# Modified Preliminary Site Investigation
# Washington State Department of Transportation
# Special Projects Construction Site
# Port of Grays Harbor
# Hoquiam, Washington

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Prepared for

**Washington State Department of Transportation**
**Urban Corridors Office**

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# 1.0 INTRODUCTION

## 1.1 RESPONSIBLE OFFICES/CONSULTANTS

This modified Preliminary Site Investigation (PSI) was requested by the Washington State Department of Transportation (WSDOT) Urban Corridors Office. WSDOT is evaluating Industrial Development District parcel #1 (IDD#1) at the Port of Grays Harbor (the property) for potential use as a Special Projects Construction Site.

Landau Associates conducted this modified PSI in accordance with our Work Plan dated June 29, 2006 (Landau Associates 2006a). This report describes environmental site investigation activities that were conducted as part of a modified PSI to document site conditions; evaluate upland soil, groundwater, and shallow marine sediments at the property for the presence of possible contamination; and assess appropriate handling and disposal of media generated during any construction activities that may occur at the property. The modified PSI was conducted during a geotechnical site investigation completed by Landau Associates under a separate scope of services.

## 1.2 SITE-SPECIFIC INFORMATION

The property is commonly known as the Port of Grays Harbor IDD#1 and is located in the City of Hoquiam in Grays Harbor County (Figure 1). The property is approximately 45 acres of vacant land bounded by the Chehalis River on the south, the Hoquiam River on the east, the Puget Sound and Pacific Railroad tracks to the north, and a vacant log yard to the west (Figure 2). According to the Grays Harbor County Assessor, the parcel numbers for the property are 056400400100 and 056400600102 (Grays Harbor County website 2006).

## 1.3 PURPOSE

WSDOT is evaluating the property as a prospective Special Projects Construction Site. The purpose of this modified PSI was to document site conditions; evaluate upland soil, groundwater, and shallow marine sediments for the presence of possible contamination; and generally assess appropriate handling and disposal of media during any future site exploration or construction activities.

## 1.4 SCOPE OF SERVICES

The modified PSI was conducted during the geotechnical site investigation, which was completed under a separate scope of services. Our scope of services, which was presented in our proposal dated June 23, 2006, included the following tasks:

- A records review to identify potential environmental concerns for the property. This task consisted of historical research and a regulatory database review. The historical research was limited in scope and consisted of a review of historical topographic maps, aerial photographs, oblique photographs, Sanborn maps, and interviews with the City of Hoquiam Building Department, the Grays Harbor County Department of Environmental Health, and the Port of Grays Harbor. The regulatory database review consisted of a report prepared by Environmental Data Resources.

- Evaluation of the condition of subsurface soil, groundwater, and sediment at the property. The evaluation included review of data from 13 borings drilled for the 2006 geotechnical investigation that were designated B-8 through B-20 (borings B-1 through B-7 were drilled in the preliminary phase of the geotechnical investigation) and chemical analysis of soil, groundwater, and sediment samples collected during drilling. Groundwater samples were collected from selected borings that were completed as monitoring wells.

- Preparation of a modified PSI report. This PSI report contains elements of an Initial Site Assessment (ISA); however, it is not intended to serve as an ISA.

Our services were provided under On-Call Services Agreement No. Y-9482, Task No. AE.

# 2.0 SITE DESCRIPTION

## 2.1 LOCATION

The City of Hoquiam lists the physical address for the property as 1200 K Street. The property is located at the confluence of the Chehalis and Hoquiam rivers at the Port of Grays Harbor in Hoquiam, Washington. The property is located in Sections 11 and 12 of Township 17N Range 10W at an approximate latitude and longitude of 46.97 and -123.88, respectively. The legal description of the property, as provided by the Grays Harbor County Assessor, is as follows (Grays Harbor County website 2006):

- HOQ TDLDS LOT 1; LOT 2 LS E 40' OF N 50' LS TAX 5, LOTS 3-5, LOT A LS N 50' OF W 40.54' TGW ALL VAC RR AVE ADJ TR 4; and
- HOQ TDLDS TAX 1 (OUT of LOT 1 TR 6 & LOTS 1 & 3 TR7).

The location of the property is shown on the Vicinity Map and Site and Exploration Plan, which are included as Figure 1 and Figure 2, respectively.

## 2.2 PHYSICAL SETTINGS AND FEATURES

Approximately 45 acres are available at the Port of Grays Harbor for use by WSDOT. The property, which includes existing wetlands, is vacant. As noted in Section 1.2, the property is bounded by the Chehalis River on the south, the Hoquiam River on the east, the Puget Sound and Pacific Railroad tracks to the north, and a vacant log yard to the west. An existing City of Hoquiam pump station is located near the center of the northern boundary of the property, as shown on Figure 2. The pumping station is not part of the property.

The property is relatively flat with average surface elevations varying from 13 to 15 ft mean lower low water (MLLW), according to the topographic map prepared for the Port of Grays Harbor in 2005. It is predominately covered with grass, except for an approximately 10-ft-wide gravel access road/dike that runs along the west, south, and east boundaries of the site. The property was originally a salt marsh before it was filled with dredge material in 1977 and 1978 (Landau Associates 2006b).

Landau Associates recently completed a geotechnical and hydrogeologic study of the property under a separate scope of services. The study identified four soil units on the property as follows:

- Soil Unit 1, which is the upper subsurface soil unit, varies in thickness from about 25 to 41 ft and includes dredge fill from previous site filling overlying native massive to slightly laminated silt with variable sand content. The dredge fill was observed to predominately consist of very loose to medium dense silty sand to sandy silt. The native silt consists of high plasticity, soft to medium stiff silt with variable content of sand, clay, and organics.

- Soil Unit 2 (subdivided into 2A and 2B) was observed to primarily consist of stratified deposits of silt and sand. Soil Unit 2A predominately consists of silt with thin sand interbeds and some relatively thick layers of sand. Soil Unit 2B predominately consists of sand with silt to silty sand with thin laminations of silt. The sand was observed to be loose to medium dense. The silt within Soil Unit 2B is medium stiff in consistency and varies in thickness from 5 to 10 ft.

- Soil Unit 3 consists of slightly laminated to massive silt with lenses of abundant organics and sand.

- Soil Unit 4 consists of dense to very dense, very sandy gravel with silt.

As part of the modified PSI, Landau Associates measured the groundwater levels in 10 monitoring wells installed as part of the geotechnical and hydrogeologic investigation. The monitoring wells were constructed at selected boring locations. The monitoring wells are shown on Figure 2 with an "MW" designation, but retain their original boring number. The measured groundwater elevations ranged from 7.7 to 9.8 ft below ground surface (BGS) on August 9, 2006. Groundwater elevations at the property fluctuate due to seasonal and tidal influences, with maximum elevations generally occurring during the winter and spring months. Based on topography and the property's location adjacent to the tidally influenced Chehalis River, the overall direction of groundwater flow is anticipated to be to the south toward Grays Harbor, except when groundwater is under tidal influence. Groundwater flow in areas influenced by tidal fluctuation is generally inhibited and/or reversed during periods of rising to high tide when flow is landward due to elevated river levels and enhanced during periods of ebbing or low tide when river elevations are low. More detailed descriptions of groundwater conditions at the property are provided in the geotechnical and hydrogeologic investigation report (Landau Associates 2006b).

# 3.0 RECORDS REVIEW

## 3.1 HISTORICAL RESEARCH

The property is currently vacant. Landau Associates contacted various agencies and reviewed available historical information regarding the property. Selected historical photographs are included in Appendix A. A summary of the findings of our historical research is as follows.

### 3.1.1 TOPOGRAPHIC MAPS

Landau Associates reviewed the U.S. Geological Survey (USGS) 7.5-minute series Hoquiam, Washington Quadrangle topographic maps for the years 1957, 1973, 1983, and 1994. The map from 1957 shows approximately 21 structures along a roadway in the northwestern portion of the property. A circular structure labeled "stack" is shown along the eastern property boundary. The southern portion of the property is shown as marsh or swamp land and the far southern boundary of the property is shown as tide flats of the Chehalis River.

The map from 1973 does not show any structures on the property. Based on historical information provided by WSDOT, the property had not been filled in 1973, and much of the property is shown on the map as being submerged or as tide flats of the Chehalis River. No significant changes to the property are shown on the 1983 map. On the 1994 map, the property has been filled to its current extent and there are no structures shown on the property.

The topographic maps show the adjacent property to the north as Northern Pacific Railroad in 1957 and Burlington Northern Railroad on subsequent maps. Two large structures, a stack, and two smaller structures are shown on the adjacent property to the west on the 1957 map. No structures are shown on this property in the maps from 1973 and 1983. One small structure is shown on this property on the 1994 map.

Overall, the topographic map review did not provide any indication of potential environmental impact to the property, but did show that several structures previously existed on the property. The topographic maps show the majority of the property as marsh or swamp land; specifically, the southern boundary of the property is shown as tide flats on the 1957 map. On the 1973 and 1983 maps, the majority of the property is shown to be submerged. The topographic maps do not show the property filled to its current extent until 1994, which conflicts with both historical information provided by WSDOT and information obtained from the aerial photograph review (see below), which indicates that the property was filled to its current extent between 1977 and 1978.

### 3.1.2 AERIAL PHOTOGRAPHS

Landau Associates reviewed aerial photographs provided by WSDOT for the years 1966, 1971, 1978, 1981, and 1988. Landau Associates requested earlier aerial photographs of the area from WSDOT and Aero-Metric, Inc., a private vendor, but no photographs were available prior to 1966. In the 1966 aerial photograph, the property is vacant with the exception of a circular structure along the eastern property boundary, which correlates to the location of the "stack" shown on the 1957 topographic map. Two access roads are visible in the northern portion of the property, with one extending east toward the circular structure and one extending west. To the south of the access roads, piles of material, which appear to be logs, are visible in a consolidated line transecting the property east to west. This appears to be the high tide line. The southern two-thirds of the property appears to be tide flat. Dendritic drainage channels are visible in the south-central portion of the property. Four log rafts are visible along the shoreline to the south of the property. A structure is visible in the area corresponding to the location of the current pumping station. This structure does not appear to be located within the boundary of the property.

In the aerial photograph from 1971, the previously described eastern access road appears to have been extended and additional branches of the road are visible. The area to the north and south of the western access road appears to have been cleared and the road is no longer visible. Increased vegetative cover is present in the northeastern portion of the property in the 1971 photograph. Dendritic drainage channels are not visible in the southern portion of the property, which may indicate that filling occurred on the property between 1966 and 1971.

In the 1978 aerial photograph, the property appears to have been filled and graded. A dark linear feature is visible along the perimeter of the property. Based on historical information provided by WSDOT, this feature is likely a dike that was constructed to contain the dredged fill material at the property. The circular structure is no longer visible in the northeastern portion of the property in the 1978 photograph. One log raft is present along the shoreline off the southeastern corner of the property.

Significant changes to the property were not visible in the aerial photograph from 1981; however, increased vegetation was observed on the property. In the 1988 aerial photograph, the property appears to have been cleared and graded. The surface of the property appears level and uniform.

Conditions of environmental concern were not observed on the property during the aerial photograph review; however, the review did indicate the former presence of a circular structure on the property, which correlates to the location of the "stack" shown on the 1957 topographic map of the property. The circular structure was likely associated with other structures, which were removed from the property prior to 1957.

### 3.1.3 SANBORN MAPS

Landau Associates reviewed historical Sanborn maps of the property provided by Environmental Data Resources. Maps received for 1889, 1890, 1891, and 1894 do not show the property. The map from 1902 shows the property as the North Western Lumber Company's Shingle Mill. Two structures are shown on the property along the eastern property boundary. Rooms within the main structure are labeled "Shingle Shed," "Steam Dry Kilns," "Mill," and "Fuel Room." This structure is identified as being built on piles. An inclined conveyor is shown on the map extending southwest from the main structure to a circular structure labeled "Fire." Maps from 1907 and 1916 do not show significant changes to the property. The circular structure is labeled "Refuse Fire" on these maps. A note on the 1916 map indicates that the area to the west of the shingle mill is refuse-filled ground covered with lumber piles.

The 1928 map also shows the property as the North Western Lumber Company's Shingle Mill; however, the configuration has changed. The labels on the structures are similar to those on the previous maps and a structure labeled "Shipping Shed" has been added. A note on this map indicates that the structures are built on piles and filled under with refuse. No lumber storage is shown on the 1928 map. The 1948 map shows one structure on the property labeled "Fish Reduction Plant." The structure is located along the eastern property boundary in the area of the former shingle mill. Two storage tanks are shown to the west of the structure. The tanks are labeled fuel oil and fish oil and have an approximate capacity of 10,000 gallons each. The 1969 map shows a circular structure along the eastern property boundary labeled "Refuse Burner." This correlates to the location of the "stack" shown on the 1957 topographic map and in the 1966 and 1971 aerial photographs. A circular concrete sewage pump house is shown along the northern property boundary. A note on the 1969 map indicates numerous cabins and shacks are present along the northern property boundary in the western portion of the property. The cabins and shacks are not drawn on the map.

The Sanborn maps show that the western portion of the property was used for lumber storage at one time and that several shacks and cabins were located along the northern property boundary. The former use and storage of fuel oil is considered a potential environmental concern for the property.

### 3.1.4 OBLIQUE PHOTOGRAPHS

Landau Associates reviewed five oblique photographs of the property provided by WSDOT. The photographs are not dated and the source of the photographs is unknown. Structures, including one circular structure (likely a smoke stack), are visible on the property in several of the photographs. The structures are located along the eastern boundary near the northeastern corner of the property where Sanborn maps show a shingle mill from 1902 to 1928 and a fish reduction plant in 1948. The circular

structure is likely the "stack" shown on Sanborn maps from 1902 to 1969, on the 1957 topographic map, and in aerial photographs from 1966 and 1971. In the oblique photographs, possible residential structures are visible in the northern portion of the property north of the high tide line, which is visible in the 1966 aerial photograph. Residential structures are shown in this area on the 1957 topographic map, but are not visible in the 1966 aerial photograph.

### 3.1.5 CITY OF HOQUIAM BUILDING DEPARTMENT

Landau Associates contacted the City of Hoquiam Building Department for information regarding previous structures on the property. According to Ms. Su Mollett, Building Official, there are no records available regarding previous structures on the property. Ms. Mollett recalls that the property was formerly a log yard; however, she does not recall any buildings on the property (Mollett, S., 2006, personal communication).

### 3.1.6 GRAYS HARBOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT

Landau Associates contacted the Grays Harbor County Environmental Health Department for information regarding hazardous materials, solid waste, septic systems, and underground storage tanks. According to Mr. Douglas George, Department Director, there are no records available regarding the property (George, D., 2006, email correspondence).

### 3.1.7 PORT OF GRAYS HARBOR

Landau Associates interviewed Mr. Leonard Barnes of the Port of Grays Harbor (Barnes, L., 2006, personal communication). Mr. Barnes has been associated with the Port for approximately 22 years. According to Mr. Barnes, the Port of Grays Harbor obtained the property from the City of Hoquiam in 1961. There were no structures on the property at the time of the property transfer, and Mr. Barnes is not aware of any previous structures on the property. The majority of the property has historically been underwater. The property was filled using dredged material from Grays Harbor from approximately 1977 to 1978 under permit from the U.S. Army Corp of Engineers. According to Mr. Barnes, municipal water and sanitary sewer services are available to the property; however, the services have not yet been extended onto the property. There has been no known use, storage, or generation of hazardous substances or petroleum products on the property.

### 3.1.8 PREVIOUS INVESTIGATIONS

Landau Associates reviewed a document titled *Survey of Chemical Contaminants in the Bottom Sediments of Grays Harbor Estuary*, which was completed by the Washington State Department of Ecology (Ecology) in 1989. The survey was conducted to evaluate the cause of lower survival rates for coho salmon originating from the Chehalis River compared to those originating near the Humptulips River. Ecology sampled and analyzed sediments from 10 sites within the Grays Harbor estuary, focusing on sediments in the area of the outfalls of the Weyerhaeuser and ITT Rayonier pulp mills located on the Chehalis River upstream of Grays Harbor, which are the only large industrial discharges to the harbor. Pulp mill effluent typically contains resin acids, guaiacols, and dioxins. Sediment samples were also collected from the Humptulips River in North Bay for use as a reference.

The sediment samples were analyzed for U.S. Environmental Protection Agency (EPA) priority pollutants and hazardous substance list compounds. Samples collected from the area of the pulp mill outfalls were also analyzed for resin acids, guaiacols, catechols, fatty acids, dioxins, and furans. The analytical results for metals and many of the organic compounds detected in the Grays Harbor samples were in the range of concentrations detected in areas of Puget Sound that are far removed from sources of contamination. Elevated concentrations of polycyclic aromatic hydrocarbons (PAHs), 4-methylphenol, dibenzofuran, and retene were detected in sediment near the Weyerhaeuser outfall, and retene, di-n-octylphthalate, and bis(2-ethlhexyl)phthalate were detected in sediments at the ITT Rayonier outfall. (Di-n-octylphthalate and bis(2-ethlhexyl)phthalate were also detected in method detection blanks; therefore, the detected concentrations may not be representative of actual concentrations.) In all cases (except the di-n-octylphthalate detected near the ITT Rayonier outfall sample), the detected concentrations were below published "apparent effects thresholds," which are the concentrations of chemicals above which statistically significant biological effects are observed. The detected concentrations of resins acids, guaiacols, and fatty acids were lower than those reported for sediments in the area of other mills in the Puget Sound region and downstream of Columbia River pulp mills. Trace amounts of dioxins and furans were detected in sediment samples near the pulp mill outfalls during this survey and during sampling completed by EPA in 1988. Dioxins, specifically HpCDD [11 to 18 parts per trillion (ppt)], total HpCDD (25-42 ppt), and total OCDD (92-140 ppt), were detected in each of the samples. Furans, specifically 2,3,7,8-TCDF (2.4 to 2.8 ppt), were detected at two sample locations, including the ITT Rayonier outfall. Furans were not detected at the Weyerhaeuser outfall.

The detected concentrations in the Grays Harbor sediments were similar to or less than concentrations detected at other sites in Washington, Oregon, and British Columbia. Sources of dioxins and furans identified in the survey are pulp mills, impurities in polychlorinated biphenyls (PCBs), commercial herbicides, and chlorinated phenols. The overall findings of the survey indicate that the

contamination level is relatively low in the Grays Harbor sediments compared with other areas in the region.

### 3.1.9 SUMMARY OF HISTORICAL RESEARCH

The property was operated as a shingle mill (1902-1928) and fish reduction plant (1948). Structures associated with these facilities were built on piles, which were reportedly filled under with refuse, and located near the northeastern corner of the property. Both the shingle mill and the fish reduction plant included fuel storage, but the available information does not indicate if the fuel was stored in aboveground or underground tanks.

The earliest aerial photograph available (1966) shows a circular structure in the northeastern portion of the property, corresponding to the location of the refuse burner shown on the Sanborn maps and on the 1957 topographic map. No other structures were visible on the property in the aerial photographs. The topographic map from 1957 also shows approximately 21 structures in the northwestern portion of the property. The 1969 Sanborn map indicates that several cabins and shacks were located in this area. The structures are not visible in the 1966 aerial photograph; however, an access road is visible in this portion of the property in the 1966 photograph. Oblique photographs (dates unknown) provided by WSDOT confirm that structures, including a circular stack, were located in the northeastern portion of the property. Representatives from the City of Hoquiam, the Port of Grays Harbor, and the Grays Harbor County Department of Environmental Health did not have any information regarding former structures on the property.

The majority of the property consisted of marshland and tide flats until approximately 1977. At that time, a dike was constructed along the perimeter of the property, and the property was filled using dredged materials from Grays Harbor. The dike is visible in the 1978 aerial photograph. Based on aerial photographs from 1966 and 1971, a limited amount of filling may have occurred prior to the construction of the dike. Between 1978 and 1988, the property was leveled and graded.

The former use and storage of fuel oil on the property are considered a potential environmental concern. Residential structures were shown to have been located in the northwestern portion of the property. Heating oil tanks and/or septic systems may have been associated with these structures. No evidence of fuel tanks, heating oil tanks, and/or septic systems was identified on the property during the field activities for this modified PSI or the geotechnical or hydrogeologic investigations.

Previous sampling in Grays Harbor conducted by Ecology identified the presence of metals, and priority pollutant and hazardous substance list organic compounds including PAHs, dioxins, and furans in sediments. The analytical results for metals and many of the organic compounds detected in the Grays Harbor samples were within the range of concentrations detected in other areas of Puget Sound. The

detected PAH concentrations were below published "apparent effects thresholds," which are the concentrations of chemicals above which statistically significant biological effects are observed. The detected dioxin and furan concentrations were similar to or less than concentrations detected at other sites in Washington, Oregon, and British Columbia. The sources of dioxins and furans identified in the Ecology survey are pulp mills, impurities in PCBs, commercial herbicides, and chlorinated phenols. The overall findings of the previous investigation indicate that the contamination level is relatively low in the Grays Harbor sediments compared with other areas in the region.

## 3.2 REGULATORY DATABASE REVIEW

Environmental Data Resources was subcontracted by WSDOT to conduct a search [as prescribed by the American Society for Testing and Materials (ASTM)] of EPA and Ecology environmental databases that contain information regarding environmental conditions at and near the property. The search focused on information in the various lists maintained by the agencies of sites with known and potential environmental conditions that may represent a threat to human health and the environment. Environmental Data Resources conducted its search of listed information (which is keyed to a geographic mapping system) using the location of the property, and identified sites listed in the databases that are located within up to a 1-mile radius of the property boundaries. Environmental Data Resources then compiled the information into a summary report that identifies sites of potential environmental concern within the prescribed radii. The complete report is presented in Appendix B.

No database listings were reported within 1 mile of the property. However, as is common to database searches keyed into a geographic mapping system, Environmental Data Resources reported that a number of sites were not mappable (in this case, 22) due to incomplete addresses or other identifying information. Based upon Landau Associates' review of the Environmental Data Resources report, 21 of the unmapped sites were found to be located outside their respective search radii and are therefore not considered to have the potential to impact the property. The remaining unmapped site is the Burlington Northern Santa Fe (BNSF) Hoquiam site. The address of the site is listed as K Street, M Street, 9$^{th}$ Street, and 12$^{th}$ Street, which places the site north of the western two-thirds of the property, and hydraulically upgradient (based on flow toward the Chehalis River) of the property (Figure 3). This site is listed on the Confirmed and Suspected Contaminated Sites List (CSCSL), the Facility Index System/Facility Registry System (FINDS), and Voluntary Cleanup Program (VCP) databases. Landau Associates contacted the Ecology project manager for further information regarding this site. According to Ms. Lisa Pearson of Ecology's Toxics Cleanup Program, the site is enrolled in Ecology's VCP. Ecology has issued an opinion letter requesting further characterization of contamination present both on and potentially off the site. Ms. Pearson indicated that potential sources for contamination on this site include an underground

storage tank (UST), car switching facilities, a car cleaning facility, and a maintenance facility. According to Ms. Pearson, all aboveground structures and the UST have been removed from this site. Offsite contamination is possible and groundwater contamination has been identified (Pearson, L., 2006, email correspondence). Ecology files would need to be reviewed to evaluate whether there is additional information regarding the status of cleanup at this site and the potential for this site to impact the property. Soil and groundwater samples were collected from near the northern property boundary of the property as part of this modified PSI. Subsurface soil and/or groundwater impacts were not identified on the property during this investigation. The subsurface soil and groundwater investigation is discussed in detail in Sections 4.0 and 5.0.

# 4.0 FIELD INVESTIGATION ACTIVITIES

## 4.1 SAMPLING PROGRAM SUMMARY

The sampling program was conducted in general accordance with the Sampling and Analysis Plan (SAP), which was submitted to WSDOT as part of the Work Plan (Landau Associates 2006a). A copy of the SAP is included in Appendix A of the Work Plan. Notable deviations from the program outlined in the SAP are discussed, as appropriate, in Section 4.2 and in Section 5.0.

Soil, groundwater, and sediment sampling was completed by the following Landau Associates staff: Brian Christianson, Senior Project Geologist; Jon Brown, Staff Engineer; and Nathan Moxley, Senior Technician. The field sampling was conducted when Landau Associates personnel were at the property conducting the geotechnical and hydrogeologic investigation.

Soil and sediment sampling was conducted between July 5 and July 19, 2006, and between September 26 and September 27, 2006. Groundwater samples were collected on August 9, 2006. Copies of the completed chains-of-custody, documenting that the soil, groundwater, and sediment samples were delivered to an accredited laboratory, are included in Appendix C. The sample locations are shown on Figure 2. Selected site photographs are included in Appendix D.

The analytes were selected to include a broad range of potential contaminants based on the former operations on the property including the associated fuel storage, the former Burlington Northern Santa Fe Railroad Company site to the north of the property, and the history of industrial use in the area. Analysis for dioxins and furans was conducted for the sediment samples based on the presence of pulp mills that discharge effluent to the Chehalis River upstream from the property.

## 4.2 FIELD CONDITIONS

Eleven soil borings (B-8 through B-17 and B-20) were advanced in the upland portion of the property using mud-rotary drilling methods as part of the geologic and hydrogeologic investigations. Soil samples were collected at 5-ft intervals during the drilling activities for lithologic logging and geotechnical analysis. Soil samples were also field screened for evidence of contamination by visual inspection (i.e., stained soil, free product) and measuring volatile vapors using a photoionization detector (PID). Two to three soil samples from each boring (except B-20, which was drilled to collect samples for Carbon 14 testing as part of the geotechnical and hydrogeologic investigation and not for environmental purposes) were selected for laboratory analysis. Based on field screening results, none of the samples exhibited indications of potential contamination [i.e., visual presence of potential contamination and/or a PID measurement greater than 0.0 parts per million (ppm)]. Therefore, samples were collected for laboratory analysis in accordance with the SAP from depths where contamination would be anticipated

based on historical site use or to characterize soils that would be excavated and disposed of during development of the property. This included collecting samples from the interval directly above the shallow groundwater level, from the native silt immediately underlying the fill material, and native material located toward the base of anticipated maximum depth of excavation. Field screening results are included on the soil boring logs in Appendix A of the geotechnical report (Landau Associates 2006b). As indicated on the logs, none of the samples exhibited indications of potential contamination. PID readings of 0.0 ppm were recorded for all of the screened samples.

Groundwater samples were collected from five upland monitoring wells that were installed in selected soil borings as part of the geotechnical and hydrogeologic investigation: MW-5 (to assess upland background conditions), MW-6 (to assess groundwater quality near the Hoquiam River and former structures identified during historical review), MW-1 and MW-7 (to assess groundwater quality near the Chehalis River), and MW-4 (to assess groundwater quality within the planned excavation area). Groundwater samples were field screened for water quality standards (dissolved oxygen, pH, conductivity, temperature, and oxygen reduction potential) using a multi-probe water quality meter. Turbidity was assessed by visual inspection. Depth to groundwater was measured at all 10 wells to evaluate flow. Groundwater samples were collected using decontaminated, non-dedicated groundwater pumps and dedicated polyethylene tubing. Purge water from the monitoring wells is temporarily stored on the site in 55-gal drums for appropriate disposal.

The offshore environmental investigation was conducted during the geotechnical lateral embankment investigation. Two offshore deep borings (B-18 and B-19) were advanced to approximately 140 ft BGS using mud-rotary drilling methods. Sediment samples were collected at 5-ft intervals during the drilling activities for lithologic logging purposes and geotechnical analysis. Sediment samples were field screened for evidence of contamination using visual inspection (i.e., stained soil, free product) and by measuring volatile vapors using a PID. None of the samples exhibited indications of potential contamination during field screening; therefore, in accordance with the SAP, two sediment samples from each boring were selected for laboratory analysis. One sample was collected to represent surface sediment or mudline conditions. The second sample was collected below the mudline within the upper 6.5 ft of the sediment column.

# 5.0 LABORATORY ANALYSIS

## 5.1 GENERAL

All soil, groundwater, and sediment chemical analyses were performed by OnSite Environmental, Inc. laboratories located in Redmond, Washington. In addition, four samples were analyzed by Analytical Resources, Incorporated (ARI) located in Tukwila, Washington.

Thirty-four soil samples were collected during the field investigation. Of those samples, 27 were selectively analyzed for total petroleum hydrocarbon (TPH) identification (Ecology Method NWTPH-HCID with acid/silica cleanup), PAHs (EPA Method 8270C/SIM), and/or total metals (EPA Method 6010B/7471A). Four samples were analyzed by ARI for soil resistivity (ASTM Method G-57) only. The remaining three samples were placed on hold at the laboratory pending the results for the initial 27 samples and, based on review of the data for the initial samples, were not selected for analysis. Volatile organic vapors were not detected in the soil samples during field screening; therefore, soil samples were not analyzed for volatile organic compounds (VOCs) as described in the SAP.

Six groundwater samples (including one field duplicate) and one trip blank were collected and analyzed for total metals (EPA Method 200.8/7470A); total diesel-range petroleum hydrocarbons (Ecology Method NWTPH-Dx with acid/silica cleanup); total gasoline-range petroleum hydrocarbons (Ecology Method NWTPH-Gx); benzene, toluene, ethylbenzene, and xylenes (BTEX; EPA Method 8021B); VOCs (EPA Method 8260B); semivolatile organic compounds (SVOCs; EPA Method 8270C-SIM); PCBs (EPA Method 8082); organochlorine pesticides (EPA Method 8081A); and/or dissolved iron and manganese (EPA Method 6010B). Analyses for dissolved iron and manganese, which are discharge permit requirements, were added as part of the evaluation of disposal options if future investigation or construction on the property would require dewatering. Groundwater samples were not analyzed for PAHs as described in the SAP; however, PAHs are included in the SVOC analysis.

Four sediment samples were collected and analyzed for total metals (EPA Method 6010B/7471A); total diesel-range petroleum hydrocarbons (Ecology Method NWTPH-Dx with acid/silica cleanup); total gasoline-range petroleum hydrocarbons (Ecology Method NWTPH-Gx); BTEX (EPA Method 8021); SVOCs (EPA Method 8270C-SIM); PCBs (EPA Method 8082); organochlorine pesticides (EPA Method 8081A); and dioxins and furans (EPA Method 1613B). Sediment samples collected from the mudline for analysis of dioxins and furans were discreet samples not composites, as described in the SAP. The discreet samples provide a more representative assessment of the sediment quality. One of the three offshore soil borings was moved to the upland portion of the property to support the geotechnical investigation. Also, to expedite receipt of data, TPH analysis was not completed in phases beginning with

initial screening using the HCID method; all of the samples were analyzed for both gasoline-range (TPH-G) and diesel-range total petroleum hydrocarbons (TPH-D).

Based on historical information, there is no reason to believe that chromium VI was used on the property or in the immediate surrounding area; therefore, the samples for metals included analysis for total chromium. The subsequent groundwater analytical results were compared to the cleanup level for total chromium, and the soil and sediment results were compared to the cleanup level for chromium III.

## 5.2 ANALYTICAL RESULTS

The analytical results for the soil, groundwater, and sediment samples are summarized in Tables 1, 2, and 3, respectively. The laboratory data reports are presented in Appendix C. Landau Associates reviewed the data quality and compared the soil and groundwater results to the Ecology Model Toxics Control Act (MTCA) Method A cleanup levels based on unrestricted land uses (Chapter 70.105D RCW and Chapter 173-340 WAC) to assess limitations on reuse or disposal of soil that might be excavated during any construction activities on the property. Where MTCA Method A soil cleanup levels were not available, the results were compared to the MTCA Method B preliminary soil cleanup levels, which are based on unrestricted land uses and protection of fresh surface water, including for use as drinking water. For groundwater, where MTCA Method A cleanup levels were not available, the results were compared to MTCA Method B preliminary cleanup levels, which are based on protection of fresh surface water, including for use as drinking water.

The analytical results for the sediment samples were compared to the Sediment Quality Standards (SQS) and Cleanup Screening Levels (CSL), which are contained in Ecology's Sediment Management Standards (SMS) in Chapter 173-204 WAC. Some of the SQS and CSL are normalized to total organic carbon (TOC). These values were not used for comparison because TOC data were not available. In addition, the sediment analytical results were compared to the MTCA Method A cleanup levels to assess limitations on the upland use of dredged sediment.

### 5.2.1 SOIL ANALYTICAL RESULTS

Twenty-seven soil samples were selected for chemical analysis. The analytical results for the soil samples are summarized in Table 1. Note that sample B-8 S-9 was misidentified on the chain of custody and, therefore, on the analytical report. The correct sample identification is B-8 S-8. For clarity, both sample identifications are listed in Table 1.

- Twenty-seven soil samples were analyzed for total metals. The analytical results indicate concentrations of barium [18 milligrams per kilogram (mg/kg) to 45 mg/kg] greater than the laboratory reporting limit in each of the samples. There is no MTCA Method A cleanup level

or published background concentration for barium. The detected concentrations are less than the MTCA Method B preliminary soil cleanup level (824 mg/kg). The analytical results indicate concentrations of total chromium (21 mg/kg to 37 mg/kg) greater than the laboratory reporting limit in each of the samples. The detected concentrations are less than the MTCA Method A cleanup level for chromium III based on unrestricted land uses (2,000 mg/kg). The analytical results indicate concentrations of lead (22 mg/kg to 120 mg/kg) greater than the laboratory reporting limit in 2 of the 27 samples. The detected concentrations are less than the MTCA Method A cleanup level for unrestricted land uses (250 mg/kg).

- Twenty-six soil samples were analyzed for PAHs. The analytical results indicate concentrations of PAHs greater than the laboratory reporting limit in 6 of the 26 samples analyzed. The detected concentrations ranged from 0.01 mg/kg to 0.096 mg/kg. Carcinogenic PAHs (cPAHS; benzo[a]pyrene, benzo[a]anthracence, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenzo[a,h]anthracene, and indeno[1,2,3-cd]pyrene) were evaluated using toxicity equivalency factors (TEF). Based on total toxicity equivalence (TEQ), the detected concentrations of cPAHs (0.001 mg/kg to 0.045 mg/kg) are less than the MTCA Method A cleanup level based on unrestricted land uses (0.01 mg/kg). The detected concentrations of non-carcinogenic PAHs [naphthalene, pyrene, fluoranthene, phenanthrene, anthracene, and benzo(g,h,i)perylene] were less than the MTCA Method A levels, where available. There are no MTCA Method A cleanup levels for phenanthrene or benzo(g,h,i)perylene.

- Twenty-seven soil samples were analyzed for petroleum hydrocarbons using the HCID method to evaluate the presence and type(s) of petroleum contamination in soil. Total petroleum hydrocarbons were not detected above the laboratory reporting limit in any of the 27 soil samples analyzed.

In summary, metals (specifically barium, chromium, and lead) were detected above the laboratory reporting limit in each of the 27 soil samples analyzed. The detected concentrations were less than the applicable MTCA cleanup levels. PAHs were detected in 6 of the 26 soil samples analyzed. The detected concentrations were less than the applicable MTCA cleanup levels, where available. Petroleum hydrocarbons were not detected above the reporting limits in any of the 27 soil samples analyzed.

### 5.2.2 GROUNDWATER ANALYTICAL RESULTS

Six groundwater samples (including one field duplicate) were selected for chemical analysis. The analytical results for the groundwater samples are summarized in Table 2 and include:

- Six groundwater samples were analyzed for total metals. The analytical results indicate concentrations of barium [58 micrograms per liter (µg/L) to 140 µg/L] greater than the laboratory reporting limit in each of the six samples. There is no MTCA Method A cleanup level for barium. The detected concentrations are less than the MTCA Method B preliminary cleanup level (1,000 µg/L). Total chromium (12 µg/L) was detected above the laboratory reporting limit in one of six samples analyzed. The detected concentration is less than the MTCA Method A cleanup level (50 µg/L).

- Two groundwater samples were analyzed for dissolved iron and manganese. Analytical results indicate concentrations of dissolved iron (80 µg/L to 100 µg/L) and dissolved

manganese (300 µg/L to 970 µg/L) greater than the laboratory reporting limit in both of the samples analyzed. There are no MTCA Method A cleanup levels for iron or manganese. The detected concentrations of iron are less than the MTCA Method B preliminary cleanup level (300 µg/L). There are no MTCA Method B cleanup levels for manganese.

- Six groundwater samples were analyzed for VOCs. Analytical results indicate concentrations of toluene (0.21 µg/L to 0.64 µg/L) greater than the laboratory reporting limit in each of the six samples. The detected concentrations are well below the MTCA Method A cleanup level (1,000 µg/L).

- Six groundwater samples were analyzed for total diesel-range petroleum hydrocarbons, total gasoline-range petroleum hydrocarbons, BTEX, SVOCs, PCBs, and organochlorine pesticides. Petroleum hydrocarbons, BTEX, SVOCs, PCBs, and pesticides were not detected above the laboratory reporting limits in any of the six samples analyzed.

In summary, metals (specifically barium, chromium, iron, and/or manganese) were detected above the laboratory reporting limit in each of the six groundwater samples analyzed. The detected concentrations are less than the applicable MTCA cleanup levels, where available. There are no MTCA Method A or B cleanup levels for dissolved manganese. Toluene was detected in each of the six groundwater samples analyzed at concentrations that are well below the MTCA Method A cleanup level. Petroleum hydrocarbons, BTEX, PCBs, SVOCs, and pesticides were not detected above the reporting limits in any of the samples analyzed.

### 5.2.3 SEDIMENT ANALYTICAL RESULTS

Four sediment samples were selected for chemical analysis. The analytical results for the sediment samples are summarized in Table 3 and include:

- Four sediment samples were analyzed for total metals. The analytical results indicate concentrations of barium (34 mg/kg to 41 mg/kg) greater than the laboratory reporting limit in each of the samples. There are no sediment screening levels, cleanup screening levels, or MTCA Method A soil cleanup levels for barium. The detected concentrations are less than the MTCA Method B cleanup level (824 mg/kg). The analytical results indicate concentrations of total chromium (30 mg/kg to 58 mg/kg) greater than the laboratory reporting limit in each of the samples. The detected concentrations are less than the SQS (260 mg/kg), the CSL (270 mg/kg), and the MTCA Method A soil cleanup level for chromium III for unrestricted land uses (2,000 mg/kg). The analytical results indicate concentrations of lead (9.7 mg/kg to 10 mg/kg) greater than the laboratory reporting limit in two of the four samples. The detected concentrations are less than the SQS (450 mg/kg), the CSL (530 mg/kg), and the MTCA Method A soil cleanup level for unrestricted land uses (250 mg/kg).

- Four sediment samples were analyzed for SVOCs. The analytical results indicate that pyrene (0.014 µg/kg to 0.017 µg/kg) and fluoranthene (0.016 µg/kg to 0.018 µg/kg) were detected above the laboratory reporting limit in two of the four samples. The SQS and CSL for these compounds are normalized to TOC and could not be used for comparison; however, the

detected concentrations are only slightly above the laboratory reporting limits. There are no MTCA Method A soil cleanup levels for pyrene or fluoranthene.

- Four sediment samples were analyzed for diesel-range petroleum hydrocarbons and gasoline-range petroleum hydrocarbons/BTEX. Diesel-range petroleum hydrocarbons (50 mg/kg) were detected above the laboratory reporting limit in one of the four samples analyzed. The detected concentration is less than the MTCA Method A soil cleanup level for unrestricted land uses (2,000 mg/kg). Lube oil-range petroleum hydrocarbons were detected above the laboratory reporting limit in three of the four samples (130 mg/kg to 330 mg/kg). The detected concentrations are less than the MTCA Method A soil cleanup level for unrestricted land uses (2,000 mg/kg). There are no sediment screening levels for diesel- or lube oil-range petroleum hydrocarbons. Gasoline-range petroleum hydrocarbons/BTEX were not detected above the reporting limits in any of the sediment samples analyzed.

- Four sediment samples were analyzed for dioxins and furans. Dioxins and furans [1.5 picograms per gram (pg/g) to 305 pg/g] were detected above the laboratory reporting limit in three of the four samples analyzed. There are no sediment screening levels or MTCA Method A soil cleanup levels for dioxins and furans.

- Four sediment samples were analyzed for PCBs and pesticides. PCBs and pesticides were not detected above the reporting limits in any of the sediment samples analyzed.

In summary, metals (specifically barium, chromium, and/or lead) were detected in each of the four sediment samples analyzed. The detected concentrations are below the SQS and CSL screening levels and the MTCA Method A soil cleanup levels for unrestricted land uses. Lube oil-range petroleum hydrocarbons were detected in three of the four sediment samples analyzed, and diesel-range petroleum hydrocarbons were detected in one of the four sediment samples analyzed. There are no SQS of CSL screening levels for lube oil- or diesel-range petroleum hydrocarbons. The detected concentrations are less than the MTCA Method A soil cleanup levels for unrestricted land uses. Low concentrations of PAHs (specifically pyrene and fluoranthene) were detected in two of the four sediment samples. There are no available SQS or CSL screening levels or MTCA Method A soil cleanup levels for pyrene or fluoranthene. Dioxins and furans were detected in three of the four sediment samples analyzed. There are no SQS or CSL screening levels for dioxins and furans. The detected concentrations of dioxins and furans (0.642 pg/g to 1.15 pg/g when evaluated by TEQ) are less than the mean concentrations detected in soil in Washington State (2.8 pg/g) during a 1998 Ecology screening survey (Ecology 1998) and lower than the EPA Office of Solid Waste and Emergency Response screening levels for soil at residential (1,000 pg/g) and industrial (5,000 to 20,000 pg/g) sites (EPA 1998). Detected concentrations of individual dioxins and furans were higher than the concentrations detected during a 1989 Ecology survey of the sediments in Grays Harbor, which may indicate continued discharges of industrial effluent from pulp mills located upstream of the property. The higher concentrations may also be due to contaminants settling out of the effluent farther downstream from the pulp mill outfalls. The samples from the 1989

survey were collected in the immediate vicinity of the outfalls. TPH-G, BTEX, PCBs, and pesticides were not detected in any of the four sediment samples analyzed.

# 6.0 DISCUSSION OF FINDINGS AND CONCLUSIONS

## 6.1 FINDINGS

Landau Associates has conducted a modified PSI at the property located at the confluence of the Chehalis and Hoquiam Rivers in Hoquiam, Washington. The findings of the modified PSI are as follows:

- The property consists of approximately 45 acres of undeveloped land. The property is relatively flat with average surface elevations varying from 13 to 15 ft mean lower low water. The property is predominately covered with grass, except for an approximately 10-ft-wide gravel access road/dike that runs along the west, south, and east boundaries of the property. The majority of the property was originally a salt marsh before the area was filled with dredge material in 1977 and 1978. The various stages of the filling are visible in aerial photographs of the property.

- Subsurface soil at the property consists of dredge fill underlain by silts and sands. The measured groundwater elevations ranged from 7.7 to 9.8 ft BGS during the current investigation. Based on topography and the property's location adjacent to the tidally influenced Chehalis River, groundwater elevations at the property fluctuate due to seasonal and tidal influences, with maximum elevations generally occurring during the winter and spring months. The overall direction of groundwater flow is anticipated to be to the south toward Grays Harbor, except when groundwater is under tidal influence. Groundwater flow will generally be inhibited during periods of high tide and enhanced during periods of low tide.

- Based on historical information, the property was formerly operated as a shingle mill (1902-1928) and a fish reduction plant (1948). A refuse burner was associated with the shingle mill. The mill structures were built on piles, which were reportedly filled under with refuse. Fuel storage was shown on historical Sanborn maps in association with both the shingle mill and the fish reduction plant. The Sanborn maps do not indicate if the fuel was stored in aboveground or underground tanks. The maps show that the western portion of the property was used for lumber storage at one time and that several shacks and cabins were located along the northern property boundary. It is possible that heating oil tanks and/or septic systems were associated with the residential structures. Evidence of fuel tanks, heating oil tanks, and/or septic systems was not observed during site reconnaissance or field activities.

- According to the Environmental Data Resources report, one site was identified with the potential to impact the property. The BNSF Hoquiam site is located to the north and hydraulically upgradient of the property. This site is listed on the CSCSL, FINDS, and VCP databases. According to the Ecology Project Manager, soil and groundwater contamination have been identified on this site and there is potential for offsite contamination. Ecology files would need to be reviewed to evaluate whether additional information is available regarding the status of cleanup at this site and the potential for this site to impact the property; however, contaminants of concern were not detected in soil (B-15) or groundwater (MW-5) samples collected nearest to the northern property boundary at concentrations exceeding the applicable MTCA cleanup levels. Low concentrations of barium and chromium were detected in soil sample B-15, and low concentrations of toluene and barium were detected in groundwater sample MW-5. The detected concentrations were similar to those detected in soil and groundwater samples collected from across the property and likely reflect area-wide concentrations.

- As part of the environmental investigation, a total of 11 soil borings were advanced in the upland portion of the property. From the soil borings, a total of 27 soil samples were selected for chemical analysis. Metals (specifically barium, chromium, and lead) and PAHs were detected in the soil samples; however, the detected concentrations were less than the applicable MTCA cleanup levels in each of the samples analyzed.

- Groundwater samples were collected from five monitoring wells installed at selected soil boring locations. Metals (specifically barium, chromium, iron, and manganese) and one VOC (toluene) were detected in groundwater samples; however, the detected concentrations were below the applicable MTCA cleanup levels. Petroleum hydrocarbons, BTEX, PCBs, SVOCs, and pesticides were not detected above the reporting limits in any of the groundwater samples analyzed.

- Four sediment samples were collected from two offshore soil borings advanced along the southern shore of the property. Metals, PAHs, diesel- and lube oil-range petroleum hydrocarbons, and dioxin and furans were detected in three of the four sediment samples analyzed. The detected levels were below the SMS, SQS, and CSL screening levels, and MTCA cleanup levels, where available. There are no sediment screening levels for petroleum hydrocarbons or dioxins and furans. The detected concentrations of diesel- and lube oil-range petroleum hydrocarbons are below the MTCA soil cleanup levels. The detected concentrations of dioxins and furans (when evaluated by TEQ) are less than the mean concentrations detected in soil in Washington State during a 1998 Ecology screening survey, and lower than the EPA Office of Solid Waste and Emergency Response screening levels for soil at residential and industrial sites. Detected concentrations of individual dioxins and furans were higher than the concentrations detected during a 1989 Ecology survey of the sediments in Grays Harbor, which may indicate continued discharges of industrial effluent from pulp mills located upstream of the property. The higher concentrations may also be due to contaminants settling out of the effluent farther downstream from the pulp mill outfalls. The samples collected during the 1989 survey were collected in the immediate vicinity of the outfalls. TPH-G, BTEX, PCBs, and pesticides were not detected above the reporting limits in any of the sediment samples analyzed.

## 6.2 DATA VALIDITY

Data quality evaluation was completed in accordance with the Quality Assurance Project Plan (QAPP), which was submitted to WSDOT as part of the Work Plan (Landau Associates 2006a). A copy of the data quality evaluation is included in Appendix E of this report. In summary, data precision was evaluated through laboratory duplicates, field duplicates, matrix spike duplicates, and laboratory control samples duplicates. Data accuracy was evaluated through surrogate spikes, matrix spikes, and laboratory control samples. Based on this data quality evaluation, all of the data were determined to be acceptable and no data were rejected. The completeness for the data set is 100 percent (Landau Associates 2006a).

## 6.3 CONCLUSIONS

The findings of the modified PSI document that the property and adjacent properties have been used for various industrial purposes since about 1900. The northeastern portion of the property was historically operated as a shingle mill (1902-1928) and fish reduction plant (1948). Structures associated with these facilities were built on piles, which were reportedly filled under with refuse, and both the shingle mill and the fish reduction plant included fuel storage. The northwestern portion of the property was developed by the 1950s with a series of cabins and shacks. There is no specific evidence of the handling or use of potentially hazardous materials in this area, but based on anticipated residential use, the structures may have had associated heating oil tanks and/or septic systems. The southern portion of the property consisted of marshland and tide flats until approximately 1977 when the property was filled using dredged material from Grays Harbor. Between 1978 and 1988, the property was leveled and graded.

The soil, groundwater, and sediment samples collected during the modified PSI were analyzed for potential contaminants anticipated to have been associated with the past industrial uses of the property and the surrounding area, as well as for analytes detected during previous sediment sampling in Grays Harbor by Ecology and EPA. The soil samples were analyzed for total petroleum hydrocarbons, PAHs, and total metals. The groundwater samples were analyzed for total metals, total petroleum hydrocarbons, volatile organic compounds including BTEX, semivolatile organic compounds including PAHs, PCBs, organochlorine pesticides, and/or dissolved iron and manganese. The sediment samples were analyzed for total metals, total petroleum hydrocarbons, BTEX, SVOCs including PAHs, PCBs, organochlorine pesticides, and dioxins and furans.

The soil samples were collected from 11 borings located to represent soil quality in various areas of the property (Figure 2). The groundwater samples were collected from five monitoring wells located throughout the property to assess property-wide groundwater quality and to assess potential contamination due to locations hydraulically upgradient of the well locations (Figures 2 and 3). The analytical results for the soil and groundwater samples collected from the property do not indicate any analyte concentrations greater than the applicable MTCA cleanup levels for unrestricted land uses. Therefore, the data do not indicate widespread soil contamination on the property at concentrations greater than the MTCA cleanup levels, or the presence of soil concentrations on or hydraulically upgradient of the property sufficient to result in groundwater contamination above cleanup levels in the wells on the property. The analytical results for the soil and groundwater samples also do not indicate limitations on disposal of groundwater from the property based on contaminant concentrations. However, the data do not preclude the localized presence of soil contamination that may not be sufficient to result in contamination of downgradient groundwater, but may require special handling. Based on the available

historical information on past uses of the property, localized areas of contamination could be present in the northeastern portion of the property where the shingle mill and fish reduction plant were located or in the northwestern portion where the residential structures were located.

The analyte concentrations detected in the sediment samples were below the SMS screening levels (SQS and CSL) and MTCA soil cleanup levels, where available. The detected concentrations of dioxins and furans (when evaluated by TEQ) are less than the mean concentrations detected in soil in Washington State during a 1998 Ecology screening survey, and lower than the EPA Office of Solid Waste and Emergency Response screening levels for soil at residential and industrial sites. Previous sediment sampling in Grays Harbor indicated dioxin and furans due to pulp mill effluent at three locations up the Chehalis River from the property. There is no evidence to suggest that there was a pulp mill operation on the property, and the dioxins and furans detected in the sediment samples collected during the modified PSI are anticipated to be due to up-river sources. The presence of detectable concentrations of dioxins and furans in sediment warrants further characterization to assess requirements for disposal of any sediment dredged from the offshore portion of the property, and to assess limitations on the upland use of dredged sediment.

# 7.0 RECOMMENDATIONS

The modified PSI did not identify any soil or groundwater with analyte concentrations above applicable MTCA cleanup levels. Based on these data, no additional investigative action is warranted regarding the upland portion of the property. The available data also do not indicate limitations on the disposal of groundwater pumped from the property, based on the chemical analysis conducted during the modified PSI and the MTCA cleanup levels. Prior to disposal of any water, the specific requirements of the receiving entity should be reviewed and additional data collected, as appropriate.

The available data do not indicate reuse or disposal limitations on soil excavated from the property, based on the modified PSI analytical results and applicable MTCA cleanup levels (including the MTCA Method A soil cleanup levels for unrestricted land uses). However, the industrial history of the property and the potential liability associated with the receiving entity should be considered prior to planning for disposal of any soil from the property. Any soil excavated for offsite disposal or reuse should be visually screened for potential contamination and sampled, as appropriate, based on observations during excavation and loading and to meet the requirements of the receiving facility or property.

As discussed above, localized areas of soil contamination may be present in upland areas of the property including the northeastern portion (former shingle mill and fish reduction facility) and western portion (former residential structures). The data suggest that any localized soil contamination has not impacted groundwater; however, if localized soil contamination is encountered during any future investigation, excavation, or construction at the property, special handling and worker protection would be required. WSDOT should consider the potential presence of localized contamination and the potential associated additional costs and schedule delays, and include notification in contract documents along with specifications to account for materials handling and worker health and safety.

Based on the presence of dioxins and furans in the sediment samples, additional characterization is needed if future construction activities at the property include potential dredging and disposal and/or reuse of sediment in upland portions of the property. The characterization should be planned and conducted to account for the anticipated construction activities and include sampling and analysis to assess potential disposal options.

# 8.0 LIMITATIONS

## 8.1 SPECIAL TERMS AND CONDITIONS

This modified PSI was undertaken and this report was prepared for the exclusive use of WSDOT and its legal representatives (authorized users) for specific application to the property. It is intended to provide the authorized users with an understanding of the potential environmental liabilities associated with the property evaluated in this report. Reliance on this report by third parties or others who do not have a contractual relationship with Landau Associates is at their sole risk.

## 8.2 LIMITATIONS AND EXCEPTIONS OF ASSESSMENT

Determining whether environmental conditions defined in this report indicate the presence of contamination at levels of concern is a matter of judgment. Liabilities associated with contaminated sites are defined in part by CERCLA and, for property located in Washington State, by MTCA. The findings and conclusions of this report are based on our evaluation of information we obtained and reviewed for this project and reflect our professional judgment with respect to that information.

## 8.3 LIMITING CONDITIONS AND METHODOLOGY USED

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for assessment of potentially contaminated sites and in general accordance with applicable WSDOT guidance and ASTM Standard Practice for Environmental Site Assessments: Environmental Site Assessment Process E-1527 and Phase II Environmental Site Assessment Process E-1903. This report is not meant to represent a legal opinion. Questions regarding this report and the associated work documented herein should be directed to Tim Syverson at (425) 778-0907.

This report was prepared by, and under the direction of, the following key staff:

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KFM/TLS/jdr

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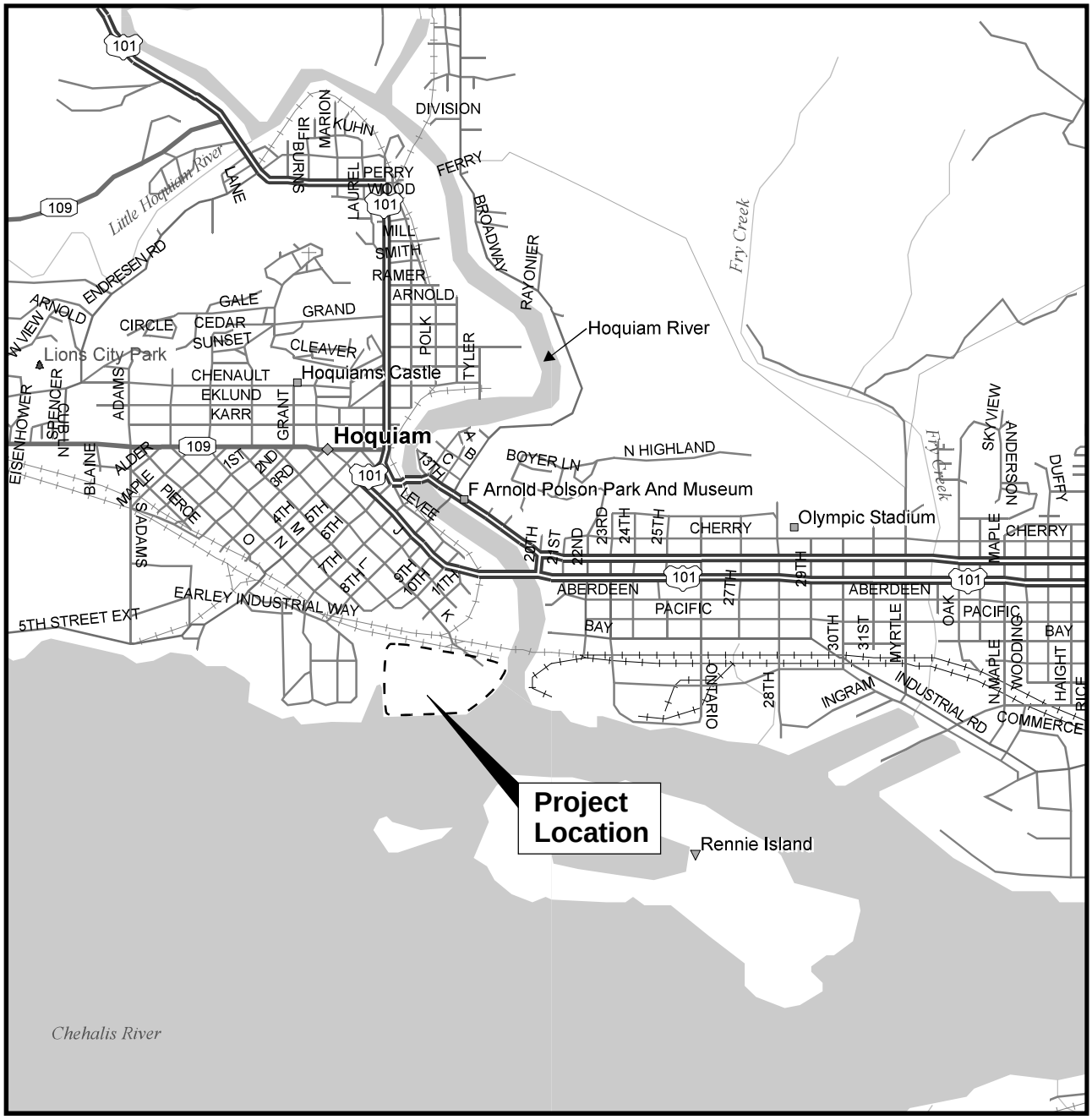
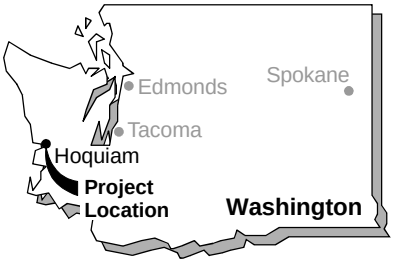



Map from DeLorme Street Atlas USA, 2002

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Scale in Miles

WSDOT/Special Projects Construction Site | V:\244\039\030\FIReportFig1.cdr 1/25/2007

LANDAU ASSOCIATES

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| WSDOT Special Projects Construction Site Hoquiam, Washington | **Vicinity Map** | Figure 1 |

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SEC. 12, T. 17N., R.10W., WM.
GRAYS HARBOR COUNTY

EXISTING PSF RAILROAD TRACK

EXISTING PUMP STATION

CPT-7
MW-5
CPT-21
CPT-23
B-15
CPT-22
CPT-8
CPT-15
B-20
MW-13
CPT-12
CPT-11
CPT-19 (SWV)
MW-9
MW-6
Hoquiam River
MW-4
B-12
MW-3
VW-4
VW-6
VW-5
PW-2
CPT-10
CPT-16
CPT-6
CPT-14
CPT-18
CPT-9
CPT-3
B-8
CPT-5
CPT-4
MW-11
CPT-17 (SWV)
CPT-20
B-10
CPT-13
Mill Pond
B-16
CPT-1
MW-2
VW-1
VW-3
PW-1
VW-2
CPT-2
MW-7
MW-1
B-14
B-17
Chehalis River
B-18
B-19
LAYOUT

## Legend

| | |
|---|---|
| B-1 | Boring Location and Designation |
| CPT-1 | Cone Penetrometer Location and Designation |
| MW-1 | Monitoring Well Location and Designation |
| PW-1 | Proposed Pumping Well and Designation |
| VW-1 | Vibrating Wire Piezometer and Designation |

0 200 400
Scale in Feet

*Base map source: WSDOT, 2005*

WSDOT - Special Projects
Construction Site
Hoquiam, Washington

**Site and Exploration Plan**

Figure
2

LANDAU ASSOCIATES

WSDOT/Geotechnical Report | V:\244\039\030\F\Report\Fig2.dwg (A) 'Figure 2" 2/2/2007

# TABLE 1
## SOIL ANALYTICAL RESULTS
## WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
## PORT OF GRAYS HARBOR
## HOQUIAM, WASHINGTON

| | MTCA Method A Soil Cleanup Levels for Unrestricted Land Use | MTCA Method A Soil Cleanup Levels for Industrial Properties | B-8 S-1 07-128-01 7/18/2006 | B-8 S-2 KB08A 7/13/2006 | B-8 S-4 07-128-02 7/18/2006 | B-8 S-9 / S-8 07-128-03 7/18/2006 | B-9 S-2 KB08B 7/18/2006 | B-9 S-3 07-102-05 7/13/2006 | B-9 S-6 07-102-06 7/13/2006 |
|---|---|---|---|---|---|---|---|---|---|
| **NWTPH-HCID (mg/kg)** | | | | | | | | | |
| Gasoline | 100 | 100 | 40 U | NA | 33 U | 32 U | NA | 34 U | 36 U |
| Diesel Fuel | 2000 | 2000 | 100 U | NA | 83 U | 79 U | NA | 86 U | 89 U |
| Lube Oil | 2000 | 2000 | 200 U | NA | 170 U | 160 U | NA | 170 U | 180 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | |
| **Methods 6010B/7471A** | | | | | | | | | |
| Arsenic | 20 | 20 | 20 U | NA | 17 U | 16 U | NA | 17 U | 18 U |
| Barium | | 824 (c) | 34 | NA | 39 | 38 | NA | 30 | 39 |
| Cadmium | 2 | 2 | 1.00 U | NA | 0.83 U | 0.79 U | NA | 0.86 U | 0.89 U |
| Chromium | 2000 (a) | 2000 (a) | 33 | NA | 30 | 29 | NA | 26 | 31 |
| Lead | 250 | 1000 | 22 | NA | 120 | 7.9 U | NA | 8.6 U | 8.9 U |
| Mercury | 2 | 2 | 0.50 U | NA | 0.42 U | 0.40 U | NA | 0.43 U | 0.45 U |
| Selenium | | | 20 U | NA | 17 U | 16 U | NA | 17 U | 18 U |
| Silver | | | 1.00 U | NA | 0.83 U | 0.79 U | NA | 0.86 U | 0.89 U |
| **PAHs (mg/kg)** | | | | | | | | | |
| **Method 8270-SIM** | | | | | | | | | |
| Naphthalene | | | 0.021 | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| 2-Methylnaphthalene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| 1-Methylnaphthalene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Naphthalenes (b) | 5 (b) | 5 (b) | 0.021 | NA | ND | ND | NA | ND | ND |
| Acenaphthylene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Acenaphthene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Fluorene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Phenanthrene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Anthracene | | 1137 (c) | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Fluoranthene | | 89 (c) | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Pyrene | | 655 (c) | 0.013 | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Benzo(a)anthracene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Chrysene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Benzo(b)fluoranthene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Benzo(k)fluoranthene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Benzo(a)pyrene | 0.1 | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Indeno(1,2,3-cd)pyrene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Dibenz(a,h)anthracene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| Benzo(g,h,i)perylene | | | 0.013 U | NA | 0.011 U | 0.011 U | NA | 0.011 U | 0.012 U |
| TEQ | 0.1 | 2 | ND | NA | ND | ND | NA | ND | ND |
| **RESISTIVITY** | | | | | | | | | |
| **ASTM G-57** | | | | | | | | | |
| Resistivity (ohm-cm) | | | NA | 180 | NA | NA | 200 | NA | NA |
| Temperature (deg C) | | | NA | 23 | NA | NA | 23 | NA | NA |

# TABLE 1
## SOIL ANALYTICAL RESULTS
## WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
## PORT OF GRAYS HARBOR
## HOQUIAM, WASHINGTON

| | MTCA Method A Soil Cleanup Levels for Unrestricted Land Use | MTCA Method A Soil Cleanup Levels for Industrial Properties | B-10 S-2 07-016-01 7/5/2006 | B-10 S-3 07-016-02 7/5/2006 | B-10 S-7 07-016-03 7/5/2006 | B-11 S-1 07-102-01 7/13/2006 | B-11 S-1 KB08C 7/18/2006 | B-11 S-4 07-102-02 7/13/2006 | B-12 S-1 07-072-01 7/11/2006 |
|---|---|---|---|---|---|---|---|---|---|
| **NWTPH-HCID (mg/kg)** | | | | | | | | | |
| Gasoline | 100 | 100 | 27 U | 35 U | 33 U | 28 U | NA | 33 U | 33 U |
| Diesel Fuel | 2000 | 2000 | 67 U | 88 U | 83 U | 69 U | NA | 82 U | 82 U |
| Lube Oil | 2000 | 2000 | 130 U | 180 U | 170 U | 140 U | NA | 160 U | 160 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | |
| **Methods 6010B/7471A** | | | | | | | | | |
| Arsenic | 20 | 20 | 13 U | 18 U | 17 U | 14 U | NA | 16 U | 16 U |
| Barium | | 824 (c) | 19 | 35 | 31 | 33 | NA | 36 | 45 |
| Cadmium | 2 | 2 | 0.67 U | 0.88 U | 0.83 U | 0.69 U | NA | 0.82 U | 0.82 U |
| Chromium | 2000 (a) | 2000 (a) | 23 | 30 | 27 | 28 | NA | 29 | 37 |
| Lead | 250 | 1000 | 6.7 U | 8.8 U | 8.3 U | 6.9 U | NA | 8.2 U | 8.2 U |
| Mercury | 2 | 2 | 0.33 U | 0.44 U | 0.42 U | 0.35 U | NA | 0.41 U | 0.41 U |
| Selenium | | | 13 U | 18 U | 17 U | 14 U | NA | 16 U | 16 U |
| Silver | | | 0.67 U | 0.88 U | 0.83 U | 0.69 U | NA | 0.82 U | 0.82 U |
| **PAHs (mg/kg)** | | | | | | | | | |
| **Method 8270-SIM** | | | | | | | | | |
| Naphthalene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| 2-Methylnaphthalene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| 1-Methylnaphthalene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Naphthalenes (b) | 5 (b) | 5 (b) | ND | ND | ND | ND | NA | ND | ND |
| Acenaphthylene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Acenaphthene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Fluorene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Phenanthrene | | | 0.0089 U | 0.017 | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Anthracene | | 1137 (c) | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Fluoranthene | | 89 (c) | 0.0089 U | 0.025 | 0.011 U | 0.015 | NA | 0.011 U | 0.013 |
| Pyrene | | 655 (c) | 0.0089 U | 0.023 | 0.011 U | 0.013 | NA | 0.011 U | 0.012 |
| Benzo(a)anthracene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Chrysene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Benzo(b)fluoranthene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Benzo(k)fluoranthene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Benzo(a)pyrene | 0.1 | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Indeno(1,2,3-cd)pyrene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Dibenz(a,h)anthracene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| Benzo(g,h,i)perylene | | | 0.0089 U | 0.012 U | 0.011 U | 0.0093 U | NA | 0.011 U | 0.011 U |
| TEQ | 0.1 | 2 | ND | ND | ND | ND | NA | ND | ND |
| **RESISTIVITY** | | | | | | | | | |
| **ASTM G-57** | | | | | | | | | |
| Resistivity (ohm-cm) | | | NA | NA | NA | NA | 560 | NA | NA |
| Temperature (deg C) | | | NA | NA | NA | NA | 23 | NA | NA |

# TABLE 1
## SOIL ANALYTICAL RESULTS
## WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
## PORT OF GRAYS HARBOR
## HOQUIAM, WASHINGTON

| | MTCA Method A Soil Cleanup Levels for Unrestricted Land Use | MTCA Method A Soil Cleanup Levels for Industrial Properties | B-12 S-3 07-072-02 7/11/2006 | B-12 S-7 07-072-03 7/11/2006 | B-13 S-1 07-062-01 7/11/2006 | B-13 S-1 KB08D 7/13/2006 | B-13 S-3 07-062-02 7/11/2006 | B-13 S-8 07-062-03 7/11/2006 | B-14 S-1 07-038-01 7/7/2006 |
|---|---|---|---|---|---|---|---|---|---|
| **NWTPH-HCID (mg/kg)** | | | | | | | | | |
| Gasoline | 100 | 100 | 30 U | 34 U | 32 U | NA | 31 U | 34 U | 24 U |
| Diesel Fuel | 2000 | 2000 | 75 U | 85 U | 81 U | NA | 78 U | 85 U | 60 U |
| Lube Oil | 2000 | 2000 | 150 U | 170 U | 160 U | NA | 160 U | 170 U | 120 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | |
| **Methods 6010B/7471A** | | | | | | | | | |
| Arsenic | 20 | 20 | 15 U | 17 U | 16 U | NA | 16 U | 17 U | 12 U |
| Barium | | 824 (c) | 31 | 41 | 37 | NA | 26 | 42 | 18 |
| Cadmium | 2 | 2 | 0.75 U | 0.85 U | 0.81 U | NA | 0.78 U | 0.85 U | 0.60 U |
| Chromium | 2000 (a) | 2000 (a) | 30 | 34 | 32 | NA | 28 | 35 | 21 |
| Lead | 250 | 1000 | 7.5 U | 8.5 U | 8.1 U | NA | 7.8 U | 8.5 U | 6.0 U |
| Mercury | 2 | 2 | 0.37 U | 0.42 U | 0.40 U | NA | 0.39 U | 0.42 U | 0.30 U |
| Selenium | | | 15 U | 17 U | 16 U | NA | 16 U | 17 U | 12 U |
| Silver | | | 0.75 U | 0.85 U | 0.81 U | NA | 0.78 U | 0.85 U | 0.60 U |
| **PAHs (mg/kg)** | | | | | | | | | |
| **Method 8270-SIM** | | | | | | | | | |
| Naphthalene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| 2-Methylnaphthalene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| 1-Methylnaphthalene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Naphthalenes (b) | 5 (b) | 5 (b) | ND | ND | ND | NA | ND | ND | ND |
| Acenaphthylene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Acenaphthene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Fluorene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Phenanthrene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Anthracene | | 1137 (c) | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Fluoranthene | | 89 (c) | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Pyrene | | 655 (c) | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Benzo(a)anthracene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Chrysene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Benzo(b)fluoranthene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Benzo(k)fluoranthene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Benzo(a)pyrene | 0.1 | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Indeno(1,2,3-cd)pyrene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Dibenz(a,h)anthracene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| Benzo(g,h,i)perylene | | | 0.010 U | 0.011 U | 0.011 U | NA | 0.010 U | 0.011 U | 0.0079 U |
| TEQ | 0.1 | 2 | ND | ND | ND | NA | ND | ND | ND |
| **RESISTIVITY** | | | | | | | | | |
| **ASTM G-57** | | | | | | | | | |
| Resistivity (ohm-cm) | | | NA | NA | NA | 100 | NA | NA | NA |
| Temperature (deg C) | | | NA | NA | NA | 23 | NA | NA | NA |

# TABLE 1
## SOIL ANALYTICAL RESULTS
## WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
## PORT OF GRAYS HARBOR
## HOQUIAM, WASHINGTON

| | MTCA Method A Soil Cleanup Levels for Unrestricted Land Use | MTCA Method A Soil Cleanup Levels for Industrial Properties | B-14 S-3 07-038-02 7/7/2006 | B-14 S-7 07-038-03 7/7/2006 | B-15 S-3 07-063-02 7/11/2006 | B-15 S-6 07-063-03 7/11/2006 | B-17 S-1 07-136-01 7/19/2006 | B-16 S-1 07-128-04 7/18/2006 | B-16 S-4 07-128-05 7/18/2006 |
|---|---|---|---|---|---|---|---|---|---|
| **NWTPH-HCID (mg/kg)** | | | | | | | | | |
| Gasoline | 100 | 100 | 30 U | 31 U | 35 U | 35 U | 31 U | 26 U | 29 U |
| Diesel Fuel | 2000 | 2000 | 75 U | 77 U | 88 U | 88 U | 78 U | 66 U | 72 U |
| Lube Oil | 2000 | 2000 | 150 U | 150 U | 180 U | 180 U | 160 U | 130 U | 140 U |
| **TOTAL METALS (mg/kg)** | | | | | | | | | |
| **Methods 6010B/7471A** | | | | | | | | | |
| Arsenic | 20 | 20 | 15 U | 15 U | 18 U | 18 U | 16 U | 13 U | 14 U |
| Barium | | 824 (c) | 41 | 33 | 36 | 36 | 38 | 19 | 31 |
| Cadmium | 2 | 2 | 0.75 U | 0.77 U | 0.88 U | 0.88 U | 0.78 U | 0.66 U | 0.72 U |
| Chromium | 2000 (a) | 2000 (a) | 33 | 27 | 32 | 32 | 31 | 24 | 29 |
| Lead | 250 | 1000 | 7.5 U | 7.7 U | 8.8 U | 8.8 U | 7.8 U | 6.6 U | 7.2 U |
| Mercury | 2 | 2 | 0.37 U | 0.38 U | 0.44 U | 0.44 U | 0.39 U | 0.33 U | 0.36 U |
| Selenium | | | 15 U | 15 U | 18 U | 18 U | 16 U | 13 U | 14 U |
| Silver | | | 0.75 U | 0.77 U | 0.88 U | 0.88 U | 0.78 U | 0.66 U | 0.72 U |
| **PAHs (mg/kg)** | | | | | | | | | |
| **Method 8270-SIM** | | | | | | | | | |
| Naphthalene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.012 | 0.0088 U | 0.0097 U |
| 2-Methylnaphthalene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.010 U | 0.0088 U | 0.0097 U |
| 1-Methylnaphthalene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.010 U | 0.0088 U | 0.0097 U |
| Naphthalenes (b) | 5 (b) | 5 (b) | ND | ND | NA | ND | 0.012 | ND | ND |
| Acenaphthylene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.010 U | 0.0088 U | 0.0097 U |
| Acenaphthene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.010 U | 0.0088 U | 0.0097 U |
| Fluorene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.010 U | 0.0088 U | 0.0097 U |
| Phenanthrene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.044 | 0.017 | 0.0097 U |
| Anthracene | | 1137 (c) | 0.010 U | 0.010 U | NA | 0.012 U | 0.017 | 0.0088 U | 0.0097 U |
| Fluoranthene | | 89 (c) | 0.010 U | 0.010 U | NA | 0.012 U | 0.096 | 0.027 | 0.0097 U |
| Pyrene | | 655 (c) | 0.010 U | 0.010 U | NA | 0.012 U | 0.095 | 0.023 | 0.0097 U |
| Benzo(a)anthracene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.046 | 0.01 | 0.0097 U |
| Chrysene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.044 | 0.0088 U | 0.0097 U |
| Benzo(b)fluoranthene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.041 | 0.0088 U | 0.0097 U |
| Benzo(k)fluoranthene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.015 | 0.0088 U | 0.0097 U |
| Benzo(a)pyrene | 0.1 | | 0.010 U | 0.010 U | NA | 0.012 U | 0.033 | 0.0088 U | 0.0097 U |
| Indeno(1,2,3-cd)pyrene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.017 | 0.0088 U | 0.0097 U |
| Dibenz(a,h)anthracene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.010 U | 0.0088 U | 0.0097 U |
| Benzo(g,h,i)perylene | | | 0.010 U | 0.010 U | NA | 0.012 U | 0.022 | 0.0088 U | 0.0097 U |
| TEQ | 0.1 | 2 | ND | ND | NA | ND | 0.045 | 0.001 | ND |
| **RESISTIVITY** | | | | | | | | | |
| **ASTM G-57** | | | | | | | | | |
| Resistivity (ohm-cm) | | | NA | NA | NA | NA | NA | NA | NA |
| Temperature (deg C) | | | NA | NA | NA | NA | NA | NA | NA |

# TABLE 1
## SOIL ANALYTICAL RESULTS
## WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
## PORT OF GRAYS HARBOR
## HOQUIAM, WASHINGTON

| | MTCA Method A Soil Cleanup Levels for Unrestricted Land Use | MTCA Method A Soil Cleanup Levels for Industrial Properties | B-16 S-9 07-128-06 7/18/2006 | B-17 S-4 07-136-02 7/19/2006 | B-17 S-7 07-136-03 7/19/2006 |
|---|---|---|---|---|---|
| **NWTPH-HCID (mg/kg)** | | | | | |
| Gasoline | 100 | 100 | 33 U | 30 U | 33 U |
| Diesel Fuel | 2000 | 2000 | 83 U | 76 U | 83 U |
| Lube Oil | 2000 | 2000 | 170 U | 150 U | 170 U |
| **TOTAL METALS (mg/kg)** | | | | | |
| **Methods 6010B/7471A** | | | | | |
| Arsenic | 20 | 20 | 17 U | 15 U | 17 U |
| Barium | | 824 (c) | 37 | 40 | 37 |
| Cadmium | 2 | 2 | 0.83 U | 0.76 U | 0.83 U |
| Chromium | 2000 (a) | 2000 (a) | 27 | 31 | 30 |
| Lead | 250 | 1000 | 8.3 U | 7.6 U | 8.3 U |
| Mercury | 2 | 2 | 0.42 U | 0.38 U | 0.42 U |
| Selenium | | | 17 U | 15 U | 17 U |
| Silver | | | 0.83 U | 0.76 U | 0.83 U |
| **PAHs (mg/kg)** | | | | | |
| **Method 8270-SIM** | | | | | |
| Naphthalene | | | 0.011 U | 0.010 U | 0.011 U |
| 2-Methylnaphthalene | | | 0.011 U | 0.010 U | 0.011 U |
| 1-Methylnaphthalene | | | 0.011 U | 0.010 U | 0.011 U |
| Naphthalenes (b) | 5 (b) | 5 (b) | ND | ND | ND |
| Acenaphthylene | | | 0.011 U | 0.010 U | 0.011 U |
| Acenaphthene | | | 0.011 U | 0.010 U | 0.011 U |
| Fluorene | | | 0.011 U | 0.010 U | 0.011 U |
| Phenanthrene | | | 0.011 U | 0.010 U | 0.011 U |
| Anthracene | | 1137 (c) | 0.011 U | 0.010 U | 0.011 U |
| Fluoranthene | | 89 (c) | 0.011 U | 0.010 U | 0.011 U |
| Pyrene | | 655 (c) | 0.011 U | 0.010 U | 0.011 U |
| Benzo(a)anthracene | | | 0.011 U | 0.010 U | 0.011 U |
| Chrysene | | | 0.011 U | 0.010 U | 0.011 U |
| Benzo(b)fluoranthene | | | 0.011 U | 0.010 U | 0.011 U |
| Benzo(k)fluoranthene | | | 0.011 U | 0.010 U | 0.011 U |
| Benzo(a)pyrene | 0.1 | | 0.011 U | 0.010 U | 0.011 U |
| Indeno(1,2,3-cd)pyrene | | | 0.011 U | 0.010 U | 0.011 U |
| Dibenz(a,h)anthracene | | | 0.011 U | 0.010 U | 0.011 U |
| Benzo(g,h,i)perylene | | | 0.011 U | 0.010 U | 0.011 U |
| TEQ | 0.1 | 2 | ND | ND | ND |
| **RESISTIVITY** | | | | | |
| **ASTM G-57** | | | | | |
| Resistivity (ohm-cm) | | | NA | NA | NA |
| Temperature (deg C) | | | NA | NA | NA |

# TABLE 1
# SOIL ANALYTICAL RESULTS
# WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
# PORT OF GRAYS HARBOR
# HOQUIAM, WASHINGTON

Notes:

(a) Value is for Chromium III.

(b) Total value for naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

(c) Value is MTCA Method B Preliminary Soil Cleanup Level based on industrial land use and protection of fresh surface water (includes use as drinking water).

mg/kg = milligrams per kilogram (parts per million)

pg/g = picograms per gram

µg/g = micrograms per gram (parts per billion)

U = Compound was not detected at the given reporting limit.

NA = Not analyzed

# TABLE 2
# GROUNDWATER ANALYTICAL RESULTS
# WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
# PORT OF GRAYS HARBOR
# HOQUIAM, WASHINGTON

| | MTCA Method A Cleanup Levels for Groundwater | B-1 08-105-05 8/9/2006 | B-4 08-105-06 8/9/2006 | B-5 08-105-02 8/9/2006 | B-6 08-105-03 8/9/2006 | Dup of B-6 B-26 08-105-01 8/9/2006 | B-7 08-105-04 8/9/2006 |
|---|---|---|---|---|---|---|---|
| **TOTAL PETROLEUM HYDROCARBONS** | | | | | | | |
| **NWTPH-Dx (mg/L)** | | | | | | | |
| Diesel | 0.500 | 0.26 U | 0.26 U | 0.26 U | 0.26 U | 0.26 U | 0.26 U |
| Lube Oil | 0.500 | 0.41 U | 0.42 U | 0.41 U | 0.41 U | 0.42 U | 0.42 U |
| **NWTPH-Gx (µg/L)** | | | | | | | |
| Gasoline | 1000 | 100 U | 100 U | 100 U | 100 U | 100 U | 100 U |
| **BTEX (µg/L)** | | | | | | | |
| **EPA Method 8021B** | | | | | | | |
| Benzene | 5 | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Toluene | 1000 | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Ethylbenzene | 700 | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| m,p-Xylene | 1000 (b) | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| o-Xylene | 1000 (b) | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| **TOTAL METALS (µg/L)** | | | | | | | |
| **EPA Methods 200.8/7470A** | | | | | | | |
| Arsenic | 5 | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U | 3.0 U |
| Barium | 1000 (c) | 69 | 73 | 58 | 140 | 130 | 140 |
| Cadmium | 5 | 4.4 U | 4.4 U | 4.4 U | 4.4 U | 4.4 U | 4.4 U |
| Chromium | 50 | 12 | 11 U | 11 U | 11 U | 11 U | 11 U |
| Lead | 15 | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Mercury | 2 | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U | 0.50 U |
| Selenium | | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U |
| Silver | | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U |
| **DISSOLVED METALS (µg/L)** | | | | | | | |
| **EPA Method 6010B** | | | | | | | |
| Iron | 300 (c) | 80 | 100 | | | | |
| Manganese | | 970 | 300 | | | | |
| **VOLATILE ORGANIC COMPOUNDS (µg/L)** | | | | | | | |
| **EPA Method 8260B** | | | | | | | |
| Dichlorodifluoromethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Chloromethane | | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Vinyl Chloride | 0.2 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Bromomethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Chloroethane | | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Trichlorofluoromethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,1-Dichloroethene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Acetone | | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U |
| Iodomethane | | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Carbon Disulfide | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Methylene Chloride | 5 | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| trans 1,2-Dichloroethene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Methyl t-Butyl Ether | 20 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,1-Dichloroethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Vinyl Acetate | | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 2,2-Dichloropropane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| cis 1,2-Dichloroethene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 2-Butanone | | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U |
| Bromochloromethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Chloroform | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,1,1-Trichloroethane | 200 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Carbon Tetrachloride | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,1-Dichloropropene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Benzene | 5 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,2-Dichloroethane | 5 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Trichloroethene | 5 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,2-Dichloropropane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Dibromomethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |

# TABLE 2
# GROUNDWATER ANALYTICAL RESULTS
# WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
# PORT OF GRAYS HARBOR
# HOQUIAM, WASHINGTON

| | MTCA Method A Cleanup Levels for Groundwater | B-1 08-105-05 8/9/2006 | B-4 08-105-06 8/9/2006 | B-5 08-105-02 8/9/2006 | B-6 08-105-03 8/9/2006 | Dup of B-6 B-26 08-105-01 8/9/2006 | B-7 08-105-04 8/9/2006 |
|---|---|---|---|---|---|---|---|
| Bromodichloromethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 2-Chloroethyl Vinyl Ether | | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| cis 1,3-Dichloropropene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Methyl Isobutyl Ketone | | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Toluene | 1000 | 0.64 | 0.25 | 0.57 | 0.22 | 0.21 | 0.37 |
| tran 1,3-Dichloropropene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,1,2-Trichloroethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Tetrachloroethene | 5 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,3-Dichloropropane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 2-Hexanone | | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Dibromochloromethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,2-Dibromoethane | 0.01 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Chlorobenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,1,1,2-Tetrachloroethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Ethylbenzene | 700 | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| m,p-Xylene | 1000 (b) | 0.40 U | 0.40 U | 0.40 U | 0.40 U | 0.40 U | 0.40 U |
| o-Xylene | 1000 (b) | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Styrene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Bromoform | | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Isopropylbenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Bromoenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,1,2,2-Tetrachloroethane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,2,3-Trichloropropane | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| n-Propylbenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 2-Chlorotoluene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 4-Chlorotoluene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,3,5-Trimethylbenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| tert-Butylbenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,2,4-Trimethylbenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| sec-Butylbenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,3-Dichlorobenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| p-Isopropyltoluene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,4-Dichlorobenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,2-Dichlorobenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| n-Butylbenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| 1,2-Dibromo-3-chloropropane | | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2,4-Trichlorobenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Hexachlorobutadiene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| Naphthalene | 160 (a) | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| 1,2,3-Trichlorobenzene | | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U | 0.20 U |
| **SEMIVOLATILE ORGANIC COMPOUNDS (µg/L)** | | | | | | | |
| **EPA Method 8270C/SIM** | | | | | | | |
| N-Nitrosodimethylamine | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Pyridine | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Phenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Aniline | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| bis(2-Chloroethyl)ether | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2-Chlorophenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 1,3-Dichlorobenzene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 1,4-Dichlorobenzene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Benzyl alcohol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 1,2-Dichlorobenzene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2-Methylphenol (o-Cresol) | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| bis(2-Chloroisopropyl)ether | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| (3+4)-Methylphenol (m,p-Cresol) | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| N-Nitro-di-n-propylamine | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Hexachloroethane | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Nitrobenzene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Isophorone | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |

# TABLE 2
## GROUNDWATER ANALYTICAL RESULTS
## WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
## PORT OF GRAYS HARBOR
## HOQUIAM, WASHINGTON

| | MTCA Method A Cleanup Levels for Groundwater | B-1 08-105-05 8/9/2006 | B-4 08-105-06 8/9/2006 | B-5 08-105-02 8/9/2006 | B-6 08-105-03 8/9/2006 | Dup of B-6 B-26 08-105-01 8/9/2006 | B-7 08-105-04 8/9/2006 |
|---|---|---|---|---|---|---|---|
| 2-Nitrophenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,4-Dimethylphenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| bis(2-Chloroethoxy)methane | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,4-Dichlorophenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 1,2,4-Trichlorobenzene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Naphthalene | 160 (a) | 0.098 U | 0.096 U | 0.096 U | 0.099 U | 0.095 U | 0.096 U |
| 4-Chloroaniline | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Hexachlorobutadiene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 4-Chloro-3-methylphenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2-Methylnaphthalene | 160 (a) | 0.098 U | 0.096 U | 0.096 U | 0.099 U | 0.095 U | 0.096 U |
| 1-Methylnaphthalene | 160 (a) | 0.098 U | 0.096 U | 0.096 U | 0.099 U | 0.095 U | 0.096 U |
| Hexachlorocyclopentadiene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,4,6-Trichlorophenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,3-Dichloroaniline | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,4,5-Trichlorophenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2-Chloronaphthalene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2-Nitroaniline | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 1,4-Dinitrobenzene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Dimethylphthalate | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 1,3-Dinitrobenzene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,6-Dinitrotoluene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 1,2-Dinitrobenzene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Acenaphthylene | | 0.098 U | 0.096 U | 0.096 U | 0.099 U | 0.095 U | 0.096 U |
| 3-Nitroaniline | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,4-Dinitrophenol | | 4.9 U | 4.8 U | 4.8 U | 5.0 U | 4.8 U | 4.8 U |
| Acenaphthene | | 0.098 U | 0.096 U | 0.096 U | 0.099 U | 0.095 U | 0.096 U |
| 4-Nitrophenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,4-Dinitrotoluene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Dibenzofuran | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,3,4,6-Tetrachlorophenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 2,3,5,6-Tetrachlorophenol | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Diethylphthalate | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 4-Chlorophenyl-phenylether | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 4-Nitroaniline | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Fluorene | | 0.098 U | 0.096 U | 0.096 U | 0.099 U | 0.095 U | 0.096 U |
| 4.6-Dinitro-2-methylphenol | | 4.9 U | 4.8 U | 4.8 U | 5.0 U | 4.8 U | 4.8 U |
| N-Nitrosodiphenylamine | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 1.2-Diphenylhydrazine | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 4-Bromophenyl-phenylehter | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Hexachlorobenzene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Penatchlorophenol | | 4.9 U | 4.8 U | 4.8 U | 5.0 U | 4.8 U | 4.8 U |
| Phenanthrene | | 0.098 U | 0.096 U | 0.096 U | 0.099 U | 0.095 U | 0.096 U |
| Anthracene | | 0.098 U | 0.096 U | 0.096 U | 0.099 U | 0.095 U | 0.096 U |
| Carbazole | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Di-n-butylphthalate | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Fluoranthene | | 0.098 U | 0.096 U | 0.096 U | 0.099 U | 0.095 U | 0.096 U |
| Benzidine | | 9.8 U | 9.6 U | 9.6 U | 9.9 U | 9.5 U | 9.6 U |
| Pyrene | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Butylbenzylphthalate | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| bis-2-Ethylhexylphthalate | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| 3,3'-Dichlorobenzidine | | 9.8 U | 9.6 U | 9.6 U | 9.9 U | 9.5 U | 9.6 U |
| Benzo(a)anthracene | | 0.0098 U | 0.0096 U | 0.0096 U | 0.0099 U | 0.0095 U | 0.0096 U |
| Chrysene | | 0.0098 U | 0.0096 U | 0.0096 U | 0.0099 U | 0.0095 U | 0.0096 U |
| bis(2-Ethylhexyl)phthalate | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Di-n-octylphthalate | | 0.98 U | 0.96 U | 0.96 U | 0.99 U | 0.95 U | 0.96 U |
| Benzo(b)fluoranthene | | 0.0098 U | 0.0096 U | 0.0096 U | 0.0099 U | 0.0095 U | 0.0096 U |
| Benzo(k)fluoranthene | | 0.0098 U | 0.0096 U | 0.0096 U | 0.0099 U | 0.0095 U | 0.0096 U |
| Benzo(a)pyrene | | 0.0098 U | 0.0096 U | 0.0096 U | 0.0099 U | 0.0095 U | 0.0096 U |
| Indeno(1,2,3-cd)pyrene | | 0.0098 U | 0.0096 U | 0.0096 U | 0.0099 U | 0.0095 U | 0.0096 U |
| Dibenz(a,h)anthracene | | 0.0098 U | 0.0096 U | 0.0096 U | 0.0099 U | 0.0095 U | 0.0096 U |
| Benzo(g,h,i)perylene | | 0.0098 U | 0.0096 U | 0.0096 U | 0.0099 U | 0.0095 U | 0.0096 U |
| TEQ | 0.1 | ND | ND | ND | ND | ND | ND |

# TABLE 2
# GROUNDWATER ANALYTICAL RESULTS
# WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
# PORT OF GRAYS HARBOR
# HOQUIAM, WASHINGTON

| | MTCA Method A Cleanup Levels for Groundwater | B-1 08-105-05 8/9/2006 | B-4 08-105-06 8/9/2006 | B-5 08-105-02 8/9/2006 | B-6 08-105-03 8/9/2006 | Dup of B-6 B-26 08-105-01 8/9/2006 | B-7 08-105-04 8/9/2006 |
|---|---|---|---|---|---|---|---|
| **PCBs (µg/L)** | | | | | | | |
| **EPA Method 8082** | | | | | | | |
| Aroclor 1016 | | 0.048 U | 0.048 U | 0.048 U | 0.049 U | 0.049 U | 0.049 U |
| Aroclor 1221 | | 0.048 U | 0.048 U | 0.048 U | 0.049 U | 0.049 U | 0.049 U |
| Aroclor 1232 | | 0.048 U | 0.048 U | 0.048 U | 0.049 U | 0.049 U | 0.049 U |
| Aroclor 1242 | | 0.048 U | 0.048 U | 0.048 U | 0.049 U | 0.049 U | 0.049 U |
| Aroclor 1248 | | 0.048 U | 0.048 U | 0.048 U | 0.049 U | 0.049 U | 0.049 U |
| Aroclor 1254 | | 0.048 U | 0.048 U | 0.048 U | 0.049 U | 0.049 U | 0.049 U |
| Aroclor 1260 | | 0.048 U | 0.048 U | 0.048 U | 0.049 U | 0.049 U | 0.049 U |
| Total PCBs | 0.1 | ND | ND | ND | ND | ND | ND |
| **ORGANOCHLORINE PESTICIDES (µg/L)** | | | | | | | |
| **EPA Method 8081A** | | | | | | | |
| alpha-BHC | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| gamma-BHC | 0.2 | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Heptachlor | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Aldrin | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| beta-BHC | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| delta-BHC | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Heptachlor epoxide | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Endosulfan I | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| 4,4'-DDE | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Dieldrin | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Endrin | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Endosulfan II | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| 4,4'-DDD | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| 4,4'-DDT | 0.3 | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Endrin Aldehyde | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Endosulfan Sulfate | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Methoxychlor | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Endrin ketone | | 0.0048 U | 0.0049 U | 0.0048 U | 0.0049 U | 0.0047 U | 0.0048 U |
| Toxaphene | | 0.048 U | 0.049 U | 0.048 U | 0.049 U | 0.047 U | 0.048 U |
| Chlordane (Technical) | | 0.048 U | 0.049 U | 0.048 U | 0.049 U | 0.047 U | 0.048 U |

Notes:
U = Compound was not detected at the given reporting limit.
ND = Compound was not detected.
mg/L = milligrams per liter (parts per million).
µg/L = micrograms per liter (parts per billion).
(a) Value is total for 1-methylnaphthalene, 2-methylnaphthalene, and naphthalene.
(b) This is a total value for all xylenes.
(c) Value is MTCA Method B Preliminary Cleanup Level based on unrestricted land use and protection of surface water (includes use as drinking water).

# TABLE 3
# SEDIMENT ANALYTICAL RESULTS
# WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
# PORT OF GRAYS HARBOR
# HOQUIAM, WASHINGTON

| | MTCA Method A Soil Cleanup Levels for Unrestricted Land Use | MTCA Method A Soil Cleanup Levels for Industrial Properties | SMS SQS (a) | SMS CSL (b) | B-18 S-1 09-210-01 9/26/2006 | B-18 S-3 09-210-02 9/26/2006 | B-19 S-1 09-214-01 9/27/2006 | B-19 S-3 09-214-02 9/27/2006 |
|---|---|---|---|---|---|---|---|---|
| **TOTAL METALS (mg/kg)** | | | | | | | | |
| **Methods 6010B/7471A** | | | | | | | | |
| Arsenic | 20 | 20 | 57 | 93 | 18 U | 17 U | 18 U | 19 U |
| Barium | | | | | 34 | 34 | 38 | 41 |
| Cadmium | 2 | 2 | 5.1 | 6.7 | 0.89 U | 0.83 U | 0.91 U | 0.94 U |
| Chromium | 2000 (c) | 2000 (d) | 260 | 270 | 31 | 30 | 41 | 58 |
| Lead | 250 | 1000 | 450 | 530 | 8.9 U | 8.3 U | 9.7 | 10 |
| Mercury | 2 | 2 | 0.41 | 0.59 | 0.45 U | 0.42 U | 0.45 U | 0.47 U |
| Selenium | | | | | 18 U | 17 U | 18 U | 19 U |
| Silver | | | 6.1 | 6.1 | 0.89 U | 0.83 U | 0.91 U | 0.94 U |
| **BTEX/NWTPH-G (mg/kg)** | | | | | | | | |
| Benzene | 0.03 | 0.03 | | | 0.020 U | 0.025 U | 0.025 U | 0.021 U |
| Toluene | 7 | 7 | | | 0.090 U | 0.12 U | 0.12 U | 0.10 U |
| Ethylbenzene | 6 | 6 | | | 0.090 U | 0.12 U | 0.12 U | 0.10 U |
| m,p-Xylene | 9 (e) | 9 (e) | | | 0.090 U | 0.12 U | 0.12 U | 0.10 U |
| o-Xylene | 9 (e) | 9 (e) | | | 0.090 U | 0.12 U | 0.12 U | 0.10 U |
| TPH-Gas | 100 | 100 | | | 9.0 U | 12 U | 12 U | 10 U |
| **NWTPH-Dx (mg/kg)** | | | | | | | | |
| Diesel Range | 2000 | 2000 | | | 45 U | 42 U | 50 | 47 U |
| Lube Oil Range | 2000 | 2000 | | | 160 | 83 U | 330 | 130 |
| **PCBs (mg/kg)** | | | | | | | | |
| **Method 8082** | | | | | | | | |
| Aroclor 1016 | | | | | 0.089 U | 0.083 U | 0.091 U | 0.094 U |
| Aroclor 1221 | | | | | 0.089 U | 0.083 U | 0.091 U | 0.094 U |
| Aroclor 1232 | | | | | 0.089 U | 0.083 U | 0.091 U | 0.094 U |
| Aroclor 1242 | | | | | 0.089 U | 0.083 U | 0.091 U | 0.094 U |
| Aroclor 1248 | | | | | 0.089 U | 0.083 U | 0.091 U | 0.094 U |
| Aroclor 1254 | | | | | 0.089 U | 0.083 U | 0.091 U | 0.094 U |
| Aroclor 1260 | | | | | 0.089 U | 0.083 U | 0.091 U | 0.094 U |
| Aroclor 1262 | | | | | 0.089 U | 0.083 U | 0.091 U | 0.094 U |
| Aroclor 1268 | | | | | 0.089 U | 0.083 U | 0.091 U | 0.094 U |
| Total PCBs | 1 | 10 | | | ND | ND | ND | ND |
| **PESTICIDES (µg/kg)** | | | | | | | | |
| **Method 8081A** | | | | | | | | |
| alpha-BHC | | | | | 8.9 U | 8.3 U | 9.1 U | 9.4 U |
| gamma-BHC | 0.01 | 10 | | | 8.9 U | 8.3 U | 9.1 U | 9.4 U |
| Hepatchlor | | | | | 8.9 U | 8.3 U | 9.1 U | 9.4 U |
| Aldrin | | | | | 8.9 U | 8.3 U | 9.1 U | 9.4 U |
| beta-BHC | | | | | 8.9 U | 8.3 U | 9.1 U | 9.4 U |
| delta-BHC | | | | | 8.9 U | 8.3 U | 9.1 U | 9.4 U |
| Heptachlor epoxide | | | | | 8.9 U | 8.3 U | 9.1 U | 9.4 U |
| Endosulfan I | | | | | 8.9 U | 8.3 U | 9.1 U | 9.4 U |
| 4,4'-DDE | | | | | 18 U | 17 U | 18 U | 19 U |
| Dieldrin | | | | | 18 U | 17 U | 18 U | 19 U |
| Endrin | | | | | 18 U | 17 U | 18 U | 19 U |
| Endosulfan II | | | | | 18 U | 17 U | 18 U | 19 U |
| 4,4'-DDD | | | | | 18 U | 17 U | 18 U | 19 U |
| 4,4'-DDT | 3 | 4000 | | | 18 U | 17 U | 18 U | 19 U |
| Endrin Aldehyde | | | | | 18 U | 17 U | 18 U | 19 U |
| Endosulfan Sulfate | | | | | 18 U | 17 U | 18 U | 19 U |
| Methoxychlor | | | | | 18 U | 17 U | 18 U | 19 U |
| Endrin Ketone | | | | | 18 U | 17 U | 18 U | 19 U |
| Toxaphene | | | | | 180 U | 170 U | 180 U | 190 U |
| Chlordane | | | | | 89 U | 83 U | 91 U | 94 U |
| **SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)** | | | | | | | | |
| **EPA Method 8270C/SIM** | | | | | | | | |
| N-Nitrosodimethylamine | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Pyridine | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Phenol | | | 420 | 1200 | 0.060 U | 0.056 U | 0.061 U | 0.063 U |

# TABLE 3
# SEDIMENT ANALYTICAL RESULTS
# WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
# PORT OF GRAYS HARBOR
# HOQUIAM, WASHINGTON

| | MTCA Method A Soil Cleanup Levels for Unrestricted Land Use | MTCA Method A Soil Cleanup Levels for Industrial Properties | SMS SQS (a) | SMS CSL (b) | B-18 S-1 09-210-01 9/26/2006 | B-18 S-3 09-210-02 9/26/2006 | B-19 S-1 09-214-01 9/27/2006 | B-19 S-3 09-214-02 9/27/2006 |
|---|---|---|---|---|---|---|---|---|
| Aniline | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| bis(2-Chloroethyl)ether | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2-Chlorophenol | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 1,3-Dichlorobenzene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 1,4-Dichlorobenzene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Benzyl alcohol | | | 57 | 73 | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 1,2-Dichlorobenzene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2-Methylphenol (o-Cresol) | | | 63 | 63 | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| bis(2-Chloroisopropyl)ether | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| (3+4)-Methylphenol (m,p-Cresol) | | | 670 | 670 | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| N-Nitro-di-n-propylamine | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Hexachloroethane | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Nitrobenzene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Isophorone | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2-Nitrophenol | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,4-Dimethylphenol | | | 29 | 29 | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| bis(2-Chloroethoxy)methane | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,4-Dichlorophenol | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 1,2,4-Trichlorobenzene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Naphthalene | 5 (d) | 5(d) | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| 4-Chloroaniline | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Hexachlorobutadiene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 4-Chloro-3-methylphenol | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2-Methylnaphthalene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| 1-Methylnaphthalene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| Hexachlorocyclopentadiene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,4,6-Trichlorophenol | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,3-Dichloroaniline | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,4,5-Trichlorophenol | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2-Chloronaphthalene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2-Nitroaniline | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 1,4-Dinitrobenzene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Dimethylphthalate | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 1,3-Dinitrobenzene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,6-Dinitrotoluene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 1,2-Dinitrobenzene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Acenaphthylene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| 3-Nitroaniline | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,4-Dinitrophenol | | | | | 0.30 U | 0.28 U | 0.30 U | 0.31 U |
| Acenaphthene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| 4-Nitrophenol | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,4-Dinitrotoluene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Dibenzofuran | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,3,4,6-Tetrachlorophenol | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 2,3,5,6-Tetrachlorophenol | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Diethylphthalate | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 4-Chlorophenyl-phenylether | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 4-Nitroaniline | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Fluorene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| 4.6-Dinitro-2-methylphenol | | | | | 0.30 U | 0.28 U | 0.30 U | 0.31 U |
| N-Nitrosodiphenylamine | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 1.2-Diphenylhydrazine | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 4-Bromophenyl-phenylehter | | | | | 0.060 U | 0.056 U | 0.30 U | 0.31 U |
| Hexachlorobenzene | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Penatchlorophenol | | | 360 | 690 | 0.30 U | 0.28 U | 0.30 U | 0.31 U |
| Phenanthrene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| Anthracene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| Carbazole | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Di-n-butylphthalate | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Fluoranthene | | | | | 0.012 U | 0.011 U | 0.018 | 0.016 |
| Benzidine | | | | | 0.60 U | 0.56 U | 0.61 U | 0.63 U |

# TABLE 3
# SEDIMENT ANALYTICAL RESULTS
# WSDOT SPECIAL PROJECTS CONSTRUCTION SITE
# PORT OF GRAYS HARBOR
# HOQUIAM, WASHINGTON

| | MTCA Method A Soil Cleanup Levels for Unrestricted Land Use | MTCA Method A Soil Cleanup Levels for Industrial Properties | SMS SQS (a) | SMS CSL (b) | B-18 S-1 09-210-01 9/26/2006 | B-18 S-3 09-210-02 9/26/2006 | B-19 S-1 09-214-01 9/27/2006 | B-19 S-3 09-214-02 9/27/2006 |
|---|---|---|---|---|---|---|---|---|
| Pyrene | | | | | 0.012 U | 0.011 U | 0.017 | 0.014 |
| Butylbenzylphthalate | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| bis-2-Ethylhexylphthalate | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| 3,3'-Dichlorobenzidine | | | | | 0.60 U | 0.56 U | 0.61 U | 0.63 U |
| Benzo(a)anthracene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| Chrysene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| bis(2-Ethylhexyl)phthalate | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Di-n-octylphthalate | | | | | 0.060 U | 0.056 U | 0.061 U | 0.063 U |
| Benzo(b)fluoranthene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| Benzo(k)fluoranthene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| Benzo(a)pyrene | 0.1 | 2 | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| Indeno(1,2,3-cd)pyrene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| Dibenz(a,h)anthracene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| Benzo(g,h,i)perylene | | | | | 0.012 U | 0.011 U | 0.012 U | 0.013 U |
| TEQ | 2 | 2 | | | ND | ND | ND | ND |
| **Percent Moisture** | | | | | 44 | 40 | 45 | 47 |
| **Dioxins & Furans (pg/g)** | | | | | | | | |
| **EPA Method 1613B** | | | | | | | | |
| 2,3,7,8-TCDD | | | | | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 1,2,3,7,8-PeCDD | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 1,2,3,4,7,8-HxCDD | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 1,2,3,6,7,8-HxCDD | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 1,2,3,7,8,9-HxCDD | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 1,2,3,4,6,7,8-HpCDD | | | | | 5.00 U | 5.00 U | 28.1 | 35.7 |
| 1,2,3,4,6,7,8,9-OCDD | | | | | 10.0 U | 10.0 U | 248 | 305 |
| 2,3,7,8-TCDF | | | | | 1.00 U | 1.00 U | 1.00 U | 1.00 U |
| 1,2,3,7,8-PeCDF | | | | | 5.00 U | 5.00 U | 5.00 U | 7.7 J |
| 2,3,4,7,8-PeCDF | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 1,2,3,4,7,8-HxCDF | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 1,2,3,6,7,8-HxCDF | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 2,3,4,6,7,8-HxCDF | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 1,2,3,7,8,9-HxCDF | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 1,2,3,4,6,7,8-HpCDF | | | | | 5.00 U | 5.00 U | 9.5 | 8.4 |
| 1,2,3,4,7,8,9-HpCDF | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| 1,2,3,4,6,7,8,9-OCDF | | | | | 10.0 U | 10.0 U | 18.0 | 18.4 |
| Total TCDD | | | | | 1.00 U | 1.5 | 1.00 U | 1.00 U |
| Total PeCDD | | | | | 5.00 U | 5.00 U | 5.00 U | 5.00 U |
| Total HxCDD | | | | | 5.00 U | 8.7 | 17.2 | 16.5 |
| Total HpCDD | | | | | 5.00 U | 5.6 | 61.8 | 73.9 |
| Total TCDF | | | | | 1.00 U | 1.00 U | 11.4 J | 14.5 J |
| Total PeCDF | | | | | 5.00 U | 5.00 U | 8.6 J | 18.3 J |
| Total HxCDF | | | | | 5.00 U | 5.00 U | 22.5 J | 31.7 J |
| Total HpCDF | | | | | 5.00 U | 5.00 U | 32.1 J | 34.8 J |
| TEQ | | | | | ND | ND | 0.642 | 1.15 |

U = Compound was not detected at the given reporting limit.
J = Compound was detected; the given concentration is an estimate.
ND = Compound was not detected.
mg/kg = milligrams per kilogram (parts per million).
pg/g = picograms per gram.
µg/kg = micrograms per kilogram (parts per billion).
(a) Washington State Department of Ecology Sediment Managements Standards - Sediment Quality Criteria
(b) Washington State Department of Ecology Sediment Managements Standards - Cleanup Screening Level
(c) Value is for Chromium III.
(d) Total value for naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.
(e) Value for total xylenes.