotes no cleanup level established.

(g) National Recommended Water Quality Criteria (NRWQC) chronic freshwater criterion (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(h) NRWQC for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with WAC 173-201A at a risk level of $1x10^{-6}$.

(i) National Toxics Rule (NTR) chronic freshwater criterion based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(j) NTR for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

µg/l - micrograms per liter

TABLE 7F

JUNE-AUGUST 2002 INVESTIGATION
GROUNDWATER ANALYTICAL RESULTS - TOTAL AND DISSOLVED METALS
Former Tacoma Metals Facility

Sample Designation	Sample Date		Metals (µg/l)[a]								
			Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
MW-13	8/5/2002	Total	<50/1.1[c]	26	<2[d]	9	3	<20/3[c]	<0.1	<50/0.7[c]	<3
		Dissolved[b]	<50/1.1[c]	23	<2	8	<2	<20/<1[c]	<0.1	<50/0.9[c]	<3
MTCA Method B Surface Water Cleanup Level[e]			0.0982 ** / 5[f]	NA[g]	20.3	NA	2,660	NA	NA	2,700	25,900
NRWQC - Aquatic Organisms Chronic Freshwater Criterion[h]			150	NA	0.37 ***	119.94 ***	14.8 ***	4.74 ***	0.77	5.0	NA
NRWQC - Human Health Consumption of Organisms[i]			0.14 ** / 5[f]	NA	NA	NA	NA	NA	NA	4,200	NA
NTR - Aquatic Organisms Chronic Freshwater Criterion[j]			190	NA	1.59 ***	288.07 ***	18.76 ***	4.74 ***	0.012 * / 0.1[k]	5	NA
NTR - Human Health Consumption of Organisms[l]			0.14 ** / 5[f]	NA	NA	NA	NA	NA	0.15	NA	NA

Notes:

(a) Samples were analyzed for metals by EPA Methods 6010/7470 series.

(b) Groundwater samples for dissolved metals were field filtered using a 0.45 micron filter.

(c) Samples were re-analyzed for metals by EPA Method 200.8 to obtain lower laboratory reporting limits.

(d) "<" denotes analyte was not detected at the indicated laboratory reporting limit.

(e) Model Toxics Control Act (MTCA) Method B surface water cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(f) Natural background concentration (Ecology 2001b).

(g) "NA" denotes no cleanup level established.

(h) National Recommended Water Quality Criteria (NRWQC) chronic freshwater criterion (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(i) NRWQC for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with WAC 173-201A at a risk level of $1x10^{-6}$.

(j) National Toxics Rule (NTR) chronic freshwater criterion based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(k) Practical quantitation limit (PQL) (Ecology 2001b).

(l) NTR for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

** Denotes natural background concentration is greater than MTCA cleanup levels and/or ARARs.

*** Freshwater criterion is expressed as a function of groundwater hardness. Average groundwater hardness at the site is 180 mg/l.

µg/l - micrograms per liter
mg/l - milligrams per liter

TABLE 8

OCTOBER 2001
GROUNDWATER ANALYTICAL RESULTS - DISSOLVED LEAD[a]
Former Tacoma Metals Facility

Sample Designation	Sample Date	Metals (µg/l)[b]								
		Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
MW-1	10/30/2001	--[c]	--	--	--	--	0.304	--	--	--
MW-2	10/30/2001	--	--	--	--	--	0.269	--	--	--
MW-4(R)	10/30/2001	--	--	--	--	--	0.199	--	--	--
MW-5	10/30/2001	--	--	--	--	--	0.292	--	--	--
MW-6	10/30/2001	--	--	--	--	--	0.383	--	--	--
MW-7	10/30/2001	--	--	--	--	--	0.249	--	--	--
MW-8(R)	10/30/2001	--	--	--	--	--	0.231	--	--	--
MW-9	10/30/2001	--	--	--	--	--	0.226	--	--	--
MW-10	10/30/2001	--	--	--	--	--	0.246	--	--	--
MW-11	10/30/2001	--	--	--	--	--	0.413	--	--	--
MW-12	10/30/2001	--	--	--	--	--	0.303	--	--	--
MTCA Method B Surface Water Cleanup Level[d]		0.0982 ** / 5[e]	NA[f]	20.3	NA	2,660	NA	NA	NA	25,900
NRWQC - Aquatic Organisms Chronic Freshwater Criterion[g]		150	NA	0.37 ***	119.94 ***	14.8 ***	4.74 ***	0.77	5.0	NA
NRWQC - Human Health Consumption of Organisms[h]		0.14 ** / 5[e]	NA	NA	NA	NA	NA	NA	4,200	NA
NTR - Aquatic Organisms Chronic Freshwater Criterion[i]		190	NA	1.59 ***	288.07 ***	18.76 ***	4.74 ***	0.012 * / 0.1[j]	5	NA
NTR - Human Health Consumption of Organisms[k]		0.14 ** / 5[e]	NA	NA	NA	NA	NA	0.15	NA	NA

Notes:

(a) Samples were field filtered using a 0.45 micron filter.

(b) Samples were analyzed for metals by EPA Method 200.8.

(c) "--" denotes samples not analyzed for listed compound.

(d) Model Toxics Control Act (MTCA) Method B surface water cleanup levels based on CLARC v3.1, dated November 2001 (Ecology 2001b).

(e) Natural background concentration (Ecology 2001b).

(f) "NA" denotes no cleanup level established.

(g) National Recommended Water Quality Criteria (NRWQC) chronic freshwater criterion (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with Washington Administrative Code (WAC) 173-201A at a risk level of $1x10^{-6}$.

(h) NRWQC for consumption of organisms only (EPA 2002) pursuant to Section 304(a)(1) of the Clean Water Act and in accordance with WAC 173-201A at a risk level of $1x10^{-6}$.

(i) National Toxics Rule (NTR) chronic freshwater criterion based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

(j) Practical quantitation limit (PQL) (Ecology 2001b).

(k) NTR for consumption of organisms only based on 40 CFR 131.36 at a risk level of $1x10^{-6}$.

* Denotes PQL is higher than MTCA cleanup levels and/or applicable, relevant, and appropriate requirements (ARARs).

** Denotes natural background concentration is higher than MTCA cleanup levels and/or ARARs.

*** Freshwater criterion is expressed as a function of groundwater hardness. Average groundwater hardness at the site is 180 mg/l.

µg/l - micrograms per liter
mg/l - milligrams per liter

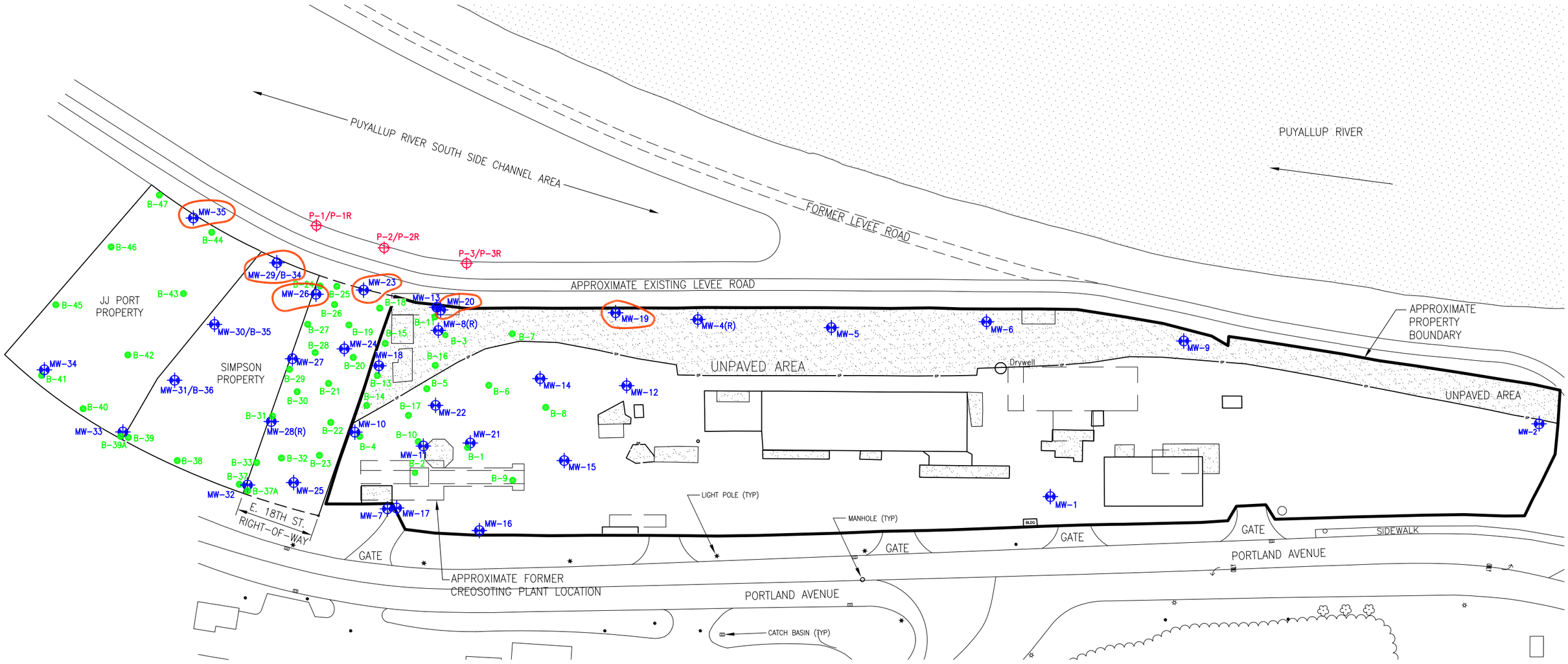
Appendix E

Puyallup River Side Channel Investigation Maps and Data Tables

Appendix E: Puyallup River Site Channel Investigation Maps and Data Tables

Table of Contents

All materials included in Appendix E are from *Revised Groundwater Investigation Summary, Puyallup River Side Channel Investigation* (Kennedy/Jenks Consultants 2012)



LEGEND:

B-1	PREVIOUS SOIL BORING LOCATION
MW-26	MONITORING WELL LOCATION
	MONITORING WELL SAMPLED OCTOBER 2010 AND FEBRUARY 2011
	UNPAVED AREA
	APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)
P-1	TEMPORARY PIEZOMETER LOCATION OCTOBER 2010 AND FEBRUARY 2011

NOTES:

1. BORING AND WELL LOCATIONS ARE BASED ON SITE SURVEY BY EARTH TECH, INC. ON 28 MARCH 2000, 13 MARCH 2003, 31 DECEMBER 2003, 14 APRIL 2004, 21 APRIL 2005, 29 MARCH 2006, AND 11 APRIL 2008.
2. ALL LOCATIONS ARE APPROXIMATE.

N

0 50 100

SCALE: 1=100

Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

SITE AND SAMPLE LOCATION MAP

996098.00\2010 PRSC\FIG_01

FIGURE 1

TABLE 1

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
POINT OF COMPLIANCE WELLS AND TEMPORARY PIEZOMETERS
Former Tacoma Metals Facility

Analyte	P-1 / P-1R				P-2 / P-2R[b]				P-3 / P-3R[b]				MW-19				Proposed Cleanup Level[a]
	unfiltered samples		filtered samples		unfiltered samples		filtered samples		unfiltered samples		filtered samples		unfiltered samples		filtered samples		
	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	
BTEX (µg/L) [c]																	
Benzene	<0.35	<0.35	---	---	<0.35 / <0.35	<0.35	---	---	<0.35	2.2 / 2.1	---	---	<0.35 [d]	<0.35	--- [e]	---	23
Toluene	<1	<1	---	---	<1 / <1	<1	---	---	<1	<1 / <1	---	---	<1	<1	---	---	19,000
Etylbenzene	<1	<1	---	---	<1 / <1	<1	---	---	<1	<1 / <1	---	---	<1	<1	---	---	6,900
Total xylenes	<3	<3	---	---	<3 / <3	<3	---	---	<3	<3 / 2.0	---	---	<3	<3	---	---	16,000 [f]
PAHs (µg/L) [g]																	
Naphthalene	0.14 j	0.12	0.10 j	0.081	0.01 j / <0.10	0.069	0.01 j / <0.10	0.032	0.01 j	0.44 / 0.46	<0.10	0.28 / 0.58	0.01 j,J	<0.025	0.02 j	<0.025	4,940
Acenaphthylene	<0.10	0.12	<0.10	0.14	<0.10 / <0.10	0.17	<0.10/<0.10	0.20	<0.10	0.40 / 0.42	<0.10	0.40 / 0.39	<0.10 J	<0.025	<0.10	<0.025	NA [h]
Acenaphthene	12	19	11	18	1.5 / 1.5	28	1.3 / 1.4	18	<0.10	76 / 63	<0.10	62 / 63	0.40 J	0.21	0.41	0.18	643
Fluorene	1.3	1.8	1.2	1.6	0.06 j / 0.06 j	5.9	0.06 j / 0.06 j	4.1	<0.10	14 / 13	<0.10	9.3 / 9.9	0.04 j,J	<0.025	0.04 j	<0.025	3,460
Phenanthrene	0.64	0.75	0.59	0.71	0.04 j / 0.04 j	2.1	0.03 j / 0.05 j	1.4	<0.10	1.6 / 1.7	<0.10	1.6 / 1.5	0.02 j,J	<0.025	<0.10	<0.025	NA
Anthracene	0.12	0.20	0.11	0.20	<0.10 / <0.10	0.10	<0.10 / <0.10	0.13	<0.10	0.086 / 0.094	<0.10	0.084 / 0.082	<0.10 J	<0.025	<0.10	<0.025	25,900
Fluoranthene	0.12	0.18	0.09 j	0.15	<0.10 / 0.02 j	0.10	<0.10 / 0.01 j	0.070	<0.10	0.048 / 0.049	<0.10	0.040 / 0.033	<0.10 J	<0.025	<0.10	<0.025	90.2
Pyrene	0.05 j	0.068	0.04 j	0.055	<0.10 / 0.01 j	0.048	<0.10 / <0.10	0.033	0.03 j	0.027 / 0.027	<0.10	<0.025 / <0.025	<0.10 J	<0.025	<0.10	<0.025	2,590
Benzo(g,h,i)perylene	<0.10	<0.025	<0.10	<0.025	<0.10 / <0.10	<0.025	<0.10 / <0.10	<0.025	<0.10	<0.025 / <0.025	<0.10	<0.025 / <0.025	<0.10 J	<0.025	<0.10	<0.025	NA
cPAHs (µg/L) [i]																	
Benzo(a)anthracene	<0.10	<0.025	<0.10	<0.025	<0.10 / <0.10	<0.025	<0.10 / <0.10	<0.025	<0.10	<0.025 / <0.025	<0.10	<0.025 / <0.025	<0.10 J	<0.025	<0.10	<0.025	NA
Chrysene	<0.10	<0.025	0.01 j	<0.025	0.01 j / <0.10	<0.025	<0.10 / <0.10	<0.025	<0.10	<0.025 / <0.025	0.01j	<0.025 / <0.025	0.01 j,J	<0.025	<0.10	<0.025	NA
Benzo(a)pyrene	<0.10	<0.025	<0.10	<0.025	<0.10 / <0.10	<0.025	<0.10 / <0.10	<0.025	<0.10	<0.025 / <0.025	<0.10	<0.025 / <0.025	<0.10 J	<0.025	<0.10	<0.025	0.03
Benzo(b)fluoranthene	<0.10	<0.025	<0.10	<0.025	<0.10 / <0.10	<0.025	<0.10 / <0.10	<0.025	<0.10	<0.025 / <0.025	<0.10	<0.025 / <0.025	<0.10 J	<0.025	<0.10	<0.025	NA
Benzo(k)fluoranthene	<0.10	<0.025	<0.10	<0.025	<0.10 / <0.10	<0.025	<0.10 / <0.10	<0.025	<0.10	<0.025 / <0.025	<0.10	<0.025 / <0.025	<0.10 J	<0.025	<0.10	<0.025	NA
Indeno(1,2,3-cd)pyrene	<0.10	<0.025	<0.10	<0.025	<0.10 / <0.10	<0.025	<0.10 / <0.10	<0.025	<0.10	<0.025 / <0.025	<0.10	<0.025 / <0.025	<0.10 J	<0.025	<0.10	<0.025	NA
Dibenz(a,h)anthracene	<0.10	<0.025	<0.10	<0.025	<0.10 / <0.10	<0.025	<0.10 / <0.10	<0.025	<0.10	<0.025 / <0.025	<0.10	<0.025 / <0.025	<0.10 J	<0.025	<0.10	<0.025	NA

TABLE 1

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
POINT OF COMPLIANCE WELLS AND TEMPORARY PIEZOMETERS
Former Tacoma Metals Facility

Analyte	MW-20				MW-23				MW-26				MW-29				MW-35				Proposed Cleanup Level[a]
	unfiltered samples		filtered samples		unfiltered samples		filtered samples		unfiltered samples		filtered samples		unfiltered samples		filtered samples		unfiltered samples		filtered samples		
	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	Oct-10	Feb-11	
BTEX (µg/L) [c]																					
Benzene	3.6	5.0	---	---	***56***	***53***	---	---	<0.35	<0.35	---	---	<0.35	<0.35	---	---	<0.35[d]	<0.35	---[e]	---	23
Toluene	<1	<1	---	---	1.4	1.2	---	---	<1	<1	---	---	<1	<1	---	---	<1	<1	---	---	19,000
Etylbenzene	3.0	2	---	---	56	52	---	---	1.1	<1	---	---	<1	<1	---	---	<1	<1	---	---	6,900
Total xylenes	4.7	3.8	---	---	22	18.7	---	---	<3	<3	---	---	<3	<3	---	---	<3	<3	---	---	16,000 [f]
PAHs (µg/L) [g]																					
Naphthalene	7.4 j	3.4	6.2	3.2	59	50	54	44	140	47	120 ve	44	0.25	0.56 J	0.39	0.31	0.02 j	<0.025	0.01 j	<0.025	4,940
Acenaphthylene	<0.10 J	0.72 J	<0.10	0.64	<0.10 J	0.91	<0.10 J	0.92	<0.10	0.33	0.62 J	0.51	<0.10 J	0.43 J	<0.10	0.37	<0.10	<0.025	<0.10	<0.025	NA [h]
Acenaphthene	210	180	190	170	170	160	170	150	67	69	60	62	43	44	37	45	0.02 j	<0.025	<0.10	<0.025	643
Fluorene	100	80	96	79	56	60	59	48	38	42	39	38	12	14	12	14	0.03 j	0.033	<0.10	<0.025	3,460
Phenanthrene	92	68	80	71	51	54	50	50	40	35	36	32	14	15	13	16	0.02 j	<0.025	0.01 j	<0.025	NA
Anthracene	4.8 j	3.0	3.7	2.7	4.6	5.5	5.7 j	4.2	3.6	4.1	3.1	3.5	3.5	4.0	3.3	3.8	<0.10	<0.025	<0.10	<0.025	25,900
Fluoranthene	1.9 J	1.7 J	1.9	1.2	5.9	6.6	6.3 J	4.9	7.1	8.2	6.3	6.3	5.4	6.4	5.2	6.4	<0.10	<0.025	<0.10	<0.025	90.2
Pyrene	0.81 J	0.77 J	0.76	0.51	3.7	4.0	3.9 J	2.9	3.7	4.4	3.2	3.7	3.3	4.1	3.2	3.7	0.11	0.16	0.09 j	0.098	2,590
Benzo(g,h,i)perylene	<0.10	<0.025	<0.10	<0.025	<0.10	<0.025	<0.10 J	<0.025	<0.10	<0.025	<0.10	<0.025	<0.10 J	<0.025 J	<0.10	<0.025	<0.10	<0.025	<0.10	<0.025	NA
cPAHs (µg/L) [i]																					
Benzo(a)anthracene	0.02 j	<0.025	<0.10	<0.025	0.30	0.28	0.20 J	0.15	0.16	0.12	0.12	0.11	0.23 J	0.28 J	0.16	0.17	<0.10	<0.025	<0.10	<0.025	NA
Chrysene	<0.10	<0.025	<0.10	<0.025	0.26	0.21	0.17 J	0.15	0.13	0.094	0.09 j	0.089	0.20 J	0.25 J	0.14	0.15	<0.10	<0.025	0.01 j	<0.025	NA
Benzo(a)pyrene	<0.10	<0.025	<0.10	<0.025	0.015 j	0.029	<0.10 J	<0.025	0.01 j	<0.025	<0.10	<0.025	***0.04 j,J***	***0.049 J***	0.01 j	<0.025	<0.10	<0.025	<0.10	<0.025	0.03
Benzo(b)fluoranthene	<0.10	<0.025	<0.10	<0.025	0.02 j	0.036	<0.10 J	<0.025	0.03 j	<0.025	<0.10	<0.025	0.05 j,J	0.062 J	0.01 j	<0.025	<0.10	<0.025	<0.10	<0.025	NA
Benzo(k)fluoranthene	<0.10	<0.025	<0.10	<0.025	<0.10	<0.025	<0.10 J	<0.025	<0.10	<0.025	<0.10	<0.025	0.02 j,J	<0.025 J	<0.10	<0.025	<0.10	<0.025	<0.10	<0.025	NA
Indeno(1,2,3-cd)pyrene	<0.10	<0.025	<0.10	<0.025	<0.10	<0.025	<0.10 J	<0.025	<0.10	<0.025	<0.10	<0.025	<0.10 J	<0.025 J	<0.10	<0.025	<0.10	<0.025	<0.10	<0.025	NA
Dibenz(a,h)anthracene	<0.10	<0.025	<0.10	<0.025	<0.10	<0.025	<0.10 J	<0.025	<0.10	<0.025	<0.10	<0.025	<0.10 J	<0.025 J	<0.10	<0.025	<0.10	<0.025	<0.10	<0.025	NA

Notes:

(a) Proposed site cleanup levels based on Kennedy/Jenks Consultants' 2007 *Cleanup Level Evaluation* report *(* submitted to Ecology under separate cover) and the Model Toxics Control Act (MTCA) (WAC 173-340) Method B surface water cleanup level based on Ecology's online CLARC database.

(b) Where two values are displayed, the second is the analytical result for a field blind duplicate sample (Dup-1).

(c) Samples were analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8260C for volatile compounds.

(d) "<" Denotes analyte was not detected at the indicated laboratory reporting limit.

(e) "---" Denotes sample was not analyzed for the listed analyte

(f) Denotes the MTCA Method B groundwater cleanup level based on Ecology's online CLARC database.

(g) Unfiltered and filtered (0.70 micron glass filter prior to extraction in laboratory) samples were analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C using selected ion monitoring (SIM) mode (where appropriate).

(h) "NA" denotes cleanup level is either not available or not appropriate.

(i) Samples were analyzed for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270C using SIM mode (where appropriate).

j = The result is below normal reporting limits (the value reported is an estimate)
J = The internal standard assoicated with the analyte is out of control limits (the reported concentration is an estimate).
ve = 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.
µg/L = micrograms per liter

Analytes detected in samples at concentrations exceeding the proposed cleanup level values are shown in bold and italics.

Appendix F

Creosote-Related Impact Maps and Cross Sections

Appendix F: Creosote-Related Impact Maps and Cross Sections

Table of Contents

All materials included in Appendix F are from *Response to Ecology Comment, Forensic Evaluation of Hydrocarbons* (Kennedy/Jenks Consultants 2009)

LEGEND:

- B-18 — SOIL BORING LOCATION
- MW-12 — MONITORING WELL LOCATION
- BB' — BB — GENERALIZED CROSS SECTION LOCATION
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- HISTORICAL FEATURES CONCURRENT WITH CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3–5' ABOVE FORMER CREOSOTING PLANT FEATURES)

NOTE:

HISTORICAL FEATURE LOCATIONS ARE BASED ON HISTORICAL AERIAL AND GROUND–LEVEL PHOTOGRAPHS AND HISTORICAL MAPS. LOCATIONS ARE APPROXIMATE.

B-47, MW-35, B-44, B-46, MW-29/B-34, B-43, B-45, MW-34, B-41, B-42, MW-31/B-36, B-40, B-39, B-39A, MW-33, B-38, B-37, MW-32, B-37A, B-32, B-33, B-31, MW-28 (R), B-30, B-27, B-28, MW-27, B-29, MW-30/B-35, B-25, B-24, MW-26, B-26, MW-23, B-21, B-22, B-23, MW-25, B-19, B-20, MW-24, B-18, B-15, B-13, B-14, B-17, MW-22/B-12, B-5, B-6, B-8, MW-14, B-16, MW-18, MW-10, B-4, B-10, MW-11, MW-21, B-1, MW-15, B-2, B-9, MW-13, MW-20, B-11, B-3, B-7, MW-19, MW-8(R), MW-17, MW-16

AA, AA', BB', CC, DD, DD', CC'

WOOD CHIP BARGE LOADING AREA

E. 18TH ST. RIGHT–OF–WAY

WHARF

OIL HOUSE

POSSIBLE COOLING TOWER STRUCTURE

UNKNOWN STRUCTURE

WOOD CHIP STORAGE AREA

POSSIBLE PUMP/COMPRESSOR STRUCTURE

WOODEN FENCE STRUCTURE

OFFICE

WORK SHOP

102,000-GALLON STORAGE TANK

450,000-GALLON STORAGE TANK

CRANE SUPPORT

CRANE SUPPORT

FORMER OFFICE

ELEVATED WOOD CHIP CONVEYOR

UNKNOWN ELEVATED STRUCTURES (POSSIBLY ASSOCIATED WITH CRANE OPERATION AREA)

UNKNOWN STRUCTURES

OCTAGONAL FOUNDATION AND PRESUMED COAL GAS STORAGE VESSEL

1,500-GALLON STORAGE TANK (ABOVE RETORT)

CREOSOTING PLANT RETORT BUILDING

POSSIBLE OFFICE

FORMER TACOMA METALS PROPERTY

JJ PORT PROPERTY

SIMPSON PROPERTY

EXISTING STRUCTURE

N

0 20 40

APPROX. SCALE: 1=40

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BGS = BELOW GRADE SURFACE.
3. THIS FIGURE WAS MODIFIED FROM THE ORIGINAL (2008) AT ECOLOGY'S REQUEST.

Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT SITE AND SAMPLE LOCATION MAP

996098.00\2008 SOURCE\FIG_01dwg

FIGURE 1

0–10 FEET DEPTH INTERVAL

- FIELD INDICATION OF HEAVY SOIL IMPACTS (NAPL PRESENT)
- FIELD INDICATION OF MODERATE SOIL IMPACTS (MODERATE TO STRONG ODOR, MODERATE TO HEAVY SHEEN)
- FIELD INDICATION OF LIGHT SOIL IMPACTS (SLIGHT ODOR, LIGHT SHEEN)
- NO FIELD INDICATION OF IMPACTS

INDICATES CONDITIONS OBSERVED IN THE CURRENT DEPTH INTERVAL

INDICATES CONDITIONS OBSERVED AT THE BOTTOM OF BORING AND WELLS TERMINATED WITHIN THE PREVIOUS DEPTH INTERVAL

B-47 MW-35 B-44 B-46 MW-29/B-34 B-45 B-43 MW-30/B-35 B-42 MW-34 B-41 MW-31/B-36 B-40 MW-33 B-39A B-39 B-38 B-37 MW-32 B-37A MW-25 B-33 B-32 B-31 MW-28 (R) B-30 B-29 MW-27 B-28 B-27 B-24 B-25 MW-26 B-26 MW-23 B-18 B-19 MW-24 B-20 B-21 B-22 B-23 B-15 MW-18 B-13 B-14 B-17 MW-10 B-4 MW-22/B-12 B-16 B-5 MW-13 MW-20 B-11 MW-8(R) B-3 B-7 MW-19 MW-14 B-6 B-8 MW-21 B-1 B-10 MW-11 B-2 B-9 MW-15 MW-17 MW-16

E. 18TH ST. RIGHT-OF-WAY

JJ PORT PROPERTY

SIMPSON PROPERTY

FORMER TACOMA METALS PROPERTY

EXISTING STRUCTURE

450,000-GALLON STORAGE TANK

102,000-GALLON STORAGE TANK

1,500-GALLON STORAGE TANK (ABOVE RETORT)

CREOSOTING PLANT RETORT BUILDING

0 20 40

APPROX. SCALE: 1=40

LEGEND:

- B-18 — SOIL BORING LOCATION
- MW-12 — MONITORING WELL LOCATION
- APPROXIMATE FIRST SILT/CLAY LAYER DEPTH CONTOUR (CONTOUR INTERVAL=2 FEET) (DASHED WHERE UNCERTAIN) (FEET BGS)
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3–5' ABOVE FORMER CREOSOTING PLANT FEATURES)

NOTE:

HISTORICAL FEATURE LOCATIONS ARE BASED ON HISTORICAL AERIAL AND GROUND-LEVEL PHOTOGRAPHS AND HISTORICAL MAPS. LOCATIONS ARE APPROXIMATE.

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BGS = BELOW GROUND SURFACE.
3. THIS MAP SHOWS THE HIGHEST LEVEL OF SOIL IMPACTS OBSERVED WITHIN THE INDICATED DEPTH INTERVAL. THESE CONDITIONS ARE NOT NECESSARILY REPRESENTATIVE OF THE ENTIRE DEPTH INTERVAL.
4. DEPTHS ARE IN FEET BGS NORMALIZED TO AN ELEVATION DATUM OF 10 FEET (THE APPROXIMATE EXISTING SURFACE ELEVATION AT THE FORMER CREOSOTING PLANT STRUCTURE).
5. NAPL = NON-AQUEOUS PHASE LIQUID.
6. FIGURE WAS MODIFIED FROM THE ORIGINAL (2008) AT ECOLOGY'S REQUEST.

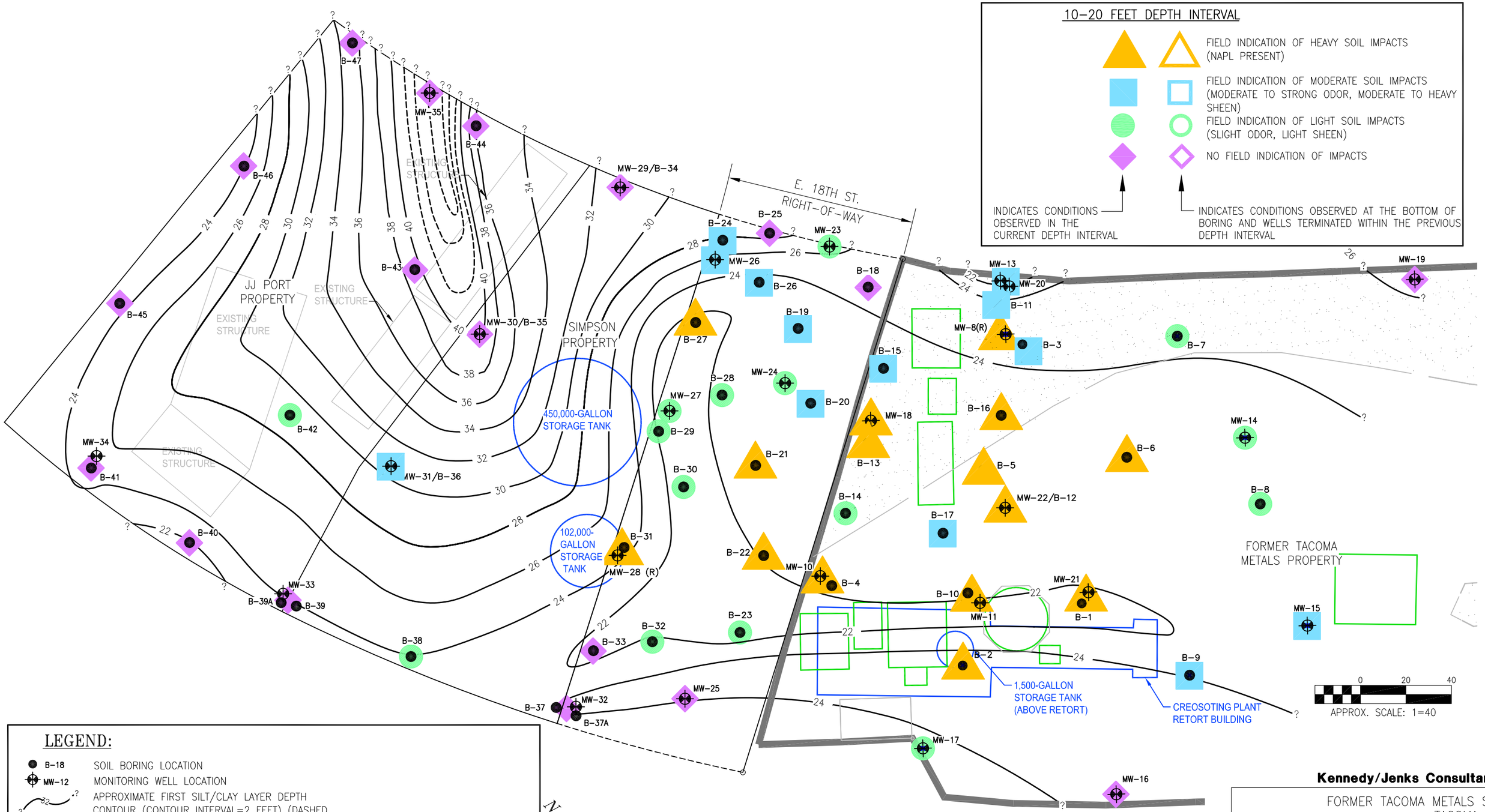
Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT SITE
SUMMARY OF SUBSURFACE SOIL IMPACTS
0-10 FEET BGS

996098.00\2008 SOURCE\FIG_02A.dwg

FIGURE 2A



LEGEND:

- B-18 — SOIL BORING LOCATION
- MW-12 — MONITORING WELL LOCATION
- APPROXIMATE FIRST SILT/CLAY LAYER DEPTH CONTOUR (CONTOUR INTERVAL=2 FEET) (DASHED WHERE UNCERTAIN) (FEET BGS)
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3–5' ABOVE FORMER CREOSOTING PLANT FEATURES)

NOTE:

HISTORICAL FEATURE LOCATIONS ARE BASED ON HISTORICAL AERIAL AND GROUND-LEVEL PHOTOGRAPHS AND HISTORICAL MAPS. LOCATIONS ARE APPROXIMATE.

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
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4. DEPTHS ARE IN FEET BGS NORMALIZED TO AN ELEVATION DATUM OF 10 FEET (THE APPROXIMATE EXISTING SURFACE ELEVATION AT THE FORMER CREOSOTING PLANT STRUCTURE).
5. NAPL = NON-AQUEOUS PHASE LIQUID.
6. FIGURE WAS MODIFIED FROM THE ORIGINAL (2008) AT ECOLOGY'S REQUEST.

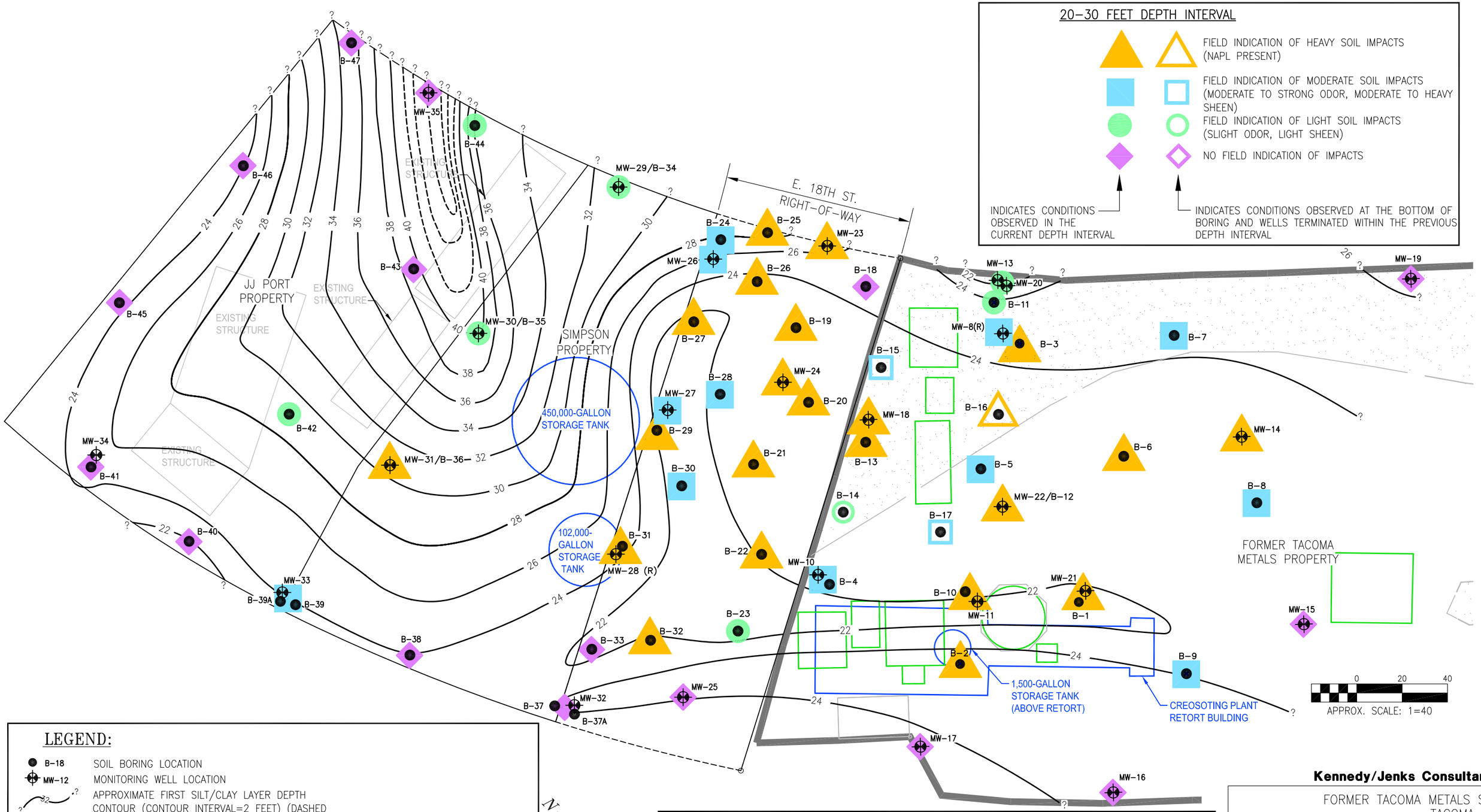
Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT SITE
SUMMARY OF SUBSURFACE SOIL IMPACTS
10-20 FEET BGS

996098.00\2008 SOURCE\FIG_02B.dwg

FIGURE 2B



LEGEND:

- B-18 — SOIL BORING LOCATION
- MW-12 — MONITORING WELL LOCATION
- APPROXIMATE FIRST SILT/CLAY LAYER DEPTH CONTOUR (CONTOUR INTERVAL=2 FEET) (DASHED WHERE UNCERTAIN) (FEET BGS)
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3–5' ABOVE FORMER CREOSOTING PLANT FEATURES)

NOTE:

HISTORICAL FEATURE LOCATIONS ARE BASED ON HISTORICAL AERIAL AND GROUND-LEVEL PHOTOGRAPHS AND HISTORICAL MAPS. LOCATIONS ARE APPROXIMATE.

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BGS = BELOW GROUND SURFACE.
3. THIS MAP SHOWS THE HIGHEST LEVEL OF SOIL IMPACTS OBSERVED WITHIN THE INDICATED DEPTH INTERVAL. THESE CONDITIONS ARE NOT NECESSARILY REPRESENTATIVE OF THE ENTIRE DEPTH INTERVAL.
4. DEPTHS ARE IN FEET BGS NORMALIZED TO AN ELEVATION DATUM OF 10 FEET (THE APPROXIMATE EXISTING SURFACE ELEVATION AT THE FORMER CREOSOTING PLANT STRUCTURE).
5. NAPL = NON-AQUEOUS PHASE LIQUID.
6. FIGURE WAS MODIFIED FROM THE ORIGINAL (2008) AT ECOLOGY'S REQUEST.

Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT SITE
SUMMARY OF SUBSURFACE SOIL IMPACTS
20-30 FEET BGS

996098.00\2008 SOURCE\FIG_02C.dwg

FIGURE 2C

30–40 FEET DEPTH INTERVAL

- FIELD INDICATION OF HEAVY SOIL IMPACTS (NAPL PRESENT)
- FIELD INDICATION OF MODERATE SOIL IMPACTS (MODERATE TO STRONG ODOR, MODERATE TO HEAVY SHEEN)
- FIELD INDICATION OF LIGHT SOIL IMPACTS (SLIGHT ODOR, LIGHT SHEEN)
- NO FIELD INDICATION OF IMPACTS

INDICATES CONDITIONS OBSERVED IN THE CURRENT DEPTH INTERVAL

INDICATES CONDITIONS OBSERVED AT THE BOTTOM OF BORING AND WELLS TERMINATED WITHIN THE PREVIOUS DEPTH INTERVAL

B-47, MW-35, B-44, B-46, MW-29/B-34, B-45, B-43, MW-30/B-35, B-42, MW-34, B-41, MW-31/B-36, B-40, MW-33, B-39A, B-39, B-38, B-37, MW-32, B-37A, MW-25, B-33, B-32, B-23, B-30, B-31, MW-28 (R), B-22, MW-10, B-4, B-21, B-24, B-25, MW-23, MW-26, B-26, B-27, B-28, B-29, MW-27, B-19, MW-24, B-20, B-18, B-15, MW-18, B-13, B-14, B-17, B-5, MW-22/B-12, B-6, MW-14, B-8, MW-13, MW-20, B-11, MW-8(R), B-3, B-7, MW-19, B-16, MW-21, B-1, B-10, MW-11, B-2, B-9, MW-15, MW-17, MW-16

E. 18TH ST. RIGHT-OF-WAY

JJ PORT PROPERTY

SIMPSON PROPERTY

FORMER TACOMA METALS PROPERTY

EXISTING STRUCTURE

450,000-GALLON STORAGE TANK

102,000-GALLON STORAGE TANK

1,500-GALLON STORAGE TANK (ABOVE RETORT)

CREOSOTING PLANT RETORT BUILDING

0 20 40

APPROX. SCALE: 1=40

LEGEND:

- B-18 — SOIL BORING LOCATION
- MW-12 — MONITORING WELL LOCATION
- APPROXIMATE FIRST SILT/CLAY LAYER DEPTH CONTOUR (CONTOUR INTERVAL=2 FEET) (DASHED WHERE UNCERTAIN) (FEET BGS)
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3–5' ABOVE FORMER CREOSOTING PLANT FEATURES)

NOTE:

HISTORICAL FEATURE LOCATIONS ARE BASED ON HISTORICAL AERIAL AND GROUND–LEVEL PHOTOGRAPHS AND HISTORICAL MAPS. LOCATIONS ARE APPROXIMATE.

N

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BGS = BELOW GROUND SURFACE.
3. THIS MAP SHOWS THE HIGHEST LEVEL OF SOIL IMPACTS OBSERVED WITHIN THE INDICATED DEPTH INTERVAL. THESE CONDITIONS ARE NOT NECESSARILY REPRESENTATIVE OF THE ENTIRE DEPTH INTERVAL.
4. DEPTHS ARE IN FEET BGS NORMALIZED TO AN ELEVATION DATUM OF 10 FEET (THE APPROXIMATE EXISTING SURFACE ELEVATION AT THE FORMER CREOSOTING PLANT STRUCTURE).
5. NAPL = NON–AQUEOUS PHASE LIQUID.
6. FIGURE WAS MODIFIED FROM THE ORIGINAL (2008) AT ECOLOGY'S REQUEST.

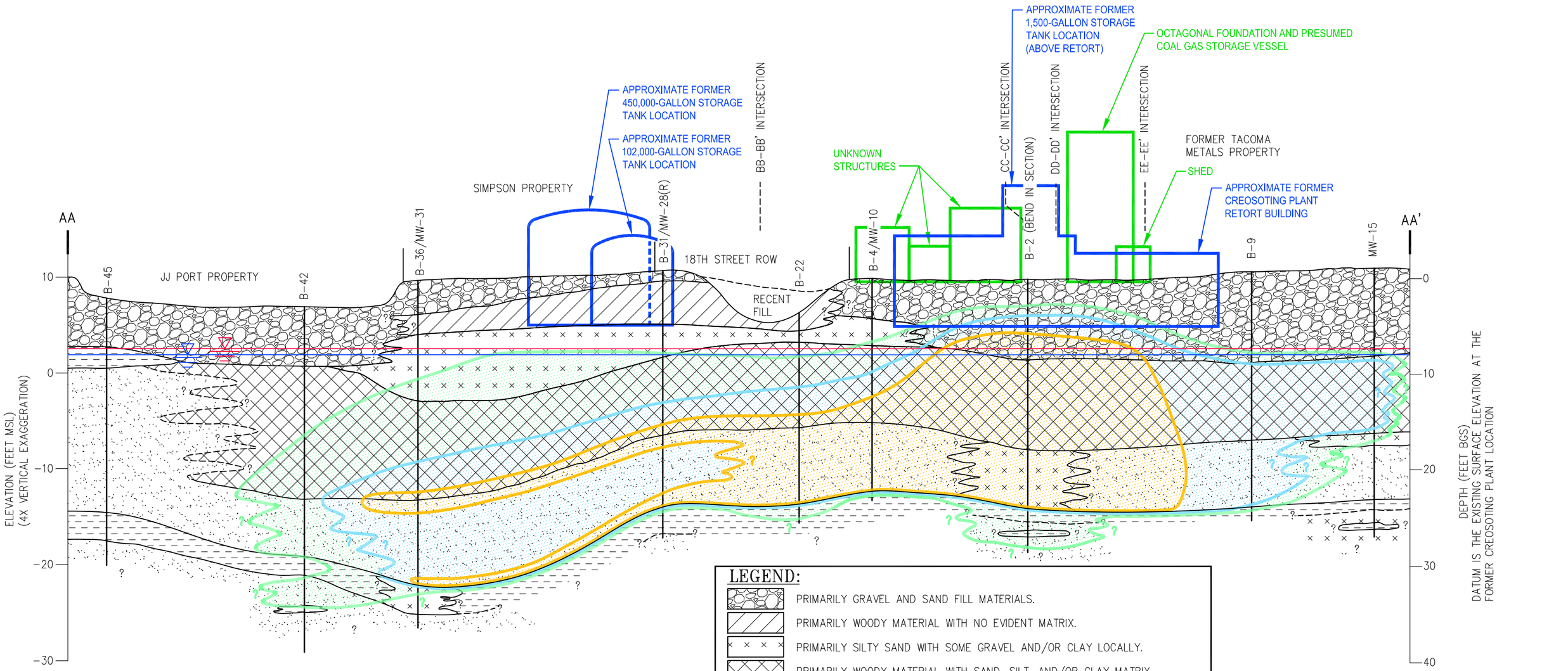
Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT SITE
SUMMARY OF SUBSURFACE SOIL IMPACTS
30-40 FEET BGS

996098.00\2008 SOURCE\FIG_02D.dwg

FIGURE 2D



NOTES:

1. REFER TO FIGURE 1 FOR CROSS SECTION LOCATIONS.
2. ALL LOCATIONS AND DEPTHS ARE APPROXIMATE.
3. MSL = FEET ABOVE MEAN SEA LEVEL (NGVD 1929).
4. NAPL = NON-AQUEOUS PHASE LIQUID.
5. BGS = BELOW GROUND SURFACE.
6. FIGURE WAS MODIFIED FROM THE ORIGINAL (2008) AT ECOLOGY'S REQUEST

APPROX. SCALE: 1=10 VERTICAL (0, 5, 10)

APPROX. SCALE: 1=40 HORIZONTAL (0, 20, 40)

LEGEND:

- PRIMARILY GRAVEL AND SAND FILL MATERIALS.
- PRIMARILY WOODY MATERIAL WITH NO EVIDENT MATRIX.
- PRIMARILY SILTY SAND WITH SOME GRAVEL AND/OR CLAY LOCALLY.
- PRIMARILY WOODY MATERIAL WITH SAND, SILT, AND/OR CLAY MATRIX.
- PRIMARILY SAND WITH SOME SILT LOCALLY.
- PRIMARILY CLAY AND SILT WITH SOME SAND LOCALLY.
- APPROXIMATE AREA OF FIELD INDICATION OF HEAVY SOIL IMPACTS (NAPL PRESENT).
- APPROXIMATE AREA OF FIELD INDICATION OF MODERATE SOIL IMPACTS (MODERATE TO STRONG ODOR, MODERATE TO HEAVY SHEEN).
- APPROXIMATE AREA OF FIELD INDICATION OF LIGHT SOIL IMPACTS (SLIGHT ODOR, LIGHT SHEEN).
- APPROXIMATE POTENTIOMETRIC SURFACE ELEVATION AT HIGH TIDE, 11 APRIL 2008.
- APPROXIMATE POTENTIOMETRIC SURFACE ELEVATION AT LOW TIDE, 11 APRIL 2008.
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3-5' ABOVE FORMER CREOSOTING PLANT FEATURES)

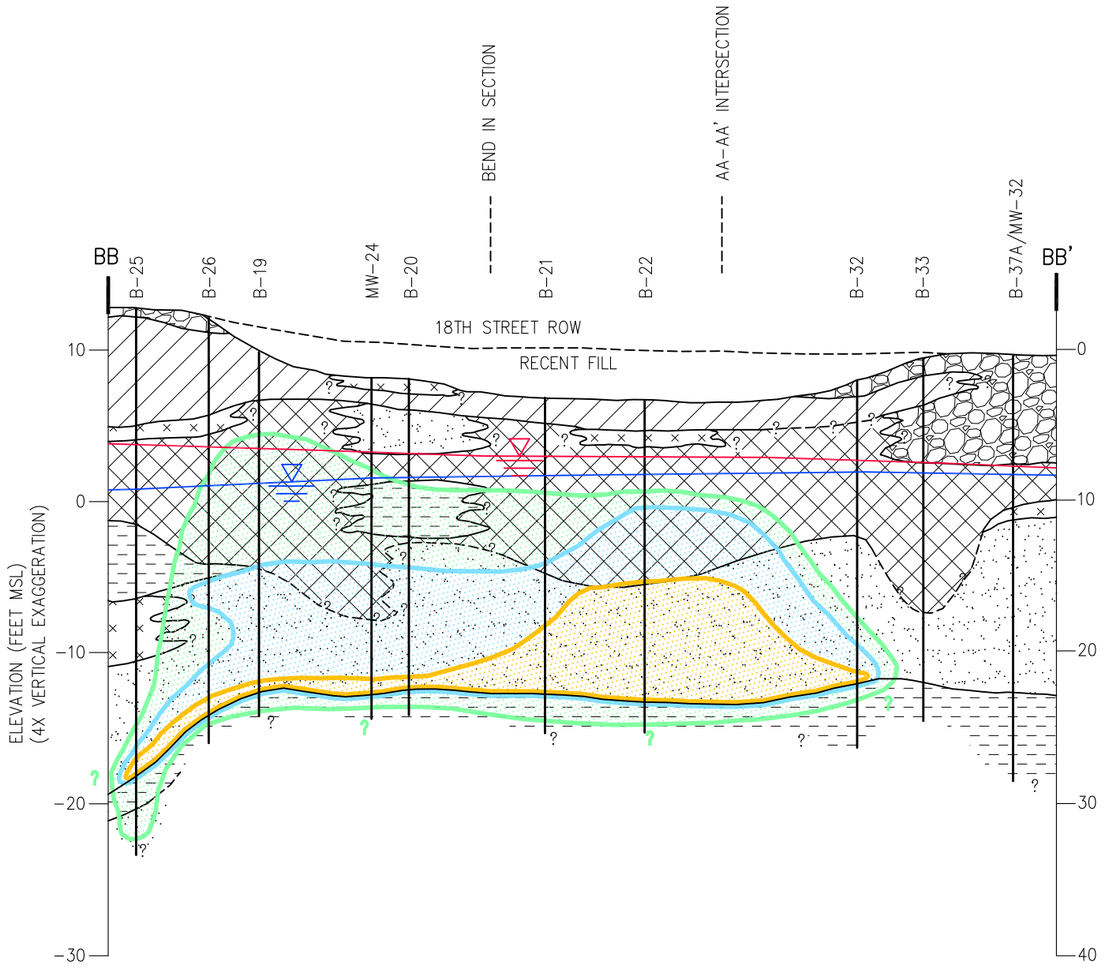
Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT SITE
GENERALIZED CROSS SECTION AA-AA'

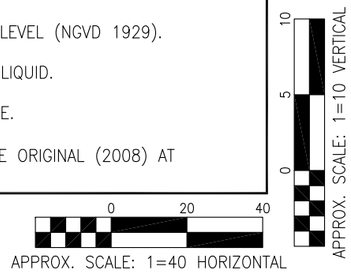
996098.00\2008 SOURCE\FIG_03A.dwg

FIGURE 3A



NOTES:

1. REFER TO FIGURE 1 FOR CROSS SECTION LOCATIONS.
2. ALL LOCATIONS AND DEPTHS ARE APPROXIMATE.
3. MSL = FEET ABOVE MEAN SEA LEVEL (NGVD 1929).
4. NAPL = NON-AQUEOUS PHASE LIQUID.
5. BGS = BELOW GROUND SURFACE.
6. FIGURE WAS MODIFIED FROM THE ORIGINAL (2008) AT ECOLOGY'S REQUEST



LEGEND:

- PRIMARILY GRAVEL AND SAND FILL MATERIALS.
- PRIMARILY WOODY MATERIAL WITH NO EVIDENT MATRIX.
- PRIMARILY SILTY SAND WITH SOME GRAVEL AND/OR CLAY LOCALLY.
- PRIMARILY WOODY MATERIAL WITH SAND, SILT, AND/OR CLAY MATRIX.
- PRIMARILY SAND WITH SOME SILT LOCALLY.
- PRIMARILY CLAY AND SILT WITH SOME SAND LOCALLY.
- APPROXIMATE AREA OF FIELD INDICATION OF HEAVY SOIL IMPACTS (NAPL PRESENT).
- APPROXIMATE AREA OF FIELD INDICATION OF MODERATE SOIL IMPACTS (MODERATE TO STRONG ODOR, MODERATE TO HEAVY SHEEN).
- APPROXIMATE AREA OF FIELD INDICATION OF LIGHT SOIL IMPACTS (SLIGHT ODOR, LIGHT SHEEN).
- APPROXIMATE POTENTIOMETRIC SURFACE ELEVATION AT HIGH TIDE, 11 APRIL 2008.
- APPROXIMATE POTENTIOMETRIC SURFACE ELEVATION AT LOW TIDE, 11 APRIL 2008.

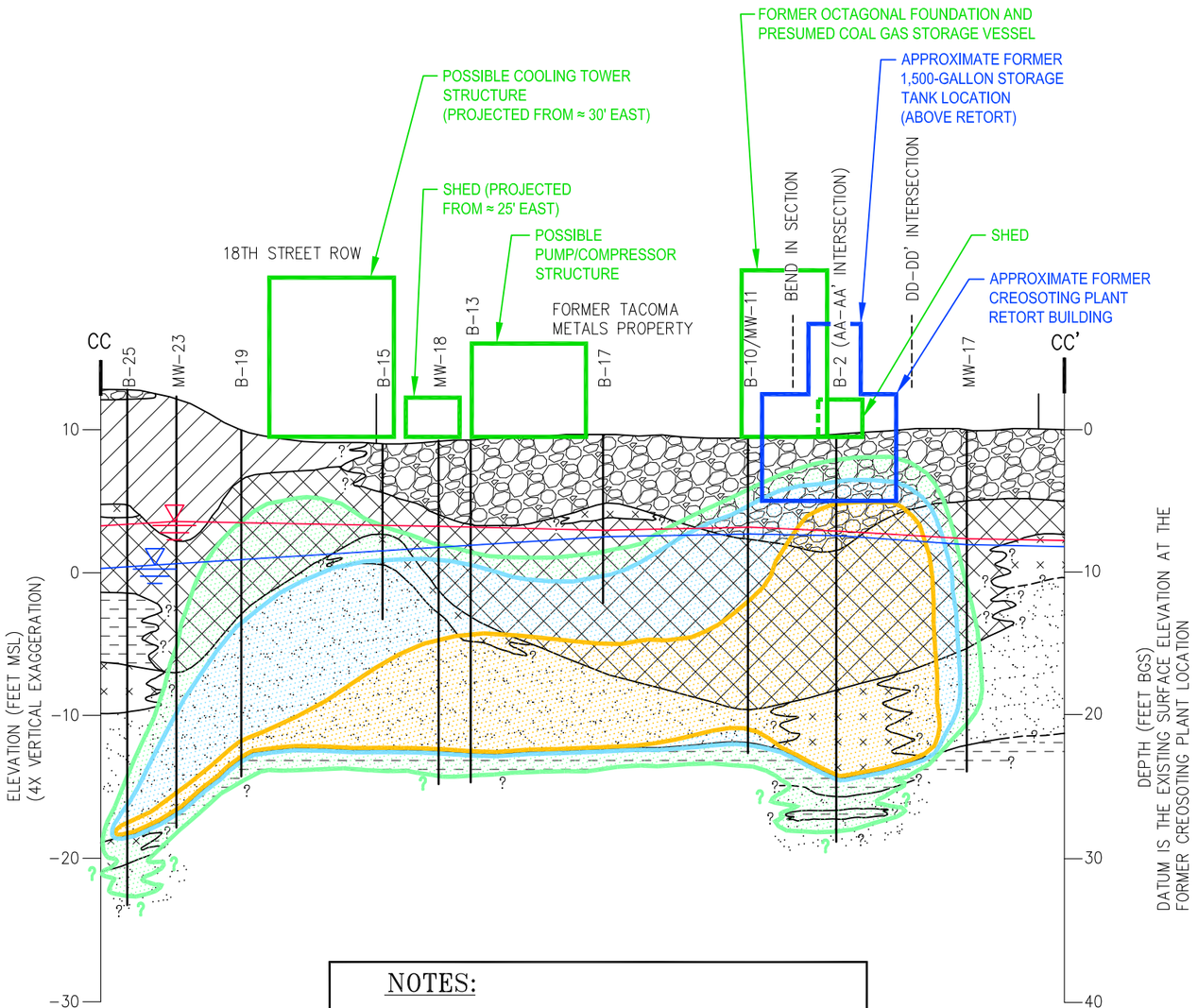
Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT SITE
GENERALIZED CROSS SECTION BB-BB'

996098.00\2008 SOURCE\FIG_03B.dwg

FIGURE 3B



NOTES:

1. REFER TO FIGURE 1 FOR CROSS SECTION LOCATIONS.
2. ALL LOCATIONS AND DEPTHS ARE APPROXIMATE.
3. MSL = FEET ABOVE MEAN SEA LEVEL (NGVD 1929).
4. NAPL = NON–AQUEOUS PHASE LIQUID.
5. BGS = BELOW GROUND SURFACE.
6. FIGURE WAS MODIFIED FROM THE ORIGINAL (2008) AT ECOLOGY'S REQUEST

APPROX. SCALE: 1=40 HORIZONTAL (0, 20, 40)

APPROX. SCALE: 1=10 VERTICAL (0, 5, 10)

LEGEND:

- PRIMARILY GRAVEL AND SAND FILL MATERIALS.
- PRIMARILY WOODY MATERIAL WITH NO EVIDENT MATRIX.
- PRIMARILY SILTY SAND WITH SOME GRAVEL AND/OR CLAY LOCALLY.
- PRIMARILY WOODY MATERIAL WITH SAND, SILT, AND/OR CLAY MATRIX.
- PRIMARILY SAND WITH SOME SILT LOCALLY.
- PRIMARILY CLAY AND SILT WITH SOME SAND LOCALLY.
- APPROXIMATE AREA OF FIELD INDICATION OF HEAVY SOIL IMPACTS (NAPL PRESENT).
- APPROXIMATE AREA OF FIELD INDICATION OF MODERATE SOIL IMPACTS (MODERATE TO STRONG ODOR, MODERATE TO HEAVY SHEEN).
- APPROXIMATE AREA OF FIELD INDICATION OF LIGHT SOIL IMPACTS (SLIGHT ODOR, LIGHT SHEEN).
- APPROXIMATE POTENTIOMETRIC SURFACE ELEVATION AT HIGH TIDE, 11 APRIL 2008.
- APPROXIMATE POTENTIOMETRIC SURFACE ELEVATION AT LOW TIDE, 11 APRIL 2008.
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3–5' ABOVE FORMER CREOSOTING PLANT FEATURES)

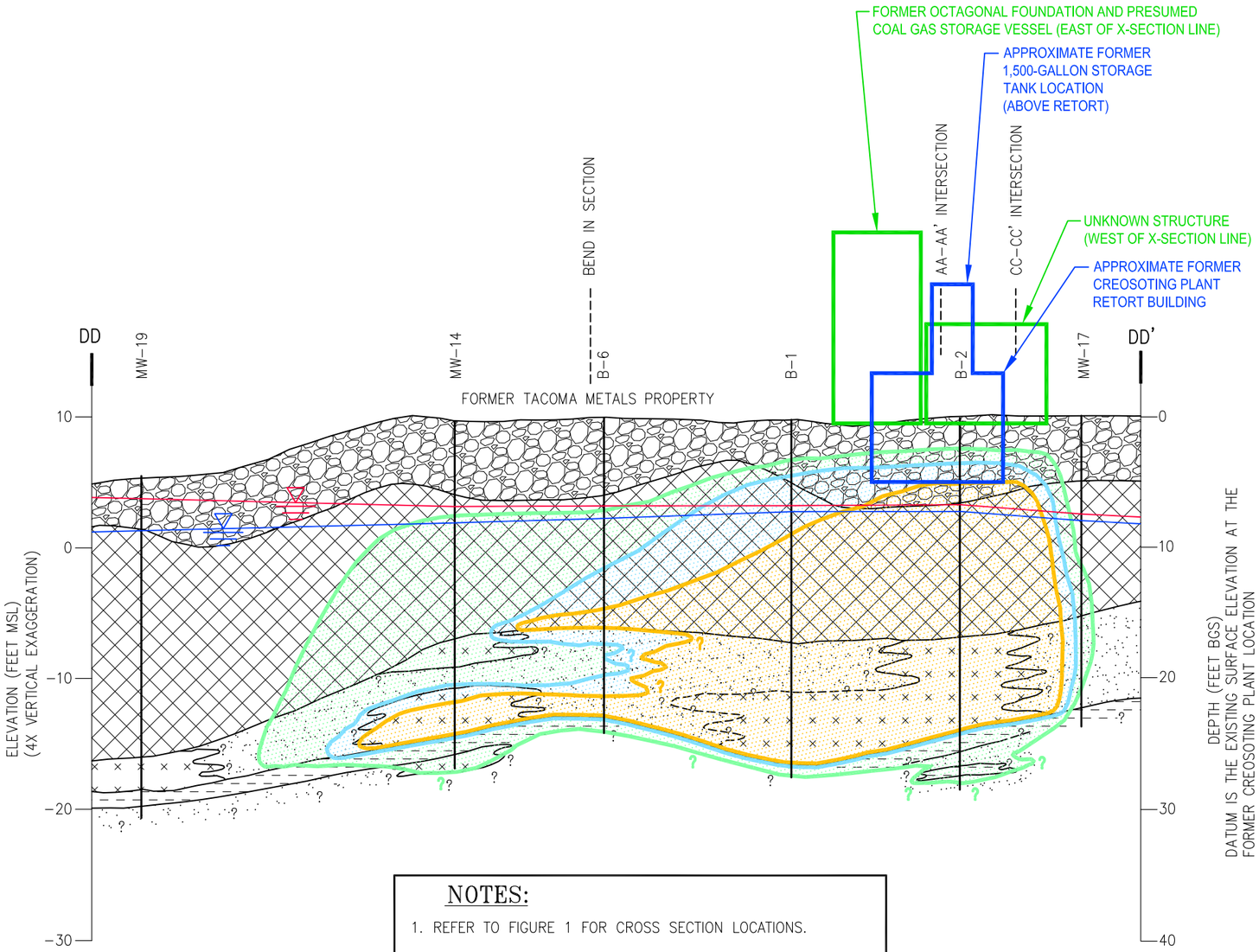
Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT SITE
GENERALIZED CROSS SECTION CC-CC'

996098.00\2008 SOURCE\FIG_03C.dwg

FIGURE 3C



NOTES:

1. REFER TO FIGURE 1 FOR CROSS SECTION LOCATIONS.
2. ALL LOCATIONS AND DEPTHS ARE APPROXIMATE.
3. MSL = FEET ABOVE MEAN SEA LEVEL (NGVD 1929).
4. NAPL = NON-AQUEOUS PHASE LIQUID.
5. BGS = BELOW GROUND SURFACE.
6. FIGURE WAS MODIFIED FROM THE ORIGINAL (2008) AT ECOLOGY'S REQUEST

APPROX. SCALE: 1=40 HORIZONTAL (0, 20, 40)

APPROX. SCALE: 1=10 VERTICAL (0, 5, 10)

LEGEND:

- PRIMARILY GRAVEL AND SAND FILL MATERIALS.
- PRIMARILY WOODY MATERIAL WITH NO EVIDENT MATRIX.
- PRIMARILY SILTY SAND WITH SOME GRAVEL AND/OR CLAY LOCALLY.
- PRIMARILY WOODY MATERIAL WITH SAND, SILT, AND/OR CLAY MATRIX.
- PRIMARILY SAND WITH SOME SILT LOCALLY.
- PRIMARILY CLAY AND SILT WITH SOME SAND LOCALLY.
- APPROXIMATE AREA OF FIELD INDICATION OF HEAVY SOIL IMPACTS (NAPL PRESENT).
- APPROXIMATE AREA OF FIELD INDICATION OF MODERATE SOIL IMPACTS (MODERATE TO STRONG ODOR, MODERATE TO HEAVY SHEEN).
- APPROXIMATE AREA OF FIELD INDICATION OF LIGHT SOIL IMPACTS (SLIGHT ODOR, LIGHT SHEEN).
- APPROXIMATE POTENTIOMETRIC SURFACE ELEVATION AT HIGH TIDE, 11 APRIL 2008.
- APPROXIMATE POTENTIOMETRIC SURFACE ELEVATION AT LOW TIDE, 11 APRIL 2008.
- FORMER CREOSOTING PLANT FEATURES (APPROXIMATE)
- FORMER COKE PLANT GAS DISTRIBUTION FEATURES (APPROXIMATE) (3–5' ABOVE FORMER CREOSOTING PLANT FEATURES)

Kennedy/Jenks Consultants

FORMER TACOMA METALS SITE
TACOMA, WA

FORMER CREOSOTING PLANT SITE
GENERALIZED CROSS SECTION DD-DD'

996098.00\2008 SOURCE\FIG_03D.dwg

FIGURE 3D

Appendix G

RI/FS Site Conceptual Model and Cleanup Alternatives

Appendix G: RI/FS Site Conceptual Model and Cleanup Alternatives

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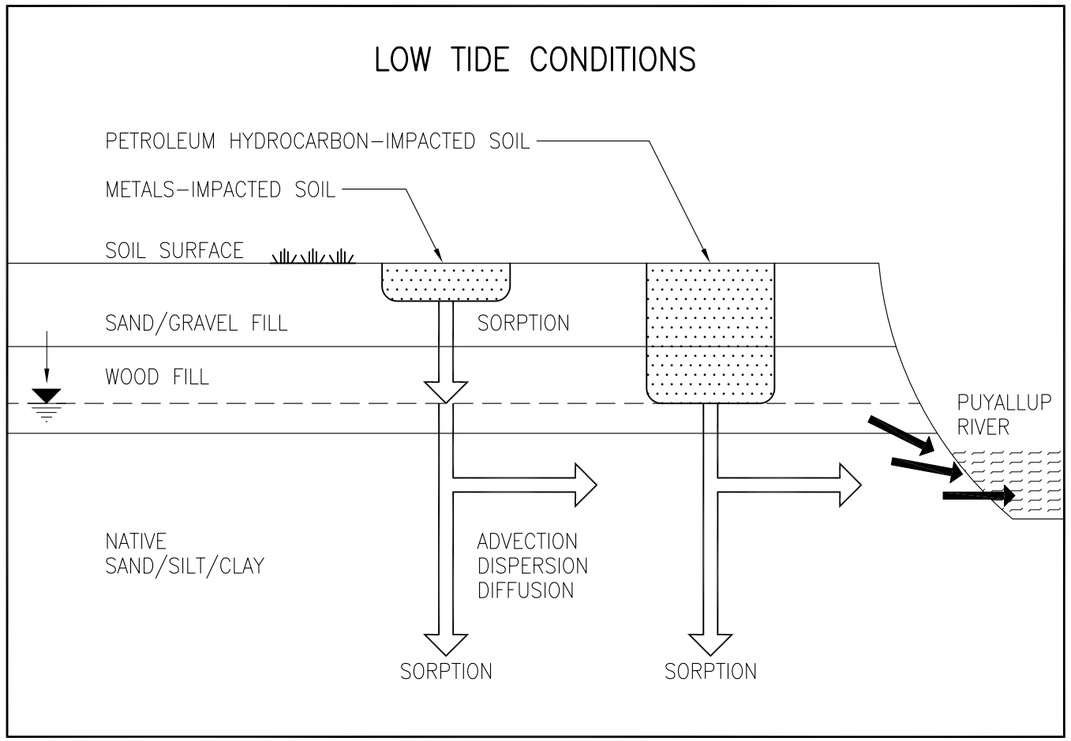
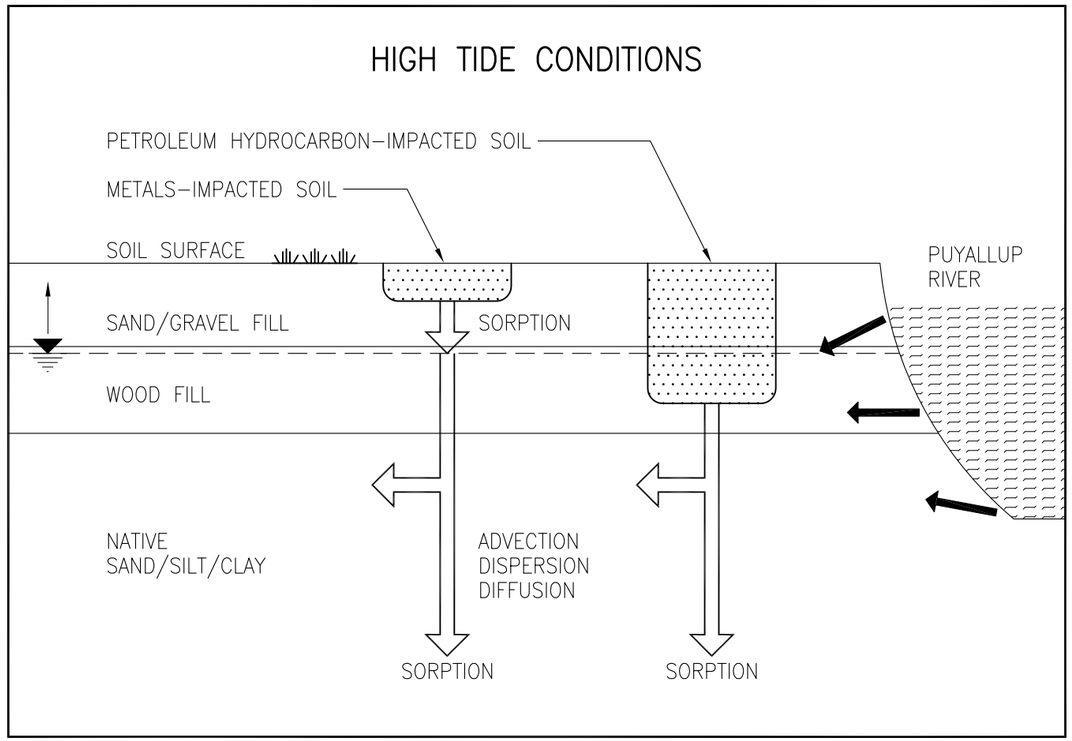
All materials included in Appendix G are from *Remedial Investigation/Feasibility Study Report* (Kennedy/Jenks Consultants 2001)





LEGEND:

FALLING POTENTIOMETRIC SURFACE

RISING POTENTIOMETRIC SURFACE

GROUNDWATER FLOW PATH

NOTE:

1. THIS FIGURE REPRESENTS THE CONCEPTUAL CONDITIONS ASSUMED FOR CHEMICAL TRANSPORT MODELING. REFER TO FIGURES 3–1, 3–2, AND 3–3 FOR INTERPRETIVE CROSS SECTIONS OF SITE GEOLOGIC CONDITIONS.

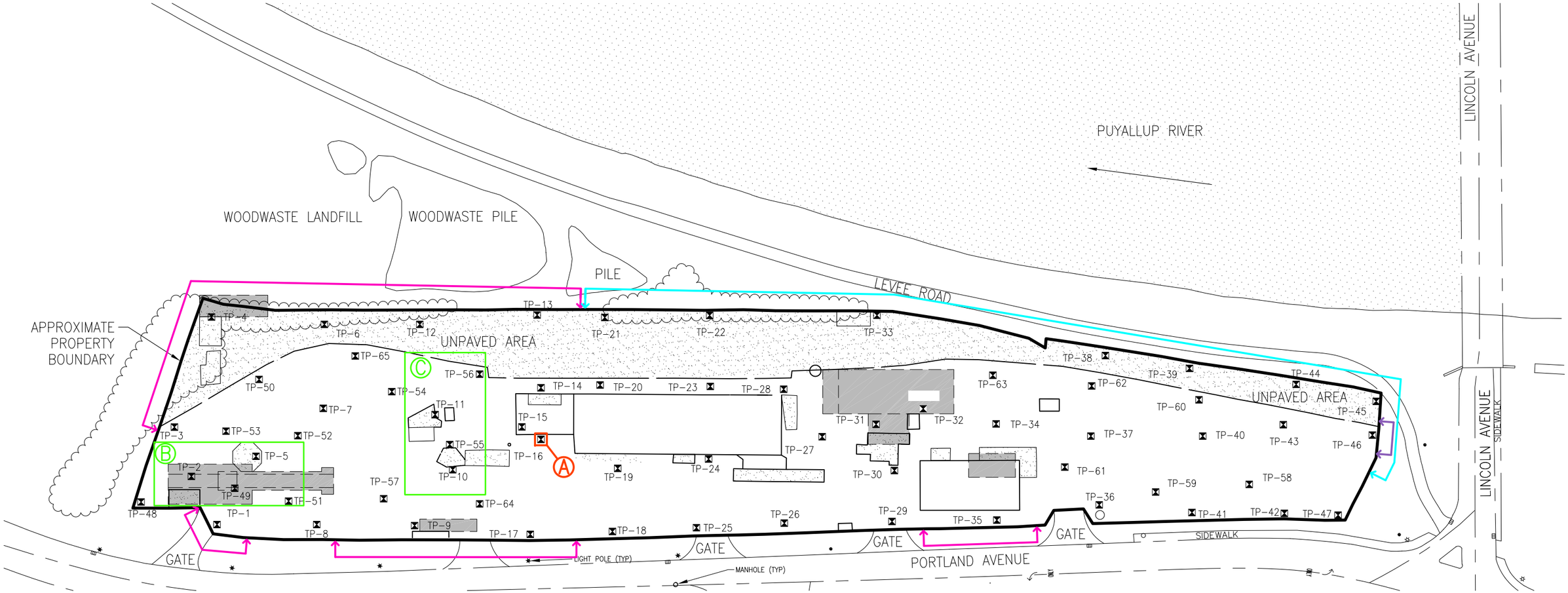
Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

CONCEPTUAL MODEL OF CHEMICAL MIGRATION

996098.00/P01SK008–1

FIGURE 8-1



LEGEND:

- TP-1 — TEST PIT LOCATION
- UNPAVED AREA
- APPROXIMATE PREVIOUS STRUCTURE LOCATION (IDENTIFIED IN HISTORICAL AERIAL PHOTOGRAPHS AND/OR SANBORN MAPS)

NOTES:

1. MAP IS BASED ON SITE SURVEY BY EARTH TECH INC., ON 28 MARCH 2000.
2. REFER TO FIGURE 4-4 FOR CONCENTRATIONS OF PETROLEUM HYDROCARBONS IN SOIL.
3. REFER TO FIGURE 4-1 FOR CONCENTRATIONS OF METALS IN SOIL.

ALTERNATIVES 1, 2, AND 3
LEAD-ACID BATTERY CASINGS AND ASSOCIATED IMPACT SOIL

Ⓐ 10ft LONG x 10ft WIDE x 3ft DEEP (AVERAGE)
(10 CUBIC YARDS)

TOTAL 10 CUBIC YARDS (APPROXIMATE).

ALTERNATIVES 1, 2, AND 3
PETROLEUM HYDROCARBON-IMPACTED SOIL EXCAVATION AREAS (INCLUDES AREAS OF ANTICIPATED FREE PRODUCT).

Ⓑ FORMER CREOSOTING PLANT
150ft LONG x 60ft WIDE x 10ft DEEP (AVERAGE)
(3,333 CUBIC YARDS)

Ⓒ WEST OF RED BRICK BUILDING
150ft LONG x 80ft WIDE x 10ft DEEP (AVERAGE)
(4,444 CUBIC YARDS)

TOTAL 7,800 CUBIC YARDS (APPROXIMATE).

ALTERNATIVES 2 AND 3 ONLY
PROPERTY BOUNDARY METALS-IMPACTED SOIL EXCAVATION AREAS (BUFFER ZONE)

930ft — 5ft WIDE x 1ft DEEP (AVERAGE)
(172 CUBIC YARDS)

920ft — 5ft WIDE x 3ft DEEP (AVERAGE)
(511 CUBIC YARDS)

30ft — 5ft WIDE x AN ADDITIONAL 3ft DEEP (AVERAGE)
(17 CUBIC YARDS)

TOTAL 700 CUBIC YARDS (APPROXIMATE).

N

0 50 100
SCALE: 1=100

Kennedy/Jenks Consultants

FORMER TACOMA METALS FACILITY
TACOMA, WA

PROPOSED REMEDIAL ACTION EXCAVATION AREAS

996098.00/P01SK009-1

FIGURE 9-1

Appendix H

Revised Remedial Alternative Costs

Appendix H: Revised Remedial Alternative Costs

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REMEDIAL ALTERNATIVE 1 REVISED COSTS 2014
Former Tacoma Metals Site
EXCAVATION / OFFSITE DISPOSAL / ASPHALT CAP / INSTITUTIONAL CONTROLS

Task	Quantity	Unit	Material		Labor		Lump Sum Price	Total Cost
			Unit Cost	Extension	Unit Cost	Extension		
REMEDIATION COSTS								
Excavate TPH / CPAH impacted soil	10564	CY			3.16	$ 33,382		$ 33,382
Oxygen-releasing compound - Phase I	3,000	LBS	9.00	$ 27,000	0.33	$ 1,000		$ 28,000
Oxygen-releasing compound - Phase II	8,775	LBS	8.00	$ 70,200	1.82	$ 16,000		$ 86,200
Import bank run soil, backfill, compact	12326	CY	14.20	$ 175,029	1.99	$ 24,529		$ 199,558
Import top course soil, grade, compact	2751	CY	20.25	$ 55,708	6.00	$ 16,506		$ 72,214
Pave asphalt cap, low permeability	28,556	SY	8.43	$ 240,727	1.04	$ 29,698		$ 270,425
Stormwater detention system	1	EA	100,000	$ 100,000	125,000	$ 125,000		$ 225,000
Stormwater lift station	1	EA	50,000	$ 50,000	25,000	$ 25,000		$ 75,000
Stormwater treatment system	1	EA	75,000	$ 75,000	25,000	$ 25,000		$ 100,000
Dust control	4	WK	250.00	$ 1,000	1636.25	$ 6,545		$ 7,545
Install signs	10	EA	15.00	$ 150	30.00	$ 300		$ 450
Deed restrictions	1	LS					$ 2,750	$ 2,750
Subtotal Remediation Costs A (A)								**$ 1,100,524**
Contractor overhead and profit	15	% of A					$ 165,079	$ 165,079
Bond and insurance	3	% of A					$ 33,016	$ 33,016
Mobilization/demobilization	5	% of A					$ 55,026	$ 55,026
Sales Tax / Tacoma	8.5	% of A					$ 93,545	$ 93,545
Contingency	10	% of A					$ 110,052	$ 110,052
Subtotal Remediation Costs B (B)								**$ 1,557,242**
Engineering Services	15	% of B					$ 233,586	$ 233,586
Construction management	10	% of B					$ 155,724	$ 155,724
Mobile laboratory	15	DAY			1,500.00	$ 22,500		$ 22,500
Off-site soil transportation/disposal (C)	15,846	TON			32.54	$ 515,629		$ 515,629
Disposal contingency	10	% of C					$ 51,563	$ 51,563
Lead battery casing disposal	1	LS					$ 10,000	$ 10,000
Monitoring well abandon and replace	1	LS					$ 60,000	$ 60,000
TOTAL REMEDIATION COSTS								**$ 2,606,244**
O&M COSTS								
Semi-Annual groundwater (CPOC Wells)	2	EA			4,500.00	$ 9,000		$ 9,000
Semi-Annual laboratory sample analysis	2	EA			15,000.00	$ 30,000		$ 30,000
Annual reporting	1	EA			4,000.00	$ 4,000		$ 4,000
Annual cap inspection / reporting	1	EA			1,000.00	$ 1,000		$ 1,000
Annual well inspection / maintenance	1	EA			5,000.00	$ 5,000		$ 5,000
Subtotal O&M Costs (D)								**$ 49,000**
Project management	15	% of D					$ 7,350	$ 7,350
O&M Contingency	10	% of D					$ 4,900	$ 4,900
TOTAL O&M COSTS (5 YR)								$ 61,250
(present worth i=0.05, n=5, P/A=4.3295)								**$ 265,182**
TOTAL - Based on 2001 cost assumptions								**$ 2,871,000**
REVISED TOTAL - Based on inflation adjustment for 2014								**$ 4,216,160**

Notes:

Present worth calculated using uniform series present worth equation

2013 inflation adjustment calculation [PV / ((1+% inflation)^#Years)] where % inflation=0.03.

REMEDIAL ALTERNATIVE 2 REVISED COSTS 2014 (PREFERRED ALTERNATIVE)
Former Tacoma Metals Site
EXCAVATION / BUFFER/ OFFSITE DISPOSAL / ASPHALT CAP / INSTITUTIONAL CONTROLS

Task	Quantity	Unit	Material		Labor		Lump Sum Price	Total Cost
			Unit Cost	Extension	Unit Cost	Extension		
REMEDIATION COSTS								
Excavate TPH / CPAH impacted soil	10564	CY			3.16	$ 33,382		$ 33,382
Excavate buffer, grade, compact	700	CY			3.53	$ 2,471		$ 2,471
Oxygen-releasing compound - Phase I	3,000	LBS	9.00	$ 27,000	0.33	$ 1,000		$ 28,000
Oxygen-releasing compound - Phase II	8,775	LBS	8.00	$ 70,200	1.82	$ 16,000		$ 86,200
Import bank run soil, backfill, compact	13,026	CY	14.20	$ 184,969	1.99	$ 25,922		$ 210,891
Import top course soil, grade, compact	2751	CY	20.25	$ 55,708	6.00	$ 16,506		$ 72,214
Pave asphalt cap, low permeability	28,556	SY	8.43	$ 240,727	1.04	$ 29,698		$ 270,425
Stormwater detention system	1	EA	100,000	$ 100,000	125,000	$ 125,000		$ 225,000
Stormwater lift station	1	EA	50,000	$ 50,000	25,000	$ 25,000		$ 75,000
Stormwater treatment system	1	EA	75,000	$ 75,000	25,000	$ 25,000		$ 100,000
Dust control	4	WK	250.00	$ 1,000	1636.25	$ 6,545		$ 7,545
Install signs	10	EA	15.00	$ 150	30.00	$ 300		$ 450
Deed restrictions	1	LS					$ 2,750	$ 2,750
Subtotal Remediation Costs A (A)								**$ 1,114,328**
Contractor overhead and profit	15	% of A					$ 167,149	$ 167,149
Bond and insurance	3	% of A					$ 33,430	$ 33,430
Mobilization/demobilization	5	% of A					$ 55,716	$ 55,716
Sales Tax / Tacoma	8.5	% of A					$ 94,718	$ 94,718
Contingency	10	% of A					$ 111,433	$ 111,433
Subtotal Remediation Costs B (B)								**$ 1,576,774**
Engineering Services	15	% of B					$ 236,516	$ 236,516
Construction management	10	% of B					$ 157,677	$ 157,677
Mobile laboratory	15	DAY			1,500.00	$ 22,500		$ 22,500
Off-site soil transportation/disposal (C)	15,846	TON			32.54	$ 515,629		$ 515,629
Disposal contingency	10	% of C					$ 51,563	$ 51,563
Lead battery casing disposal	1	LS					$ 10,000	$ 10,000
Monitoring well abandon and replace	1	LS					$ 60,000	$ 60,000
TOTAL REMEDIATION COSTS								**$ 2,630,660**
O&M COSTS								
Semi-Annual groundwater (CPOC Wells)	2	EA			4,500.00	$ 9,000		$ 9,000
Semi-Annual laboratory sample analysis	2	EA			15,000.00	$ 30,000		$ 30,000
Annual reporting	1	EA			4,000.00	$ 4,000		$ 4,000
Annual cap inspection / reporting	1	EA			1,000.00	$ 1,000		$ 1,000
Annual well inspection / maintenance	1	EA			5,000.00	$ 5,000		$ 5,000
Subtotal O&M Costs (D)								**$ 49,000**
Project management	15	% of D					$ 7,350	$ 7,350
O&M Contingency	10	% of D					$ 4,900	$ 4,900
TOTAL O&M COSTS (5 YR)								$ 61,250
(present worth i=0.05, n=5, P/A=4.3295)	4.3295	P/A						**$ 265,182**
TOTAL - Based on 2001 cost assumptions								**$ 2,896,000**
REVISED TOTAL - Based on inflation adjustment for 2014								**$ 4,252,874**

Notes:

Present worth calculated using uniform series present worth equation

2013 inflation adjustment calculation [PV / ((1+% inflation)^#Years)] where % inflation=0.03.

REMEDIAL ALTERNATIVE 3 REVISED COSTS 2014
Former Tacoma Metals Site
EXCAVATION / ONSITE TREATMENT / ASPHALT CAP / INSTITUTIONAL CONTROLS

Task	Quantity	Unit	Material Unit Cost	Material Extension	Labor Unit Cost	Labor Extension	Lump Sum Price	Total Cost
REMEDIATION COSTS								
Excavate TPH / CPAH impacted soil	10564	CY			3.16	$ 33,382		$ 33,382
Screen TPH / CPAH impacted soil	10564	CY			3.01	$ 31,794		$ 31,794
Thermal desorption of TPH / CPAH soil	9897	CY			82.50	$ 816,530		$ 816,530
Excavate lead impacted soil	11,047	CY			3.16	$ 34,909		$ 34,909
Screen lead impacted soil	11,047	CY			3.01	$ 33,247		$ 33,247
Stabilization of lead impacted soil	16,071	TON			21.00	$ 337,481		$ 337,481
Oxygen-releasing compound - Phase I	3,000	LBS	9.00	$ 27,000	0.33	$ 1,000		$ 28,000
Oxygen-releasing compound - Phase II	8,775	LBS	8.00	$ 70,200	1.82	$ 16,000		$ 86,200
Backfill and compact treated soil	20,944	CY			2.19	$ 45,868		$ 45,868
Import bank run soil, backfill, compact	2444	CY	14.20	$ 34,705	1.99	$ 4,864		$ 39,568
Import top course soil, grade, compact	2736	CY	20.25	$ 55,404	6.00	$ 16,416		$ 71,820
Pave asphalt cap, low permeability	28,556	SY	8.43	$ 240,727	1.04	$ 29,698		$ 270,425
Stormwater detention system	1	EA	100,000	$ 100,000	125,000	$ 125,000		$ 225,000
Stormwater lift station	1	EA	50,000	$ 50,000	25,000	$ 25,000		$ 75,000
Stormwater treatment system	1	EA	75,000	$ 75,000	25,000	$ 25,000		$ 100,000
Dust control	8	WK	250.00	$ 2,000	1636.25	$ 13,090		$ 15,090
Install signs	10	EA	15.00	$ 150	30.00	$ 300		$ 450
Deed restrictions	1	LS					$ 2,750	$ 2,750
Subtotal Remediation Costs A (A)								**$ 2,247,514**
Contractor overhead and profit	15	% of A					$ 337,127	$ 337,127
Bond and insurance	3	% of A					$ 67,425	$ 67,425
Mobilization/demobilization	5	% of A					$ 112,376	$ 112,376
Sales Tax / Tacoma	8.5	% of A					$ 191,039	$ 191,039
Contingency	10	% of A					$ 224,751	$ 224,751
Subtotal Remediation Costs B (B)								**$ 3,180,232**
Engineering Services	15	% of B					$ 477,035	$ 477,035
Construction management	10	% of B					$ 318,023	$ 318,023
Mobile laboratory	15	DAY			1,500.00	$ 22,500		$ 22,500
Off-site debris transportation/disposal (C)	1,000	TON			32.54	$ 32,540		$ 32,540
Disposal contingency	10	% of C					$ 3,254	$ 3,254
Lead battery casing disposal	1	LS					$ 10,000	$ 10,000
Monitoring well abandon and replace	1	LS					$ 60,000	$ 60,000
TOTAL REMEDIATION COSTS								**$ 4,043,584**
O&M COSTS								
Semi-Annual groundwater (CPOC Wells)	2	EA			4,500.00	$ 9,000		$ 9,000
Semi-Annual laboratory sample analysis	2	EA			15,000.00	$ 30,000		$ 30,000
Annual reporting	1	EA			4,000.00	$ 4,000		$ 4,000
Annual cap inspection / reporting	1	EA			1,000.00	$ 1,000		$ 1,000
Annual well inspection / maintenance	1	EA			5,000.00	$ 5,000		$ 5,000
Subtotal O&M Costs (D)								**$ 49,000**
Project management	15	% of D					$ 7,350	$ 7,350
O&M Contingency	10	% of D					$ 4,900	$ 4,900
TOTAL O&M COSTS (5 YR)								$ 61,250
(present worth i=0.05, n=5, P/A=4.3295)								**$ 265,182**
TOTAL - Based on 2001 cost assumptions								**$ 4,309,000**
REVISED TOTAL - Based on inflation adjustment for 2014								**$ 6,327,912**

Notes:

Present worth calculated using uniform series present worth equation

2013 inflation adjustment calculation [PV / ((1+% inflation)^#Years)] where % inflation=0.03.

Appendix I

Borings and Well Construction Logs

Appendix I: Appendix I: Boring and Well Construction Logs

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MONITORING WELL CONSTRUCTION DETAILS
Former Tacoma Metals Facility

Well Designation	Previous Designation[a]	Date of Installation	Casing Diameter/ Construction	Nominal Borehole Diameter	Top of PVC Casing Elevation (feet)[b]	Total Well Depth (feet)	Length of Screen (feet)	Slot Size (inch)
On-Property Wells								
MW-1	NA[c]	8/25/1992[d]	2-inch / PVC	9-inch	12.23	16.5	6	0.010
MW-2	NA	8/25/1992[d]	2-inch / PVC	9-inch	12.04	16.5	6	0.010
MW-3(D)[e]	MW-3	8/26/1992[d]	2-inch / PVC	9-inch	NA	16.5	6	0.010
MW-4(R)[f]	NMW-2	9-May-00	2-inch / PVC	9-inch	12.55	22.8	17.8	0.010
MW-5	NA	8/27/1992[d]	2-inch / PVC	9-inch	10.90	16.5	6	0.010
MW-6	NA	8/26/1992[d]	2-inch / PVC	9-inch	10.07	16.5	6	0.010
MW-7	NA	9/11/1992[d]	2-inch / PVC	9-inch	9.45	16.5	6	0.010
MW-8(R)[g]	NMW-3	9-May-00	2-inch / PVC	9-inch	11.12	23.6	18.6	0.010
MW-9	NMW-1	9-May-00	2-inch / PVC	9-inch	13.61	23.5	18.5	0.010
MW-10	NMW-4	10-Nov-00	2-inch / PVC	9-inch	9.39	20	12	0.010
MW-11	NMW-5	10-Nov-00	2-inch / PVC	9-inch	9.47	20	14	0.020
MW-12	NMW-6	10-Nov-00	2-inch / PVC	9-inch	10.80	20	12	0.020
MW-13	NA	26-Jun-02	2-inch / PVC	9-inch	9.84	18.5	10	0.010
MW-14	NA	26-Feb-03	2-inch / PVC	9-inch	9.77	24	10	0.010
MW-15	NA	28-Feb-03	2-inch / PVC	9-inch	10.49	26.3	10	0.010
MW-16	NA	28-Feb-03	2-inch / PVC	9-inch	9.72	26.8	10	0.010
MW-17	NA	28-Feb-03	2-inch / PVC	9-inch	9.57	23.2	10	0.010
MW-18	NA	27-Feb-03	2-inch / PVC	9-inch	11.79	22.7	10	0.010
MW-19	NA	27-Feb-03	2-inch / PVC	9-inch	10.78	24.2	10	0.010
MW-20	NA	27-Feb-03	2-inch / PVC	9-inch	10.21	27	5	0.010
MW-21	NA	28-Feb-03	2-inch / PVC	9-inch	9.47	21.8	10	0.010
MW-22	NA	1-Dec-03	2-inch / PVC	9-inch	9.51	23.3	10	0.010
Off-Property Wells								
MW-23	NA	29-Mar-04	2-inch / PVC	9-inch	14.35	30	10	0.010
MW-24	NA	29-Mar-04	2-inch / PVC	9-inch	10.58	23	10	0.010
MW-25	NA	29-Mar-04	2-inch / PVC	9-inch	11.24	24	10	0.010
MW-26	NA	5-Apr-05	2-inch / PVC	9-inch	12.52	28.5	10	0.010
MW-27	NA	5-Apr-05	2-inch / PVC	9-inch	11.06	26.8	10	0.010
MW-28(D)[h]	MS-28	5-Apr-05	2-inch / PVC	9-inch	10.43	26	10	0.010
MW-28(R)[h]	NA	15-Feb-06	2-inch / PVC	9-inch	10.43	24.25	10	0.010
MW-29	NA	15-Feb-06	2-inch / PVC	9-inch	11.12	32.5	10	0.010
MW-30	NA	15-Feb-06	2-inch / PVC	9-inch	10.05	41	15	0.010
MW-31	NA	15-Feb-06	2-inch / PVC	9-inch	9.38	33	10	0.010
MW-32	NA	29-Feb-08	2-inch / PVC	9-inch	9.26	24.5	10	0.010
MW-33	NA	28-Feb-08	2-inch / PVC	9-inch	9.24	24.5	10	0.010
MW-34	NA	28-Feb-08	2-inch / PVC	9-inch	9.62	25.6	10	0.010
MW-35	NA	28-Feb-08	2-inch / PVC	9-inch	7.95	50.5	10	0.010

Notes:

(a) Wells installed in 2000 by Kennedy/Jenks Consultants were initially designated NMW-# but were subsequently numbered in sequential order with the existing site monitoring wells.

(b) Elevations measured at northern side of PVC casing. Vertical elevations (NGVD 29) based on well surveys performed by KPG, Inc. (previously Earth Tech, Inc.) on 28 March 2000, 21 November 2000, 13 March 2003, 31 December 2003, 14 April 2004, 21 April 2005, 29 March 2006, and 11 April 2008.

(c) NA = Not applicable.

(d) Wells not installed by Kennedy/Jenks Consultants; boring and well construction logs unavailable.

(e) MW-3(D) was originally installed on 26 August 1992 by Pacific Groundwater Group. MW-3(D) was demolished (D) by a former Tacoma Metals site tenant.

(f) MW-4 was originally installed on 26 August 1992 by Pacific Groundwater Group. MW-4(R) was replaced (R) 9 May 2000 by Kennedy/Jenks Consultants.

(g) MW-8 was originally installed on 25 August 1992 by Pacific Groundwater Group. MW-8(R) was replaced (R) 9 May 2000 by Kennedy/Jenks Consultants.

(h) MW-28 was initially installed on 5 April 2005, but was subsequently destroyed (D) by a contractor during construction of the Puyallup River South Side Channel. MW-28(D) was abandoned and replaced with MW-28(R) on 15 February 2006.

PVC - Polyvinyl chloride (Schedule 40)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Cresoting Plant Retort Area	**Boring Name** B-1
DRILLING COMPANY: Cascade	DRILLER: James
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch OD
	Project Name Former Tacoma Metals
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Pure Gold Bentonite Chips	FROM 2 TO 27 FT.
GROUT: Concrete	FROM 0 TO 2 FT.

ELEVATION AND DATUM	TOTAL DEPTH: 27.0 ft. bgs
DATE STARTED: 6/25/02	DATE COMPLETED: 6/25/02
INITIAL WATER DEPTH (FT): 11.0	
LOGGED BY: DKM	
SAMPLING METHODS: Split Spoon	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	1	30 15 6				>2000		SW	**Well-graded SAND with gravel** Gray/brown, ~50% medium sand, 40-45% fine- to medium- gravel, some silt, no odor, no sheen.
SS	1	2 2 7				82.8			
SS	1.5	10 11 14	5	B1-4		>2000			**WOOD DEBRIS with SILT or SAND matix** Dark gray to black, wood debris typically with 5-10% silt and fine sand matrix overall, locally matrix is <5% to 20%, moist to wet below ~11 feet, very strong creosote odor, heavy sheen with NAPL blebs visible on water surface in sheen test and on wood surfaces in sampler.
SS	1.5	3 4 6				>2000			
				B1-7					
SS	1.5	4 9 15							
SS	1.5	15 32 29	10	B1-9		457		Wood	
SS	1.5	7 14 24		B1-10.5 B1-11	▽	328			
SS	1	9 50-5				>2000			
SS	0.2	19 34 29	15	B1-16		1400			
SS	1.5	5 13 14		B1-18		>2000		SP	**Poorly graded SAND** Dark gray, medium sand with up to 5% fibrous wood debris and some silt, wet, moderate to strong creosote odor, product blebs visible on water suface in sheen test.
SS	1.5	2 3 7	20	B1-19		37.9			
SS	1.5	3 3 4		B1-20.5		>2000			
				B1-22					
SS	1.5	6 22 24				>2000		SP/	**Poorly graded SAND with silt** Gray to brown, fine- to medium- sand with 5-30% silt (locally variable) generally fining downward, wet, strong creosote odor, heavy sheen with NAPL blebs visible on water surface in sheen test and on soil surface in sampler.
SS	1.5	3 3 3		B1-24				SM	
			25	B1-25.5		>2000			
SS	1.5	3 3 6		B1-26 B1-27		>2000		ML/ CL	**Clayey SILT** Gray/brown, clayey silt, stiff, wet, no evident odor, no sheen.

KJ PNW JUNE 2002 LOGS.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: North Part of Creosoting Plant	**Boring Name** B-2
DRILLING COMPANY: Cascade	DRILLER: James
	Project Name Former Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch OD
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Pure Gold Bentonite Chips	FROM 2 TO 28.5 FT.
GROUT: Concrete	FROM 0 TO 2 FT.

ELEVATION AND DATUM	TOTAL DEPTH: 28.5 ft. bgs
DATE STARTED: 6/25/02	DATE COMPLETED: 6/25/02
INITIAL WATER DEPTH (FT): 11.0	
LOGGED BY: DKM	
SAMPLING METHODS: Split Spoon	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	0.1	100				19		GW/ GM	**Well-graded GRAVEL with silt and sand** Gray, sand/silt/gravel mixture, locally includes minor wood debris with creosote odor, otherwise no odor, no sheen.
SS	0.1	14 14 12				94.3			
SS	1.5	15 11 11	5	B2-5		96.6		SP	**Poorly graded SAND** Brown, fine- to medium- sand with some silt, moist, moderate creosote odor and light sheen 3.5-6.5 feet, strong creosote odor and heavy sheen with NAPL blebs visible on water surface in sheen test 6.5-8.5 feet.
SS	1.5	1 2 3		B2-7		>2000			
SS	1.5	2 2 3		B2-9		138			
SS	1.5	9 13 13	10			138		Wood	**WOOD DEBRIS with SILT or SAND matrix** Dark gray to black, wood debris typically with 5-10% silt and fine sand matrix overall, locally matrix is <5% to 20%, moist to wet at ~11 feet, very strong creosote odor, heavy sheen with NAPL blebs visible on water surface in sheen test and on wood surfaces in sampler.
SS	0.3	10 50			▽	141			
SS	0.2	10 7 9							
SS	0.5	6 9 15				163			
SS	0.1	19 20 26	15						
SS	0.1	6 4 6				>2000			
SS	1.5	6 5 6	20	B2-21				SM	**Silty SAND** Gray/brown, fine- to medium- sand with 30-50% silt, locally layered, wet, moderate creosote odor, light to moderate sheen, NAPL blebs visible on water surface in sheen test for some samples.
SS	1.5	3 4 4				48.9			
SS	1.5	5 7 7		B2-24		>2000			
SS	1.5	8 9 9	25	B2-25.5		26.6		ML	**Sandy SILT** Gray, silt wtih 10-15% fine sand, vague layering visible, moderately stiff, wet, slight creosote odor and sheen.
SS	1.5	5 6 6		B2-27		33		CL/	**Silty CLAY** Gray/brown, layered silty clay with 10-20% fine sand, wet, no evident odor, very slight sheen.
SS	1.5	7 8 6		B2-28				ML	**Poorly graded SAND** Gray, fine- to medium- sand with <5% silt, wet, slight creosote odor and sheen.
								SP	**Silty CLAY** Silty clay as above.
								CL/	*(See next page for lithology description)*

KJ PNW JUNE 2002 LOGS.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

Project Name Former Tacoma Metals **Project Number** 996098.00 **Boring Name** B-2

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								ML	**Poorly graded SAND** Gray, fine- to medium- sand, wet, very slight creosote odor, no sheen.
								SP	

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F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: NE Corner of Site Next to MW-8(R)	**Boring Name** B-3
DRILLING COMPANY: Cascade	DRILLER: James
	Project Name Former Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch OD
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Pure Gold Bentonite Chips	FROM 2 TO 28 FT.
GROUT: Concrete	FROM 0 TO 2 FT.

ELEVATION AND DATUM	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 6/26/02	DATE COMPLETED: 6/26/02
INITIAL WATER DEPTH (FT): 11.0	
LOGGED BY: DKM	
SAMPLING METHODS: Split Spoon	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Well-graded SAND with silt and gravel Brown, medium- and fine- sand with 30-35% fine- to medium- gravel and 10-15% silt, slight creosote odor increasing with depth, no sheen.
SS	1	6 8 8				7.6		SW/	
SS	1	6 6 3						SM	
SS	1.5	3 5 5	5	B3-4 B3-5					
SS	1.5	3 2 2				7.8		Wood	**WOOD DEBRIS with SILT** Blocky wood debris with 10-15% silt matrix between fragments, moist, slight creosote odor, no sheen.
SS	1.5	2 2 3		B3-9		64.3		SM	**Silty SAND** Gray to brown, fine sand with 30-35% silt, layered between silty fine sand and moderately dense sandy silt, moist, moderate creosote odor, moderate to heavy sheen.
SS	1.5	2 5 6				20.1			
SS	1.5	2 3 4	10	B3-10					**Poorly graded SAND** Gray, medium- to coarse- sand with up to 5% silt, moist to wet at ~11 feet, moderate creosote odor generally deceasing with depth but stronger at ~20 feet than above, overall light to no visible sheen but minor NAPL blebs are visible on soil surface at 20-20.5 feet.
				B3-11.5	▽	14.2			
SS	1.5	6 5 4				7.5			
SS	1.5	12 9 5				313			
SS	1.5	9 9 11	15	B3-14.5		25.7		SP	
SS	0.4	9 14 16				159			
SS	1.5	18 15 19				57.7			
SS	1.5	6 10 9	20	B3-19		160			
				B3-20.5					
SS	1.5	5 5 7		B3-21.5		141		SP/	**Poorly graded SAND with silt** Gray, medium- to fine- sand with 30-35% silt, layered texture, wet, strong creosote odor and heavy sheen at approximately 21.5, 23, and 23.5 feet in sandy layers, small NAPL blebs locally visible on soil surface.
SS	1.5	13 15 19		B3-23		82.9		SM	
SS	1	22 50		B3-23.5 B3-24.5		12.4			
			25					ML/	**Clayey SILT** Gray, clayey silt, wet, no evident odor, no sheen.
SS	1.5	9 13 23				26.5			
				B3-26.5				CL	**Poorly graded SAND** Gray, medium- to fine- sand with minor silt, wet, moderate creosote odor and sheen.
SS	1.5	11 13 14		B3-27.5		51.8			
								SP	**Silty SAND** Gray, fine sand with up to 50% silt, vague layering visible, moderately dense, wet, slight creosote odor, very slight sheen.
								SM	

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F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area Western Property Boundary (Adjacent MW-10)	**Boring Name** B-4
DRILLING COMPANY: Cascade Drilling, Inc. / DRILLER: Kasey	**Project Name** Former Tacoma Metals
DRILLING METHOD(S): GeoProbe - Direct Push / DRILL BIT(S) SIZE: N/A	**Project Number** 996098.00
ISOLATION CASING: N/A — FROM N/A TO N/A FT.	ELEVATION AND DATUM: 9.44' (NGVD29) / TOTAL DEPTH: 23.0 ft. bgs
BLANK CASING: N/A — FROM N/A TO N/A FT.	DATE STARTED: 3/11/03 / DATE COMPLETED: 3/11/03
SLOTTED CASING: N/A — FROM N/A TO N/A FT.	INITIAL WATER DEPTH (FT): 10.5
SIZE AND TYPE OF FILTER PACK: N/A — FROM N/A TO N/A FT.	LOGGED BY: AJA
SEAL: N/A — FROM N/A TO N/A FT.	SAMPLING METHODS: 1"x2' split spoon with acetate liner / WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Cement Slurry (tremied) — FROM 0.0 TO 23.0 FT.	

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
							GW	**Well-graded GRAVEL with sand (fill)** Brown, dry, gravel (~60%) with medium and fine sand (~35%) and minor (<5%) silt.
							GW	**Well-graded GRAVEL with sand (fill)** Medium brown, dry, gravel (~50%) with fine and medium sand (~50%). Gravel material is generally fine-grained.
			5				ML/ CL	**Clayey SILT with sand (fill)** Light brown, crumbly, moderately dense silt with ~5-10% fine sand. Includes some clay.
							ML/	**Clayey SILT (fill)** Mixed silt and clay, dark brown, soft, low density.
			10				CL Wood	**WOOD DEBRIS with SILT or SAND matrix** Brown to gray, wet at ~10.5' bgs, soft silt and fine sand with some clay. Mixed with wood debris. Wood debris is typically ~85-95% of material. Silt, sand and clay are around and coating the wood material.
			15					
SS	2.0			B-4-16.5-17			SP	**Poorly graded SAND** Brownish black (5YR 2/1), fine to medium grained sand, wet, moderate creosote odor.
SS	1.5							~16.2-17' visible creosote sheen, visible product blebs on soil.
SS	2.0		20					~19-19.5' visible creosote sheen on soil, visible product blebs on soil.
SS	2.0			B-4-21.5-22				~20' strong creosote odor.
							CL	**Lean CLAY** Dark yellowish brown (10YR 4/2) with moderate yellow brown mottling, upper contact is sharp, lean clay at least 1' thick, low to moderate plasticity, moist, no odor, no sheen.

NOTES

1. Boring was advanced to confirm confining layer location. Lithology from the upper 15 feet has been inferred from boring location MW-10.
2. Ground surface elevation based on City of Tacoma datum (NGVD 29).

KJ PNW TACOMA METALS OBSERVATION BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Boring Name** B-5
DRILLING COMPANY: Cascade Drilling, Inc. / DRILLER: Kasey	**Project Name** Former Tacoma Metals
DRILLING METHOD(S): GeoProbe - Direct Push / DRILL BIT(S) SIZE: N/A	**Project Number** 996098.00
ISOLATION CASING: N/A — FROM N/A TO N/A FT.	ELEVATION AND DATUM: 9.89' (NGVD29) / TOTAL DEPTH: 24.0 ft. bgs
BLANK CASING: N/A — FROM N/A TO N/A FT.	DATE STARTED: 3/11/03 / DATE COMPLETED: 3/11/03
SLOTTED CASING: N/A — FROM N/A TO N/A FT.	INITIAL WATER DEPTH (FT): 10.0
SIZE AND TYPE OF FILTER PACK: N/A — FROM N/A TO N/A FT.	LOGGED BY: AJA
SEAL: N/A — FROM N/A TO N/A FT.	SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner / WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Cement Slurry (tremied) — FROM 0.0 TO 24.0 FT.	

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Asphalt
SS	2.0						GP	**Poorly graded GRAVEL with sand (fill)** Dark yellowish brown (10YR 4/2), loose, fine to medium grained gravel (subrounded to subangular), ~40% fine to coarse grained sand, moist, no odor.
SS	1.0		5					
SS	0.0		10				Wood	**WOOD DEBRIS with SILT or SAND matrix** Olive black (5Y 2/1) to black (N1), wet at ~10' bgs, wood debris with ~5-15% silt/fine grained sand matrix overall, matix locally up to 20% or less than 5%. ~12' very strong creosote odor, visible blebs of brown creosote product on wood.
SS	0.5		15	B-5-15.5-16				
SS	1						SP	**Poorly graded SAND** Olive black (5Y 2/1), fine to medium grained sand, wet. ~20-21.5' predominately medium grained sand. ~21.5' very strong creosote odor with visible sheen.
SS	2.0		20	B-5-21.5-22				
SS	2.0						CL	**Lean CLAY** Olive gray (5Y 4/1), upper contact is sharp, lean clay layer at least 2' thick, moderate plasticity, moist, no odor, no sheen.

NOTES

1. Boring was advanced to confirm confining layer location.
2. Ground surface elevation based on City of Tacoma datum (NGVD 29).

KJ PNW TACOMA METALS OBSERVATION BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Boring Name** B-6
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Kasey
	Project Name Former Tacoma Metals
DRILLING METHOD(S): GeoProbe - Direct Push	DRILL BIT(S) SIZE: N/A
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: N/A	FROM N/A TO N/A FT.
GROUT: Cement Slurry (tremied)	FROM 0.0 TO 24.0 FT.

ELEVATION AND DATUM: 9.78' (NGVD29)	TOTAL DEPTH: 24.0 ft. bgs
DATE STARTED: 3/11/03	DATE COMPLETED: 3/11/03
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: AJA	
SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Asphalt
SS	1.0						SW	**Well-graded SAND with gravel (fill)** Moderate brown (5YR 3/4) to olive gray (5Y 4/1), loose, fine to coarse grained sand, ~15-20% gravel-subangular to subrounded, moist, no odor.
SS	1.0		5					
								WOOD DEBRIS with SILT or SAND matrix Olive black (5Y 2/1) to black (N1), wood debris with ~5-15% silt/fine sand matrix overall, locally up to 20% or less than 5%.
SS	0.5		10				Wood	~10' wet, slight creosote odor.
SS	3.0		15	B6-15.5-16				~15-16' strong creosote odor, visible blebs of brown creosote product on wood, visible sheen on soil.
SS	2.0							**Poorly graded SAND** Olive black (5Y 2/1), fine to medium grained sand, wet, slight creosote odor and sheen.
SS	2.0						SP	~18-20' coarser grained sand lens.
SS	2.0		20					
SS	2.0			B-6-23-23.2				~22' gradation to predominantly fine grained sand/silt, very strong creosote odor, visible blebs of brown creosote product on soil.
				B-6-23.8-24			CL	**Lean CLAY** Dark yellowish brown (10YR 4/2), lean clay layer is at least 0.75' thick, ~1-inch thick sand lens at ~23.6' bgs, low to moderate plasticity, moist, no odor, no sheen.

NOTES

1. Boring was advanced to confirm confining layer location.
2. Ground surface elevation based on City of Tacoma datum (NGVD 29).

KJ PNW TACOMA METALS OBSERVATION BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Boring Name** B-7
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Kasey
	Project Name Former Tacoma Metals
DRILLING METHOD(S): GeoProbe - Direct Push	DRILL BIT(S) SIZE: N/A
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: N/A	FROM N/A TO N/A FT.
GROUT: Cement Slurry (tremied)	FROM 0.0 TO 30.0 FT.

ELEVATION AND DATUM: 9.41' (NGVD29)	TOTAL DEPTH: 30.0 ft. bgs
DATE STARTED: 3/11/03	DATE COMPLETED: 3/11/03
INITIAL WATER DEPTH (FT): 9.5	
LOGGED BY: AJA	
SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3.0						SP	**Poorly graded SAND with gravel (fill)** Dusky yellowish brown (10YR 2/2), loose, medium to coarse grained sand, ~30-40% gravel-subangular to subrounded, moist, no odor.
SS	3.0		5				ML	**SILT with WOOD debris** Dusky yellowish brown (10YR 2/2), occasional wood debris, moist, no odor.
SS	3.5		10					~9-10' wet.
							SP/ SM	**Poorly graded SAND with silt** Dusky yellowish brown (10YR 2/2), fine sand, ~30-50% fines, wet, no odor or sheen.
SS	4.0		15				ML	**SILT with sand** Dusky yellowish brown (10YR 2/2), ~15-20% fine sand, wet.
							SP/ SM	**Poorly graded SAND with silt** As described above.
SS	1.5							**Well-graded SAND** Dusky yellowish brown (10YR 2/2), fine to coarse grained sand, occasional gravel, wet.
SS	2.0		20				SW	~19' creosote odor, slight sheen.
SS	2.0			B-7-21.9-22				~21' strong creosote odor, visible sheen on soil.
SS	2.0			B-7-23-23.5				~21.7-21.9' silt with sand, dusky yellowish brown (10YR 2/2), wet.
SS	2.0		25				CL	~22' poorly graded sand, dusky yellowish brown (10YR 2/2), wet, fine grained, very strong creosote odor, visible sheen on soil.
SS	2.0						SP	**Lean CLAY** Dark yellowish brown (10YR 4/2), lean clay layer 0.5' thick, low plasticity, moist.
SS	2.0							**Poorly graded SAND** Olive black (5Y 2/1), fine grained sand, wet.
SS	2.0		30				ML	~26' creosote odor and sheen. ~26-27.7' contains silt layers. ~26-28.7' slight creosote odor.
								SILT Dark yellowish brown (10YR 4/2), silt, non-plastic, moist, no odor, no sheen.

NOTES

1. Boring was advanced to confirm confining layer location.
2. Ground surface elevation based on City of Tacoma datum (NGVD 29).

KJ PNW TACOMA METALS OBSERVATION BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Boring Name:** B-8
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Kasey
Project Name: Former Tacoma Metals	
DRILLING METHOD(S): GeoProbe - Direct Push	DRILL BIT(S) SIZE: N/A
Project Number: 996098.00	
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
ELEVATION AND DATUM: 10.15' (NGVD29)	TOTAL DEPTH: 28.0 ft. bgs
BLANK CASING: N/A	FROM N/A TO N/A FT.
DATE STARTED: 3/11/03	DATE COMPLETED: 3/11/03
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
INITIAL WATER DEPTH (FT): 10.0	
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
LOGGED BY: AJA	
SEAL: N/A	FROM N/A TO N/A FT.
SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Cement Slurry (tremied)	FROM 0.0 TO 28.0 FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Asphalt
SS	3.0						SP	**Poorly graded SAND with gravel (fill)** Dusky yellowish brown (10YR 2/2), fine to medium grained sand, ~15-20% gravel-subangular to subrounded, occasional wood fragments, moist, no odor.
SS	3.0		5					
SS	3.0		10				Wood	**WOOD DEBRIS with SILT or SAND matrix** Olive black (5Y 2/1), wood debris with variable ~20-25% silt/fine sand matrix. ~10' wet, slight creosote odor.
SS	3.5		15					
SS	1.5							
SS	2.0						SP	**Poorly graded SAND** Olive black (5Y 2/1), fine grained sand, trace fines, wet. ~19.25-24' strong to moderate creosote odor, visual sheen on soil.
SS	2.0		20					
SS	2.0			B-8-23.5-24				
SS	2.0		25				CL	**Lean CLAY** Dark yellowish brown (10YR 4/2), lean clay 0.8' thick, moderate plasticity, moist.
SS	2.0			B-8-26.5-27			SP	**Poorly graded SAND** As described above, slight creosote odor.
							CL	**Lean CLAY** As described above, lean clay at least 1' thick, no odor, no sheen.

NOTES

1. Boring was advanced to confirm confining layer location.
2. Ground surface elevation based on City of Tacoma datum (NGVD 29).

KJ PNW TACOMA METALS OBSERVATION BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Boring Name** B-9
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Kasey
	Project Name Former Tacoma Metals
DRILLING METHOD(S): GeoProbe - Direct Push	DRILL BIT(S) SIZE: N/A
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: N/A	FROM N/A TO N/A FT.
GROUT: Cement Slurry (tremied)	FROM 0.0 TO 26.0 FT.

ELEVATION AND DATUM: 10.51' (NGVD29)	TOTAL DEPTH: 26.0 ft. bgs
DATE STARTED: 3/11/03	DATE COMPLETED: 3/11/03
INITIAL WATER DEPTH (FT): 11.0	
LOGGED BY: AJA	
SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Asphalt
SS	3.0						GP	**Poorly graded GRAVEL with sand (fill)** Various colors (dusky yellowish brown- 10YR 2/2, light olive gray-5Y 5/2, dark reddish brown - 10R 3/4), ~15-20% coarse sand, moist, no odor.
SS	3.0		5				SP	**Poorly graded SAND (fill)** Olive black (5Y 2/1), fine to medium sand, moist, no odor.
SS	3.0		10				Wood	**WOOD DEBRIS with SILT or SAND matrix** Dark yellowish brown (10YR 4/2), typically with ~5-10% silt/fine sand matrix although ~20-40% was observed, slight creosote odor. ~9-11' wood, very little matrix. ~11' wet.
SS	1.0							
SS	1.7		15					
SS	1.5						SP/SM	**Poorly graded SAND with silt** Dusky yellowish brown (10YR 2/2), fine sand, trace fines, visual sheen on soil, non-plastic, wet, strong creosote odor.
SS	2.0		20				SP	**Poorly graded SAND** Dusky yellowish brown (10YR 2/2), fine sand, no visual sheen on soil, wet, moderate creosote odor. ~18-22' gradual gradation fine to coarser sand.
SS	2.0			B-9-23.5-24			SP/SM	**Poorly graded SAND with silt** Dusky brown (5YR 2/2), fine sand, trace fines, visual sheen on soil, wet, strong creosote odor.
SS	1.8		25				CL	**Lean CLAY** Olive gray (5Y 4/1), clay layer at least 1.5' thick, fine sand lens at ~25.5-25.8' bgs, moderate plasticity, moist, no odor or sheen.

NOTES

1. Boring was advanced to confirm confining layer location.
2. Ground surface elevation based on City of Tacoma datum (NGVD 29).

KJ PNW TACOMA METALS OBSERVATION BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area (Adjacent MW-11)	**Boring Name** B-10
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Kasey — **Project Name** Former Tacoma Metals
DRILLING METHOD(S): GeoProbe - Direct Push	DRILL BIT(S) SIZE: N/A — **Project Number** 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: N/A	FROM N/A TO N/A FT.
GROUT: Cement Slurry (tremied)	FROM 0.0 TO 22.0 FT.

ELEVATION AND DATUM: 9.29' (NGVD29)	TOTAL DEPTH: 22.0 ft. bgs
DATE STARTED: 3/11/03	DATE COMPLETED: 3/11/03
INITIAL WATER DEPTH (FT): 10.5	
LOGGED BY: AJA	
SAMPLING METHODS: 1"x2' split spoon with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			0				GW	**Well-graded GRAVEL with sand (fill)** Gray to brown-orange, slightly moist, gravel with ~25-30% sand and some (<5%) silt.
			5					
			10				Wood	**WOOD DEBRIS with SILT or SAND matrix** Brown to gray, wet at ~10.5' bgs, soft silt and fine sand with some clay. Mixed with wood debris. Wood debris is typically ~85-95% of material. Silt, sand and clay are around and coating the wood material.
			15					~16' Olive black (5Y 2/1), visible blebs of brown creosote product on wood, wet, strong creosote odor.
SS	0.2							
SS	0.6		20				SP	**Poorly graded SAND** Brownish black (5YR 2/1), fine to medium grained sand, wet.
SS	2.0			B-10-21-21.5				~20.5' strong creosote odor, visible sheen on soil.
							CL	**Lean CLAY** Dark yellowish brown (10YR 4/2), upper contact is sharp, fine grained sand in toe of sampler, lean clay layer 0.5' thick, low to moderate plasticity, moist, no odor, no sheen.

NOTES

1. Boring was advanced to confirm confining layer location. Lithology from the upper 16 feet has been inferred from boring location MW-11.
2. Ground surface elevation based on City of Tacoma datum (NGVD 29).

KJ PNW TACOMA METALS OBSERVATION BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area (Northern Property Boundary)	**Boring Name:** B-11
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Kasey
	Project Name: Former Tacoma Metals
DRILLING METHOD(S): GeoProbe - Direct Push	DRILL BIT(S) SIZE: N/A
	Project Number: 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: N/A	FROM N/A TO N/A FT.
GROUT: Cement Slurry (tremied)	FROM 0.0 TO 22.0 FT.

ELEVATION AND DATUM: 7.42' (NGVD29)	TOTAL DEPTH: 22.0 ft. bgs
DATE STARTED: 3/11/03	DATE COMPLETED: 3/11/03
INITIAL WATER DEPTH (FT): 11.0	
LOGGED BY: AJA	
SAMPLING METHODS: 1"x2' split spoon with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
							GW	**Well-graded GRAVEL with sand** Brown fine to medium gravel with ~40-45% fine to medium sand and some silt, no odor, no apparent sheen.
			5				Wood	**WOOD DEBRIS with SILT matrix** Dark gray, wood debris typically with ~5-10% silt/fine sand matrix, no sheen above 13 feet, moderate sheen below 13 feet, slight to moderate creosote odor below 13 feet.
			10					~11' wet.
			15					
SS	1.8						SP	**Poorly graded SAND** Dusky yellowish brown (10YR 2/2), fine to medium sand, wet, slight creosote odor, no sheen.
SS	2.0		20				SM	**Silty SAND** Dusky yellowish brown (10YR 2/2), fine sand, 1-inch medium sand lens at ~21.3' bgs, wet, slight creosote odor, no sheen.
SS	2.0						CL	**Lean CLAY** Dark yellowish brown (10YR 4/2), upper contact is sharp, clay at least 0.4' thick, low to moderate plasticity, moist, no odor, no sheen.

NOTES

1. Boring was advanced to confirm confining layer location. Lithology from the upper 16 feet has been inferred from boring location MW-13.
2. Ground surface elevation based on City of Tacoma datum (NGVD 29).

KJ PNW TACOMA METALS OBSERVATION BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Well Name** MW-22 (B-12)
DRILLING COMPANY: Cascade Drilling Company	DRILLER: Andy / Don
	Project Name Tacoma Metals
DRILLING METHOD(S): HSA / Geoprobe	DRILL BIT(S) SIZE: 9" OD / 2" OD
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 23 FT. / 13 TO 23.3 FT.
SLOTTED CASING: 2" Schedule 40 PVC Pipe 0.010" slot	FROM 13 TO 23 FT.
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 11 TO 23.5 FT.
SEAL: Pure Gold Bentonite Chips	FROM 2 TO 23.5 / 11 TO 24 FT.
GROUT: Cement	FROM 0 TO 2 FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 24.0 ft. bgs
DATE STARTED: 11/24/03	DATE COMPLETED: 12/1/03
INITIAL WATER DEPTH (FT): 7.5	STATIC WATER ELEV. (FT): N/A
LOGGED BY: DKM	
SAMPLING METHODS: 2"x4' shelby tube with acetate liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Asphalt Surface
SH	3			B12-2-3		4.4			**Well-graded GRAVEL with silt and sand** Gray/green, locally orange/brown, 55-65% gravel, 5-10% silt, moist, no odor, no sheen. 2-3' slight chemical odor.
						2.1			
SH	4		5	B12-4-5	well	1.6		GW/ GM	5.5-6', 3" gray granular material above 3" of fractured red brick material.
				B12-6.5-7.5	Geoprobe boring	1.3			6-8', black/dark gray angular gravel with sand and silt, wet below 7.5'.
SH	2			B12-8-9		7.2			8-9', pea gravel with brick fragments and coarse sand.
				B12-9-10		40.5			
SH	1		10						**WOOD DEBRIS** Blocky to fibrous wood debris with 5-15% silt and fine sand matrix material, wet, moderate to strong creosote odor, heavy sheen on water in sampler.
SH	1							Wood	
SH	1		15			21.9			
									Poorly graded SAND Dark gray, poorly graded medium sand with <5% silt, creosote product on grains, wet, strong creosote odor, very heavy sheen, product blebs rinse out in sheen test covering 5-10% of water surface, slightly more below 22'.
SH	4		20	B12-20-21		17.9		SP	
				B12-22-23		20.6			
						10.8		CL/ ML	**Silty CLAY** Brown, silty clay, dense, wet, slight sheen and creosote odor.

NOTES

1. Pilot boring advance with Geoprobe rig on 11/24/03.
2. Well installed with hollow-stem auger rig on 12/1/03.
3. OVA - Organic Vapor Analyzer
4. A 0.3 foot sump installed from 23 to 23.3 feet bgs.

KJ PNW TACOMA METALS DNAPL BORING LOGS DEC 2003.GPJ KJ PNW.GDT 12/16/03

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Boring Name** B-13
DRILLING COMPANY: Cascade Drilling Company	DRILLER: Don
	Project Name Tacoma Metals
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2" OD
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: N/A	FROM N/A TO N/A FT.
GROUT: Baroid Quick-Grout Bentonite	FROM 0 TO 24 FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 24.0 ft. bgs
DATE STARTED: 11/24/03	DATE COMPLETED: 11/24/03
INITIAL WATER DEPTH (FT): 8.5	
LOGGED BY: DKM	
SAMPLING METHODS: 2"x4' shelby tube with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	2			B13-1-3				GW/ GM	**Well-graded GRAVEL with silt and sand** Dark brown to gray, gravel with 30-40% sand and some silt, minor glass a metal debris in upper several feet, moist, no odor, no sheen.
SH	4		5	B13-5-6		6.3			
SH	.5		10	B13-8-10		1.1 7.7 4.6		Wood	**WOOD DEBRIS** Woody debris, fine to coarse chips in sampler, 10-30% gray to light brown silty matrix material, moist, no odor, no sheen. 8-10', brown woody debris with 20-30% fine sand and silt matrix, wet below approximately 8.5 feet, moderate creosote odor, no evident sheen.
SH	3		15	B13-14-15		7.1 29.5		ML	**SILT** Dark gray, silt with some clay, soft, loose, wet, moderate creosote odor, slight sheen.
SH	4			B13-19-20		80.1 59.1		SP	**Poorly graded SAND** Gray, medium to coarse sand, mixed with fine sand in upper 6", heavy sheen on surface in sampler (13-16 feet), creosote product on sand grains, wet, strong creosote odor, heavy sheen, product blebs on 10% of water surface in sheen test. Medium to coarse sand, minor silt in small clumps, fines with depth, mostly medium sand by 19', wet, strong creosote odor, heavy sheen with product blebs over 5% of water surface in sheen test.
SH	2		20	B13-21-22		19.5			
SH	1							CL	**Lean CLAY** Gray to brown, silty clay with some fibrous plant material, wet, very slight creosote odor, no evident sheen.
SH	1			B13-23-24					

NOTES

1. OVA- Organic Vapor Analyzer

KJ PNW TACOMA METALS DNAPL BORING LOGS DEC 2003.GPJ KJ PNW.GDT 12/16/03

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Boring Name:** B-14
DRILLING COMPANY: Cascade Drilling Company	DRILLER: Don
	Project Name: Tacoma Metals
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2" OD
	Project Number: 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Pure Gold Bentonite Chips	FROM 0 TO 12 FT.
GROUT: N/A	FROM N/A TO N/A FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 12.0 ft. bgs
DATE STARTED: 11/24/03	DATE COMPLETED: 11/24/03
INITIAL WATER DEPTH (FT): 8	
LOGGED BY: DKM	
SAMPLING METHODS: 2"x4' shelby tube with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	2		1–2	B14-1-2		4.0		GW/ GM	**Well-graded GRAVEL with silt and sand** Brown, gravel with 30-40% sand and some silt, contains fine roots 0-2', moist, no odor, no sheen.
SH	3		5–6	B14-5-6		1.5		Wood	**WOOD DEBRIS** Orange-brown to dark brown, 10-20% sandy silt matrix, soft, moist to wet (below 8').
			7			1.7			4.5-8', no odor, no sheen.
SH	2		9–10	B14-9-10		13.1			8-10', slight creosote odor, slight sheen.
			11–12						11-12', very slight creosote odor, slight sheen.

NOTES

1. OVA- Organic Vapor Analyzer

KJ PNW TACOMA METALS DNAPL BORING LOGS DEC 2003.GPJ KJ PNW.GDT 12/16/03

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area		**Boring Name**	B-15
DRILLING COMPANY: Cascade Drilling Company	DRILLER: Don	**Project Name**	Tacoma Metals
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2" OD	**Project Number**	996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 12.0 ft. bgs
BLANK CASING: N/A	FROM N/A TO N/A FT.	DATE STARTED: 11/24/03	DATE COMPLETED: 11/24/03
SLOTTED CASING: N/A	FROM N/A TO N/A FT.	INITIAL WATER DEPTH (FT): 7.5	
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.	LOGGED BY: DKM	
SEAL: Pure Gold Bentonite Chips	FROM 0 TO 12 FT.	SAMPLING METHODS: 2"x4' shelby tube with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE ____ FT.
GROUT: N/A	FROM N/A TO N/A FT.		

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	2		1–3	B15-1-2		1.3		GW/ GM	**Well-graded GRAVEL with silt and sand** Brown, gravel with 30-40% sand and some silt, moist, no odor, no sheen.
			4					Wood	**WOOD DEBRIS** Brown to dark brown, wood debris with 10-20% soft sandy silt matrix, moist, no odor, no sheen.
SH	4		5–6	B15-5-6		0.6			
			7–8	B15-7-8		0.6		SM	**Silty SAND** Gray, moderately dense fine sand with 30-40% silt, moist to wet, no odor, no sheen.
SH	3		9–11	B15-10-11		0.6		SP	**Poorly graded SAND** Gray, medium sand with some coarse sand and minor silt, wet, no odor, no sheen.
			12						

NOTES

1. OVA- Organic Vapor Analyzer

KJ PNW TACOMA METALS DNAPL BORING LOGS DEC 2003.GPJ KJ PNW.GDT 12/16/03

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Boring Name:** B-16
DRILLING COMPANY: Cascade Drilling Company	DRILLER: Don
	Project Name: Tacoma Metals
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2" OD
	Project Number: 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Pure Gold Bentonite Chips	FROM 0 TO 12 FT.
GROUT: N/A	FROM N/A TO N/A FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 12.0 ft. bgs
DATE STARTED: 11/24/03	DATE COMPLETED: 11/24/03
INITIAL WATER DEPTH (FT): 9	
LOGGED BY: DKM	
SAMPLING METHODS: 2"x4' shelby tube with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE ____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			1			121		GW/ GM	**Well-graded GRAVEL with silt and sand** Light to dark brown, gravel with 30-40% sand and some silt, moist, moderate chemical odor, no sheen.
SH	3.5		2	B16-1.5-2.5		71.1		SP/ SM	**Poorly graded SAND with silt** Gray, medium sand with 5-10% silt in small pods, moist, moderate chemical odor, no sheen.
			3	B16-3-4		74.9		GW/ GM	**Well-graded GRAVEL with silt and sand** Gray/green, gravel with 30-40% sand and some silt, moist, moderate chemical odor, no sheen.
			4						
			5	B16-5-6		133		Wood	**WOOD DEBRIS** Brown to gray, woody debris with 10-20% soft silty matrix, moist, moderate chemical odor, no sheen.
SH	3.5		6						
			7	B16-7-8		106		SM	**Silty SAND** Gray, silty fine sand with some medium sand, moist to wet, strong creosote odor, slight sheen.
			8						
			9	B16-8.5-9.5	▽	249			
SH	4		10	B16-10-11				SP	**Poorly graded SAND** Gray, medium to coarse sand with minor silt, wet, strong creosote odor, heavy sheen, minor product blebs.
			11			224			
			12						

NOTES

1. OVA- Organic Vapor Analyzer

KJ PNW TACOMA METALS DNAPL BORING LOGS DEC 2003.GPJ KJ PNW.GDT 12/16/03

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Boring Name:** B-17
DRILLING COMPANY: Cascade Drilling Company	**Project Name:** Tacoma Metals
DRILLER: Don	**Project Number:** 996098.00
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2" OD
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Pure Gold Bentonite Chips	FROM 0 TO 12 FT.
GROUT: N/A	FROM N/A TO N/A FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 12.0 ft. bgs
DATE STARTED: 11/24/03	DATE COMPLETED: 11/24/03
INITIAL WATER DEPTH (FT): 9.5	
LOGGED BY: DKM	
SAMPLING METHODS: 2"x4' shelby tube with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			0						Asphalt surface
SH	3.5		1–4	B17-1-2, B17-3-4		2.6, 2.0		GW/ GM	**Well-graded GRAVEL with silt and sand** Brown to gray, gravel with 30-40% sand and some silt, pea gravel with coarse sand in lower foot, moist, no odor, no sheen.
SH	3		5–8	B17-5-6, B17-7-8		1.3, 2.4		SM	**Silty SAND** Light brown to gray, fine sand with silt, moist, no odor, no sheen.
								Wood	**WOOD DEBRIS** Dark brown, fibrous to blocky woody debris, 10-20% soft silt matrix material, moist to wet, no odor, no sheen.
SH	1		9–12			30.3			

NOTES

1. OVA- Organic Vapor Analyzer

KJ PNW TACOMA METALS DNAPL BORING LOGS DEC 2003.GPJ KJ PNW.GDT 12/16/03

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Off-property (Northwest former Tacoma Metals)	**Boring Name** B-18
DRILLING COMPANY: Cascade Drilling, Inc. / DRILLER: Kasey Goble	**Project Name** Former Tacoma Metals
DRILLING METHOD(S): Geoprobe Direct Push / DRILL BIT(S) SIZE: N/A	**Project Number** 996098.00
ISOLATION CASING: N/A — FROM N/A TO N/A FT.	ELEVATION AND DATUM / TOTAL DEPTH: 26.0 ft. bgs
BLANK CASING: N/A — FROM N/A TO N/A FT.	DATE STARTED: 3/10/04 / DATE COMPLETED: 3/10/04
SLOTTED CASING: N/A — FROM N/A TO N/A FT.	INITIAL WATER DEPTH (FT): 8
SIZE AND TYPE OF FILTER PACK: N/A — FROM N/A TO N/A FT.	LOGGED BY: SDM
SEAL: Bentonite Chips — FROM 0 TO 26 FT.	SAMPLING METHODS: Macro Core / WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: N/A — FROM N/A TO N/A FT.	

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA (PPM)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Wood	**WOOD DEBRIS wood chips** Tan, ~1/2 inch diameter loose wood chips, dry to slightly moist, no odor, no sheen.
								ML	**Gravelly SILT** Black, ~30% 1/2-inch diameter rounded to subrounded gravel, ~70% silt, moist, no odor, no sheen.
☒				B-18-3.4-4					
			5			0		Wood	**WOOD DEBRIS** Black, wood debris, ~<10% silt content, moist, slight wood odor, no sheen.
								SP	**Poorly graded SAND** Gray/brown, poorly graded fine to medium sand, slightly moist, no odor, no sheen.
☒				B-18-8-8.5	▽				**Silty CLAY with wood debris** Gray, silt to clay matrix with ~30% wood debris, wood debris in shoe, one foot in macro core tube, slightly moist, no odor, no sheen. ~ 8' Very moist to saturated.
			10					CL/ ML	
☒				B-18-12-13					
			15						**Well-graded SAND** Black, fine to medium sand, little or no fines, saturated, no odor, no sheen.
☒				B-18-18-19					
			20					SW	
☒				B-18-22-23					
☒				B-18-24-25					
			25					CH	**Fat CLAY** Gray/brown, upper contact sharp, soft, medium plasticity, very moist, no odor, no sheen.

KJ PNW TACOMA METALS OFF PROPERTY MAR 2004.GPJ KJ PNW.GDT 3/24/04

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Off-property (Northwest former Tacoma Metals)	**Boring Name** B-19
DRILLING COMPANY: Cascade Drilling, Inc. / DRILLER: Kasey Goble	**Project Name** Former Tacoma Metals
DRILLING METHOD(S): Geoprobe Direct Push / DRILL BIT(S) SIZE: N/A	**Project Number** 996098.00

	FROM	TO	FT.
ISOLATION CASING: N/A	N/A	N/A	
BLANK CASING: N/A	N/A	N/A	
SLOTTED CASING: N/A	N/A	N/A	
SIZE AND TYPE OF FILTER PACK: N/A	N/A	N/A	
SEAL: Bentonite Chips	0	24	
GROUT: N/A	N/A	N/A	

ELEVATION AND DATUM	TOTAL DEPTH: 24.0 ft. bgs
DATE STARTED: 3/10/04	DATE COMPLETED: 3/10/04
INITIAL WATER DEPTH (FT): 12	
LOGGED BY: SDM	
SAMPLING METHODS: Macro Core	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA (PPM)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Wood	**WOOD DEBRIS** Tan, ~1/2-inch diameter loose wood chips, no odor, no sheen.
				B-19-2-4					
			5			6			**WOOD DEBRIS with silt** Wood debris with ~20-30% silt matrix, slight creosote odor, no sheen.
								Wood	
				B-19-9-10		25			
			10						~ 9'-10' Moderate cresote odor, visable sheen.
									Poorly graded SAND Black, poorly graded fine to medium sand, little or no fines, saturated, moderate creosote odor, moderate sheen.
				B-19-14-15					
			15					SP	
			20						
				B-19-21-22					~21'- 22.5' Product blebs, strong creosote odor, visable sheen.
				B-19-23-24				CL/ ML	**Silty CLAY** Gray/brown, upper contact is sharp, soft, medium plasticity, moist, slight creosote odor, no sheen.

NOTES

1. Top one foot of reconniasance groundwater sample tube coated with product on outside.

KJ PNW TACOMA METALS OFF PROPERTY MAR 2004.GPJ KJ PNW.GDT 3/24/04

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Off-property (Northwest former Tacoma Metals)	**Boring Name** B-20
DRILLING COMPANY: Cascade Drilling, Inc. / DRILLER: Kasey Goble	**Project Name** Former Tacoma Metals
DRILLING METHOD(S): Geoprobe Direct Push / DRILL BIT(S) SIZE: N/A	**Project Number** 996098.00
ISOLATION CASING: N/A — FROM N/A TO N/A FT.	ELEVATION AND DATUM / TOTAL DEPTH: 22.0 ft. bgs
BLANK CASING: N/A — FROM N/A TO N/A FT.	DATE STARTED: 3/10/04 / DATE COMPLETED: 3/10/04
SLOTTED CASING: N/A — FROM N/A TO N/A FT.	INITIAL WATER DEPTH (FT): 8
SIZE AND TYPE OF FILTER PACK: N/A — FROM N/A TO N/A FT.	LOGGED BY: SDM
SEAL: Bentonite Chips — FROM 0 TO 22 FT.	SAMPLING METHODS: Macro Core / WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: N/A — FROM N/A TO N/A FT.	

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA (PPM)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
							Wood		**WOOD DEBRIS**
							ML		Tan, ~1/2-inch diameter loose wood chips, dry to slightly moist, no odor, no sheen.
							Wood		**SILT with wood**
									Black, ~40-50% silt matrix with decomposed wood, very moist, slight wood odor, no sheen.
				B-20-3.5-4		<1		SP	**WOOD DEBRIS**
									Black, ~1-inch diameter wood chips, moist, wood odor, no sheen.
			5						**Poorly graded SAND with gravel**
							Wood		Gray, poorly graded medium to coarse sand with ~<10% 1/2-inch diameter black gravel, little to no fines, slightly moist, no odor, no sheen.
				B-20-7-8					**WOOD DEBRIS with silt and sand**
									Black to tan (on fresh wood surfaces), wood debris with ~30% silt matrix, slightly moist, no odor, no sheen.
									Silty CLAY with wood debris
								CL/ ML	Dark gray, ~60-70% silty clay with ~40-50% wood debris, soft, medium plasticity, mosit, no odor, no sheen.
									~8' Saturated, slight creosote odor.
			10	B-20-10-11					
				B-20-12-13					**Poorly graded SAND**
									Black, poorly graded fine to medium sand, little or no fines, saturated.
									~12'-14' Moderate creosote odor, slight visable sheen. Odor and sheen subsides below ~14' and increase at ~18'.
			15					SP	
									~18'-20.5' Sheen coats inside of sample liner.
				B-20-19-20					
			20			36			
								CH	**Fat CLAY**
									Dark gray, clay, upper contact sharp, soft, medium plasticity, moist, slight creosote odor, no sheen.

NOTES

1. Product coats outside of entire length of tubing used to collect reconniasance groundwater sample.

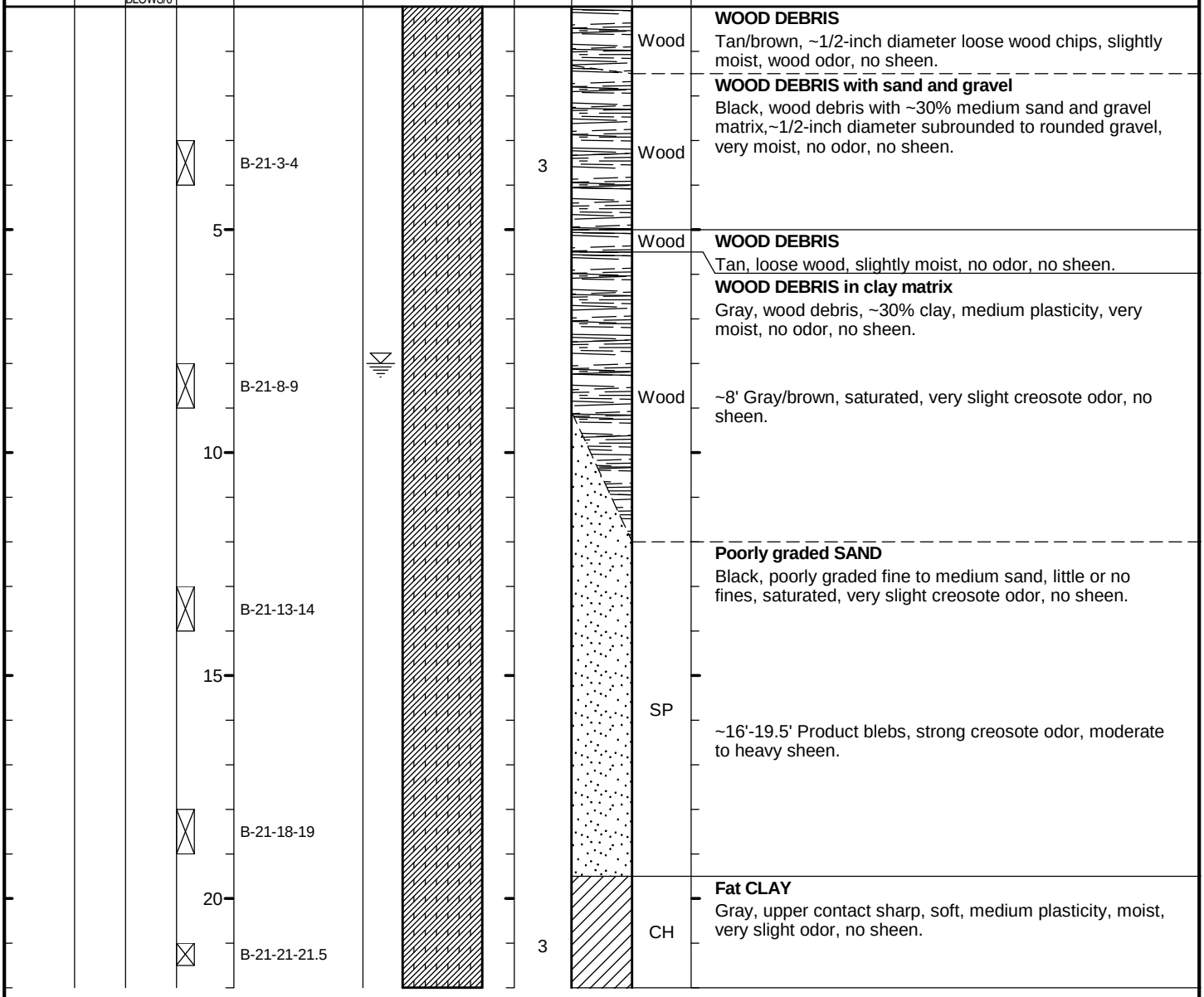
KJ PNW TACOMA METALS OFF PROPERTY MAR 2004.GPJ KJ PNW.GDT 3/24/04

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Off-property (Northwest former Tacoma Metals)	**Boring Name** B-21
DRILLING COMPANY: Cascade Drilling, Inc. / DRILLER: Kasey Goble	**Project Name** Former Tacoma Metals
DRILLING METHOD(S): Geoprobe Direct Push / DRILL BIT(S) SIZE: N/A	**Project Number** 996098.00
ELEVATION AND DATUM	TOTAL DEPTH: 22.0 ft. bgs
DATE STARTED: 3/11/04	DATE COMPLETED: 3/11/04
INITIAL WATER DEPTH (FT): 8	
LOGGED BY: SDM	
SAMPLING METHODS: Macro Core	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

	FROM	TO	FT.
ISOLATION CASING: N/A	N/A		N/A
BLANK CASING: N/A	N/A		N/A
SLOTTED CASING: N/A	N/A		N/A
SIZE AND TYPE OF FILTER PACK: N/A	N/A		N/A
SEAL: Bentonite Chips	0		22
GROUT: N/A	N/A		N/A



NOTES

1. Product coats outside of entire length of tubing used to collect reconniasance groundwater sample.

KJ PNW TACOMA METALS OFF PROPERTY MAR 2004.GPJ KJ PNW.GDT 3/24/04

F-40.1
(6-87) (3-88) (8-90)

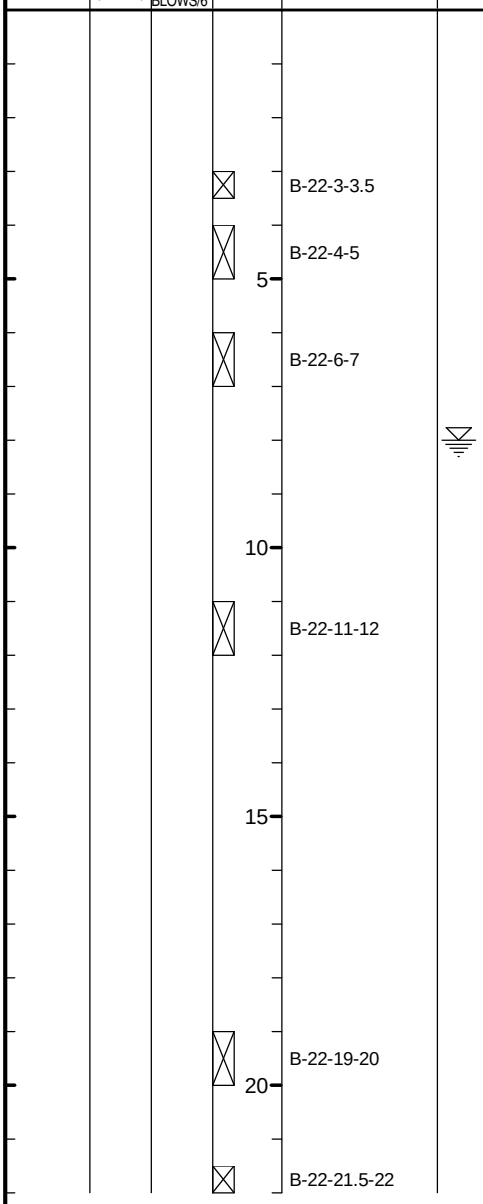
Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Off-property (Northwest former Tacoma Metals)	**Boring Name:** B-22
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Kasey Goble
DRILLING METHOD(S): Geoprobe Direct Push	DRILL BIT(S) SIZE: N/A
Project Name: Former Tacoma Metals	
Project Number: 996098.00	

	FROM	TO	FT.
ISOLATION CASING: N/A	N/A	N/A	
BLANK CASING: N/A	N/A	N/A	
SLOTTED CASING: N/A	N/A	N/A	
SIZE AND TYPE OF FILTER PACK: N/A	N/A	N/A	
SEAL: Bentonite Chips	0	22	
GROUT: N/A	N/A	N/A	

ELEVATION AND DATUM	TOTAL DEPTH: 22.0 ft. bgs
DATE STARTED: 3/11/04	DATE COMPLETED: 3/11/04
INITIAL WATER DEPTH (FT): 8	
LOGGED BY: SDM	
SAMPLING METHODS: Macro Core	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.



DEPTH (FEET)	SAMPLE NUMBER	OVA (PPM)	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			Wood	**WOOD DEBRIS** Dark brown to black, ~1/2-inch diameter loose wood chips, slightly decomposed, slightly moist, no odor, no sheen.
			Wood	**WOOD DEBRIS with sand and gravel**
			SM	Black, wood debris with ~30% medium sand and gravel matrix, ~1/2-inch diameter subrounded to rounded gravel, very moist, no odor, no sheen.
	B-22-3-3.5	3	Wood	**Silty SAND**
	B-22-4-5			Dark brown, silty sand, ~60% medium sand, ~40% non-plastic fines, slightly moist, no odor, no sheen.
5				**WOOD DEBRIS with sand and gravel** Same as 1.5' to 2', no odor, no sheen.
	B-22-6-7		Wood	**WOOD DEBRIS with some sand** Wood debris with ~10-20% fine sand matrix, very moist to saturated, no odor, no sheen.
			Wood	**WOOD DEBRIS with silt** Dark gray, wood debris, ~10-20% silt matrix, saturated, moderate to strong creosote odor, moderate sheen.
10				
	B-22-11-12	42		
			SP	**Poorly graded SAND** Black, poorly graded fine to medium sand, little or no fines, product blebs, saturated, moderate to strong creosote odor, visable sheen.
15				
20	B-22-19-20		CH	**Fat CLAY** Gray, upper contact sharp, soft, medium plasticity, moist, slight creosote odor, no sheen.
	B-22-21.5-22			

NOTES

1. Product coats outside of entire length of tubing used to collect reconniasance groundwater sample.

KJ PNW TACOMA METALS OFF PROPERTY MAR 2004.GPJ KJ PNW.GDT 3/24/04

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Off-property (Northwest former Tacoma Metals)		**Boring Name**	B-23
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Kasey Goble	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): Geoprobe Direct Push	DRILL BIT(S) SIZE: N/A	**Project Number**	996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM	TOTAL DEPTH: 22.0 ft. bgs
BLANK CASING: N/A	FROM N/A TO N/A FT.	DATE STARTED: 3/11/04	DATE COMPLETED: 3/11/04
SLOTTED CASING: N/A	FROM N/A TO N/A FT.	INITIAL WATER DEPTH (FT): 7.5	
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.	LOGGED BY: SDM	
SEAL: Bentonite Chips	FROM 0 TO 22 FT.	SAMPLING METHODS: Macro Core	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE ____ FT.
GROUT: N/A	FROM N/A TO N/A FT.		

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA (PPM)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Wood	**WOOD DEBRIS** Dark brown, slightly decomposed loose wood debris, slightly moist, no odor, no sheen.
						0		Wood	**WOOD DEBRIS in silt matrix** Black, ~1/2-inch to ~1-inch diameter wood debris, ~20% silt matrix, very moist, no odor, no sheen.
				B-23-3-4				SP	**Poorly graded SAND with gravel** Gray, poorly graded fine to medium sand stringer, slightly moist, no odor, no sheen.
			5						**WOOD DEBRIS in silt matrix** Brown to black, wood debris, ~10-20% silt matrix, slightly moist, no odor, no sheen.
				B-23-6.5-7				Wood	~7.5' Saturated, slight creosote odor. ~8'-10' Slight sheen.
				B-23-9-10					
			10						
									Poorly graded SAND Black, poorly graded fine to medium sand, little or no fines, saturated, no odor, no sheen.
			15	B-23-14-16				SP	
				B-23-18-20					~19-20' Slight creosote odor, slight sheen.
			20						
				B-23-21.5-22				CH	**Fat CLAY** Gray, upper contact is sharp, soft, medium plasticity, moist, no odor, no sheen.

KJ PNW TACOMA METALS OFF PROPERTY MAR 2004.GPJ KJ PNW.GDT 3/24/04

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name** B-24
DRILLING COMPANY: Cascade	DRILLER: Jaymen — **Project Name** Tacoma Metals
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch — **Project Number** 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT. — ELEVATION AND DATUM — TOTAL DEPTH: 36.0 ft. bgs
BLANK CASING: N/A	FROM N/A TO N/A FT. — DATE STARTED: 3/23/05 — DATE COMPLETED: 3/23/05
SLOTTED CASING: N/A	FROM N/A TO N/A FT. — INITIAL WATER DEPTH (FT): 14
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT. — LOGGED BY: DKM
SEAL: Bentonite Chips	FROM 0 TO 36 FT. — SAMPLING METHODS: MacroCore w/PVC liner — WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: N/A	FROM N/A TO N/A FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								GW	**Well-graded GRAVEL with sand** Approximately 3 inches surface gravel.
SS	3					0.0			**WOOD DEBRIS** Brown/orange, wood material, medium wood chip to coarse sawdust sized, no soil present, loose, moist, no evident odor, no sheen.
SS	1		5					Wood	
SS	2.5		10	B24-9-10		0.0		SM	**Silty SAND** Gray, silty fine sand, massive, moderately dense, moist, no evident odor, no sheen.
SS	3.5		15	B24-15-16	approx. ▽	164 329			**WOOD DEBRIS** Gray/brown, wood material, blocky, 10-15% silt/clay matrix overall but matrix varies from <5% to 20-25% locally, matrix is soft with moderate plasticity and dilatency, moist to wet below ~14 feet, no evident odor, no sheen above ~ 14 feet, below ~14 feet faint creosote odor, no sheen.
SS	0.5								
SS	0.5		20			154		Wood	Moderate creosote odor, moderate intermittent sheen on water in sampler.
SS	2.5		25			285			Strong creosote odor, heavy sheen on water surface in sampler.
SS	1.5		30	B24-30.5-31.5		51.3		SM	**Silty SAND** Gray/brown, silty fine sand overall, evident layering of poorly graded fine sand, silty fine sand, and sandy silt, typically 1-2 inch layers, moderately dense, wet, slight creosote odor, light sheen.
SS	3		35			0.0		SP	**Poorly graded SAND** Gray, poorly graded medium to coarse sand, coarsens downwards, wet, no evident odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B24-RGW screen placed ~28-32 feet bgs.
2. Refusal at first location at ~12 feet bgs, moved ~4 feet west. Refusal at second location, moved additional ~8 feet west. Third location successful.

KJ PNW LOGS B24 TO B33.GPJ KJ PNW.GDT 5/5/05

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name** B-25
DRILLING COMPANY: Cascade	DRILLER: Jaymen
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch
	Project Name Tacoma Metals
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite Chips	FROM 0 TO 36 FT.
GROUT: N/A	FROM N/A TO N/A FT.
ELEVATION AND DATUM	TOTAL DEPTH: 36.0 ft. bgs
DATE STARTED: 3/23/05	DATE COMPLETED: 3/23/05
INITIAL WATER DEPTH (FT): 13	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore w/PVC liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	4					30.6		GM	**Silty GRAVEL with sand** Gravely silt with grass and roots.
								Wood	**WOOD DEBRIS** Orange/brown, wood material, medium chip to coarse sawdust sized, no soil present, fibrous texture locally, loose, moist, no evident odor, no sheen.
SS	2		5	B25-6-7		2.5			
								GM	**Silty GRAVEL** Dark brown, silty gravel with some grayish wood chip material, poor sample recovery but appears to grade into underlying wood debris material, moist, no evident odor, no sheen.
SS	1		10			1.8		Wood	**WOOD DEBRIS** Dark brown/gray, wood material, some gravel, 10-15% silty fine sand matrix evident in sampler (poor revovery), wet at ~13 feet, no evident odor, no sheen.
SS	2		15	B25-14-15	approx. ▽	3.0		ML	**SILT** Gray, silt, some fine sand and clay likely, locally contains fine root-like material, some wood chip material in upper ~1 foot, moderately stiff, low plasticity, moderately rapid dilatency, wet, no evident odor, no sheen.
SS	2.5					0.0		SM	**Silty SAND** Gray, silty fine sand, 25-30% silt overall, possibly some clay locally, not evidently layered but some textural variation (sandy silt locally), wet, no evident odor, no sheen.
SS	4		20	B25-22-23		3.2			
								SP	**Poorly graded SAND** Dark gray, poorly graded medium sand, wet, no evident odor, no sheen above ~29 feet.
SS	2.5		25			5.3			
						4.3			Below ~29 feet, strong creosote odor, heavy sheen, NAPL blebs evident locally in sampler.
SS	2		30	B25-30-31		262		SM	**Silty SAND** Silty sand overall, interbedded poorly graded fine sand, sandy silt/silty sand, and silt in lower ~1 foot, typically in 2-3" layers, wet, slight creosote odor, light sheen.
SS	3.5		35	B25-34-35		25.1		SP	**Poorly graded SAND** Dark gray, poorly graded medium sand, wet, very slight creosote odor, light sheen.

NOTES

1. Reconnaissance groundwater sample B25-RGW screen placed ~28-32 feet bgs.

KJ PNW LOGS B24 TO B33.GPJ KJ PNW.GDT 5/5/05

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name** B-26
DRILLING COMPANY: Cascade	DRILLER: Jaymen — **Project Name** Tacoma Metals
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch — **Project Number** 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT. — ELEVATION AND DATUM — TOTAL DEPTH: 28.0 ft. bgs
BLANK CASING: N/A	FROM N/A TO N/A FT. — DATE STARTED: 3/24/05 — DATE COMPLETED: 3/24/05
SLOTTED CASING: N/A	FROM N/A TO N/A FT. — INITIAL WATER DEPTH (FT): 15
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT. — LOGGED BY: DKM
SEAL: Bentonite Chips	FROM 0 TO 28 FT. — SAMPLING METHODS: MacroCore w/PVC liner — WELL COMPLETION: ☐ SURFACE HOUSING
GROUT: N/A	FROM N/A TO N/A FT. — ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	4					0.0		GW	**Well-graded GRAVEL** Greenish to brown, gravel with some silt in upper few inches, no evident odor, no sheen.
									WOOD DEBRIS Orange/brown, wood material, medium chips to coarse sawdust sized, no soil evident, loose, moist, no evident odor, no sheen.
SS	3		5	B26-6.5-7.5		0.0		Wood / ML	**SILT** Dark gray to black, silt with some gravel and wood material, moist, no evident odor, no sheen.
SS	0.5		10					Wood	**WOOD DEBRIS** Gray/brown, wood material, blocky, silty matrix material, poor sample recovery, wet below ~15 feet, no evident odor, no sheen in recovered material.
SS	0.5		15		approx. ▽				
SS	3.5			B26-18-19		0.0		ML	**SILT** Brown/gray, silt mixed with some wood material, very soft, wet, no evident odor, no sheen.
			20			0.0		SP	**Poorly graded SAND** Gray, poorly graded medium sand, 5-15% silt locally, wet, above ~19 feet strong creosote odor and moderately heavy sheen (no NAPL), below ~19 feet, no evident odor and no sheen.
SS	3.5					0.0			Coarsens downwards to medium/coarse sand mix at ~23 feet bgs.
SS	3.5		25	B26-25-26		356			Below ~24 feet bgs, moderately strong creosote odor and moderate sheen, fines downwards to mostly medium sand by ~25 feet.
						2.4		CL/ML	**Silty CLAY** Tan/brown, silty clay, moderately stiff, moderately high plasticity, no dilatency, wet, no evident odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B26-RGW screen placed ~22-26 feet bgs.

KJ PNW LOGS B24 TO B33.GPJ KJ PNW.GDT 5/5/05

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name** B-27
DRILLING COMPANY: Cascade	DRILLER: Jaymen — **Project Name** Tacoma Metals
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch — **Project Number** 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT. — ELEVATION AND DATUM — TOTAL DEPTH: 28.0 ft. bgs
BLANK CASING: N/A	FROM N/A TO N/A FT. — DATE STARTED: 3/23/05 — DATE COMPLETED: 3/23/05
SLOTTED CASING: N/A	FROM N/A TO N/A FT. — INITIAL WATER DEPTH (FT): 10
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT. — LOGGED BY: DKM
SEAL: Bentonite Chips	FROM 0 TO 28 FT. — SAMPLING METHODS: MacroCore w/PVC liner — WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: N/A	FROM N/A TO N/A FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								GW	**Well-graded GRAVEL** Approximately 3 inches surface gravel.
SS	1							Wood	**WOOD DEBRIS** Orange/brown, wood material, medium chips to coarse sawdust sized, no evident soil, loose, moist, no evident odor, no sheen.
SS	3.5		5	B27-7-8		3.0		ML	**SILT** Dark gray to black, silty material, ~30-35% wood chip material, oily surface appearance locally, soft, moist, no evident odor, possible light sheen.
SS	1.5		10		approx. ▽	27.7		Wood	**WOOD DEBRIS** Grayish brown, wood material, blocky to fibrous texture, 10-15% silty/clayey matrix overall but varies from <5% to 20-25% locally, matrix matrial has moderate plasticity and dilatency, wet below ~10 feet, possible faint creosote odor, no sheen.
SS	0.5		15						No evident odor, no sheen in recovered sample material.
SS	0		20						
SS	3			B27-22-23		1.6		SP	**Poorly graded SAND** Dark gray, poorly graded medium to coarse sand, fining downwards to mostly medium sand, moderately dense, wet, possible slight creosore odor, no sheen at top.
			25	B27-24.5-25.5		2,517			Below ~24 feet, strong creosote odor, heavy sheen, abundant NAPL blebs on water surface.
SS	3			B27-27-28		104		ML / SP	**Sandy SILT** Medium gray/brown, silt with ~30% fine sand, wet, low to moderate creosote odor, heavy sheen, minor NAPL blebs locally. **Poorly graded SAND** Medium gray, poorly graded fine to medium sand, some silt, wet, slight to moderate creosote odor, no evident sheen.

NOTES

1. Reconnaissance groundwater sample B27-RGW screen placed ~24-28 feet bgs.

KJ PNW LOGS B24 TO B33.GPJ KJ PNW.GDT 5/5/05

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name** B-28
DRILLING COMPANY: Cascade	DRILLER: Jaymen
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch
	Project Name Tacoma Metals
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite Chips	FROM 0 TO 28 FT.
GROUT: N/A	FROM N/A TO N/A FT.
ELEVATION AND DATUM	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 3/24/05	DATE COMPLETED: 3/24/05
INITIAL WATER DEPTH (FT): 10	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore w/PVC liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3.5							GW	**Well-graded GRAVEL with sand** Brown to gray/green, gravel with sand, dense, no evident odor, no sheen.
								Wood	**WOOD DEBRIS** Brown/orange, wood material, medium chips to coarse sawdust sized, no evident soil, moist, no evdient odor, no sheen.
SS	4		5	B28-6-7		2.1		SW/ SM	**Well-graded SAND with silt and gravel** Dark gray/brown, sand, gravel, and silt mixture, locally granular texture, some coal-like fragments, moist, no evident odor, no sheen.
SS	2		10	B28-11-12	approx. ▽	0.0		Wood	**WOOD DEBRIS** Gray, wood material, 10-15% silty/clayey matrix overall but varies from <5% to 20-25% locally, wet below ~10 feet bgs, no evident odor, no sheen.
SS	3		15			0.0			Sheen present on water surface in sampler ~15-16 feet bgs, slight creosote odor.
SS	2.5					0.0		SP	**Poorly graded SAND** Dark gray, poorly graded medium to coarse sand, wet, no evident odor and no sheen above ~23.5 feet bgs.
SS	2.5		20	B28-23.5-24.5		0.0			Below ~23.5 feet, moderate creosote odor and sheen, no evident NAPL.
SS	3.5		25	B28-25-26		284 0.0		CL/ ML	**Silty CLAY** Tan/brown, silty clay, moderately stiff, moderate plasticity , slow dilatency, wet, possible faint creosote odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B28-RGW screen placed ~21-25 feet bgs.

KJ PNW LOGS B24 TO B33.GPJ KJ PNW.GDT 5/5/05

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name** B-29
DRILLING COMPANY: Cascade	DRILLER: Jaymen
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite Chips	FROM 0 TO 28 FT.
GROUT: N/A	FROM N/A TO N/A FT.

Project Name Tacoma Metals

Project Number 996098.00

ELEVATION AND DATUM	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 3/23/05	DATE COMPLETED: 3/23/05
INITIAL WATER DEPTH (FT): 8.5	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore w/PVC liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								GW/ GM	**Well-graded GRAVEL with silt** Gravel with ~4" topsoil above.
SS	4							Wood	**WOOD DEBRIS** Orange/brown, wood material, medium chips to coarse sawdust sized, no evident soil, loose, moist, no evident odor, no sheen.
SS	4		5	B29-6.5-7.5		0.0		SW	**Well-graded SAND with gravel** Grayish green, sand with 10-15% gravel, granular texture, moist, no evident odor, no sheen.
					approx.			ML	**Sandy SILT** Dark gray, silt with ~20% fine sand and minor gravel, some wood material below ~7.5 feet, poor recovery but appears to grade into underlying wood material, soft, moist to wet, no evident odor, no sheen.
SS	1.5		10	B29-11-12		0.9		Wood	**WOOD DEBRIS** Dark gray, wood material, 10-15% silty matrix with some fine sand and clay, matrix varies locally from <5% to 20-25%, slightly less matrix (~10%) and lighter gray color below ~16 feet, wet, no evident odor, no sheen.
SS	1.5		15			0.3			
SS	1.5								
			20			0.0		SP	**Poorly graded SAND** Dark gray, poorly graded medium to coarse sand grading downwards to mainly medium sand, wet, slight odor, no sheen at top.
SS	3			B29-22.5-23.5		1,309			Below ~22 feet, strong creosote odor, heavy sheen, some NAPL blebs.
SS	4		25	B29-25-26		14.1		CL/ ML	**Silty CLAY** Brown, silty clay to clayey silt, some wood material present locally, sticky, moderately stiff, moderately low plasticity, moderate dilatency, wet, slight creosote odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B29-RGW screen placed ~20-24 feet bgs.

KJ PNW LOGS B24 TO B33.GPJ KJ PNW.GDT 5/5/05

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name:** B-30
DRILLING COMPANY: Cascade	DRILLER: Jaymen
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite Chips	FROM 0 TO 24 FT.
GROUT: N/A	FROM N/A TO N/A FT.
Project Name: Tacoma Metals	
Project Number: 996098.00	
ELEVATION AND DATUM	TOTAL DEPTH: 24.0 ft. bgs
DATE STARTED: 3/24/05	DATE COMPLETED: 3/24/05
INITIAL WATER DEPTH (FT): 10	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore w/PVC liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								GW/ GM	**Well-graded GRAVEL with silt and sand** Gray/brown, gravel with sand and silt, moist, no evident odor, no sheen.
SS	3							Wood	**WOOD DEBRIS** Orange/brown, wood material, medium chips to coarse sawdust sized, no evident soil, moist, no evident odor, no sheen.
			5						
SS	3			B30-5.5-6.5		0.0		SM	**Silty SAND** Dark gray to black, silty sand with fine decayed wood material (<25%), oily surface appearance, soft, moist, no evident odor, heavy sheen.
SS	3		10	approx.				Wood	**WOOD DEBRIS** Brown/gray, wood material, blocky, 5-15% silty/clayey matrix overall, matrix varies from <5% to 20-25% locally, wet below ~10 feet, very faint creosote odor, no sheen.
				B30-11-12		0.0			
SS	3								
			15			0.0			**Poorly graded SAND** Gray, poorly graded medium sand, up to 5-10% silt, wet, no evdient odor, no sheen.
SS	1							SP	Poor recovery, but light sheen is visible on water surface in sampler, no evident odor.
			20			0.0			
SS	3.5			B30-22-23		86.2			Below ~22 feet, moderate sheen, slight to moderate creosote odor, medium to coarse sand.
						1.7		CL/ ML	**Silty CLAY** Tan/brown, silty clay, some wood material, moderately soft, high plasticity, low dilatency, wet, sticky, no evident odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B30-RGW screen placed ~20-24 feet bgs.
2. Refusal at first location at ~13 feet bgs, moved ~3 feet east. Second location successful.

KJ PNW LOGS B24 TO B33.GPJ KJ PNW.GDT 5/5/05

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name** B-31
DRILLING COMPANY: Cascade	DRILLER: Jaymen
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch
	Project Name Tacoma Metals
	Project Number 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite Chips	FROM 0 TO 28 FT.
GROUT: N/A	FROM N/A TO N/A FT.
ELEVATION AND DATUM	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 3/24/05	DATE COMPLETED: 3/24/05
INITIAL WATER DEPTH (FT): 11	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore w/PVC liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3							GW	**Well-graded GRAVEL** Gray/green/brown, well graded gravel.
								Wood	**WOOD DEBRIS** Brown/orange, wood material, medium chips to fine sawdust sized, no evident soil, moist, no evident odor, no sheen.
SS	2.5		5	B31-6-7		3.2		ML	**Gravelly SILT** Dark brown to gray, silty material with some gravel and wood chips, oily appearance locally, soft, moist, no evident odor, no evident sheen.
								ML	**SILT** Dark brown, silty material with <25% wood material, some fine sand, soft, moist, no evident odor, no evident sheen.
SS	2		10		approx.				**WOOD DEBRIS** Gray/brown, wood material, blocky, <10% matrix in recovered sample material, wet below ~11 feet, no evident odor, no sheen.
SS	0		15					Wood	
SS	2.5			B31-19-20		100.1			16 to 20 foot sample--material above sand is very wet (sloppy, runny) and large NAPL blebs are present on the water surface in the sampler.
			20					SP	**Poorly graded SAND** Gray, poorly graded medium sand, coarsens gradually downwards, wet, strong creosote odor, heavy sheen on surface in sampler appears to increase with depth, no evident NAPL but gloves/baggies are stained.
SS	4					523.0			
				B31-24-25		1,292			
SS	3.5		25			8.4		CL/ ML	**Silty CLAY** Brown/gray, silty clay to clayey silt, moderately stiff, moderate plasticity, low diltatency, wet, no evdient odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B31-RGW screen placed ~21-25 feet bgs.

KJ PNW LOGS B24 TO B33.GPJ KJ PNW.GDT 5/5/05

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name** B-32
DRILLING COMPANY: Cascade	DRILLER: Jaymen — **Project Name** Tacoma Metals
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch — **Project Number** 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT. — ELEVATION AND DATUM — TOTAL DEPTH: 24.0 ft. bgs
BLANK CASING: N/A	FROM N/A TO N/A FT. — DATE STARTED: 3/24/05 — DATE COMPLETED: 3/24/05
SLOTTED CASING: N/A	FROM N/A TO N/A FT. — INITIAL WATER DEPTH (FT): 8
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT. — LOGGED BY: DKM
SEAL: Bentonite Chips	FROM 0 TO 24 FT. — SAMPLING METHODS: MacroCore w/PVC liner — WELL COMPLETION: ☐ SURFACE HOUSING
GROUT: N/A	FROM N/A TO N/A FT. — ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	2							GM	**Silty GRAVEL with sand** Brown, gravel with sand and silt, 3-4 inches red/brown topsoil above gravel, moist, no evident odor, no sheen.
									WOOD DEBRIS Gray/brown, wood material, 10-15% silty/clayey matrix overall, matrix varies from <5% to 20-25% locally, moist to wet at ~8 feet, no evident odor, no sheen.
SS	3		5	B32-6-7	approx. ▽	0.0		Wood	Appears to be the "lower/older" wood unit.
SS	2.5		10	B32-11-12		0.0			**Poorly graded SAND** Dark gray to black, poorly graded medium sand, some silt locally, wet, no evident odor, no sheen.
SS	0		15					SP	
SS	2.5			B32-19-20		83.0			Below ~18 feet, strong creosote odor, moderate sheen, NAPL blebs rinse out in sheen test.
SS	3.5		20	B32-21-22		0.0		CL/ ML	**Silty CLAY** Tan/brown, sitly clay, moderately stiff, moderately high plasticity, low dilatency, wet, no evident odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B32-RGW screen placed ~16-20 feet bgs.

KJ PNW LOGS B24 TO B33.GPJ KJ PNW.GDT 5/5/05

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: East 18th St Right of Way, NW of Tacoma Metals property	**Boring Name:** B-33
DRILLING COMPANY: Cascade	DRILLER: Jaymen
DRILLING METHOD(S): Geoprobe	DRILL BIT(S) SIZE: 2-inch
	Project Name: Former Tacoma Metals
	Project Number: 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite Chips	FROM 0 TO 24 FT.
GROUT: N/A	FROM N/A TO N/A FT.

ELEVATION AND DATUM	TOTAL DEPTH: 24.0 ft. bgs
DATE STARTED: 3/24/05	DATE COMPLETED: 3/24/05
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore w/PVC liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	3.5					8.9		GM	**Silty GRAVEL** Brown, silty gravel, moist, no evident odor, no sheen.
								Wood	**WOOD DEBRIS** Orange/brown, wood material, medium chip to coarse sawdust sized, no evident soil, moist, no evident odor, no sheen.
								GW	**Well-graded GRAVEL with sand** Gray/green to dark gray, well graded gravel with ~40% sand, possibly some silt, layered appearance, dense, moist, no evident odor, no sheen.
SS	3		5	B33-6-7		3.4		SW/ SM	**Well-graded SAND with silt and gravel** Dark gray, sand and silt with some gravel, granular texture locally, moist, no evident odor, no sheen.
SS	3		10		approx.			Wood	**WOOD DEBRIS** Gray, wood material, coarse blocky texture, less than 10% matrix present in recovered sample material, moist to wet below ~10 feet, no evident odor, no sheen.
SS	1		15			10.1			
SS	2			B33-18-19		0.0		SP	**Poorly graded SAND** Dark gray, poorly graded sand, mainly coarse sand, some medium sand, wet, no evident odor, no sheen.
SS	4		20	B33-20.5-21.5		3.1		ML	**Sandy SILT** Brown/gray, sandy silt, 30-40% fine sand, wet, no evident odor, no sheen.
						0.0		CL/ ML	**Silty CLAY** Tan/brown, silty clay, moderately stiff, moderate plasticity, low dilatency, wet, no evident odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B33-RGW screen placed ~18-22 feet bgs.

KJ PNW LOGS B24 TO B33 2005.GPJ KJ PNW.GDT 2/25/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Northeast Corner Simpson Property	**Well Name** MW-29 / B-34
DRILLING COMPANY: Cascade	DRILLER: Casey / Jaymen — **Project Name** Former Tacoma Metals
DRILLING METHOD(S): HSA / GeoProbe	DRILL BIT(S) SIZE: 9-inch / 2-inch — **Project Number** 998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 22.2 FT. / FROM 32.2 TO 32.5
SLOTTED CASING: 2" Schedule 40 PVC Pipe, 0.010-Slot	FROM 22.2 TO 32.2 FT.
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 19 TO 32.5 FT.
SEAL: Pure Gold Bentonite Chips	FROM 1.5 TO 19 FT. / FROM 32.5 TO 36
GROUT: Concrete	FROM 0 TO 1.5 FT.

ELEVATION AND DATUM	TOTAL DEPTH: 36.0 ft. bgs
DATE STARTED: 2/14/06	DATE COMPLETED: 2/15/06
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore w/PVC Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	2					0.2		SW	**Well-graded SAND with gravel** Gray, medium sand with 10-15% gravel and ~5% red/brown woody material locally, moderately dense, moist, no odor, no sheen.
SH	1		5	B34-7-8		0.5		Wood	**WOOD DEBRIS** Red/brown, woody material, fine chips to coarse sawdust size, locally up to 5% silt but typically no matrix material, soft, moist, no odor, no sheen.
SH	0.5		10					Wood	**WOOD DEBRIS** Dark gray to dark orange/brown, blocky wood material, typically coated with silt and fine sand, 5-10% matrix material, moist to wet below 10 feet bgs, no odor, no sheen.
SH	3		15					ML	**Sandy SILT** Medium gray/brown, silt with fine sand, <5% sand at top, 15-20% sand by ~16 feet bgs, ~20% sand by 20 feet bgs, moderately dense overall but loose 20-22.5 feet bgs, wet, no odor, no sheen.
SH	2.5			B34-18-19		0.0			
SH	4		20					ML	**SILT** Gray, silt, becomes sandier (fine sand) with depth, up to 10% sand by ~24 feet bgs, moderately stiff, wet, no odor, no sheen.
SH	2.5		25					SP	**Poorly graded SAND** Gray, medium to coarse sand at top, primarily medium sand by ~28 feet bgs, fine sand present below ~30 feet bgs, moderately dense, wet, slight creosote odor, no sheen.
SH	3.5		30	B34-30-31		57.4			
						1.0		SM	**Silty SAND** Gray, silty fine sand, 15-20% silt, moderately dense, wet, no odor, no sheen.
SH	3.5		35	B34-34-35		0.3		SP	**Poorly graded SAND** Gray, medium to fine sand at top, grading to mostly medium/coarse sand by 36 feet bgs, moderately dense, wet, no odor, no sheen.

NOTES

1. Sampling and lithologic logging were performed during GeoProbe boring on 2/14/06. The well was installed at the same location on 2/15/06.

KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Simpson Property center well		**Well Name**	MW-30 / B-35
DRILLING COMPANY: Cascade	DRILLER: Casey / Jaymen	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): HSA / GeoProbe	DRILL BIT(S) SIZE: 9-inch / 2-inch	**Project Number**	998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM	TOTAL DEPTH: 44.0 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 40.7 / 25.7 TO 41 FT.	DATE STARTED: 2/14/06	DATE COMPLETED: 2/15/06
SLOTTED CASING: 2" Schedule 40 PVC Pipe, 0.010-Slot	FROM 25.7 TO 40.7 FT.	INITIAL WATER DEPTH (FT): 9.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 23 TO 41 FT.	LOGGED BY: DKM	
SEAL: Pure Gold Bentonite Chips	FROM 1.5 / 41 TO 23 / 44 FT.	SAMPLING METHODS: MacroCore w/PVC Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0 TO 1.5 FT.		

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	1.5							SW	**Well-graded SAND with gravel** Brown/gray, sand with 25-30% rounded gravel, some silt below ~4 feet bgs, moist, no odor, no sheen.
SH	2.5		5	B35-6-7		0.3		SM	**Silty SAND with gravel** Dark gray to black, granular (sand-sized) material mixed with 15-20% silt and some angular gravel material, oily surface appearance locally, moist, no odor, no sheen.
SH	2.5		10					Wood	**WOOD DEBRIS** Gray to brown/yellow (on exposed surfaces), blocky wood debris with gray silty matrix material (5-10%) typically coating wood surfaces, wet, no odor, no sheen.
SH	1		15			0.5			
SH	0		20						
SH	3			B35-23-24		0.4		SP	**Poorly graded SAND** Medium gray, poorly graded medium to coarse sand, locally minor fine sand, wet, no odor, no sheen above ~24 feet bgs.
SH	4		25			1.1			Slight creosote odor and no sheen ~24-28 feet bgs.
SH	4		30			1.4			Slight to moderate creosote odor and no sheen ~28-35 feet bgs (strongest odor ~30-33').
SH	4			B35-32-33		15.5			
SH	4		35			5.6			No odor or sheen below ~35 feet bgs.
SH	4		40	B35-39-40		0.4			
SH	4					0.9		ML	**SILT** Tan/gray, silt, minor fine sand and clay, stiff, moderate plasticity and dilatency, wet, no odor, no sheen.
						0.8		SP	**Poorly graded SAND** Medium gray, poorly graded medium to coarse sand, wet, no odor, no sheen.
								ML	**SILT** Tan/gray, silt, minor fine sand and clay, stiff, moderate plasticity and dilatency, wet, no odor, no sheen.
								SP	*(See next page for lithology description)*

NOTES

1. Sampling and lithologic logging were performed during GeoProbe boring on 2/14/06. The well was installed at the same location on 2/15/06.

KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

Boring & Well Construction Log

Kennedy/Jenks Consultants

Project Name Former Tacoma Metals **Project Number** 998098.00 **Well Name** MW-30 / B-35

SAMPLES			DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"							
									Poorly graded SAND Medium gray, poorly graded medium to coarse sand, wet, no odor, no sheen.

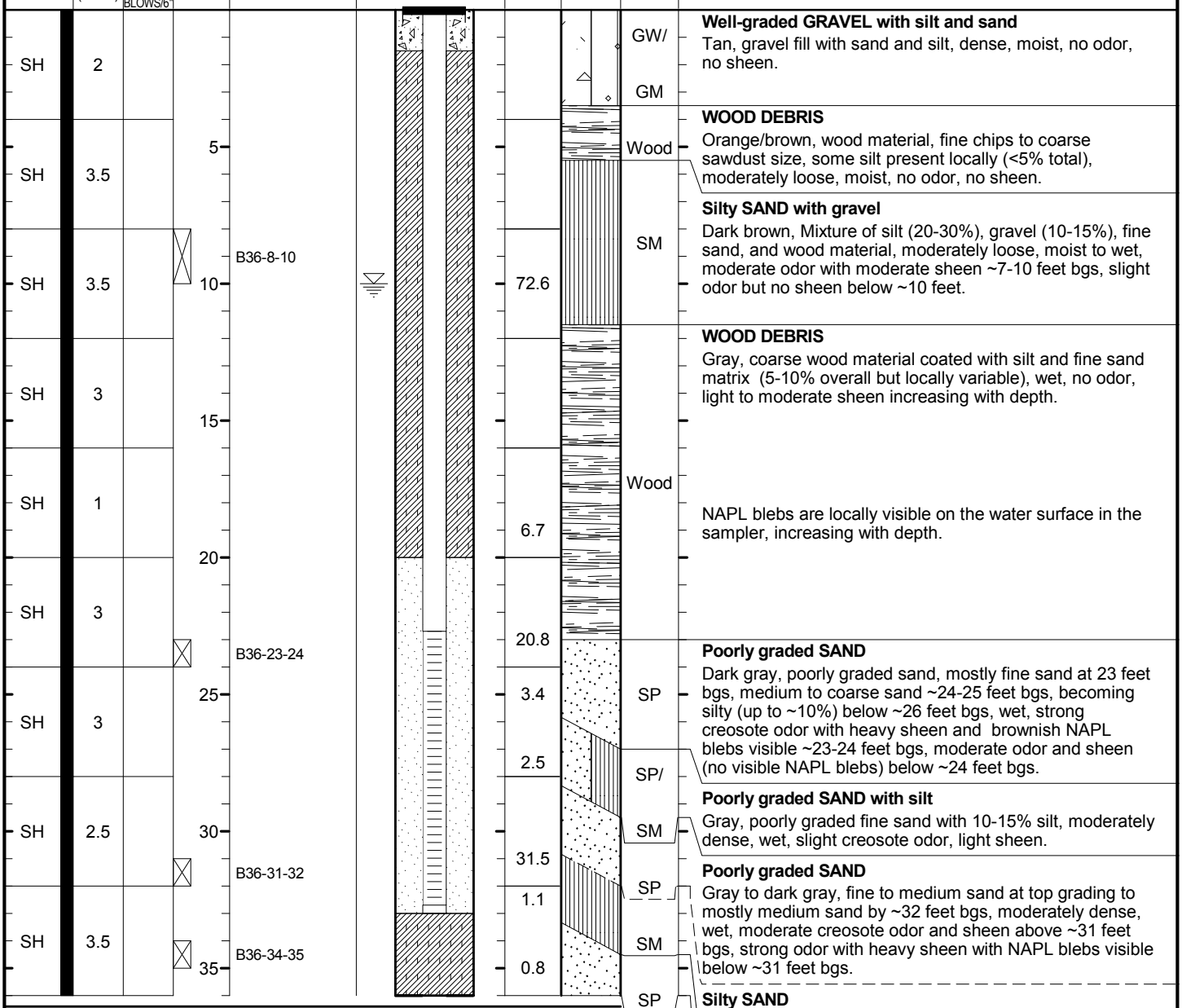
KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Simpson Property nearest Portland Avenue		**Well Name**	MW-31 / B-36
DRILLING COMPANY: Cascade	DRILLER: Casey / Jaymen	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): HSA / GeoProbe	DRILL BIT(S) SIZE: 9-inch / 2-inch	**Project Number**	998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM	TOTAL DEPTH: 36.0 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 32.7 FT. / 22.7 TO 33	DATE STARTED: 2/14/06	DATE COMPLETED: 2/15/06
SLOTTED CASING: 2" Schedule 40 PVC Pipe, 0.010-Slot	FROM 22.7 TO 32.7 FT.	INITIAL WATER DEPTH (FT): 10.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 20 TO 33 FT.	LOGGED BY: DKM	
SEAL: Pure Gold Bentonite Chips	FROM 1.5 / 33 TO 20 / 36 FT.	SAMPLING METHODS: MacroCore w/PVC Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0 TO 1.5 FT.		



NOTES

1. Sampling and lithologic logging were performed during GeoProbe boring on 2/14/06. The well was installed at the same location on 2/15/06.

KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

Project Name Former Tacoma Metals **Project Number** 998098.00 **Well Name** MW-31 / B-36

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Poorly graded SAND Gray, poorly graded medium to coarse sand, moderately dense, wet, no odor, no sheen.

KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Simpson Property	**Boring Name:** B-37
DRILLING COMPANY: Cascade	DRILLER: Kasey
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
Project Name: Tacoma Metals	
Project Number: 996098*00	

	FROM	TO	FT.
ISOLATION CASING: N/A	N/A		N/A
BLANK CASING: N/A	N/A		N/A
SLOTTED CASING: N/A	N/A		N/A
SIZE AND TYPE OF FILTER PACK: N/A	N/A		N/A
SEAL: Bentonite	0		24
GROUT: N/A	N/A		N/A

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 24.0 ft. bgs
DATE STARTED: 10/29/07	DATE COMPLETED: 10/29/07
INITIAL WATER DEPTH (FT): 9.5	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	3.5					0		GW	**Well-graded GRAVEL with sand** Brown, gravel and sand fill, moist, no odor, no sheen.
								SW	**Well-graded SAND with gravel** Layered green-gray/dark gray/tan, abrupt contacts between different colored layers, sand with 20-30% gravel overall (locally variable), some silt locally, moderately dense, moist, no odor, no sheen.
SH	3		5	B37-5-6					
								Wood	**WOOD DEBRIS** Dark brown to red-brown, wood material with 5-10% silty matrix, moist, no odor, no sheen.
SH	2.5		10			0		SP	**Poorly graded SAND** Dark gray, poorly graded medium sand, moderately dense, moist to wet at ~9.5 feet bgs, no odor, no sheen.
								SM	**Silty SAND** Gray/brown, silty fine sand, some woody material locally, moderately dense, wet, no odor, no sheen.
SH	2.5		15	B37-14-15		0		SP	**Poorly graded SAND** Dark gray, poorly graded medium to coarse sand, local small (<1/2 inch) silt nodules in lower ~3 feet, moderately dense, wet, possible faint creosote odor 16-20 feet, otherwise no odor, no sheen.
SH	3								
			20						
SH	3			B37-21-22		0		CL/ ML	**Silty CLAY** Gray, silty clay, moderately stiff, moderately high plasticity, wet, no odor, no sheen.
								SP	**Poorly graded SAND** Gray, poorly graded medium sand, moderately dense, wet, no odor, no sheen.
								ML	**Sandy SILT** Gray, sandy silt, moderately stiff, low plasticity, wet, no odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B37-RGW screen set 18-22 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: City of Tacoma Right of Way		**Boring Name**	B-37A
DRILLING COMPANY: Cascade	DRILLER: Eli	**Project Name**	Tacoma Metals
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch	**Project Number**	996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 24.0 ft. bgs
BLANK CASING: N/A	FROM N/A TO N/A FT.	DATE STARTED: 1/25/08	DATE COMPLETED: 1/25/08
SLOTTED CASING: N/A	FROM N/A TO N/A FT.	INITIAL WATER DEPTH (FT): 10.0	
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.	LOGGED BY: RCZ	
SEAL: Bentonite	FROM 0 TO 24 FT.	SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: N/A	FROM N/A TO N/A FT.		

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	3					0		GP	**Poorly graded GRAVEL with sand** Brown, gravely fill material, moderately dense, no odor, no sheen.
								SP	**Poorly graded SAND with gravel** Gray, poorly graded medium-fine sand with 5-10% gravel, moderately dense, no odor, no sheen.
								SP/	**Poorly graded SAND with silt** Brown, sand with 30% silt, some organic debris and wood chip material, soft, no odor, no sheen.
SH	2.5		5			0		SM	**Well-graded SAND with gravel** Dark gray, sand with 50% gravel, moderately dense, no odor, no sheen.
								SW	**Well-graded SAND with silt** Dark gray to brown, sand with 30% silt, moderately dense, moist, no odor, no sheen.
								SW/	**WOOD DEBRIS** Dark brown to red-brown, wood material with 5-10% silty matrix, moist, no odor, no sheen.
SH	2.3		10			0		SM	**Well-graded GRAVEL with silt and sand** Dark gray, well graded gravel with 10% fine sand and 20% silt, moderately dense, wet, no odor, no sheen.
								Wood	**Poorly graded SAND** Gray, poorly graded medium sand, 5% fine to medium gravel in upper 2 feet, grading to fine sand by 20-21 feet, moderately dense, wet, no odor, no sheen.
SH	1.3		15			0		GW/	
								GM	
SH	0.5		20			0		SP	
SH	3					0		CL/ ML	**Silty CLAY** Gray, silty clay, moderately stiff, medium-low pasticity, wet, no odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B37A-RGW screen set 18-22 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Simpson Property	**Boring Name:** B-38
DRILLING COMPANY: Cascade	DRILLER: Kasey
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
	Project Name: Tacoma Metals
	Project Number: 996098*00

	FROM	TO	FT.
ISOLATION CASING: N/A	N/A		N/A
BLANK CASING: N/A	N/A		N/A
SLOTTED CASING: N/A	N/A		N/A
SIZE AND TYPE OF FILTER PACK: N/A	N/A		N/A
SEAL: Bentonite	0		28
GROUT: N/A	N/A		N/A

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 10/29/07	DATE COMPLETED: 10/29/07
INITIAL WATER DEPTH (FT): 9.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	3							GW	**Well-graded GRAVEL with sand** Tan, gravelly fill material, moderately dense, slightly moist, no odor, no sheen.
								SP/	**Poorly graded SAND with silt** Dark gray, sand with 10-15% silt and 5-10% gravel, moderately dense, moist, no odor, no sheen.
SH	3		5	B38-5-6				SM	
SH	2.8		10			0		SM	**Silty SAND** Gray, very fine sand with 30-40% silt, moderately dense, moist, no odor, no sheen.
SH	3.2		15	B38-14.5-15.5		0		SP	**Poorly graded SAND** Gray, poorly graded medium sand, local small (<1/2") silt nodules in lower ~5 feet, moderately dense, wet, possible slight creosote odor ~15-20 feet bgs, no odor otherwise, no sheen.
SH	2.5					0			
SH	3.5		20	B38-22.5-23.5		0			@ ~23 feet bgs 1/2" thick layer of gray/brown silty clay
SH	4		25					CL/ ML	**Silty CLAY** Gray, silty clay, some fine sand locally, moderately stiff, high plasticity, wet, no odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B38-RGW screen set 20-24 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: Simpson Property	**Boring Name:** B-39
DRILLING COMPANY: Cascade	DRILLER: Kasey
	Project Name: Tacoma Metals
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
	Project Number: 996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite	FROM 0 TO 28 FT.
GROUT: N/A	FROM N/A TO N/A FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 10/29/07	DATE COMPLETED: 10/29/07
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	2							GW	**Well-graded GRAVEL with sand** Brown to gray/brown, gravelly fill, moderately dense, no odor, no sheen.
								SM	**Silty SAND** Brown/red, silty fine sand with 10-20% wood chip material, soft, moist, no odor, no sheen.
SH	3.5		5	B39-5.5-6.5		0		Wood	**WOOD DEBRIS** Brown/gray, wood debris with <5% silt/sand matrix material, moist, creosote odor, no sheen.
								SM	**Silty SAND** Dark gray, silty sand with some wood debris, moderately dense, moist, possible slight creosote odor, medium sheen.
SH	3		10	B39-10-11		0			**Silty SAND** Tan/gray, fine sand with >40% silt, moderately dense, moist, no odor, no sheen.
SH	0		15					SP	**Poorly graded SAND** Dark gray, poorly graded medium sand, coarser sand with some fine gravel in lower ~3 feet, moderately dense, wet, no odor, medium to heavy sheen ~21-22 feet bgs, no sheen otherwise.
SH	3.5								
SH	4		20	B39-21-22		0			
				B39-23-24		0		ML/ CL	**Clayey SILT** Gray, clayey silt, moderately stiff, wet, no odor, no sheen. **Poorly graded SAND with silt** Gray, fine sand with 10-15% silt overall, layered texture with interbedded poorly graded sand to silty fine sand, moderately dense, wet, no odor, no sheen.
SH	4		25					SP/ SM CL/ ML	**Silty CLAY** Gray, silty clay, moderately stiff, high plasticity, wet, no odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B39-RGW screen set 19-23 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Boring Name:** B-39A
DRILLING COMPANY: Cascade	DRILLER: Eli
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
	Project Name: Tacoma Metals
	Project Number: 996098*00

	FROM	TO	FT.
ISOLATION CASING: N/A	N/A	N/A	
BLANK CASING: N/A	N/A	N/A	
SLOTTED CASING: N/A	N/A	N/A	
SIZE AND TYPE OF FILTER PACK: N/A	N/A	N/A	
SEAL: Bentonite	0	28	
GROUT: N/A	N/A	N/A	

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 1/25/08	DATE COMPLETED: 1/25/08
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: RCZ	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	3							GW	**Well-graded GRAVEL with sand** Dark orange/brown, gravelly fill with 30-40% sand, moderately dense, no odor, no sheen.
						0		SW/ SM	**Well-graded SAND with silt** Dark orange/brown, silty fine sand with 10-20% wood chip material and 10% gravel, moderately dense, moist, no odor, no sheen.
SH	3		5			0		SW/ SM	**Well-graded SAND with silt** Tan/gray, silty fine sand with 5-10% gravel, moderately dense, moist, no odor, no sheen. **Well-graded SAND with silt** Dark orange/brown, fine sand with 10% silt, moderately dense, moist, no odor, no sheen.
SH	2.5		10			0		SW/ SM	**WOOD DEBRIS** Brown/red, wood debris with up to 50% silt/sand matrix material, moist, no odor, no sheen. **Silty SAND** Tan/gray, fine sand with 30-40% silt, moderately dense, moist, no odor, no sheen.
SH	2.5		15					Wood SM	**Poorly graded SAND** Dark gray, poorly graded medium sand, coarsening downwards to medium/coarse sand, some gravel at 24 feet, moderately dense, wet, no odor, no sheen.
SH	3					0		SP	
SH	2		20						
SH	3.5		25			0		ML/ CL	**Clayey SILT** Gray, clayey silt with 5% fine sand, moderately stiff, high plasticity, wet, no odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B39A-RGW screen set 22.5-26.5 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Boring Name:** B-40
DRILLING COMPANY: Cascade	DRILLER: Kasey
	Project Name: Tacoma Metals
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
	Project Number: 996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite	FROM 0 TO 28 FT.
GROUT: N/A	FROM N/A TO N/A FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 10/29/07	DATE COMPLETED: 10/29/07
INITIAL WATER DEPTH (FT): 9.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Asphalt surface and base gravel fill.
SH	3.5					0		SW	**Well-graded SAND with gravel** Tan/orange/brown, sand with 30-35% fine to medium gravel, some silt, moderately dense, moist, no odor, no sheen.
SH	3		5	B40-6.5-7.5				SP	**Poorly graded SAND** Brown, poorly graded medium sand with 5-10% gravel, moderately dense, moist, no odor, no sheen.
								Wood	**WOOD DEBRIS** Dark orange/brown, wood chip material, <5% matrix material, moist, no odor, no sheen.
SH	3.5		10			0		SM	**Silty SAND** Tan/gray, fine sand with 30-40% silt overall (locally variable), moderately dense, moist to wet at ~9' bgs, no odor, no sheen.
SH	3.5		15	B40-14-15				SP	**Poorly graded SAND** Dark gray, poorly graded sand, mostly medium sand at top, grading downward to medium/coarse sand mixture, local small (<1") silt nodules ~17-20 feet bgs, moderately dense, wet, no odor, no sheen.
SH	3					0			
SH	3.5		20	B40-21.5-22.5		0			
								ML	**Sandy SILT** Gray, silt with ~30% fine sand, moderately stiff, low plasticity, wet, no odor, no sheen.
SH	3.5		25					SM	**Silty SAND** Brown/gray, fine sand with 15-20% silt, moderately dense, wet, no odor, no sheen.
								CL/ ML	**Silty CLAY** Gray/tan, silty clay, moderately stiff, moderately high plasticity, wet, no odor, no sheen.
								SP/ SM	**Poorly graded SAND with silt** Gray, poorly graded medium to fine sand with 10-15% silt, moderately dense, wet, no odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B40-RGW screen set 19-23 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Boring Name:** B-41
DRILLING COMPANY: Cascade	DRILLER: Kasey
	Project Name: Tacoma Metals
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
	Project Number: 996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite	FROM 0 TO 28 FT.
GROUT: N/A	FROM N/A TO N/A FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 10/30/07	DATE COMPLETED: 10/30/07
INITIAL WATER DEPTH (FT): 9.5	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Asphalt surface and base gravel fill.
SH	2					0		SM	**Silty SAND with gravel** Tan, fine to medium sand with 20-25% silt and 5-15% gravel, moderately dense, moist, no odor, no sheen.
			5					SP	**Poorly graded SAND** Brown, poorly graded medium to coarse sand, ~5% fine gravel, moderately dense, moist, no odor, no sheen.
SH	3.5			B41-7-8		0		OH	**Organic SILT** Dark brown to dark gray, silt with abundant organic material including woody debris, soft, moist, no odor, no sheen.
								CL/	
SH	3		10			0		ML	**Silty CLAY** Tan to tan-brown, silty clay, moderately stiff, high plasticity, moist, no odor, no sheen.
				B41-11-12				ML	**Sandy SILT** Gray/brown, silt with 30-40% fine sand overall, layered texture with interbedded clayey silt, silt, and sandy silt, wet, no odor, no sheen.
SH	3								
			15			0		SP	**Poorly graded SAND** Dark gray, poorly graded sand, mostly medium sand at top coarsening slightly downward, local small (<1/2") silt nodules ~16-20 feet bgs, moderately dense, wet, no odor, no sheen.
SH	3								
						0			
			20						
SH	3.5			B41-21.5-22.5					
						0		SM	**Silty SAND** Gray, fine sand with 20-25% silt, moderately dense, wet, no odor, no sheen.
			25	B41-24.5-25.5				SP	**Poorly graded SAND** Gray, poorly graded fine sand, moderately dense, wet, no odor, no sheen.
SH	3.5							CL	**Lean CLAY** Olive/gray, clay, moderately stiff, moderately high plasticity, wet, no odor, no sheen
								SP	**Poorly graded SAND** Gray, poorly graded fine sand, moderately dense, wet, no odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B41-RGW screen set 21-25 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Boring Name:** B-42
DRILLING COMPANY: Cascade	DRILLER: Kasey
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
	Project Name: Tacoma Metals
	Project Number: 996098*00

	FROM	TO	FT.
ISOLATION CASING: N/A	N/A		N/A
BLANK CASING: N/A	N/A		N/A
SLOTTED CASING: N/A	N/A		N/A
SIZE AND TYPE OF FILTER PACK: N/A	N/A		N/A
SEAL: Bentonite	0		36
GROUT: N/A	N/A		N/A

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 36.0 ft. bgs
DATE STARTED: 10/30/07	DATE COMPLETED: 10/30/07
INITIAL WATER DEPTH (FT): 9.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	2					0		GW	**Well-graded GRAVEL with sand** Brown to gray, gravelly fill with >40% sand, moderately dense, moist, no odor, no sheen.
SH	2		5	B42-5-6		4.9		SW	**Well-graded SAND with gravel** Granular fill material including charcoal and rock fragments, moderately loose, no odor, no sheen.
SH	2		10			0		Wood	**WOOD DEBRIS** Brown to red/brown, wood debris with 5-10% silty matrix, moist to wet at ~9 feet bgs, slight creosote odor, light sheen below ~12 feet bgs.
SH	1.5		15						
SH	2					0			
SH	2.5		20	B42-22-23		0		SP	**Poorly graded SAND** Gray, poorly graded fine to medium sand, some fibrous to blocky wood debris locally, moderately dense, wet, no odor, no sheen.
SH	3		25	B42-24.5-25.5		0		CL/ ML	**Silty CLAY** Tan/gray, silty clay, moderately stiff, medium plasticity, wet, no odor, no sheen.
SH	3		30	B42-30-31		0		SP	**Poorly graded SAND** Gray, poorly graded sand, mostly medium sand, moderately dense, wet, possible very faint creosote odor, no sheen.
SH	4		35					ML	**Sandy SILT** Tan/gray, silt with 30-40% fine to very fine sand, moderately stiff, wet, no odor, no sheen.
								SP	**Poorly graded SAND** Gray, poorly graded medium to coarse sand, up to 15% silt at ~33-34 feet bgs, otherwise <5% silt, moderately dense, wet, no odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B42-RGW screen set 22-26 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Boring Name:** B-43
DRILLING COMPANY: Cascade	DRILLER: Kasey
	Project Name: Tacoma Metals
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
	Project Number: 996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite	FROM 0 TO 44 FT.
GROUT: N/A	FROM N/A TO N/A FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 44.0 ft. bgs
DATE STARTED: 10/30/07	DATE COMPLETED: 10/30/07
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	2.5					0.5		SW	**Well-graded SAND with gravel** Gray/orange/dark gray, Sand and gravel (20-30%) fill material, cinders, rock fragments, some silt, moist, no odor, no sheen.
SH	2.5		5	B43-6-7		0			**WOOD DEBRIS** Brown, wood material with 5-10% gray silty matrix material, matrix varies locally from <5% up to ~20%, moist to wet at ~10 feet bgs, no odor, no sheen.
SH	1.5		10			0		Wood	
SH	2.5		15	B43-14.5-15.5		0			**Poorly graded SAND** Gray, poorly graded sand, mostly medium sand at top grading to fine sand at bottom, some woody material in upper ~5 feet, moderately dense, wet, slight to moderate creosote odor ~27-33 feet bgs, otherwise no odor, no sheen.
SH	3		20						
SH	3.5					0			
SH	3.5		25			0		SP	
SH	3.5		30	B43-28.5-29.5		0			
SH	3.5		35	B43-34.5-35.5		0			
SH	3.5					0		ML/ CL	**Clayey SILT** Gray, clayey silt, moderately stiff, medium plasticity, wet, no odor, no sheen. **Poorly graded SAND** Gray, poorly graded sand, medium to coarse sand at top grading to mostly medium sand by ~39 feet bgs, local small (<1") silty fine sand layers or nodules below ~38 feet bgs, moderately dense, wet, no odor, no sheen.
SH	3		40					SP	

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Project Name Tacoma Metals **Project Number** 996098*00 **Boring Name** B-43

SAMPLES			DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"							

NOTES

1. Reconnaissance groundwater sample B43-RGW screen set 26-30 feet bgs.

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Boring Name:** B-44
DRILLING COMPANY: Cascade	DRILLER: Kasey
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
Project Name: Tacoma Metals	
Project Number: 996098*00	
ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 40.0 ft. bgs
DATE STARTED: 10/31/07	DATE COMPLETED: 10/31/07
INITIAL WATER DEPTH (FT): 8.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

		FROM	TO	FT.
ISOLATION CASING	N/A	N/A	N/A	N/A
BLANK CASING	N/A	N/A	N/A	N/A
SLOTTED CASING	N/A	N/A	N/A	N/A
SIZE AND TYPE OF FILTER PACK	N/A	N/A	N/A	N/A
SEAL	Bentonite	0	40	
GROUT	N/A	N/A	N/A	N/A

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	3			B44-2-3				GW	**Well-graded GRAVEL** Well graded gravel fill material, no odor, no sheen.
								SM	**Silty SAND** Tan to gray, silty fine sand fill, moist, no odor, no sheen.
SH	3		5					ML	**SILT** Dark brown, silt, abundant fine wood material, moderately soft, moist, no odor, no sheen.
								Wood	**WOOD DEBRIS** Brown/red-brown, wood debris with 10-15% silty matrix overall, matrix locally variable <5% up to 20%, moist, no odor, no sheen.
SH	2		10					ML	
SH	2.5			B44-14-15				ML	**Sandy SILT with gravel** Dark gray, silt/sand mixture with some gravel, very loose/soft, moist to wet at ~8 feet bgs, no odor, no sheen.
			15					SP	**SILT** Gray, silt, soft, low placticity, wet, no odor, no sheen.
SH	2					0		SM	**Poorly graded SAND** Gray, poorly graded medium sand, moderately dense, wet, no odor, no sheen.
SH	2.5		20			0		SP	**Silty SAND** Gray, fine sand with 30-40% silt overall, interbedded poorly graded sand with silt, silty sand, and sandy silt, lower contact is sharp but depth is approximate, moderately dense, wet, no odor, no sheen.
SH	2.5		25	B44-25.5-26.5		0			**Poorly graded SAND** Gray, poorly graded sand, fine to medium sand at top, grading gradually to medium/coarse sand by ~30 feet bgs, moderately dense, wet, slight creosote odor and light sheen at ~24-26 feet bgs and below ~30 feet bgs, no odor and no sheen otherwise.
SH	2		30	B44-31.5-32.5		0			
SH	3		35			0		CL/ ML	**Silty CLAY** Dark brown, silty clay, moderately stiff, high plasticity, wet, no odor, no sheen. **Poorly graded SAND** Gray, poorly graded sand, fine to medium sand at top grading to medium/coarse sand by ~37 feet bgs, moderately dense, wet, no odor, no sheen.
SH	3					0		SP	
			40						

NOTES

1. Reconnaissance groundwater sample B44-RGW screen set 28-32 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Boring Name:** B-45
DRILLING COMPANY: Cascade	DRILLER: Kasey
	Project Name: Tacoma Metals
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
	Project Number: 996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite Chips	FROM 0 TO 28 FT.
GROUT: N/A	FROM N/A TO N/A FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 28.0 ft. bgs
DATE STARTED: 10/30/07	DATE COMPLETED: 10/30/07
INITIAL WATER DEPTH (FT): 8.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	2.5					0		GW	**Well-graded GRAVEL with sand** Tan, gravelly fill with 40-45% sand, moderately dense, no odor, no sheen.
								SW	**Well-graded SAND** Dark gray, granular material with cinders, charcoal, and pumice-like fragments, no odor, no sheen.
SH	2.5		5	B45-6-7		0		CL/ ML	**Silty CLAY** Orange/gray to gray, silty clay, moderately stiff, medium plasticity, moist, no odor, no sheen.
SH	3.5		10	B45-11-12		0		SP	**Poorly graded SAND** Dark Gray, poorly graded medium sand, grading to medium/coarse sand mixure by ~15 feet bgs, moderately dense, wet, no odor, no sheen.
SH	2		15			0			
SH	2.5					0			@ ~17.5 feet bgs, ~1.5 inch silt layer or nodule
			20			0			
SH	3.5			B45-21-22				CL/ ML	**Silty CLAY** Tan/light brown, silty clay, moderately stiff, moderately high plasticity, wet, no odor, no sheen.
SH	3.5		25			0		SP/ SM	**Poorly graded SAND with silt** Gray, poorly graded fine sand with 10-15% silt, moderately dense, wet, no odor, no sheen. **Poorly graded SAND** Gray, poorly graded medium to fine sand, moderately dense, wet, no odor, no sheen.
								SP	

NOTES

1. Reconnaissance groundwater sample B45-RGW screen set 18-22 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Boring Name:** B-46
DRILLING COMPANY: Cascade	DRILLER: Kasey
	Project Name: Tacoma Metals
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
	Project Number: 996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: N/A	FROM N/A TO N/A FT.
SLOTTED CASING: N/A	FROM N/A TO N/A FT.
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.
SEAL: Bentonite	FROM 0 TO 32 FT.
GROUT: N/A	FROM N/A TO N/A FT.
ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 32.0 ft. bgs
DATE STARTED: 10/31/07	DATE COMPLETED: 10/31/07
INITIAL WATER DEPTH (FT): 8.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	3					0		SW	**Well-graded SAND with gravel** Brown, sandy fill with 10-20% gravel, some silt, moderately dense, moist, no odor, no sheen.
SH	3		5	B46-6-7		0		SP/ SM	**Poorly graded SAND with silt** Brown, fine sand with 10-20% silt, moderately dense, moist to wet at ~9 feet bgs, no odor, no sheen.
SH	3.5		10			0		Wood	**WOOD DEBRIS** Dark brown to orange-brown, wood debris, 5-10% sandy matrix material, wet, no odor, no sheen.
SH	4		15	B46-13-14				SM	**Silty SAND** Dark gray, fine sand with 20-30% silt, moderately dense, wet, no odor, no sheen.
SH	3					0		SP	**Poorly graded SAND** Gray, poorly graded medium sand, local small (<1/2") silt nodules, moderately dense, wet, no odor, no sheen.
SH	3.5		20	B46-21-22		0		ML	**Sandy SILT** Gray, silt with ~40% fine sand, moderately stiff, wet, no odor, no sheen.
SH	4		25			0		CL/ ML	**Silty CLAY** Tan to gray, layered, silty clay, moderately stiff, moderately high plasticity, wet, no odor, no sheen.
SH	3.5		30					SM	**Silty SAND** Gray, fine sand with 30-40% silt, moderately dense, wet, no odor, no sheen.
								SP	**Poorly graded SAND** Gray, poorly graded medium sand, moderately dense, wet, no odor, no sheen.

NOTES

1. Reconnaissance groundwater sample B46-RGW screen set 17-21 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Boring Name:** B-47
DRILLING COMPANY: Cascade	DRILLER: Kasey
DRILLING METHOD(S): GeoProbe	DRILL BIT(S) SIZE: 2-inch
Project Name: Tacoma Metals	
Project Number: 996098*00	
ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 36.0 ft. bgs
DATE STARTED: 10/31/07	DATE COMPLETED: 10/31/07
INITIAL WATER DEPTH (FT): 8.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore with PVC Liner	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.

	FROM	TO	FT.
ISOLATION CASING: N/A	N/A		N/A
BLANK CASING: N/A	N/A		N/A
SLOTTED CASING: N/A	N/A		N/A
SIZE AND TYPE OF FILTER PACK: N/A	N/A		N/A
SEAL: Bentonite	0		36
GROUT: N/A	N/A		N/A

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	3					0		SW/ SM	**Well-graded SAND with silt and gravel** Brown to dark brown, gravelly fill with 40-45% sand and 5-10% silt, moderately dense, moist, no odor, no sheen.
SH	1.8		5	B47-6-7		0		GM	**Silty GRAVEL with sand** Gravelly fill with 30-40% sand and 10-15% silt, moderately dense, moist, no odor, no sheen.
SH	4		10			0		ML/ CL	**Clayey SILT** Gray, clayey silt, moderately soft, medium plasticity, wet, no odor, no sheen.
SH	3			B47-13-14		0		SP	**Poorly graded SAND** Gray, poorly graded medium sand, moderately dense, wet, no odor, no sheen.
SH	0		15					SM	**Silty SAND** Gray, fine sand with 20-30% silt, moderately dense, wet, no odor, no sheen.
SH	1.5		20			0		ML CL	**Sandy SILT** Gray, silt with 30-40% fine to very fine sand, moderately stiff, wet, no odor, no sheen. **Lean CLAY** Olive gray, clay, some fine root material, moderately stiff, high plasticity, wet, no odor, no sheen.
SH	2.5		25			0		SM	**Silty SAND** Gray/brown, fine sand with 35-45% silt, layered texture, moderately dense, wet, no odor, no sheen.
SH	3.3		30	B47-30.5-31.5		0		GP/ GM	**Poorly graded GRAVEL with silt and sand** Gray-green to dark gray, angular medium gravel-sized rock material with up to 15% silt/sand matrix material, generally poor sample recovery, ~6 inches of white fractured rock material with no matrix at top of unit, dense, wet, no odor, no sheen.
SH	3.5		35			0		SP	**Poorly graded SAND** Gray, poorly graded medium sand, some coarse sand, moderately dense, wet, no odor, no sheen.
								ML/ CL	**Clayey SILT** Tan/brown, clayey silt, moderately stiff, medium plasticity, wet, no odor, no sheen.
								SP	**Poorly graded SAND** Gray, poorly graded medium to coarse sand, no odor, no sheen.
								ML/ CL	**Sandy clayey SILT** Gray, interbedded clayey silt and poorly graded medium to coarse sand with silt, layers typically 1/2 to 1 inch thick with abrupt contacts, wet, no odor, no sheen.
								SP	*(See next page for lithology description)*

NOTES

1. Reconnaissance groundwater sample B47-RGW screen set 28-32 feet bgs.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

Project Name Tacoma Metals **Project Number** 996098*00 **Boring Name** B-47

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Poorly graded SAND Gray, poorly graded sand, coarse to medium sand at top grading to fine/medium sand by ~35.5 feet bgs, some silt below ~35.5 feet, moderately dense, wet, no odor, no sheen.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	EAST–NORTHEAST OF RED BRICK BUILDING
DRILLING COMPANY	CASCADE DRILLING, INC.
DRILLER	SCOTT KREUGER
DRILLING METHOD	HOLLOW STEM AUGER
DRILL BIT(S) SIZE:	9 INCH

Boring/Well Name MW–4(R)

Project Name TACOMA METALS

Project Number 996098.00

	FROM	TO	FT.
ISOLATION CASING: NONE			
BLANK CASING: 2" DIA. SCH 40 PVC	0.0	5.0	
PERFORATED CASING: 2" DIA. SCH 40 PVC 0.010 SLOTTED	5.0	22.8	
SIZE AND TYPE OF FILTER PACK: LAPIS LUSTRE #2/12 SILICA	4.0	22.8	
SEAL: BENTONITE CHIPS	2.0	4.0	
GROUT: CONCRETE	0.0	2.0	

ELEVATION AND DATUM: 10.0	TOTAL DEPTH: 22.8
DATE STARTED: 05/09/2000	DATE COMPLETED: 05/09/2000
INITIAL WATER DEPTH (FT): 10.3	
LOGGED BY: TAH/DKM	
SAMPLING METHODS: 2.5" ID SPLIT SPOON	WELL COMPLETION: SURFACE HOUSING; STAND PIPE 3.0 FT.

SAMPLES TYPE	RECOVERY (FEET)	PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
S	1.5	24 25 28		NMW–2–0.0				**Well-graded SAND with gravel** Mixed gravelly sand. Well–graded sand, well–graded gravel (~20%), medium dense, moist, brown, contains wood, glass, and metal fragments, moderate to strong creosote–like odor, no sheen.
S	1.5	5 5 6	5	NMW–2–5.0			SW	
S	1.5	15 17 20	10	NMW–2–10.0			SP/ SM	**Poorly graded SAND with silt** Highly organic (woody) silty sand, fine sand, dense, brown, wet. Organic material is partially decomposed wood w/strong to very strong creosote–like odor. Very strong odor at 15.0 feet bgs.
S	1.0	32 50	15	NMW–2–15.0				
S	1.5	27 30 32	20	NMW–2–21.3			SP	**Poorly graded SAND** Angular to sub–angular medium to coarse clean sand (predominantly coarse sand), dense, charcoal gray/black, wet, massive, strong creosote–like odor.

Notes:

1 Creosote–like odor detected in all soil samples collected. Strongest odor occurs at elevation of wood fill material.

2 Below depth of 10 feet bgs, soil also has diesel–like petroleum odor

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	NORTHEAST CORNER OF SITE
DRILLING COMPANY	CASCADE DRILLING, INC.
DRILLER	SCOTT KREUGER
DRILLING METHOD	HOLLOW STEM AUGER
DRILL BIT(S) SIZE:	9 INCH

		FROM	TO	FT.
ISOLATION CASING	NONE			
BLANK CASING	2" DIA. SCH 40 PVC	0.0	5.0	
PERFORATED CASING	2" DIA. SCH 40 PVC 0.010 SLOTTED	5.0	23.6	
SIZE AND TYPE OF FILTER PACK	LAPIS LUSTRE #2/12 SILICA	4.0	23.6	
SEAL	BENTONITE CHIPS	2.0	4.0	
GROUT	CONCRETE	0.0	2.0	

Boring/Well Name MW-8(R)

Project Name TACOMA METALS

Project Number 996098.00

ELEVATION AND DATUM: 8.5	TOTAL DEPTH: 23.6
DATE STARTED: 05/09/2000	DATE COMPLETED: 05/09/2000
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: TAH/DKM	
SAMPLING METHODS: 2.5" ID SPLIT SPOON	WELL COMPLETION: SURFACE HOUSING; STAND PIPE 3.0 FT.

SAMPLES TYPE	RECOVERY (FEET)	PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
S	1.5	25 25 22					SW	**Well-graded SAND with gravel** Mixed gravelly sand with some silt, medium dense, brown, moist, mixed, contains some small metal scrap, no hydrocarbon sheen, no odor.
S	1.5	5 5 6	5	NMW-3-5.0			ML	**Sandy SILT** Sandy silt/silty sand. Fine sand, loose, gray, wet, heterogeneous, contains trace small wood fragments, no hydrocarbon odor, no sheen.
S	1.5	12 15 16	10	NMW-3-10.0			SP	**Poorly graded SAND** Angular to sub-angular fine to medium clean sand, dense, charcoal gray/black, wet, massive. Heavy sheen, very strong hydrocarbon odor. At 15' bgs, strong odor, no sheen. At 20' bgs, moderate odor, no sheen.
S	1.5	12 13 15	15					
S	1.5	12 15 15	20	NMW-3-22.1				

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	EAST OF STORAGE BUILDING
DRILLING COMPANY	CASCADE DRILLING, INC.
DRILLER	SCOTT KREUGER
DRILLING METHOD	HOLLOW STEM AUGER
DRILL BIT(S) SIZE:	9 INCH

		FROM	TO	FT.
ISOLATION CASING	NONE			
BLANK CASING	2" DIA. SCH 40 PVC	0.0	5.0	
PERFORATED CASING	2" DIA. SCH 40 PVC 0.010 SLOTTED	5.0	23.5	
SIZE AND TYPE OF FILTER PACK	LAPIS LUSTRE #2/12 SILICA	4.0	23.5	
SEAL	BENTONITE CHIPS	2.0	4.0	
GROUT	CONCRETE	0.0	2.0	

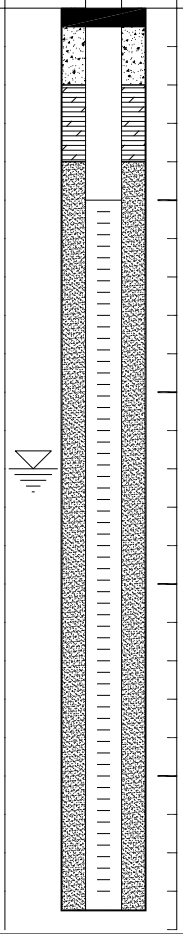
Boring/Well Name MW-9

Project Name TACOMA METALS

Project Number 996098.00

ELEVATION AND DATUM: 12.0	TOTAL DEPTH: 23.5
DATE STARTED: 05/09/2000	DATE COMPLETED: 05/09/2000
INITIAL WATER DEPTH (FT): 12.0	
LOGGED BY: TAH/DKM	
SAMPLING METHODS: 2.5" ID SPLIT SPOON	WELL COMPLETION: SURFACE HOUSING; STAND PIPE 3.0 FT.

SAMPLES TYPE	RECOVERY (FEET)	PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
S	0.7	16 12 12		NMW-1-0.0		SW/SM	**Well-graded SAND with silt and gravel** Mixed gravelly sand with some silt, medium dense, brown, moist, contains some wood and small metal scrap, no hydrocarbon sheen, no odor.
S	1.5	3 4 12	5	NMW-1-5.0		SP	**Poorly graded SAND** Fine to medium sand (predominantly medium), medium dense, wet, gray, contains small glass fragments, no hydrocarbon sheen, no odor.
S	1.5	15 15 16	10	NMW-1-10.0		SM	**Silty SAND** Fine sand, medium dense, gray, wet, homogeneous, no hydrocarbon sheen, no odor.
S	1.5	42 35 37	15	NMW-1-15.0		SP	**Poorly graded SAND** Medium Sand, medium dense, gray, wet, homogeneous, no hydrocarbon sheen, no odor.
S	1.5	18 29 30	20	NMW-1-22.0		SP	**Poorly graded SAND** Angular to sub-angular fine to medium clean sand, dense, charcoal gray/black, wet, massive, no sheen, no odor.



Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	WEST PROPERTY LINE
DRILLING COMPANY	CASCADE
DRILLER	
DRILLING METHOD	HSA
DRILL BIT(S) SIZE:	9 INCH

ISOLATION CASING		FROM	TO	FT.
BLANK CASING	2–INCH SCHEDULE 40 PVC	FROM 0.0	TO 8.0	FT.
PERFORATED CASING	2–INCH SCHEDULE 40 PVC 0.010 SLOT	FROM 8.0	TO 20.0	FT.
SIZE AND TYPE OF FILTER PACK	RMC #2/12 LAPIS LUSTRE SAND	FROM 7.0	TO 20.0	FT.
SEAL	PURE GOLD MEDIUM BENTONITE CHIPS	FROM 1.0	TO 7.0	FT.
GROUT	CONCRETE	FROM 0.0	TO 1.0	FT.

Boring/Well Name MW–10

Project Name TACOMA METALS

Project Number 996098.00

ELEVATION AND DATUM	TOTAL DEPTH
DATE STARTED 11/10/1900	DATE COMPLETED 11/10/1900
INITIAL WATER DEPTH (FT) 10.5	
LOGGED BY DKM	
SAMPLING METHODS: SPLIT SPOON	WELL COMPLETION: ■ SURFACE HOUSING; ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOVERY (FEET)	PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	OVA	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
						GW	**Well-graded GRAVEL with sand**
S	1.0	16 12 9		NMW–4–2.5	0.0	GW	Brown, dry, gravel (60%) with medium and fine sand (35%) and minor (<5%) silt.
			5			ML/CL	**Well-graded GRAVEL with sand**
S	1.5	4 5 6		NMW–4–5.0	0.0	ML/CL	Medium brown, dry, gravel (50%) with fine and medium sand (50%). Gravel material is generally fine–grained.
S	0.5	6		NMW–4–7.5	10		**Clayey SILT with sand**
							Light brown, crumbly, moderately dense silt with 5–10% fine sand. Includes some clay.
S	1.0	10 7 50/3	10				**Clayey SILT**
						ML/CL	Mixed silt and clay, dark brown, soft, low density.
							Clayey SILT
S	0.3	35 25 20	15				Brown to gray, wet, soft silt and fine sand with some clay. Mixed with wood debris. Wood debris is typically 85%–95% of material. Silt, sand and clay are around and coating the wood material.
S	1.5	5 7 10		NMW–4–17.5	7	SP	**Poorly graded SAND**
S	1.0	4 10 10	20	NMW–4–20.0	6		Dark brown, wet, poorly graded medium to fine grained sand.
			25				
			30				

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	WEST OF OCTAGON FOUNDATION		
DRILLING COMPANY	CASCADE	DRILLER	
DRILLING METHOD	HSA	DRILL BIT(S) SIZE:	12 INCH

Boring/Well Name MW-11
Project Name TACOMA METALS
Project Number 996098.00

	FROM	TO	FT.
ISOLATION CASING			
BLANK CASING 4-INCH SCHEDULE 40 PVC	0.0	6.0	
PERFORATED CASING 4-INCH SCHEDULE 40 PVC 0.020 SLOT	6.0	20.0	
SIZE AND TYPE OF FILTER PACK RMC #2/12 LAPIS LUSTRE SAND	5.0	20.0	
SEAL PURE GOLD MEDIUM BENTONITE CHIPS	1.0	5.0	
GROUT CONCRETE	0.0	1.0	

ELEVATION AND DATUM	TOTAL DEPTH
DATE STARTED 11/10/1900	DATE COMPLETED 11/10/1900
INITIAL WATER DEPTH (FT) 10.5	
LOGGED BY DKM	
SAMPLING METHODS SPLIT SPOON	WELL COMPLETION ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOVERY (FEET)	PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	OVA	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
S	0.7	20 20 9		NMW-5-2.5	0.8	GW	**Well-graded GRAVEL with sand** Gray to brown-orange, slightly moist, gravel with 25-30% sand and some (<5%) silt. Fill material.
S	0.5	5 3 2	5	NMW-5-5.0	2.0		
S		40 18 10					
S	0.2	23 13 8	10	NMW-5-10.0	12	ML/ CL	**Clayey SILT** Brown to gray, wet, soft silt and fine sand with some clay. Mixed with wood debris. Wood debris is typically 85%-95% of material. Silt, sand and clay are around and coating the wood material.
S		8 50/3					
S	0.2	25 20 50/2	15				
S	0.4	7 10 12		NMW-5-17.5	38	SP	**Poorly graded SAND** Dark brown, wet, poorly graded medium to fine grained sand.
S	1.5	2 5 37	20	NMW-5-20.0	33	CL/ ML	**Silty CLAY** Light brown, soft slay to silty clay with small fibrous wood fragments.
			25				
			30				

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	WEST OF MACHINE SHED		
DRILLING COMPANY	CASCADE	DRILLER	
DRILLING METHOD	HSA	DRILL BIT(S) SIZE:	12 INCH
ISOLATION CASING		FROM TO FT.	
BLANK CASING	4-INCH SCHEDULE 40 PVC	FROM 0.0 TO 7.0 FT.	
PERFORATED CASING	4-INCH SCHEDULE 40 PVC 0.020 SLOT	FROM 7.0 TO 19.0 FT.	
SIZE AND TYPE OF FILTER PACK	RMC #2/12 LAPIS LUSTRE SAND	FROM 6.0 TO 19.0 FT.	
SEAL	PURE GOLD MEDIUM BENTONITE CHIPS	FROM 1.0 TO 6.0 FT.	
GROUT	CONCRETE	FROM 0.0 TO 1.0 FT.	

Boring/Well Name MW-12

Project Name TACOMA METALS

Project Number 996098.00

ELEVATION AND DATUM	TOTAL DEPTH
DATE STARTED 11/10/1900	DATE COMPLETED 11/10/1900
INITIAL WATER DEPTH (FT) 10	
LOGGED BY DKM	
SAMPLING METHODS: SPLIT SPOON	WELL COMPLETION: ■ SURFACE HOUSING; □ STAND PIPE _____ FT.

SAMPLES TYPE	RECOVERY (FEET)	PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	OVA	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
						GW	**Well-graded GRAVEL with sand** Dark brown to gray, slightly moist, gravel (55–60%) with sand (35%) and some silt (<5%).
S	0.3	6 14 14				SW	**Well-graded SAND with gravel** Medium brown sand and gravel (40%) with some silt (5%), moist, includes some wood fragments.
			5				
S	1.0	8 6 6		NMW-6-5.0	0.8	GW	**Well-graded GRAVEL with sand** Dark gray to brown, moist, gravel (60–65%) with sand.
S	0.1	8 2 6					
			10				**Clayey SILT** Brown to gray, wet, soft silt and fine sand with some clay. Mixed with wood debris. Wood debris is typically 85%–95% of material. Silt, sand and clay are around and coating the wood material.
S	0.5	5 5 15				ML/ CL	
S	0.3	5 10 25					
			15				
S	0.2	4 7 35					
S	1.5	7 20 20		NMW-6-17.5	1	SP	**Poorly graded SAND** Gray/brown, wet, poorly graded medium to fine grained sand.
			20				
S	1.0	2 5 8		NMW-6-20.0	1		
			25				
			30				

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION	NE OF MW-8(R) NEAR PROPERTY BOUNDARY
DRILLING COMPANY	CASCADE
DRILLER	JAMES
DRILLING METHOD	HOLLOW STEM AUGER
DRILL BIT(S) SIZE	9-INCH OD

ISOLATION CASING		FROM	TO	FT.
BLANK CASING	2-INCH SCHEDULE 40 PVC PIPE	FROM 0.0	TO 7.0	FT.
PERFORATED CASING	2-INCH SCHEDULE 40 PVC 0.010-INCH SLOT	FROM 7.0	TO 18.0	FT.
SIZE AND TYPE OF FILTER PACK	LAPIS LUSTRE #2/12 MOTEREY SAND	FROM 5.0	TO 18.5	FT.
SEAL	PURE GOLD BENTONITE CHIPS	FROM 2.0	TO 5.0	FT.
GROUT	CONCRETE	FROM 2.0	TO 0	FT.

Boring/Well Name MW-13

Project Name TACOMA METALS

Project Number 996098.00

ELEVATION AND DATUM	TOTAL DEPTH 21.5
DATE STARTED 06/26/2002	DATE COMPLETED 06/26/2002
INITIAL WATER DEPTH (FT) 11.0	
LOGGED BY DKM	
SAMPLING METHODS: SPLIT SPOON	WELL COMPLETION: ☐ SURFACE HOUSING; ■ STAND PIPE 3.0 FT.

SAMPLES TYPE	RECOVERY (FEET)	PENETRATION RESIST (BLOWS/6 IN.)	DEPTH (FEET)	SAMPLE NO.	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Well-graded GRAVEL with sand
S	1.0	7 6 6					GW	Brown fine- to medium- gravel with 40-45% fine- to medium- sand and some silt, no odor, no apparent sheen.
S	1.0	5 6 5		MW-13-2.5	133			
S	1.0	7 50			68			**WOOD with SILT matrix**
			5	MW-13-5	9.3			Dark gray, wood debris typically with 5-10% silt/fine sand matrix, no sheen above 13 feet, moderate sheen below 13 feet, slight to moderate creosote odor below 13 feet.
S	1.0	4 4 5			701			
S	1.5	4 5 12			245			
S	0.5	19 50						
S	1.0	22 16 25	10		>2000		SM	
S	0.4	5 13 13			>2000			
S	1.0	5 6 6			67.1			
			15					
S	0.3	15 29 32			221			
S	1.5	8 7 5		MW-13-17.5	>2000 764		SP ML/ CL	**Poorly graded SAND** Dark gray fine sand with some silt, slight creosote odor and sheen.
S	1.5	8 12 15						**Clayey SILT** Gray to light brown clayey silt, soft, moderately dense, no creosote odor, no apparent sheen.
S	1.5		20	MW-13-20	>2000		SP/ SM	**Poorly graded SAND with silt** Gray fine sand with 10-20% silt, none to very slight creosote odor, no apparent sheen.
					>2000			
			25					

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area		**Well Name**	MW-14
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Brian	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): Hollow-Stem Auger	DRILL BIT(S) SIZE: 9-inch OD	**Project Number**	996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: 10.05' (NGVD29)	TOTAL DEPTH: 26.5 ft. bgs
BLANK CASING: 2-inch SCH.40 PVC with 6-inch sump	FROM 0.0 TO 13.5 FT.; FROM 23.5 TO 24.0	DATE STARTED: 2/26/03	DATE COMPLETED: 2/26/03
SLOTTED CASING: 2-inch SCH.40 PVC 0.010-inch slot	FROM 13.5 TO 23.5 FT.	INITIAL WATER DEPTH (FT): 9.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 11.5 TO 25.0 FT.	LOGGED BY: JML/AJA	
SEAL: Pure Gold Bentonite Chips	FROM 2.5 TO 11.5 FT.; FROM 25.0 TO 26.5	SAMPLING METHODS: 2.5" ID split spoon	WELL COMPLETION: ■ SURFACE HOUSING; □ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0.0 TO 2.5 FT.		

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	OVA (ppm)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Asphalt
SS	0	32 50 4						**Well-graded SAND with gravel (fill)** Dark yellowish brown to (10YR 4/12) to dusky brown (5YR 2/2), fine to coarse sand, ~10-20% fine gravel, trace fines, moist, no odor/sheen.
SS	1	10 13 10			1.2		SW	
SS	0.9	3 4 3	5		1.6			~4' brownish black (5YR 2/1).
SS	1	3 3 4			1.7			~5.5' dusky brown (5YR 2/2), gradual increase in fines.
SS	0.5	4 6 4			17.0			**WOOD DEBRIS with SILT or SAND matrix** Dark gray (N3) to black (N1), wood debris typically with ~5-10% silt/fine sand matrix, although matrix >20% and <5% was observed.
SS	0.5	3 2 5						~7' Slight creosote odor.
SS	0.4	3 2 2	10		0.7		Wood	~9' Wet.
SS	0.3	3 50 6			1.8			~10' Increase in fines, matrix predominantly silt to silt clay.
SS	0.2	3 5 5		MW-14-14-14.5	1.2			~11' Visible sheen, creosote odor.
SS	0.4	20 20 15	15		1.6			~14.5' Large wood debris.
SS	0.8	8 8 8			0.9			**Silty SAND** Brownish black (5YR 2/1), ~10-20% fine-medium sand, some fibrous organic material, wet, slight sheen and creosote odor.
SS	0.7	6 5 6			0.3		SM	
SS	0.3	4 5 5	20		2.2		SP	**Poorly graded SAND** Brownish black (5YR 2/1), fine to medium sand, trace fines, wet, slight sheen and creosote odor.
SS	0.2	5 7 7					SM	**Silty SAND** Dusky brown (5YR 2/2), fine sand, ~20-35% fines, wet.
SS	0.8	3 8 11		MW-14-22-22.3	6.6			
SS	1.2	8 16 30		MW-14-23.8-24	5.5		CL	~22' very strong sheen and creosote odor, small blebs visible on soil surface.
SS	--	10 25 37	25	MW-14-26-26.5	2.0		SM	**Lean CLAY** Dusky yellowish brown (10YR 2/2), low to moderate plasticity, moist, slight creosote odor, no sheen.
							ML	**Silty SAND** As described above.
							CL	**SILT with sand** Dusky yellowish brown (10YR 2/2), trace fines, wet, no visible sheen or odor.
							SM	**Lean CLAY with sand** As described above with ~15% fine sand.
								Silty SAND Dusky yellowish brown (10YR 2/2), fine to medium sand, ~15-25% fines, wet, slight creosote odor, no sheen.

NOTES
1. OVA - Organic vapor analyzer.
2. Ground surface elevation based on City of Tacoma datum (NGVD29).

KJ PNW TACOMA METALS DNAPL BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area		**Well Name**	MW-15
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Brian	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): Hollow-Stem Auger	DRILL BIT(S) SIZE: 9-inch OD	**Project Number**	996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: 10.77' (NGVD29)	TOTAL DEPTH: 28.0 ft. bgs
BLANK CASING: 2-inch SCH.40 PVC with 2-inch sump	FROM 0.0 TO 16.1 FT.; FROM 26.1 TO 26.3	DATE STARTED: 2/28/03	DATE COMPLETED: 2/28/03
SLOTTED CASING: 2-inch SCH.40 PVC 0.010-inch slot	FROM 16.1 TO 26.1 FT.	INITIAL WATER DEPTH (FT): 11.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 14.0 TO 26.3 FT.	LOGGED BY: JML/SCK	
SEAL: Pure Gold Bentonite Chips	FROM 2.5 TO 14.0 FT.; FROM 26.3 TO 28.0	SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner	WELL COMPLETION: ■ SURFACE HOUSING; □ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0.0 TO 2.5 FT.		

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA (ppm)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	2.4					5.5			**Asphalt** **Well-graded GRAVEL with sand (fill)** Moderate brown (5YR 4/4) to black (N1), fine to coarse gravel-subangular to subrounded, ~30-40% fine to medium sand, trace silt, moist.
SS	0.8		5			36.0		GW	~3.5' color change to olive black (5YR 2/1), sheen, strong hydrocarbon odor.
SS	2.8		10	MW-15-11-11.5		22.0			**WOOD DEBRIS with SILT or SAND matrix** Red to dark yellowish brown (10YR 4/2), ~95% wood, moderate sheen and slight hydrocarbon odor. ~11' Wet.
SS	0.0					--		Wood	
SS	1.8		15			10.2			~15' ~100% wood, light gray (N7), no sheen or odor. ~16'-17' ~ 50% wood, ~50% silty fine sand.
SS	2.0					8.6		SM	**Silty SAND** Dark gray (N3) to brownish black (5YR 2/1), fine sand, ~30-50% silt, wet, slight sheen and creosote odor.
SS	1.7					3.4			**Poorly graded SAND**
SS	2.0		20			3.6		SP	Dark gray (N3) to black (N1), fine to medium sand, wet, no sheen or odor.
SS	2.0					7.9			~22.9' gradual increase in fine sand.
SS	2.0		25	MW-15-25-26		2.9		ML	**SILT** Light olive gray (5YR 5/2), contains fibrous organic material, wet, no sheen or odor.
SS	2.0					2.5		SM	**Silty SAND** As described above, no sheen or odor.
								CL	**Lean CLAY** Light gray (N7), moderate plasticity, moist, no sheen or odor.
								SM	**Silty SAND** Pale brown (5YR 5/2), wet, no sheen or odor.

NOTES

1. Pilot boring advanced with GeoProbe rig. Well installed using 9-inch diameter hollow-stem auger drill rig.
2. OVA - Organic vapor analyzer.
3. Ground surface elevation based on City of Tacoma datum (NGVD29).

KJ PNW TACOMA METALS DNAPL BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area (Southern Property Boundary)	**Well Name:** MW-16
DRILLING COMPANY: Cascade Drilling, Inc. / DRILLER: Brian	**Project Name:** Former Tacoma Metals
DRILLING METHOD(S): Hollow-Stem Auger / DRILL BIT(S) SIZE: 9-inch OD	**Project Number:** 996098.00
ISOLATION CASING: N/A — FROM N/A TO N/A FT.	ELEVATION AND DATUM: 10.23' (NGVD29) / TOTAL DEPTH: 28.0 ft. bgs
BLANK CASING: 2-inch SCH.40 PVC with 6-inch sump — FROM 0.0 TO 16.3 FT. / FROM 26.3 TO 26.8	DATE STARTED: 2/28/03 / DATE COMPLETED: 2/28/03
SLOTTED CASING: 2-inch SCH.40 PVC 0.010-inch slot — FROM 16.3 TO 26.3 FT.	INITIAL WATER DEPTH (FT): 10.0
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand — FROM 14.5 TO 26.8 FT.	LOGGED BY: JML/SCK
SEAL: Pure Gold Bentonite Chips — FROM 2.0 TO 14.5 FT. / FROM 26.8 TO 28.0	SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner / WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete — FROM 0.0 TO 2.0 FT.	

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA (ppm)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Asphalt
SS	2.5					0.5		GP	**Poorly graded GRAVEL (fill)** Moderate yellowish brown (10YR 5/4), moist, no odor.
								SP/ SM	**Poorly graded SAND with silt and gravel (fill)** Dark to dusky yellowish brown (10YR 4/2-10Y 2/2), fine to medium sand, ~20-30% fine gravel (up to 1"), moist.
SS	3.0		5	MW-16-7.5-8		3.5		Wood	**WOOD DEBRIS with SILT or CLAY matrix** Various colors (moderate reddish brown, to moderate yellowish brown), trace to ~40% fines. ~7.5' Very slight creosote odor, no sheen.
SS	0.4					4.3			~ 8' No odor or sheen.
SS	0.4		10			4.2			~10' Wet.
SS	1.5					4.3		CL	**Lean CLAY** Dark yellowish brown (10YR 4/2), low plasticity, moist.
SS	1.6		15			4.4		SP	**Poorly graded SAND** Brownish black (5YR 2/1), fine to medium sand, trace silt, wet, no odor or sheen.
SS	1.7					5.8			~17.5' Gradual increase to medium to coarse sand.
SS	1.7		20			2.1			~19.5' and 21.9' Minor silt layers less than 1" thick.
SS	1.8					2.0			
SS	2.0					1.7		SM	**Silty SAND** Dusky yellowish brown (10YR 2/2), ~25-40% fines, wet, no odor or sheen.
SS	2.0		25	MW16-25-26		2.0			
SS	1.9					1.1		CL	**Lean CLAY** Dark yellowish brown to olive gray (10YR 4/2 to 5YR 4/1), minor fibrous organic material, clay is at least 2' thick, moderate plasticity, moist, no odor or sheen.

NOTES

1. Pilot boring advanced with GeoProbe rig. Well installed using 9-inch diameter hollow-stem auger drill rig.
2. OVA - Organic vapor analyzer.
3. Ground surface elevation based on City of Tacoma datum (NGVD29).

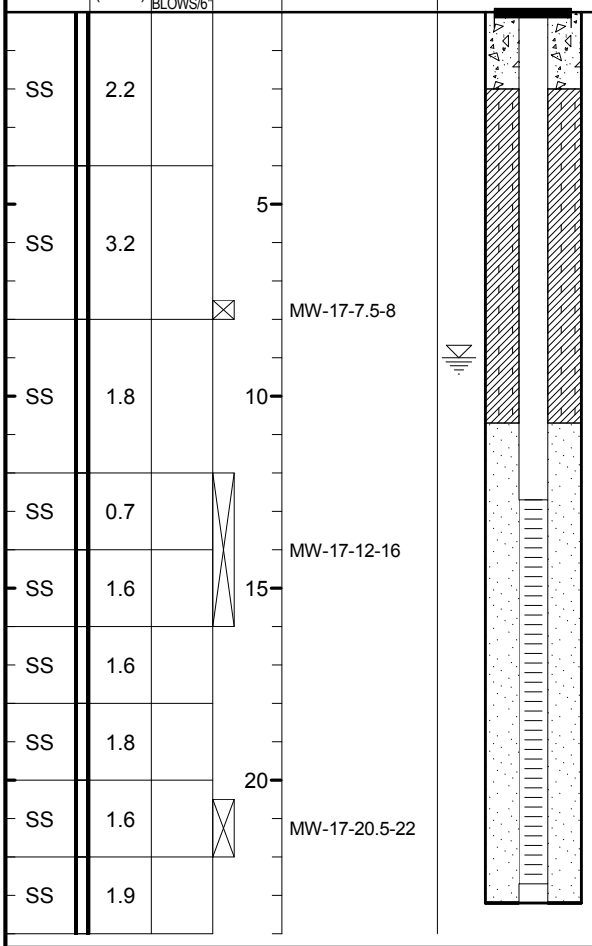
KJ PNW TACOMA METALS DNAPL BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area (Southern Property Boundary)	**Well Name:** MW-17
DRILLING COMPANY: Cascade Drilling, Inc. / DRILLER: Brian	**Project Name:** Former Tacoma Metals
DRILLING METHOD(S): Hollow-Stem Auger / DRILL BIT(S) SIZE: 9-inch OD	**Project Number:** 996098.00
ISOLATION CASING: N/A — FROM N/A TO N/A FT.	ELEVATION AND DATUM: 9.90' (NGVD29) / TOTAL DEPTH: 24.0 ft. bgs
BLANK CASING: 2-inch SCH.40 PVC with 6-inch sump — FROM 0.0 TO 12.7 FT. / FROM 22.7 TO 23.2	DATE STARTED: 2/28/03 / DATE COMPLETED: 2/28/03
SLOTTED CASING: 2-inch SCH.40 PVC 0.010-inch slot — FROM 12.7 TO 22.7 FT.	INITIAL WATER DEPTH (FT): 9.0
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand — FROM 10.7 TO 23.2 FT.	LOGGED BY: JML/SCK
SEAL: Pure Gold Bentonite Chips — FROM 2.0 TO 10.7 FT.	SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner / WELL COMPLETION: ■ SURFACE HOUSING, □ STAND PIPE _____ FT.
GROUT: Concrete — FROM 0.0 TO 2.0 FT.	



SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	OVA (ppm)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	2.2				6.3		SP/ SM	**Poorly graded SAND with silt (fill)** Dark to dusky yellowish brown (10YR 4/2 10YR 2/2), fine to medium sand, ~30% gravel up to 1"- subangular to subrounded, moist. ~2'-2.5' ash-like material. ~2.5'-5' ~10% fine gravel.
SS	3.2		5	MW-17-7.5-8	3.7		Wood	**WOOD DEBRIS with SILT matrix** Various colors (reddish brown to gray to pale yellow), varying silt content (~10-40%).
SS	1.8		10		6.5			~9' Wet.
SS	0.7			MW-17-12-16	3.4			~13' Minor silt with sand lenses within wood, dusky yellowish brown, wet, slight creosote odor and sheen.
SS	1.6		15		4.8			
SS	1.6				5.6		SP	**Poorly graded SAND** Brownish black (5YR 2/1), fine to medium grained, wet, slight creosote odor and sheen.
SS	1.8				2.9			~18' Medium to coarse sand occasional fine to coarse gravel, no odor or sheen.
SS	1.6		20	MW-17-20.5-22	3.7			
SS	1.9				4.1		CL	**Lean CLAY** Dark yellowish brown to olive gray (10YR 4/2-5YR 4/1), upper 0.5' contains fibrous organic material, clay is at least 2' thick, moist, no odor or sheen.

NOTES

1. Pilot boring advanced with GeoProbe rig. Well installed using 9-inch diameter hollow-stem auger drill rig.
2. OVA - Organic vapor analyzer.
3. Ground surface elevation based on City of Tacoma datum (NGVD29).

KJ PNW TACOMA METALS DNAPL BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area (Western Property Boundary)	**Well Name:** MW-18
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Brian
	Project Name: Former Tacoma Metals
DRILLING METHOD(S): Hollow-Stem Auger	DRILL BIT(S) SIZE: 9-inch OD
	Project Number: 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2-inch SCH.40 PVC with 6-inch sump	FROM 0.0 TO 12.2 FT. / 22.2 TO 22.7
SLOTTED CASING: 2-inch SCH.40 PVC 0.010 -inch slot	FROM 12.2 TO 22.2 FT.
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 10.0 TO 22.7 FT.
SEAL: Pure Gold Bentonite Chips	FROM 2.0 TO 10.0 FT.
GROUT: Concrete	FROM 0.0 TO 2.0 FT.

ELEVATION AND DATUM: 9.40' (NGVD29)	TOTAL DEPTH: 24.0 ft. bgs
DATE STARTED: 2/27/03	DATE COMPLETED: 2/27/03
INITIAL WATER DEPTH (FT): 11.0	
LOGGED BY: JML/SCK	
SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ■ STAND PIPE 3.58 FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	OVA (ppm)	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	1.5				2.4	GM	**Silty GRAVEL with sand (fill)** Moderate yellowish brown to dusky yellowish brown (10YR 5/4 to 10YR 2/2), moist, no odor or sheen. ~2' Ash-like material.
SS	1.5		5		4.1	Wood	**WOOD DEBRIS with SILT or SAND matrix** Dark gray to black (N3-N1), wood debris typically with ~5-10% silt/fine sand matrix, although ~20-30% was observed.
SS	0.0				--		
SS	2.0		10	MW-18-11.5-12	15.3		~10' Moderate creosote odor. ~11' Wet.
SS	1.0				--	CL	**Lean CLAY** Black (N1), blebs of creosote product visible, moist, strong creosote odor.
SS	2.0		15		17.5	SM	**Silty SAND** Black (N1), fine grained sand, creosote product coating soil, wet.
SS	1.2				74.4	SP	**Poorly graded SAND** Black (N1), medium to coarse sand, creosote product coating soil, wet, strong creosote odor.
SS	1.4				7.8		~18.5'-18-8' Interbedded lean clay and sand layers.
SS	1.7		20	MW-18-21.5-21.9	46.0		~ 21.5' Very strong creosote odor, creosote product coating soil, creosote product visible.
SS	1.8				8.8	CL	**Lean CLAY** Olive gray (5Y4/1), contains some fibrous organic material, clay is at least 2' thick, no apparent staining or product, moist, slight creosote odor.

NOTES

1. Pilot boring advanced with GeoProbe rig. Well installed using 9-inch diameter hollow-stem auger drill rig.
2. OVA - Organic vapor analyzer.
3. Ground surface elevation based on City of Tacoma datum (NGVD29).

KJ PNW TACOMA METALS DNAPL BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area (Northern Property Boundary)	
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Brian
DRILLING METHOD(S): Hollow-Stem Auger	DRILL BIT(S) SIZE: 9-inch OD
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2-inch SCH.40 PVC with 2-inch sump	FROM 0.0 TO 14.0 FT. / FROM 24.0 TO 24.2
SLOTTED CASING: 2-inch SCH.40 PVC 0.010-inch slot	FROM 14.0 TO 24.0 FT.
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 12.0 TO 24.2 FT.
SEAL: Pure Gold Bentonite Chips	FROM 2.5 TO 12.0 FT.
GROUT: Concrete	FROM 0.0 TO 2.5 FT.

Well Name MW-19

Project Name Former Tacoma Metals

Project Number 996098.00

ELEVATION AND DATUM: 7.58' (NGVD29)	TOTAL DEPTH: 26.0 ft. bgs
DATE STARTED: 2/27/03	DATE COMPLETED: 2/27/03
INITIAL WATER DEPTH (FT): 10.5	
LOGGED BY: JML/SCK	
SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner	WELL COMPLETION: ☐ SURFACE HOUSING ■ STAND PIPE 3.54 FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	OVA (ppm)	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SS	2.5				0.6	Wood	**WOOD DEBRIS and BARK (fill)**
						SW	**Well-graded SAND with gravel (fill)** Moderate yellowish brown (10YR 5/4), fine to coarse sand, ~30% gravel (up to 3") - subangular to subrounded, moist, no odor or sheen.
SS	0.2		5		5.0		**WOOD DEBRIS with SILT or SAND matrix** Various colors (reddish brown to brown to olive gray), varying fines up to ~50%, no odor or sheen.
SS	0.1		10		3.0		~10.5' Wet.
SS	1.0				1.7	Wood	
SS	1.2		15	MW-19-16-18	1.5		
SS	0.8	3 4 3	20				
SS	1.2	12 12 18			2.6		
SS	1.2	10 14 14		MW-19-23.5-24		SM	**Silty SAND** Dark gray (N3), fine to medium sand, ~20% fines, wet, no odor or sheen.
SS	2.0		25	MW-19-24.5-25	2.1	CL	**Lean CLAY** Olive gray (5Y 4/1), moist, no odor or sheen.
						SP	**Poorly graded SAND** Brownish black (5YR 2/1), fine to medium sand, trace fines, wet, no odor or sheen. ~25' Sandy silt layer ~4" thick, olive gray (5Y 4/1), wet, no odor or sheen, grades back to poorly graded sand.

NOTES

1. Pilot boring advanced with GeoProbe rig. Well installed using 9-inch diameter hollow-stem auger drill rig.
2. Due to poor sample recovery using GeoProbe rig, soil samples were collected using the hollow-stem auger rig and 2.5" ID split spoon sampler between 19.5' and 24'.
3. OVA - Organic vapor analyzer.
4. Ground surface elevation based on City of Tacoma datum (NGVD29).

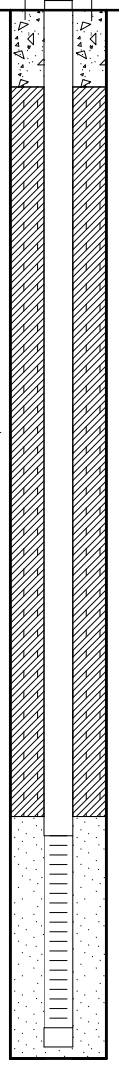
KJ PNW TACOMA METALS DNAPL BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area (Northern Property Boundary)		**Well Name**	MW-20
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Brian	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): Hollow-Stem Auger	DRILL BIT(S) SIZE: 9-inch OD	**Project Number**	996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: 7.58' (NGVD29)	TOTAL DEPTH: 30.5 ft. bgs
BLANK CASING: 2-inch SCH.40 PVC with 6-inch sump	FROM 0.0 TO 21.5 FT. / FROM 26.5 TO 27.0	DATE STARTED: 2/26/03	DATE COMPLETED: 2/27/03
SLOTTED CASING: 2-inch SCH.40 PVC 0.010-inch slot	FROM 21.5 TO 26.5 FT.	INITIAL WATER DEPTH (FT): 11.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 21.0 TO 27.3 FT.	LOGGED BY: JML/SCK	
SEAL: Pure Gold Bentonite Chips	FROM 2.0 TO 21.0 FT.	SAMPLING METHODS: 2.5" ID split spoon	WELL COMPLETION: ☐ SURFACE HOUSING ■ STAND PIPE 2.75 FT.
GROUT: Concrete	FROM 0.0 TO 2.0 FT.		



SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	OVA (ppm)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
							GW	**Well-graded GRAVEL with sand** Brown fine to medium gravel with ~40-45% fine to medium sand and some silt, no odor, no apparent sheen.
			5					**WOOD DEBRIS with SILT matrix** Dark gray, wood debris typically with ~5-10% silt/fine sand matrix, no sheen above 13 feet, moderate sheen below 13 feet, slight to moderate creosote odor below 13 feet.
			10				Wood	~11' Wet.
SS	0.2	9 14 10	15		3.9			
SS	0.2	18 10 18			3.6			
SS	0.6	10 18 14			3.3		SP/	**Poorly graded SAND with silt** Brownish black (5YR 2/1), medium to coarse sand, trace to ~15% fines, wet, slight creosote odor, no sheen.
SS	0.6	4 7 8			4.1		SM	~19' Fibrous organic material.
SS	1.5	3 4 3	20		4.5			
SS	0.8	3 2 2			5.1		CL	**Lean CLAY** Moderate yellowish brown (10YR 5/4), fibrous organic material, moist.
SS	1.2	3 5 5		MW-20-24-24.3	4.2		SP/	**Poorly graded SAND with silt** As described above.
SS	1.5	11 15 19	25	MW-20-24.8-25	4.1		SM	**SILT with sand** Olive gray (5Y 4/1), fine sand, wet, no odor or sheen.
SS	1.5	4 11 20		MW-20-26.7-26.9	4.5 3.1 2.6		ML	**Poorly graded SAND with silt** As described above.
SS	1.5	10 17 23			3.6		SP/	**SILT with sand** As described above.
SS	1.5	12 18 19	30		3.5		SM	**Poorly graded SAND with silt** Brownish black (5YR 2/1), fine to medium sand, trace to ~15 % fines, wet, slight creosote odor, no sheen.
							ML	**SILT with sand** As described above.
							SP/	***(See next page for lithology description)***

NOTES

1. Pilot boring drilled with hollow-stem auger adjacent to well MW-13. Lithology from upper 16 feet has been inferred from boring location MW-13.
2. OVA - Organic vapor analyzer.
3. Ground surface elevation based on City of Tacoma datum (NGVD29).

KJ PNW TACOMA METALS DNAPL BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

Boring & Well Construction Log

Kennedy/Jenks Consultants

Project Name Former Tacoma Metals **Project Number** 996098.00 **Well Name** MW-20

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA (ppm)	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								SM	**Poorly graded SAND** Olive gray (5Y 4/1), fine to medium sand, contains interbedded silt layers (1/8-1/16" thick), wet, slight creosote odor, no sheen.
								ML	
								SP	

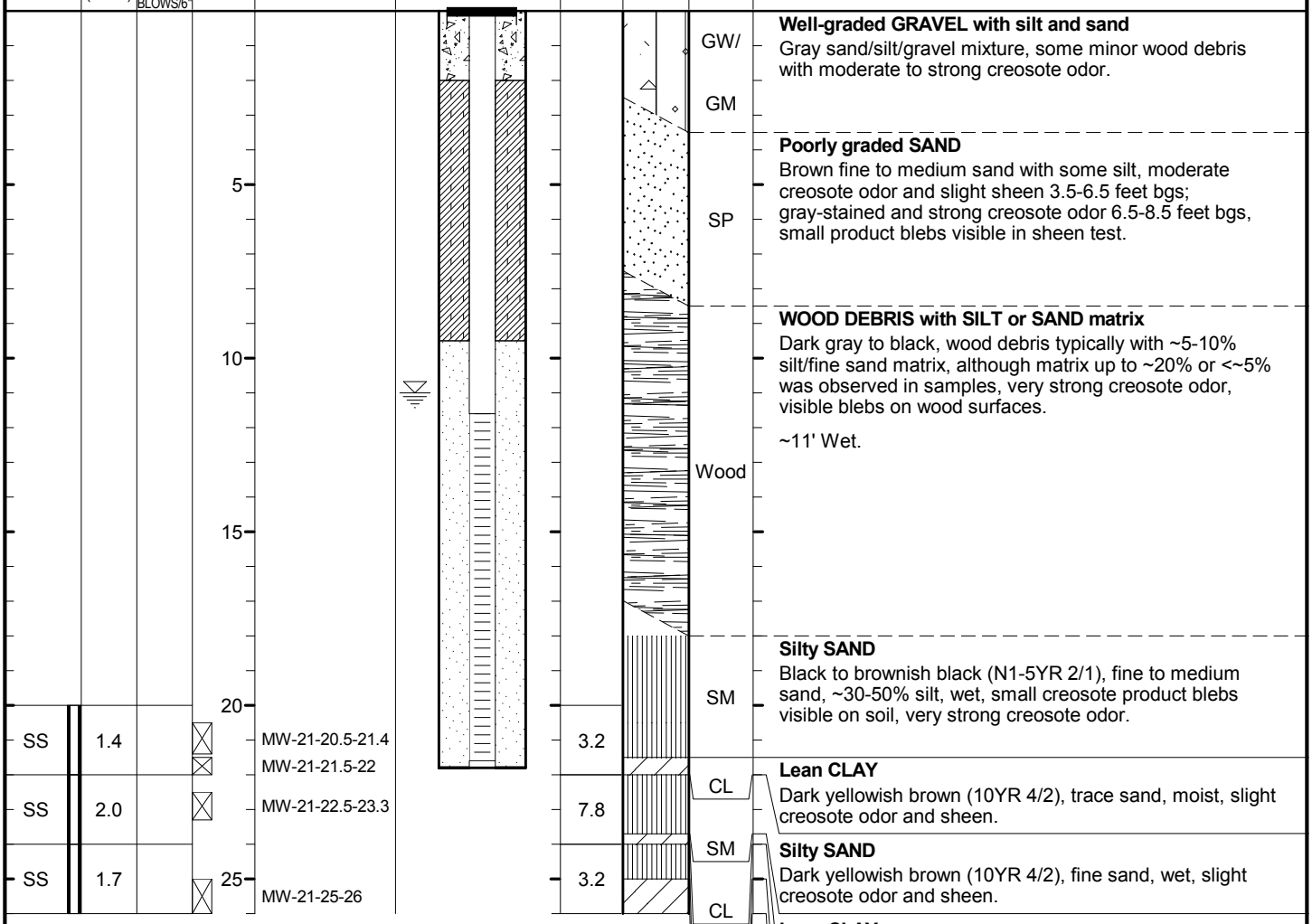
KJ PNW TACOMA METALS DNAPL BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area (Adjacent to Boring B-2)		**Well Name**	MW-21
DRILLING COMPANY: Cascade Drilling, Inc.	DRILLER: Brian	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): Hollow-Stem Auger	DRILL BIT(S) SIZE: 9-inch OD	**Project Number**	996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: 9.77' (NGVD29)	TOTAL DEPTH: 26.0 ft. bgs
BLANK CASING: 2-inch SCH.40 PVC with 2-inch sump	FROM 0.0 TO 11.6 FT. / FROM 21.6 TO 21.8	DATE STARTED: 2/28/03	DATE COMPLETED: 2/28/03
SLOTTED CASING: 2-inch SCH.40 PVC 0.010-inch slot	FROM 11.6 TO 21.6 FT.	INITIAL WATER DEPTH (FT): 11.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 9.5 TO 21.8 FT.	LOGGED BY: JML/SCK	
SEAL: Pure Gold Bentonite Chips	FROM 2.0 TO 9.5 FT.	SAMPLING METHODS: 1"x2' and 2"x4' split spoon with acetate liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0.0 TO 2.0 FT.		



NOTES

1. Pilot boring advanced with GeoProbe. Lithology from upper 20' has been inferred from boring location B-2. Well installed using 9-inch diameter hollow-stem auger drill rig.
2. OVA - Organic vapor analyzer.
3. Ground surface elevation based on City of Tacoma datum (NGVD29).

KJ PNW TACOMA METALS DNAPL BORING LOGS 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Former Creosoting Area	**Well Name:** MW-22 (B-12)
DRILLING COMPANY: Cascade Drilling Company	DRILLER: Andy / Don
	Project Name: Former Tacoma Metals
DRILLING METHOD(S): HSA / Geoprobe	DRILL BIT(S) SIZE: 9" OD / 2" OD
	Project Number: 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 23 FT. / 13 TO 23.3 FT.
SLOTTED CASING: 2" Schedule 40 PVC Pipe 0.010" slot	FROM 13 TO 23 FT.
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 11 TO 23.5 FT.
SEAL: Pure Gold Bentonite Chips	FROM 2 / 23.5 TO 11 / 24 FT.
GROUT: Cement	FROM 0 TO 2 FT.

ELEVATION AND DATUM	TOTAL DEPTH: 24.0 ft. bgs
DATE STARTED: 11/24/03	DATE COMPLETED: 12/1/03
INITIAL WATER DEPTH (FT): 7.5	STATIC WATER ELEV. (FT): N/A
LOGGED BY: DKM	
SAMPLING METHODS: 2"x4' shelby tube with acetate liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Asphalt Surface
SH	3			B12-2-3		4.4			**Well-graded GRAVEL with silt and sand** Gray/green, locally orange/brown, 55-65% gravel, 5-10% silt, moist, no odor, no sheen. 2-3' slight odor.
						2.1			
				B12-4-5		1.6		GW/	
			5					GM	5.5-6', 3" gray granular material above 3" of fractured red brick material.
SH	4				well				
				B12-6.5-7.5	Geoprobe boring	1.3			6-8', black/dark gray angular gravel with sand and silt, wet below 7.5'.
SH	2			B12-8-9		7.2			8-9', pea gravel with brick fragments and coarse sand.
				B12-9-10		40.5			
			10						**WOOD DEBRIS** Blocky to fibrous wood debris with 5-15% silt and fine sand matrix material, wet, moderate to strong creosote odor, heavy sheen visible on water in sampler.
SH	1								
SH	1							Wood	
			15						
SH	1					21.9			
			20						**Poorly graded SAND** Dark gray, poorly graded medium sand with <5% silt, creosote product on grains, wet, strong creosote odor, very heavy sheen, visible product blebs rinse out in sheen test covering 5-10% of water surface, slightly more below 22'.
				B12-20-21		17.9		SP	
SH	4			B12-22-23		20.6			
						10.8		CL/ ML	**Silty CLAY** Brown, silty clay, dense, wet, slight sheen and creosote odor.

NOTES

1. Pilot boring advance with Geoprobe rig on 11/24/03.
2. Well installed with hollow-stem auger rig on 12/1/03.
3. OVA - Organic Vapor Analyzer
4. A 0.3 foot sump installed from 23 to 23.3 feet bgs.

KJ PNW TACOMA METALS DNAPL BORING LOGS DEC 2003.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: 38 feet NW of NW property corner, north of SB-18	**Well Name:** MW-23
DRILLING COMPANY: Cascade Drilling Company, Inc.	DRILLER: Andy — **Project Name:** Former Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9 inches — **Project Number:** 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2 inch sch. 40 PVC	FROM 0 TO 29.5 FT. / 18.5 TO 30 FT.
SLOTTED CASING: 2 inch 0.010 slotted sch. 40 PVC	FROM 18.5 TO 29.5 FT.
SIZE AND TYPE OF FILTER PACK: 2/12 Clean Silica	FROM 16.5 TO 29.5 FT.
SEAL: 3/8 inch Bentonite Chips	FROM 1.0 TO 16.5 FT.
GROUT: Concrete w/ 2ft.X2ft. Surface PA	FROM 0 TO 1 FT.
ELEVATION AND DATUM	TOTAL DEPTH: 30.0 ft. bgs
DATE STARTED: 3/29/04	DATE COMPLETED: 3/29/04
INITIAL WATER DEPTH (FT): 9.7	
LOGGED BY: GCD	
SAMPLING METHODS: 2 inch Cal. Mod D&M spoon	WELL COMPLETION: ☐ SURFACE HOUSING ■ STAND PIPE 3 FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			0			0			**WOOD DEBRIS** Red/brown, coarse sawdust, dry to damp, no odor, no sheen.
			5					Wood	
			10			0			**WOOD DEBRIS with silty sand matrix** Brown/black, blocky to coarse wood debris with ~40-50% silty fine sand matrix, wet, no odor, no sheen.
			15			0		Wood	Sand content increasing downwards.
SS	80%	NM	20			0.1		SP	**Poorly graded SAND** Gray, fine sand with some silt (~20%), loose, wet, slight creosote odor, no sheen.
SS	80%	3 3 4							
SS	100%	3 3 2							**Poorly graded SAND** Black, medium sand, loose, fining downward to ~23 feet then coarsening, wet, strong creosote odor, heavy sheen starting at ~21 bgs.
SS	80%	NM				0.3		SP	
SS	10%	NM	25						
SS	100%	4 11 7							~27' Clayey silt layer ~1" thick.
SS	80%	4 10 8				0.1		CL	**Lean CLAY** Gray/brown, moderately stiff to stiff silty clay, contact at top of clay is not distinct, wet, slight creosote odor, no sheen.
			30						

NOTES

1. Threaded bottom cap at bottom of well screen is 0.5 feet. Slotted portion of screen extends approximately 2 inches below top of clay.
2. Soil descriptions between the ground surface and 19 feet bgs based on cuttings and adjacent soil probe number B18.
3. PID-Photoionization Detector Headspace Reading

KJ PNW TACOMA METALS DNAPL BORING LOGS MAR 2004.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: NW of SB-20 37 feet from property boundary	**Well Name:** MW-24
DRILLING COMPANY: Cascade Drilling Company, Inc.	DRILLER: Andy — **Project Name:** Former Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9 inches — **Project Number:** 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2 inch sch. 40 PVC	FROM 0 TO 12.8 FT. / 22.5 TO 23
SLOTTED CASING: 2 inch 0.010 slotted sch. 40 PVC	FROM 12.8 TO 22.5 FT.
SIZE AND TYPE OF FILTER PACK: 2/12 Clean Silica	FROM 11 TO 22.3 FT.
SEAL: 3/8 inch Bentonite Chips	FROM 1 TO 11 FT.
GROUT: Concrete w/ 2ft.X2ft. Surface PA	FROM 0 TO 1 FT.
ELEVATION AND DATUM	TOTAL DEPTH: 23.0 ft. bgs
DATE STARTED: 3/29/04	DATE COMPLETED: 3/29/04
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: GCD	
SAMPLING METHODS: 2 inch Cal. Mod D&M spoon	WELL COMPLETION: ☐ SURFACE HOUSING ■ STAND PIPE 3 FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			0			0			**WOOD DEBRIS** Brown, loose woody debris with ~30-50% silty sand matrix, wet at ~10 feet, no odor, no sheen.
			5			0			
			10					Wood	
SS	10%	<50 6	15			0.4			
SS	50%	23 41 >50				0.8			**Poorly graded SAND** Black, medium dense, medium sand with trace silt (<10%), wet, slight creosote odor, slight sheen, increasing odor and sheen to ~22 feet.
SS	75%	20 21 5				0.8		SP	
SS	80%	11 13 14	20			0.8			
SS	80%	10 11 11				0			
								CL	**Lean CLAY** Gray, medium stiff to stiff clay with silt, moist, slight creosote odor, no sheen.

NOTES

1. Threaded bottom cap at bottom of well screen is 0.5 feet. Slotted portion of screen extends approximately 2 inches below top of clay.
2. Soil descriptions between the ground surface and 15 feet bgs based on cuttings.
3. PID-Photoionization Detector Headspace Reading

KJ PNW TACOMA METALS DNAPL BORING LOGS MAR 2004.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: NW of SB-23 40 feet from property boundary near Portland Ave.	**Well Name** MW-25
DRILLING COMPANY: Cascade Drilling Company, Inc. / DRILLER: Andy	**Project Name** Former Tacoma Metals
DRILLING METHOD(S): HSA / DRILL BIT(S) SIZE: 9 inches	**Project Number** 996098.00
ISOLATION CASING: N/A — FROM N/A TO N/A FT.	ELEVATION AND DATUM / TOTAL DEPTH: 24.0 ft. bgs
BLANK CASING: 2 inch sch. 40 PVC — FROM 0 TO 23.5 FT. / FROM 13.8 TO 24.0 FT.	DATE STARTED: 3/29/04 / DATE COMPLETED: 3/29/04
SLOTTED CASING: 2 inch 0.010 slotted sch. 40 PVC — FROM 13.8 TO 23.5 FT.	INITIAL WATER DEPTH (FT): 7.5
SIZE AND TYPE OF FILTER PACK: 2/12 Clean Silica — FROM 11.8 TO 23.3 FT.	LOGGED BY: GCD
SEAL: 3/8 inch Bentonite Chips — FROM 1 TO 11.8 FT.	SAMPLING METHODS: 2 inch Cal. Mod D&M spoon / WELL COMPLETION: ☐ SURFACE HOUSING ■ STAND PIPE 3 FT.
GROUT: Concrete w/ 2ft.X2ft. Surface PA — FROM 0 TO 1 FT.	

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			0			0			**WOOD DEBRIS** Brown/gray, loose woody debris with ~50% silty fine sand matrix, moist to wet at ~7.5 feet, no odor, no sheen.
			5			0		Wood	
			10						
			15						
SS	75%	9 7 9				0			**Well-graded SAND** Black, loose to medium dense, fine to medium sand with trace silt, wet, no odor, no sheen.
SS	75%	7 9 16				0			
SS	90%	25 26 10				0		SW	
SS	90%	11 12 3	20			0			
SS	80%	6 7 6				0			
SS	80%	6 12 11				0		ML/ CL	**Clayey SILT** Gray, moderately stiff clayey silt, moist to wet, no odor, no sheen.

NOTES

1. Threaded bottom cap at bottom of well screen is 0.5 feet. Slotted portion of screen extends approximately 2 inches below top of clay.
2. Soil descriptions between the ground surface and 15 feet bgs based on cuttings.
3. PID-Photoionization Detector Headspace Reading

KJ PNW TACOMA METALS DNAPL BORING LOGS MAR 2004.GPJ KJ PNW.GDT 2/19/13

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: E 18th Street Right of Way, between borings B-24 and B-27	**Well Name:** MW-26
DRILLING COMPANY: Cascade	DRILLER: Frank
	Project Name: Former Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch
	Project Number: 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2-inch schedule 40 PVC pipe	FROM 0 TO 18.1 FT. / FROM 28.1 TO 28.5
SLOTTED CASING: 2-inch schedule 40 PVC pipe, 0.010 slot	FROM 18.1 TO 28.1 FT.
SIZE AND TYPE OF FILTER PACK: RMC Lapis Lustre #2/12 sand	FROM 15 TO 29 FT.
SEAL: Pure Gold bentonite chips	FROM 2 TO 15 FT.
GROUT: Concrete	FROM 0 TO 2 FT.

ELEVATION AND DATUM	TOTAL DEPTH: 29.0 ft. bgs
DATE STARTED: 4/5/05	DATE COMPLETED: 4/5/05
INITIAL WATER DEPTH (FT): 14.0	
LOGGED BY: DKM	
SAMPLING METHODS: Split Spoon	WELL COMPLETION: ■ SURFACE HOUSING / □ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	PID	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
						GW	**Well-graded GRAVEL with sand** Approximately 3 inches surface gravel.
						Wood	**WOOD DEBRIS** Brown/orange, wood material, medium wood chip to coarse sawdust sized, no soil present, loose, moist, no evident odor, no sheen.
SS	1.5	3 3 6	5		2.4		
						SM	**Silty SAND** Gray, silty fine sand, moderately dense, moist, no evident odor, no sheen.
SS	0.5	1 2 3	10		148		
						Wood	**WOOD DEBRIS** Gray/brown, wood material, blocky, 10-15% silt/clay matrix overall but matrix varies from <5% to 20-25% locally, matrix is soft with moderate plasticity and dilatency, moist to wet below ~14 feet, low to moderate creosote odor, evident sheen on water in sampler.
SS	1.5	2 2 4	15		276		
							Strong creosote odor, heavy sheen on water surface in sampler.
SS	<0.5	15 20 23	20		251		
SS	1.5	33 28 21			0.6		
SS	1	20 26 21	25		0.0	SP	**Poorly graded SAND** Gray, poorly graded medium sand, wet, no odor, no sheen at top of sand, but increases to moderate odor and light sheen by 26 feet.
SS	0.5	14 5 6			147 654		
SS	0.75	19 38 33			32.1	SM	**Silty SAND** Gray/brown, silty fine sand overall, evident layering of poorly graded fine sand, silty fine sand, and sandy silt, typically 1-2 inch layers, moderately dense, wet, slight creosote odor, light sheen.
						SP	**Poorly graded SAND** Gray, poorly graded medium to coarse sand, wet, no evident odor, no sheen.

NOTES

1. Lithology is also based on findings from soil borings B-24 and B-27.

KJ PNW LOGS MW26 TO MW28 2005.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: E 18th Street Right of Way, near soil boring B-29	**Well Name:** MW-27
DRILLING COMPANY: Cascade	DRILLER: Frank
	Project Name: Former Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch
	Project Number: 996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2-inch schedule 40 PVC pipe	FROM 0 TO 16.4 FT. / FROM 26.4 TO 26.8
SLOTTED CASING: 2-inch schedule 40 PVC pipe, 0.010 slot	FROM 16.4 TO 26.4 FT.
SIZE AND TYPE OF FILTER PACK: RMC Lapis Lustre #2/12 sand	FROM 13 TO 27 FT.
SEAL: Pure Gold bentonite chips	FROM 2 TO 13 FT.
GROUT: Concrete	FROM 0 TO 2 FT.

ELEVATION AND DATUM	TOTAL DEPTH: 27.0 ft. bgs
DATE STARTED: 4/5/05	DATE COMPLETED: 4/5/05
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: DKM	
SAMPLING METHODS: Split Spoon	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	PID	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								GW/ GM	**Well-graded GRAVEL with silt** Gravel with ~4" topsoil above. **WOOD DEBRIS** Orange/brown, wood material, medium chips to coarse sawdust sized, no evident soil, loose, moist, no evident odor, no sheen.
SS	1.5	8 6 8	5			0.6		Wood	
								SW	**Well-graded SAND with gravel** Grayish green, sand with 10-15% gravel, granular texture, moist, no evident odor, no sheen.
								ML	**Sandy SILT** Dark gray, silt with ~20% fine sand and minor gravel, soft, moist to wet, no evident odor, no sheen.
SS	0.5	15 50-3	10			84.8			**WOOD DEBRIS** Dark gray, wood material, 10-15% silty matrix with some fine sand and clay, matrix varies locally from <5% to 20-25%, slightly less matrix (~10%) and lighter gray color below ~16 feet, wet, no evident odor, no sheen.
SS	<0.5	14 14 11	15			7.4		Wood	
									Poorly graded SAND Dark gray, poorly graded medium to coarse sand, wet, slight creosote odor at top increasing downwards to moderate at bottom, very slight sheen locally.
SS	1	2 6 9	20			1.4			
SS	1.5	11 13 17				0.0		SP	
SS	1.5	7 7 6				16.2			
SS	1.5	5 11 15	25			58.1			
SS	1.5	2 2 3				29.5 1.1		CL/ ML	**Silty CLAY** Tan/brown, silty clay, moderately stiff, moderate plasticity, moderate dilatency, wet, no evident odor, no sheen.

NOTES

1. Lithology is also based on findings from soil boring B-29.

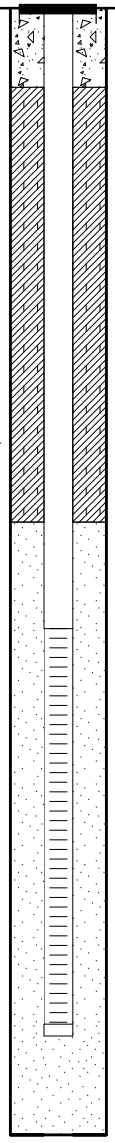
KJ PNW LOGS MW26 TO MW28 2005.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: E 18th Street Right of Way, near soil boring B-31		**Well Name**	MW-28 (Abandoned)
DRILLING COMPANY: Cascade	DRILLER: Frank	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch	**Project Number**	996098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM	TOTAL DEPTH: 28.5 ft. bgs
BLANK CASING: 2-inch schedule 40 PVC pipe	FROM 0 TO 25.7 FT. / 15.7 TO 26 FT.	DATE STARTED: 4/5/05	DATE COMPLETED: 4/5/05
SLOTTED CASING: 2-inch schedule 40 PVC pipe, 0.010 slot	FROM 15.7 TO 25.7 FT.	INITIAL WATER DEPTH (FT): 11.0	
SIZE AND TYPE OF FILTER PACK: RMC Lapis Lustre #2/12 sand	FROM 13 TO 28.5 FT.	LOGGED BY: DKM	
SEAL: Pure Gold bentonite chips	FROM 2 TO 13 FT.	SAMPLING METHODS: Split Spoon	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0 TO 2 FT.		



SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	PID	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
						GW	**Well-graded GRAVEL** Gray/green/brown, well graded gravel.
						Wood	**WOOD DEBRIS** Brown/orange, wood material, medium chips to fine sawdust sized, no evident soil, moist, no evident odor, no sheen.
SS	1	6 5 4	5		0.5		
						ML	**Gravelly SILT** Dark brown to gray, silty material with some gravel and wood chips, soft, moist, no evident odor, no evident sheen.
						ML	**SILT** Dark brown, silty material with <25% wood material, some fine sand, soft, moist, no evident odor, no evident sheen.
SS	<0.5	100-3	10		44.3		**WOOD DEBRIS** Gray/brown, wood material, blocky, 10-15% silty matrix, wet below ~11 feet, moderate creosote odor, moderate to heavy sheen on water in sampler.
SS	0	43 16 14	15			Wood	Strong creosote odor, heavy sheen on water surface in sampler.
SS	0	8 6 5	20				**Poorly graded SAND** Dark gray, poorly graded medium sand, coarsens gradually downwards, wet, moderate creosote odor, moderate to heavy sheen.
SS	<0.5	9 9 4			0.0	SP	
SS	1	9 8 3			31.1		
SS	1	3 5 8	25		130		
SS	1	2 5 2			31.4	ML	**Sandy SILT** Brown/gray, layered poorly graded sand with silt, silty sand, sandy silt, and silt, layers typically 2-4 inches thick, 60% of sequence appears to be silt and sandy silt, wet, no evident odor, no sheen.
SS	1.5	15 30 40			0.0		

NOTES

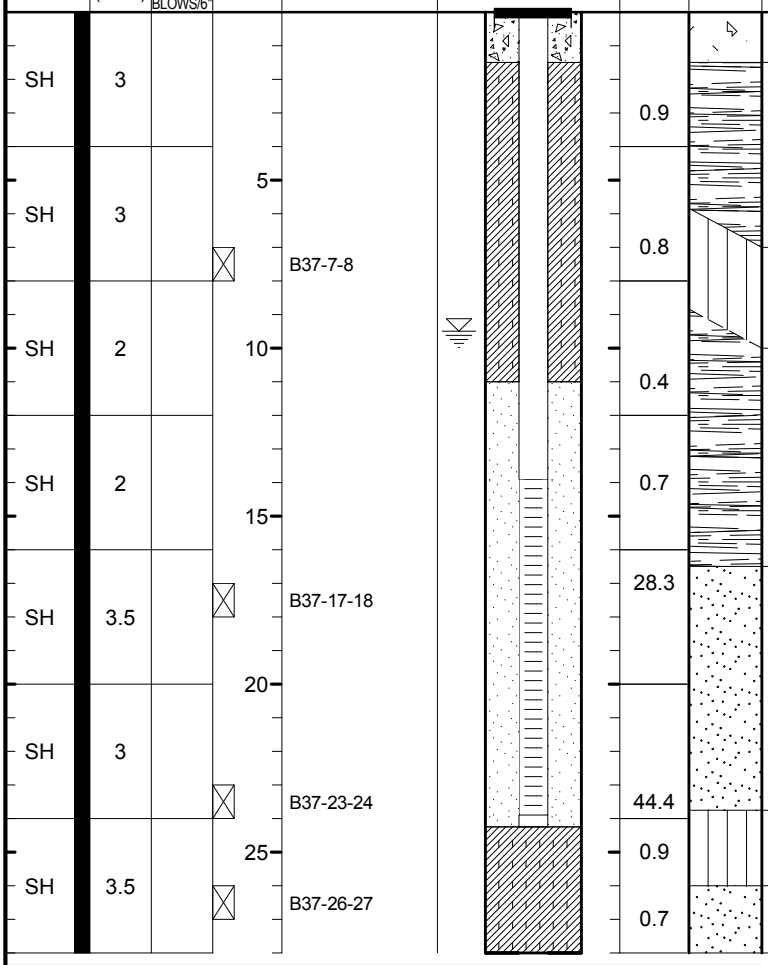
1. Lithology is also based on findings from soil boring B-31.
2. Well MW-28 was abandoned in February 2006 because of damage to the monument and upper casing. The well was replaced with MW-28(R).

KJ PNW LOGS MW26 TO MW28 2005.GPJ KJ PNW.GDT 2/19/13

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Next to MW-28		**Well Name**	MW-28(R)
DRILLING COMPANY: Cascade	DRILLER: Casey / Jaymen	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): HSA / GeoProbe	DRILL BIT(S) SIZE: 9-inch / 2-inch	**Project Number**	998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM	TOTAL DEPTH: 28.0 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 23.9 FT. / FROM 13.9 TO 24.25 FT.	DATE STARTED: 2/14/06	DATE COMPLETED: 2/15/06
SLOTTED CASING: 2" Schedule 40 PVC Pipe, 0.010-Slot	FROM 13.9 TO 23.9 FT.	INITIAL WATER DEPTH (FT): 9.5	
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 11 TO 24.25 FT.	LOGGED BY: DKM	
SEAL: Pure Gold Bentonite Chips	FROM 1.5 TO 24.25 / 11 TO 28 FT.	SAMPLING METHODS: MacroCore w/PVC Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0 TO 1.5 FT.		



SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	OVA	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	3					GW	**Well-graded GRAVEL with sand** Greenish brown, gravel with sand and silt, moderately dense, moist, no odor, no sheen.
					0.9	Wood	**WOOD DEBRIS** Orange/brown, wood material, fine chips/shreds to coarse sawdust, no soil matrix, moist, no odor, no sheen.
SH	3		5	B37-7-8	0.8	ML	**SILT** Dark gray/brown, silty material mixed with up to 25% wood chips and shreds, some sand and gravel, soft, moist to wet at 9.5 feet bgs, slight odor 7.5-8 feet bgs, otherwise no odor, no sheen.
SH	2		10		0.4	Wood	**WOOD DEBRIS** Dark gray to dark orange/brown, coarse wood material coated with grayish silt, approximately 5-10% silt matrix material overall, wet, no odor or sheen. Possibly some small NAPL blebs visible on water surface in sampler 12-16 feet bgs.
SH	2		15		0.7		
SH	3.5			B37-17-18	28.3	SP	**Poorly graded SAND** Gray to dark gray, fine to medium sand at top grading to mostly medium sand by 20 feet bgs and to medium/coarse sand mixture at bottom, wet, slight creosote odor to ~19 feet bgs, no sheen.
SH	3		20				Moderate creosote odor 19-21 feet bgs, no sheen. Below 21 feet bgs, strong creosote odor and moderate sheen (abrupt interface).
				B37-23-24	44.4		At 22 feet bgs, moderate sheen with no NAPL visible. At 23 feet bgs, heavy sheen with NAPL blebs visible.
SH	3.5		25	B37-26-27	0.9	ML	At 23.5 feet, very heavy sheen with NAPL blebs visible.
					0.7	SP	**Sandy SILT** Tan, sandy silt, 30-40% fine sand, moderately stiff, low plasticity, moderately quick dilatency, wet, no odor, no sheen.
							Poorly graded SAND Gray, primarily medium sand, some fine sand, wet, no odor, no sheen.

NOTES

1. Sampling and lithologic logging were performed during GeoProbe boring on 2/14/06. The well was installed at the same location on 2/15/06.

KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Northeast Corner Simpson Property	**Well Name** MW-29 / B-34
DRILLING COMPANY: Cascade	DRILLER: Casey / Jaymen — **Project Name** Former Tacoma Metals
DRILLING METHOD(S): HSA / GeoProbe	DRILL BIT(S) SIZE: 9-inch / 2-inch — **Project Number** 998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 22.2 FT. / FROM 32.2 TO 32.5
SLOTTED CASING: 2" Schedule 40 PVC Pipe, 0.010-Slot	FROM 22.2 TO 32.2 FT.
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 19 TO 32.5 FT.
SEAL: Pure Gold Bentonite Chips	FROM 1.5 TO 19 FT. / FROM 32.5 TO 36
GROUT: Concrete	FROM 0 TO 1.5 FT.

ELEVATION AND DATUM	TOTAL DEPTH: 36.0 ft. bgs
DATE STARTED: 2/14/06	DATE COMPLETED: 2/15/06
INITIAL WATER DEPTH (FT): 10.0	
LOGGED BY: DKM	
SAMPLING METHODS: MacroCore w/PVC Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	2					0.2		SW	**Well-graded SAND with gravel** Gray, medium sand with 10-15% gravel and ~5% red/brown woody material locally, moderately dense, moist, no odor, no sheen.
SH	1		5	B34-7-8		0.5		Wood	**WOOD DEBRIS** Red/brown, woody material, fine chips to coarse sawdust size, locally up to 5% silt but typically no matrix material, soft, moist, no odor, no sheen.
SH	0.5		10					Wood	**WOOD DEBRIS** Dark gray to dark orange/brown, blocky wood material, typically coated with silt and fine sand, 5-10% matrix material, moist to wet below 10 feet bgs, no odor, no sheen.
SH	3		15					ML	**Sandy SILT** Medium gray/brown, silt with fine sand, <5% sand at top, 15-20% sand by ~16 feet bgs, ~20% sand by 20 feet bgs, moderately dense overall but loose 20-22.5 feet bgs, wet, no odor, no sheen.
SH	2.5			B34-18-19		0.0			
SH	4		20					ML	**SILT** Gray, silt, becomes sandier (fine sand) with depth, up to 10% sand by ~24 feet bgs, moderately stiff, wet, no odor, no sheen.
SH	2.5		25					SP	**Poorly graded SAND** Gray, medium to coarse sand at top, primarily medium sand by ~28 feet bgs, fine sand present below ~30 feet bgs, moderately dense, wet, slight creosote odor, no sheen.
SH	3.5		30	B34-30-31		57.4			
						1.0		SM	**Silty SAND** Gray, silty fine sand, 15-20% silt, moderately dense, wet, no odor, no sheen.
SH	3.5		35	B34-34-35		0.3		SP	**Poorly graded SAND** Gray, medium to fine sand at top, grading to mostly medium/coarse sand by 36 feet bgs, moderately dense, wet, no odor, no sheen.

NOTES

1. Sampling and lithologic logging were performed during GeoProbe boring on 2/14/06. The well was installed at the same location on 2/15/06.

KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Simpson Property center well		**Well Name**	MW-30 / B-35
DRILLING COMPANY: Cascade	DRILLER: Casey / Jaymen	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): HSA / GeoProbe	DRILL BIT(S) SIZE: 9-inch / 2-inch	**Project Number**	998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM	TOTAL DEPTH: 44.0 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 40.7 / 25.7 TO 41 FT.	DATE STARTED: 2/14/06	DATE COMPLETED: 2/15/06
SLOTTED CASING: 2" Schedule 40 PVC Pipe, 0.010-Slot	FROM 25.7 TO 40.7 FT.	INITIAL WATER DEPTH (FT): 9.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 23 TO 41 FT.	LOGGED BY: DKM	
SEAL: Pure Gold Bentonite Chips	FROM 1.5 / 41 TO 23 / 44 FT.	SAMPLING METHODS: MacroCore w/PVC Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0 TO 1.5 FT.		

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
SH	1.5							SW	**Well-graded SAND with gravel** Brown/gray, sand with 25-30% rounded gravel, some silt below ~4 feet bgs, moist, no odor, no sheen.
SH	2.5		5	B35-6-7		0.3		SM	**Silty SAND with gravel** Dark gray to black, granular (sand-sized) material mixed with 15-20% silt and some angular gravel material, oily surface appearance locally, moist, no odor, no sheen.
SH	2.5		10					Wood	**WOOD DEBRIS** Gray to brown/yellow (on exposed surfaces), blocky wood debris with gray silty matrix material (5-10%) typically coating wood surfaces, wet, no odor, no sheen.
SH	1		15			0.5			
SH	0		20						
SH	3			B35-23-24		0.4		SP	**Poorly graded SAND** Medium gray, poorly graded medium to coarse sand, locally minor fine sand, wet, no odor, no sheen above ~24 feet bgs.
SH	4		25			1.1			Slight creosote odor and no sheen ~24-28 feet bgs.
SH	4		30			1.4			Slight to moderate creosote odor and no sheen ~28-35 feet bgs (strongest odor ~30-33').
SH	4			B35-32-33		15.5			
SH	4		35			5.6			No odor or sheen below ~35 feet bgs.
SH	4		40	B35-39-40		0.4			
SH	4					0.9		ML	**SILT** Tan/gray, silt, minor fine sand and clay, stiff, moderate plasticity and dilatency, wet, no odor, no sheen.
						0.8		SP	**Poorly graded SAND** Medium gray, poorly graded medium to coarse sand, wet, no odor, no sheen.
								ML	**SILT** Tan/gray, silt, minor fine sand and clay, stiff, moderate plasticity and dilatency, wet, no odor, no sheen.
								SP	*(See next page for lithology description)*

NOTES

1. Sampling and lithologic logging were performed during GeoProbe boring on 2/14/06. The well was installed at the same location on 2/15/06.

KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

Boring & Well Construction Log

Kennedy/Jenks Consultants

Project Name Former Tacoma Metals **Project Number** 998098.00 **Well Name** MW-30 / B-35

SAMPLES			DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"							
									Poorly graded SAND Medium gray, poorly graded medium to coarse sand, wet, no odor, no sheen.

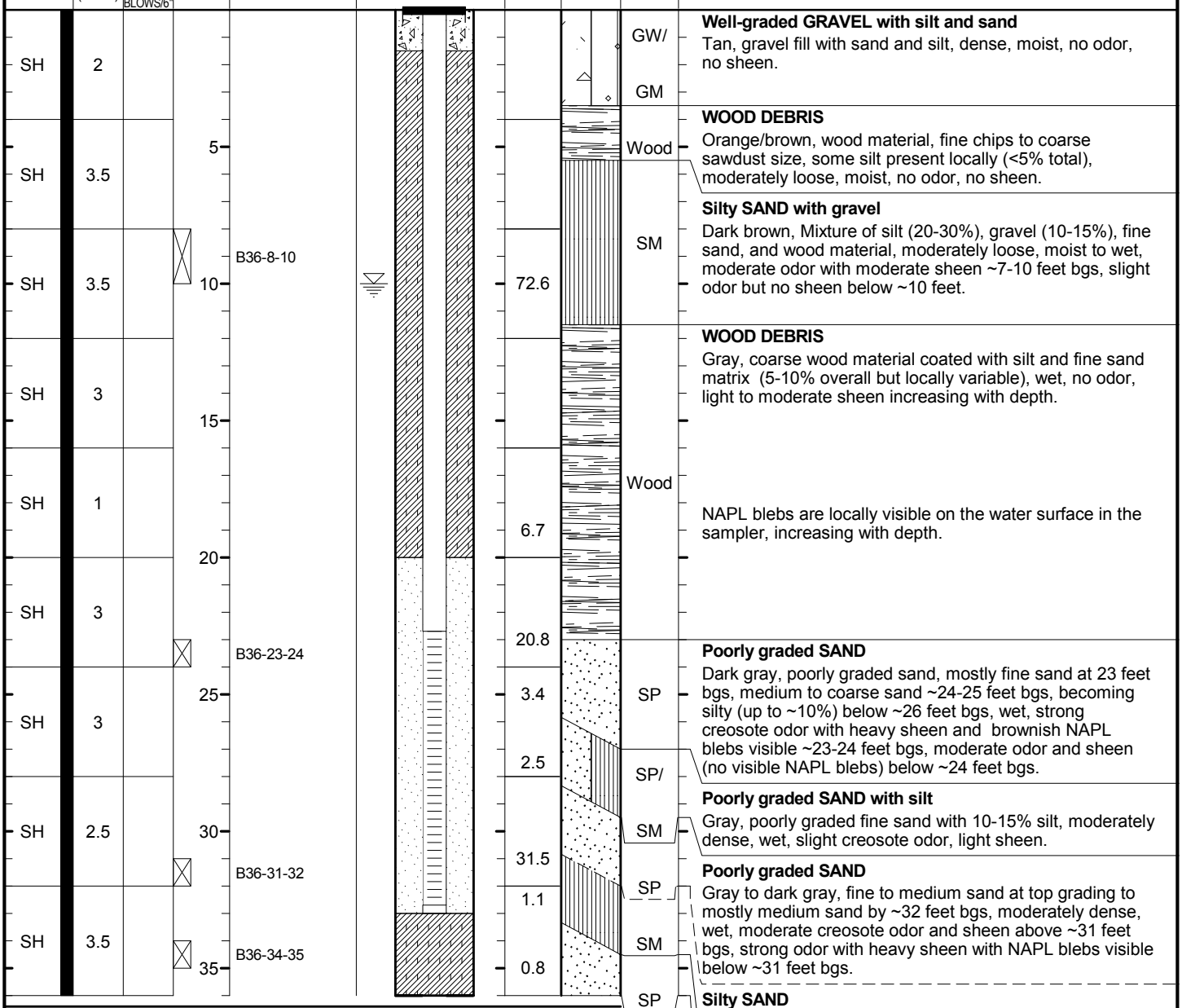
KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: Simpson Property nearest Portland Avenue		**Well Name**	MW-31 / B-36
DRILLING COMPANY: Cascade	DRILLER: Casey / Jaymen	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): HSA / GeoProbe	DRILL BIT(S) SIZE: 9-inch / 2-inch	**Project Number**	998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM	TOTAL DEPTH: 36.0 ft. bgs
BLANK CASING: 2" Schedule 40 PVC Pipe	FROM 0 TO 32.7 FT. / 22.7 TO 33	DATE STARTED: 2/14/06	DATE COMPLETED: 2/15/06
SLOTTED CASING: 2" Schedule 40 PVC Pipe, 0.010-Slot	FROM 22.7 TO 32.7 FT.	INITIAL WATER DEPTH (FT): 10.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustre #2/12 Monterey Sand	FROM 20 TO 33 FT.	LOGGED BY: DKM	
SEAL: Pure Gold Bentonite Chips	FROM 1.5 / 33 TO 20 / 36 FT.	SAMPLING METHODS: MacroCore w/PVC Liner	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0 TO 1.5 FT.		



NOTES

1. Sampling and lithologic logging were performed during GeoProbe boring on 2/14/06. The well was installed at the same location on 2/15/06.

KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

Project Name Former Tacoma Metals **Project Number** 998098.00 **Well Name** MW-31 / B-36

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	OVA	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
									Poorly graded SAND Gray, poorly graded medium to coarse sand, moderately dense, wet, no odor, no sheen.

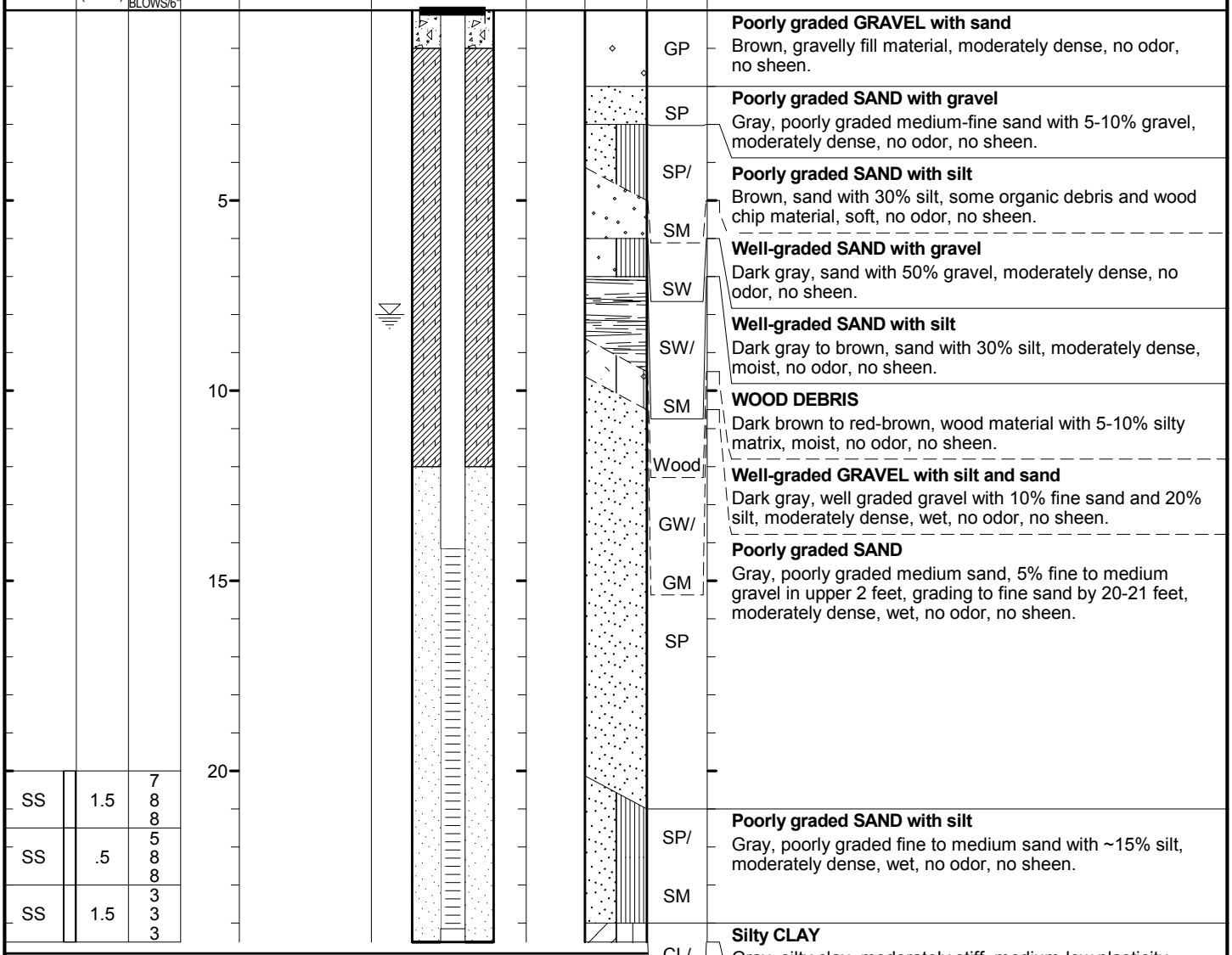
KJ PNW LOGS MW-28R TO MW-31 2006.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: 18th Street Right of Way		**Well Name**	MW-32
DRILLING COMPANY: Cascade	DRILLER: Scott	**Project Name**	Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch	**Project Number**	996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 24.5 ft. bgs
BLANK CASING: 2-inch Schedule 40 PVC Pipe	FROM 0 TO 14.15 FT.	DATE STARTED: 2/29/08	DATE COMPLETED: 2/29/08
SLOTTED CASING: 2-inch Schedule 40 PVC Pipe, 0.010 inch slots	FROM 14.15 TO 24.15 FT.	INITIAL WATER DEPTH (FT): 8.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustrr #2/12 Monterey Sand	FROM 12 TO 24.5 FT.	LOGGED BY: DKM	
SEAL: Pure Gold Bentonite Chips	FROM 1 TO 12 FT.	SAMPLING METHODS: Split Spoon	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0 TO 1 FT.		



NOTES

1. Lithology for upper 20 feet is based on B-37A.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

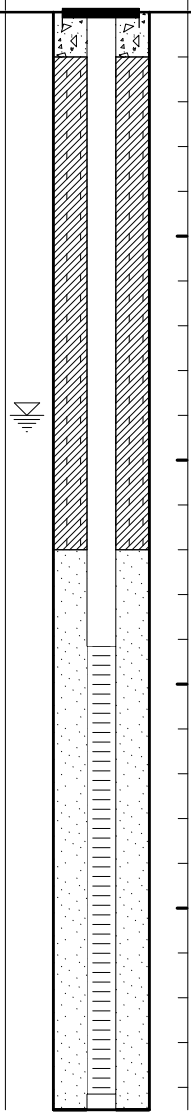
F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Well Name:** MW-33
DRILLING COMPANY: Cascade	DRILLER: Scott
	Project Name: Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch
	Project Number: 996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2-inch Schedule 40 PVC Pipe	FROM 0 TO 14.15 FT. / FROM 24.15 TO 24.5 FT.
SLOTTED CASING: 2-inch Schedule 40 PVC Pipe, 0.010 inch slots	FROM 14.15 TO 24.15 FT.
SIZE AND TYPE OF FILTER PACK: Lapis Lustrr #2/12 Monterey Sand	FROM 12 TO 24.5 FT.
SEAL: Pure Gold Bentonite Chips	FROM 1 TO 12 FT.
GROUT: Concrete	FROM 0 TO 1 FT.

ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 24.5 ft. bgs
DATE STARTED: 2/28/08	DATE COMPLETED: 2/28/08
INITIAL WATER DEPTH (FT): 9.0	
LOGGED BY: DKM	
SAMPLING METHODS: Split Spoon	WELL COMPLETION: ■ SURFACE HOUSING / □ STAND PIPE _____ FT.



SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
					GW	**Well-graded GRAVEL with sand** Dark orange/brown, gravelly fill with 30-40% sand, moderately dense, no odor, no sheen.
					SW/SM	**Well-graded SAND with silt** Dark orange/brown, silty fine sand with 10-20% wood chip material and 10% gravel, moderately dense, moist, no odor, no sheen.
			5		SW/SM	**Well-graded SAND with silt** Tan/gray, silty fine sand with 5-10% gravel, moderately dense, moist, no odor, no sheen.
					SW/SM	**Well-graded SAND with silt** Dark orange/brown, fine sand with 10% silt, moderately dense, moist, no odor, no sheen.
			10		SW/SM	**WOOD DEBRIS** Brown/red, wood debris with up to 50% silt/sand matrix material, moist, no odor, no sheen.
					Wood	**Silty SAND** Tan/gray, fine sand with 30-40% silt, moderately dense, moist, no odor, no sheen.
					SM	**Poorly graded SAND** Dark gray, poorly graded medium sand, coarsening downwards to medium/coarse sand, some fine gravel at 20-24 feet bgs, moderately dense, wet, no odor, no sheen.
			15		SP	
SS	1.5	8 12 15	20			
SS	1	8 15 16				
SS	1.5	10 6 4			ML/CL	**Clayey SILT** Gray, clayey silt, moderately stiff, moderate plasticity, wet, no odor, no sheen.

NOTES

1. Lithology for upper 20 feet is based on B-39A.

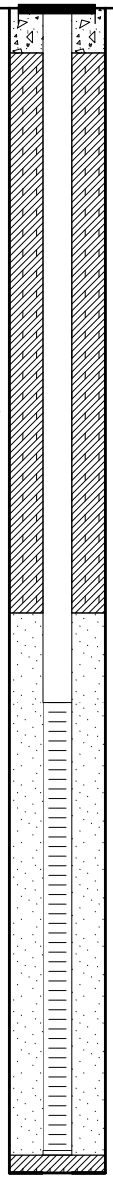
KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property		**Well Name**	MW-34
DRILLING COMPANY: Cascade	DRILLER: Scott	**Project Name**	Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch	**Project Number**	996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 26.0 ft. bgs
BLANK CASING: 2-inch Schedule 40 PVC Pipe	FROM 0 TO 15.5 FT. / FROM 25.5 TO 25.6 FT.	DATE STARTED: 2/28/08	DATE COMPLETED: 2/28/08
SLOTTED CASING: 2-inch Schedule 40 PVC Pipe, 0.010 inch slots	FROM 15.5 TO 25.5 FT.	INITIAL WATER DEPTH (FT): 9.0	
SIZE AND TYPE OF FILTER PACK: Lapis Lustrr #2/12 Monterey Sand	FROM 13.5 TO 25.6 FT.	LOGGED BY: DKM	
SEAL: Pure Gold Bentonite Chips	FROM 1 TO 13.5 FT. / FROM 25.6 TO 26 FT.	SAMPLING METHODS: Split Spoon	WELL COMPLETION: ■ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Concrete	FROM 0 TO 1 FT.		

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			0					Asphalt surface and base gravel fill.
							SM	**Silty SAND with gravel** Tan, fine to medium sand with 20-25% silt and 5-15% gravel, moderately dense, moist, no odor, no sheen.
			5				SP	**Poorly graded SAND** Brown, poorly graded medium to coarse sand, ~5% fine gravel, moderately dense, moist, no odor, no sheen.
							OH	**Organic SILT** Dark brown to dark gray, silt with abundant organic material including woody debris, soft, moist, no odor, no sheen.
							CL/	
							ML	**Silty CLAY** Tan to tan-brown, silty clay, moderately stiff, high plasticity, moist, no odor, no sheen.
			10				ML	**Sandy SILT** Gray/brown, silt with 30-40% fine sand overall, layered texture with interbedded clayey silt, silt, and sandy silt, wet, no odor, no sheen.
							SP	**Poorly graded SAND** Dark gray, poorly graded sand, mostly medium sand at top coarsening slightly downward, local small (<1/2") silt nodules ~16-20 feet bgs, moderately dense, wet, no odor, no sheen.
			15					
			20					
SS	1.5	9 13 15						
SS	1.5	13 15 18						
SS	1.5	10 15 18					SM	**Silty SAND** Gray, fine sand with 20-25% silt, moderately dense, wet, no odor, no sheen.
SS	1.5	10 12 15	25				SP	**Poorly graded SAND** Gray, poorly graded fine sand, moderately dense, wet, no odor, no sheen.
							ML/ CL	**Clayey SILT** Gray, clayey silt, moderately stiff, moderately high plasticity, wet, no odor, no sheen
							SP/	*(See next page for lithology description)*

NOTES

1. Lithology for upper 20 feet is based on B-41.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

Project Name Tacoma Metals **Project Number** 996098*00 **Well Name** MW-34

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION		LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								SM	**Poorly graded SAND with silt** Gray, poorly graded fine sand with some silt, moderately dense, wet, no odor, no sheen.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

BORING LOCATION: JJ Port Property	**Well Name:** MW-35
DRILLING COMPANY: Cascade	DRILLER: Scott — **Project Name:** Tacoma Metals
DRILLING METHOD(S): HSA	DRILL BIT(S) SIZE: 9-inch — **Project Number:** 996098*00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.
BLANK CASING: 2-inch Schedule 40 PVC Pipe	FROM 0 TO 40.5 FT. / 50.4 TO 50.5
SLOTTED CASING: 2-inch Schedule 40 PVC Pipe, 0.010 inch slots	FROM 40.5 TO 50.4 FT.
SIZE AND TYPE OF FILTER PACK: Lapis Lustrr #2/12 Monterey Sand	FROM 38.5 TO 50.5 FT.
SEAL: Pure Gold Bentonite Chips	FROM 2 / 50.5 TO 38.5 / 51 FT.
GROUT: Concrete	FROM 0 TO 2 FT.
ELEVATION AND DATUM: ground surface	TOTAL DEPTH: 51.0 ft. bgs
DATE STARTED: 2/28/08	DATE COMPLETED: 2/28/08
INITIAL WATER DEPTH (FT): 8.0	
LOGGED BY: DKM	
SAMPLING METHODS: Split Spoon	WELL COMPLETION: ☐ SURFACE HOUSING ■ STAND PIPE 2.5 FT.

SAMPLES TYPE	RECOV. (FEET)	PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
							GW	**Well-graded GRAVEL** Well graded gravel fill material, no odor, no sheen.
							SM	**Silty SAND** Tan to gray, silty fine sand fill, moist, no odor, no sheen.
							ML	**SILT** Dark brown, silt, abundant fine wood material, moderately soft, moist, no odor, no sheen.
SS	1.5	1 1 2	5				Wood	**WOOD DEBRIS** Brown/red-brown, wood debris with 10-15% silty matrix (locally variable <5% up to 20%), moist to wet, no odor, no sheen.
SS	1.5	2 3 3	10				SP	**Poorly graded SAND** Gray, poorly graded medium sand, moderately dense, wet, no odor, no sheen.
SS	1.5	2 3 3	15				SM	**Silty SAND** Gray, fine sand with 30-40% silt overall, interbedded poorly graded sand with silt, silty sand, and sandy silt, moderately dense, wet, no odor, no sheen.
SS	1	3 3 3	20				SP	**Poorly graded SAND** Gray, poorly graded sand, typically medium to coarse sand, locally some silt and gravel, moderately dense, wet, no odor, no sheen.
SS	.5	50	25					
SS	.5	50						
SS	.5	50						Dark gray coarse sand, some medium sand.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring & Well Construction Log

Kennedy/Jenks Consultants

Project Name Tacoma Metals **Project Number** 996098*00 **Well Name** MW-35

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
								Poorly graded SAND
SS	1	18 23 25	30					Gray, poorly graded sand, typically medium to coarse sand, locally some silt and gravel, moderately dense, wet, no odor, no sheen. ***(Continued)***
SS	1.5	15 19 20						
SS	1.5	15 18 23						
SS	1.5	15 19 22	35					Mostly medium sand, some coase sand, minor silt.
SS	1.5	14 17 23						
SS	1.5	18 21 25						
SS	1.5	18 25 27					SP	
SS	1.5	18 23 24	40					Locally 5-10% silt in small nodules.
SS	1.5	12 15 18						
SS	1.5	15 18 20						
SS	1.5	18 26 30	45					Gravelly sand (fine gravel) 44-47 feet bgs
SS	1.5	18 27 30						
SS	1.5	15 22 29						
SS	1.5	18 26 15	50					
SS	.5	18					ML	**Sandy SILT** Brown, silt with 20-30% fine sand, some clay, moderately stiff, moderately low plasticity, wet, no odor, no sheen.
							SP	**Poorly graded SAND** Gray, poorly graded fine to medium sand with some silt, moderately dense, wet, no odor, no sheen.

NOTES

1. Lithology for upper 30 feet is also based on B-44.

KJ PNW LOGS B37 TO B47 2007.GPJ KJ PNW.GDT 2/19/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: NE Existing Levee Road		**Boring Name**	P-1 / P1-R
DRILLING COMPANY: Cascade Drilling	DRILLER:	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): Steel Tip Advance	DRILL BIT(S) SIZE: 1-inch	**Project Number**	998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 20.0 ft. bgs
BLANK CASING: 1-inch stainless steel	FROM N/A TO N/A FT.	DATE STARTED: 2/1/11	DATE COMPLETED: 2/1/11
SLOTTED CASING: 0.010-inch slot stainless steel	FROM 16 TO 20 FT.	INITIAL WATER DEPTH (FT): 6.0	
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.	LOGGED BY: Inference	
SEAL: N/A	FROM N/A TO N/A FT.	SAMPLING METHODS: NA	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Bentonite Chips	FROM 0 TO 20 FT.		

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			0				SW	**Well-graded SAND with gravel** Gray, medium sand with 10-15% gravel and ~5% red/brown woody material locally, moderately dense, moist, no odor, no sheen.
			5				Wood	**WOOD DEBRIS** Red/brown, woody material, fine chips to coarse sawdust size, locally up to 5% silt but typically no matrix material, soft, moist, no odor, no sheen.
			10				Wood	**WOOD DEBRIS** Dark gray to dark orange/brown, blocky wood material, typically coated with silt and fine sand, 5-10% matrix material, moist to wet below 10 feet bgs, no odor, no sheen.
			15				ML	**Sandy SILT** Medium gray/brown, silt with fine sand, <5% sand at top, 15-20% sand by ~16 feet bgs, ~20% sand by 20 feet bgs, moderately dense overall but loose 20-22.5 feet bgs, wet, no odor, no sheen.
			20					

NOTES

1. Temporary piezometers installed without lithologic samples collected due to drilling technique. Lithology shown on log has been inferrred from the most proximal well (MW-29/B-34)
2. Total depths from February 2011 installations

KJ PNW TEMPPIEZOMETERS.GPJ KJ PNW.GDT 2/25/13

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: NE Existing Levee Road		**Boring Name**	P-2 / P2-R
DRILLING COMPANY: Cascade Drilling	DRILLER:	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): Steel Tip Advance	DRILL BIT(S) SIZE: 1-inch	**Project Number**	998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 20.0 ft. bgs
BLANK CASING: 1-inch stainless steel	FROM N/A TO N/A FT.	DATE STARTED: 2/1/11	DATE COMPLETED: 2/1/11
SLOTTED CASING: 0.010-inch slot stainless steel	FROM 16 TO 20 FT.	INITIAL WATER DEPTH (FT): 4.7	
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.	LOGGED BY: Inference	
SEAL: N/A	FROM N/A TO N/A FT.	SAMPLING METHODS: NA	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Bentonite Chips	FROM 0 TO 20 FT.		

SAMPLES TYPE	SAMPLES RECOV. (FEET)	SAMPLES PENETR. RESIST. BLOWS/6"	DEPTH (FEET)	SAMPLE NUMBER	BACKFILL DETAILS	LITHOLOGY	USCS LOG	SAMPLE DESCRIPTION AND DRILLING REMARKS
			5				Wood	**WOOD DEBRIS** Red/brown, coarse sawdust, dry to damp, no odor, no sheen.
			10				Wood	**WOOD DEBRIS with silty sand matrix** Brown/black, blocky to coarse wood debris with ~40-50% silty fine sand matrix, wet, no odor, no sheen.
			15					Sand content increasing downwards.
			20				SP	**Poorly graded SAND** Gray, fine sand with some silt (~20%), loose, wet, slight creosote odor, no sheen.

NOTES

1. Temporary piezometers installed without lithologic samples collected due to drilling technique. Lithology shown on log has been inferrred from the most proximal well (MW-23)
2. Total depths and screen intervals from February 2011 installations

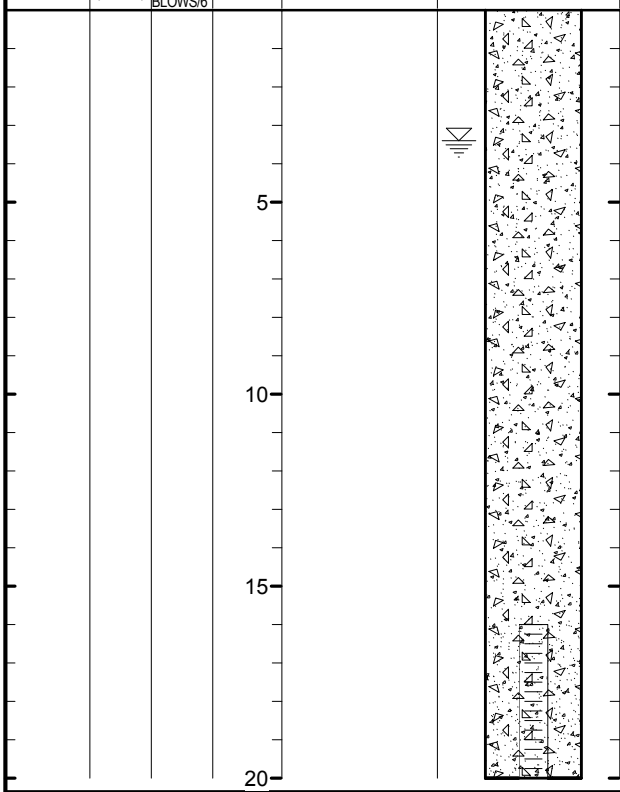
KJ PNW TEMPPIEZOMETERS.GPJ KJ PNW.GDT 2/25/13

F-40.1
(6-87) (3-88) (8-90)

Boring Log

Kennedy/Jenks Consultants

BORING LOCATION: NE Existing Levee Road		**Boring Name**	P-3 / P3-R
DRILLING COMPANY: Cascade Drilling	DRILLER:	**Project Name**	Former Tacoma Metals
DRILLING METHOD(S): Stell Tip Advance	DRILL BIT(S) SIZE: 1-inch	**Project Number**	998098.00
ISOLATION CASING: N/A	FROM N/A TO N/A FT.	ELEVATION AND DATUM: bgs	TOTAL DEPTH: 20.0 ft. bgs
BLANK CASING: 1-inch stainless steel	FROM N/A TO N/A FT.	DATE STARTED: 2/1/11	DATE COMPLETED: 2/1/11
SLOTTED CASING: 0.010-inch slot stainless steel	FROM 16 TO 20 FT.	INITIAL WATER DEPTH (FT): 3.4	
SIZE AND TYPE OF FILTER PACK: N/A	FROM N/A TO N/A FT.	LOGGED BY: Inference	
SEAL: N/A	FROM N/A TO N/A FT.	SAMPLING METHODS: NA	WELL COMPLETION: ☐ SURFACE HOUSING ☐ STAND PIPE _____ FT.
GROUT: Bentonite Chips	FROM 0 TO 20 FT.		



NOTES

1. Temporary piezometers installed without lithologic samples collected due to drilling technique. Lithology shown on log has been inferrred from the most proximal well (MW-20)
2. Total depths and screen intervals from February 2011 installations

KJ PNW TEMPPIEZOMETERS.GPJ KJ PNW.GDT 2/25/13