Cleanup Action Plan

Industrial Petroleum Distributors
1120 West Bay Drive NW
Olympia, Washington

FS ID: 1436
Cleanup Site ID: 4240

Prepared by the
Washington State
Department of Ecology

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Acronyms and Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirement
ARCADIS	ARCADIS U.S., Inc.
ARCO	Atlantic Richfield Company
Bulk plant	Bulk petroleum storage facility
CAAE	Cleanup action alternatives evaluation
CFR	Code of Federal Regulations
COC	Constituent of concern
cPAH	Carcinogenic polycyclic aromatic hydrocarbon
CUL	Cleanup level
DRO	Diesel range organics
Ecology	Washington State Department of Ecology
GRO	Gasoline range organics
HO	Heavy oil range organics
IDW	Investigation-derived waste
IPD	Industrial Petroleum Distributors
mg/kg	Milligrams per kilogram
MTCA	Model Toxics Control Act
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RI	Remedial investigation
Site	Former Industrial Petroleum Distributors Site, generally located at 1120 West Bay Drive in Olympia, Washington
U.S.C.	United States Code
µg/L	Micrograms per liter

1. Introduction

This Cleanup Action Plan (CAP) was prepared for the former Industrial Petroleum Distributors (IPD) Site, generally located at 1120 West Bay Drive in Olympia, Washington (the "Site"). Figure 1 shows the Site location. BP West Coast Products, LLC, ARCADIS U.S., Inc. (ARCADIS) prepared the preliminary draft CAP as required by Agreed Order No. DE 8953. Ecology reviewed the preliminary draft CAP and used it as to develop this CAP.

This CAP summarizes the results of the previously completed remedial investigation (RI; SECOR, 2001 and ARCADIS, 2012) and feasibility study (FS; ARCADIS 2013), including a rationale for selecting the proposed cleanup action to address petroleum hydrocarbons in soil exceeding the Model Toxics Control Act (MTCA) Method A Cleanup Levels (CULs). The CAP is for the entire Site. However, remedial action is only required on part of the Site because a previous interim action was sufficient to meet cleanup levels for part of the Site (*see* Section 5).

Ecology held a public comment period on the draft CAP from September 4 – October 6, 2014. The comments Ecology received during the comment period did not result in any changes to the draft CAP. This final CAP will be implemented under an agreed order.

2. Site History, Location, and Description

The Site encompasses two parcels of land (Parcel Nos. 0903-000-5000 and 0903-000-3000) on the west side of West Bay Drive and a lowland parcel that has been assigned (Parcel No. 0903-000-1000) by Thurston County which is located at 1120 West Bay Drive in Olympia, Washington on the east side of West Bay Drive. The parcels on the west side of West Bay Drive are zoned Professional Office/Residential and the parcels on the east side of West Bay Drive are zoned Industrial/Urban Waterfront. A Site Vicinity Map is presented on Figure 2. As shown in this figure, Parcel No. 0903-000-3000 is the only parcel that has been developed; a professional office building and associated parking lot was built on the parcel in 2006-07.The majority of the Site area on the east side of West Bay Drive is currently owned by the Port of Olympia, with a 0.02-acre inactive railroad right-of-way owned by Burlington Northern Santa Fe Railway Company (BNSF).

The Site was first developed in the early 1950s as a bulk fuel storage facility for the Richfield Oil Corporation. The facility consisted of eight above-ground storage tanks (ASTs) that ranged in size from 20,000 gallons to 156,744 gallons. A pipeline (which ran both above- and below-ground) was used to transfer petroleum products (gasoline and oil) from barges into the ASTs located at the upland bulk plant (located on Parcel No. 0903-000-3000). An abandoned pier was previously located on the easternmost portion of the Site, extending approximately 400 feet into West Bay. Site plans are presented in Figures 3a and 3b. Figure 3a (from SECOR, 2001) shows the former bulk plant and associated sample locations on the west side of West Bay Drive (Parcel No. 0903-000-3000) and Figure 3b depicts monitoring well and boring locations associated with the 2010 RI on the lowland portion of the Site (east side of West Bay Drive) conducted by ARCADIS. In 1977, Atlantic Richfield Company (ARCO, the successor to Richfield Oil Corporation) sold the property to Industrial Petroleum Distributors. The Site was then used to store waste oil until 1999 when the ASTs and associated piping were demolished and removed. A more detailed description of the property history is provided in SECOR (2001).

3. Regional and Site Specific Settings

This section describes the local and regional hydrogeologic Site setting.

3.1 Geology and Hydrogeology

The Site is situated on West Bay, located on the southern end of Budd Inlet in Puget Sound. Puget Sound is located in the Puget Trough, which is bordered by the Cascade Range to the east and the Coast Range to the west. The Site elevation is approximately mean sea level, and the topography of the immediate area is generally flat, with a slope towards West Bay. The Site is located in a geographic area known as the Puget Sound lowlands, on an area of Pleistocene-age glacial recessional outwash. The recessional outwash forms a layer ranging from a few feet to 150 feet thick and is characterized as poorly sorted, discontinuously bedded loose gravel with some sand, silt, and clay (Washington State Department of Water Resources 1970).

Subsurface material observed during Site investigation activities generally consisted of silty clays and sandy silt to approximately 6 feet below ground surface (bgs) and fine to medium sand and fine gravel between 6 and 13 feet bgs. Wood debris and bark dust were observed between 3 and 9 feet bgs. Observed subsurface conditions are consistent with the location of the Site adjacent to West Bay and are indicative of historical glacial deposition. A Site map depicting the locations of geologic cross-sections is shown on Figure 4. The geologic cross-sections are presented on Figure 5 and Figure 6.

Historical groundwater elevations, tidal stages during sampling events, and groundwater electrical conductivity readings have been evaluated to determine if brackish bay water is intruding into groundwater on Site. ARCADIS presented a detailed evaluation of tidal influence on the hydrogeology of the Site in the RI Report (ARCADIS 2012). Groundwater gradient at the Site is generally toward the southeast towards West Bay at a hydraulic gradient of approximately 0.033 and 0.031 foot/foot (ft/ft) at high and low tides, respectively. Groundwater elevations are plotted on cross-section A-A' and cross-section B-B' (Figure 5 and Figure 6), providing a cross-sectional view of apparent groundwater gradient direction as measured during well gauging. A contour map depicting high and low tide potentiometric groundwater surfaces is presented on Figure 7. Groundwater elevation data from 2010 and 2011 are presented in Table 1.Measurements of groundwater electrical conductivity data are presented in Table 2. Groundwater in wells MW-7, MW-8, and MW-9 are likely experiencing influence from brackish bay water based on an evaluation of electrical conductivity and their proximity to the bay.

3.2 Land and Water Use

As mentioned in Section 2.0, Thurston County has zoned the Site parcels on the west side of West Bay Drive as Professional Office/Residential and the Site area on the east side of West Bay Drive as Industrial/Urban Waterfront. Parcels surrounding the Site are zoned mixed urban waterfront, commercial, industrial, and residential. Adjacent properties include commercial/ industrial properties to the north, undeveloped property to the south, and West Bay to the east. Based on information provided by Ecology, the city of Olympia may redevelop the undeveloped portion of the Site for use as a public park in the future. In the interest of conservative estimation, future land use at this portion of the Site is considered unrestricted.

The Site is located within the city of Olympia water service area. No drinking water wells are located on Site. Groundwater at the Site is not currently used for potable purposes and, based on the location of the Site within the city of Olympia water service area; future use of groundwater at the Site for potable purposes is unlikely. However, the future installation of a drinking water well at the Site would not be prohibited by the city of Olympia. Thus, as a conservative estimate, it is assumed that groundwater use at the Site may include drinking water beneficial uses in the future.

4. Summary and Results of Previous Investigations

As summarized by SECOR (2001), the Site was placed on the Washington State Confirmed and Suspected Sites List in 1994 after an Ecology inspection observed corrosion around the base of several ASTs in the tank farm and soil staining in several areas. In 1998, the Thurston County Health Department conducted a Site Hazard Assessment (SHA) and the Site was given a "1" ranking and placed on the Hazardous Sites List. A score of "1" represents the highest level of concern relative to other sites. During the SHA, the poor condition of the ASTs was again noted and active leakage of the waste stored in the tanks was observed. As a result, the property owner was requested to remove the waste stored in the tanks; this was performed in 1999 during demolition. A total of approximately 160,000 gallons of waste oil materials were removed from the tanks (AEC, 2002a). An undocumented underground storage tank (UST) located south of the loading dock was also removed in 1999. However, no soil or groundwater samples were collected during the removal of this tank (SECOR, 2001).

Ecology oversight of the Site began in September 2000 with the issuance of Agreed Order No. DE 00TCPSR-1628 that required that an RI/FS be prepared. The RI/FS was performed in two separate phases. The RI/FS for the upland bulk plant portion of the Site (west side of West Bay Drive) was completed by SECOR (2001) and the RI/FS for the lowland portion of the Site (east side of West Bay Drive) was completed by ARCADIS (2012, 2013). On September 17, 2012, Agreed Order DE 8953 was issued for the Site; this order superseded and replaced the previous agreed order. Agreed Order DE 8953 continued the scope of the previous order with the added requirement that a draft CAP be prepared.

4.1 SECOR (2001) Investigation

The SECOR (2001) RI/FS investigation included the installation of 24 direct-push borings, five groundwater monitoring wells, two surface soil samples, and six test pits. The area of investigation included the entire Site (both sides of West Bay Drive). This RI/FS was successful in characterizing the soil and groundwater impacts for the upland bulk plant portion of the Site but did not completely characterize the petroleum hydrocarbon related impacts on the lowland portion of the Site (east side of West Bay Drive). For the upland bulk plant portion of the Site, SECOR (2001) concluded that limited and isolated impacts to soil and groundwater were present. Soil locations that exceeded MTCA Method A Cleanup Levels for total petroleum hydrocarbons–diesel range organics (TPH-DRO), total petroleum hydrocarbons–heavy oil range (TPH-HO), carcinogenic polycyclic aromatic hydrocarbons (cPAHs), benzene, and cadmium consisted of three separate areas within the tank farm (borings B-4, B-9, and sump) and one location in the former UST excavation area (boring B-18); these locations are shown on Figure 3a. Groundwater concentrations exceeded the MTCA Method A Cleanup Levels for total petroleum hydrocarbons–gasoline range organics (TPH-GRO), TPH-DRO, and TPH-HO in grab samples from the following tank farm borings: B-8 and B-9 (TPH-DRO) and B-1 and B-8 (TPH-HO). The locations of borings B-1, B-8 and B-9 are shown on Figure 3a. However, groundwater samples from temporary borings do not always represent actual groundwater

concentrations. Groundwater monitoring wells are preferred to use for collecting representative groundwater samples.

The Site investigations on the lowland parcel were focused near the pipeline formerly used to transfer petroleum products. A total of 15 soil samples (IPD-1 through IPD-6, S-1 through S-6, and WBTP-01 through WBTP-03) were collected at depths ranging from 2.5 feet to 7 feet bgs. Grab groundwater samples were collected from 10 of these locations (IPD-1 through IPD-5, W-1[S-1] and W-2 [S-2], and WBTP-01 through WBTP-03) (SECOR, 2001). The approximate locations of historical soil and groundwater sampling locations are presented on Figure 8. Soil and groundwater samples collected as a result of these Site investigations were submitted for analysis of petroleum hydrocarbon constituents and metals. The analytical results of historical soil samples collected at the Site are included in Table 3 and groundwater samples are included in Table 4. The results of the historic investigations detected petroleum constituents including total petroleum hydrocarbons–diesel range organics (TPH-DRO), total petroleum hydrocarbons-heavy oil range organics (TPH-HO), metals and volatile organic compounds (VOCs) in both soil and groundwater samples.

TPH in the gasoline range (TPH-GRO) was not detected above laboratory method reporting limits in any of the soil samples submitted for analysis. TPH-DRO and TPH-HO, as well as carcinogenic polycyclic aromatic hydrocarbons (cPAHs) and metals were detected in several soil samples. However, only TPH-DRO and cPAHs were detected at concentrations exceeding applicable MTCA Method A CULs.

TPH-GRO, TPH-DRO, TPH-HO, benzene, toluene, total xylenes, cPAHs, and metals were detected in several of the grab groundwater samples collected from the borings. Of these, only TPH-GRO, TPH-DRO, TPH-HO, arsenic and lead were detected at concentrations exceeding MTCA Method A CULs.

4.2 Sediments Investigation

In August 2009, Integral Consulting, Inc. (Integral), under subcontract to Delta Environmental Consultants (Delta), conducted an investigation of marine sediments bordering the Site. The objective of the sediment sampling was to screen intertidal sediments for petroleum hydrocarbon impacts. The investigation included the collection of sediment samples at four locations along the abandoned pier at sampling locations and depths specified by Ecology. The samples were analyzed for total petroleum hydrocarbons (gasoline, diesel, and oil ranges) by the Hydrocarbon Identification Method (NWTPH-HCID). The analytes were not detected above the laboratory reporting limits or above the Ecology-specified screening level of 100 milligrams per kilogram. A detailed summary of the sampling methodology is presented the Integral Sediment Screening and Sampling Report, dated December 17, 2009 (Appendix A).

4.3 ARCADIS (2010) Investigation

ARCADIS (2012, 2013) completed the investigation of the lowland portion of the Site that was begun by SECOR (2001).ARCADIS installed 16 soil borings to characterize the extent of petroleum hydrocarbons in soil at the locations shown on Figure 3b. Seven of the borings were completed as groundwater monitoring wells to evaluate potential COC concentrations in groundwater. Subsequently, groundwater samples were collected from the newly installed wells during five consecutive quarterly groundwater monitoring events.

Soil analytical results from the 16 borings were compared to the MTCA Method A Soil CULs for Unrestricted Land Uses as presented in Table 740-1 of Chapter 173-340 WAC. Naphthalenes, cPAHs, TPH-GRO, and

TPH-DRO were detected above the applicable MTCA Method A CULs in soil samples collected from several locations in the northwest corner of the Site. Results of the soil analysis are presented in Table 5. Figures 9, 10 and 11 summarize the results of soil analytical data.

Groundwater analytical results for the Site were compared to the MTCA Method A CULs for Ground Water as presented in Table 720-1 of Chapter 173-340 WAC. Groundwater samples did not exhibit concentrations of analyzed chemicals in exceedance of the MTCA Method A groundwater CULs. Results of groundwater sample analyses for October 2010 through December 2011 are summarized in Table 6.

5. Interim Cleanup Action

An interim action (partial cleanup) was performed at the upland tank farm portion of the Site in 2002 under Ecology's Voluntary Cleanup Program (VCP). The scope of work for this interim action is described in the Cleanup Action Plan and Soil Excavation Work Plan (AEG, 2002a,b) and was documented in the Final Cleanup Report (AEG, 2002c). The actions that were performed included:

- Demolishing the warehouse building, pump shed, and the concrete slabs for the former ASTs. The ASTs and associated piping had previously been removed in 1999.

- Excavation and disposal of a total of 339.16 tons of soil contaminated with petroleum constituents and metals from the B-4, B-9, B-18, and sump locations. The soil was disposed at the Olympic View Sanitary Landfill in Port Orchard, Washington on July 20, 2002.

- Collection of quarterly groundwater monitoring data from wells MW-1 through -5. These wells were sampled for TPH-DRO, TPH-HO, arsenic, chromium, and lead in November 2002 (AEG, 2002d) and February and May 2003 (AEG, 2003).

Based on the confirmation soil sampling reported in AEG (2002c), the interim action met MTCA Method A Soil Cleanup Levels for Unrestricted Land Use for TPH-DRO, TPH-HO, and cPAHs. Based the MTCA Method B remediation levels calculated by SECOR (2001), soil concentrations of benzene and cadmium at locations B-4, B-18, and Sump did not require removal. However, removal of the benzene and cadmium contaminated soil occurred anyway at these locations because it was co-located with the TPH and cPAH contaminated soil that was excavated during the interim action.

On January 29, 2003, Ecology issued an interim determination that no further remedial action (NFA) was required for soil at the tank farm portion of the Site where the interim action was performed. However, additional quarterly groundwater monitoring at MW-1 through -5 was required. Following the results of the February and May 2003 groundwater sampling events, Ecology issued an NFA letter on June 25, 2003 stating that release of Site contamination into groundwater beneath the tank farm portion of the Site no longer poses a threat to human health or the environment. The February and May 2003 groundwater sample results were all below MTCA Method A Groundwater Cleanup Levels for benzene, toluene, ethylbenzene, total xylenes, TPH-DRO, TPH-HO, arsenic, chromium, and lead.

6. Site Cleanup Levels

This section evaluates CULs appropriate for the Site.

6.1 Method A Cleanup Levels

Ecology issued CULs under the MTCA. Method A defines CULs for common hazardous substances, such as petroleum hydrocarbons. Methods A CULs for Unrestricted Land Use will be used for groundwater and soil at the remaining portion of the Site that was not addressed during the interim action.

The Method A CULs may be used if the Site meets one of two criteria under WAC-173-340-704:

- *"Sites undergoing a routine cleanup action as defined in WAC 173-340-200"*
- *"Sites where numerical standards are available in this chapter or applicable state and federal laws for all indicator hazardous substances in the media for which the Method A cleanup level is being used."*

According to WAC-173-340-200, routine cleanup actions must meet the following criteria:

- "*Cleanup standards for each hazardous substance addressed by the cleanup are obvious and undisputed, and allow for an adequate margin of safety for protection of human health and the environment*"
- *"It involves an obvious and limited choice among cleanup action alternatives and uses an alternative that is reliable, has proven capable of accomplishing cleanup standards, and with which the department has experience"*
- *"The cleanup action does not require preparation of an environmental impact statement*"
- *"The Site qualifies under WAC 173-340-7491 for an exclusion from conducting a simplified or Site-specific terrestrial ecological evaluation, or if the Site qualifies for a simplified ecological evaluation, the evaluation is ended under WAC 173-340-7492(2) or the values in Table 749-2 are used."*

Historical investigations indicate that petroleum hydrocarbons and their constituents are the only constituents of concern relating to historical Site operations that were detected in soil and groundwater at the Site. Furthermore, numerical standards for the COCs are available for soil and groundwater under MTCA Method A for Unrestricted Land Use. Therefore, Method A CULs for Unrestricted Land Use are appropriate and are used for the Site. MTCA Method A CULs for Unrestricted Land Use at the Site are listed below, according to Tables 720-1 and 740-1 of the MTCA Statute and Regulation.

Table 5A: MTCA Method A CULs for Site COCs

Groundwater [1]	
Constituent	**Cleanup Criteria (µg/L)[3]**
GRO	800/1,000 [5]
DRO	500
HO	500
EDB	0.01
EDC	5
Benzene	5
Toluene	1,000
Ethylbenzene	700
Total xylenes	1,000
MTBE	20
n-Hexane	--[6]
cPAHs	0.1[7]
Total Naphthalenes	160
PCBs	0.1[8]
Lead	15

Soil [2]	
Constituent	**Cleanup Criteria (mg/kg)[4]**
GRO	30/100 [5]
DRO	2,000
HO	2,000
EDB	0.005
EDC	--[6]
Benzene	0.03
Toluene	7
Ethylbenzene	6
Total xylenes	9
MTBE	0.1
n-Hexane	--[6]
cPAHs	0.1[7]
Total Naphthalenes	5
PCBs	1[8]
Lead	250

Notes:

[1] CULs from Ecology's MTCA Method A CULs for Ground Water (WAC 173-340-900, Table 720-1).

[2] CULs from Ecology's MTCA Method A Soil CULs for Unrestricted Land Uses (WAC 173-340-900, Table 740-1).

[3] µg/L = Micrograms per liter.

[4] mg/kg = Milligrams per kilogram.

[5] Method A CULs for GRO are determined based on the presence of benzene.

[6] -- = Ecology Method A CUL not established.

[7] Based on benzo(a)pyrene equivalencies (WAC 173-340-900, Table 740-1).

[8] Total value for all polychlorinated biphenyls (PCBs) (mixtures).

EDB = Ethylene dibromide.

EDC = Ethylene dichloride.

MTBE = Methyl tertiary butyl ether.

Groundwater CULs were selected based on an estimation of the highest beneficial use of groundwater for current and future use at the Site. According to WAC-173-340-720(1)(a), "*The department has determined that most Sites use of ground water as a source of drinking water is the beneficial use requiring the highest quality of ground water and that exposure to hazardous substances through ingestion of drinking water and other domestic uses represents the reasonable maximum exposure*." Therefore, CULs established under MTCA Method A are protective for the beneficial use of groundwater as a current and/or future potable water source at the Site.

Soil CULs were based on estimates of the reasonable maximum exposure scenario expected to occur, given current and/or future use of the Site. According to WAC-173-340-740(1)(a), "*The department has*

determined that residential land use is generally the Site use requiring the most protective cleanup levels and that exposure to hazardous substances under residential land use conditions represents the reasonable maximum exposure scenario." Therefore, CULs established under MTCA Method A are protective for the maximum exposure scenario for impacted soil, given current and/or future anticipated land use at the Site.

6.2 Points of Compliance

Points of compliance are defined under the MTCA as the point or points on a Site where the selected CULs must be attained. Such points are further divided to include standard and conditional points of compliance. A standard point of compliance requires CULs to be met for every location sampled, and therefore throughout the entire Site. A conditional point of compliance requires CULs to be met only at some locations sampled, provided regulatory requirements are met according to WAC 173-340-720 through 173-340-760. Typically, Sites that establish a conditional point of compliance place an environmental covenant on the affected properties, thereby limiting future uses of the properties (Ecology 2010).

Standard points of compliance were established for soil and groundwater at the Site. The soil point of compliance is defined as throughout the Site from the ground surface to fifteen feet below the ground surface. The vertical and lateral boundaries of the soil point of compliance were designated for the Site based on human exposure via direct contact or other exposure pathways where the soil is required to complete the pathway, as outlined in WAC 173-340-740(6)(d). The groundwater point of compliance is defined as throughout the Site, from the uppermost depth of the saturated zone extending vertically to the lowest depth that could potentially be affected. The vertical and lateral boundaries of the groundwater point of compliance were designated for the Site based on the standard point of compliance for all Sites, as outlined in WAC 173-340-720(8)(b). The point of compliance for each COC in soil and groundwater is summarized in Tables 7A and 7B, respectively.

6.3 Applicable Relevant and Appropriate Regulations

According to WAC 173-340-360(2), all cleanup actions under the MTCA must comply with applicable state and federal laws. Such laws are defined under the MTCA as including Applicable or Relevant and Appropriate Requirements (ARARs). ARARs for the Site are discussed in Sections 5.3.1 and 5.3.2.

6.3.1 Federal

- *Safe Drinking Water Act (National Primary and Secondary Drinking Water Regulations) (42 United States Code [U.S.C.] 300f, 40 Code of Federal Regulations [CFR] Part 141, 40 CFR Part 143)*. Petroleum hydrocarbon CULs are based on the beneficial use of groundwater as a current and/or future potable water source at the Site.

- *Resource Conservation and Recovery Act (RCRA) (42 U.S.C. 6901-6992, 40 CFR Part 260-268)*. Investigation-derived waste (IDW) and any other waste produced during activities at the Site will be handled per RCRA regulations and implemented according to WAC 173-303.

- *Occupational Safety and Health Act (OSHA) (29 CFR 1910)*. Site activities will be conducted in a manner compliant with OSHA standards and regulations.

- *Rules for Transport of Hazardous Waste (49 CFR 171 through 180)*. Hazardous waste generated at the Site will be appropriately characterized to determine package, transportation and transportation requirements.

6.3.2 State

- *MTCA (WAC 173-340)*. Site activities will occur in accordance with MTCA statutes and regulations.

- *Dangerous Waste Regulations (WAC 173-303)*. IDW and any other waste produced during activities at the Site will be handled per RCRA regulations and implemented according to WAC 173-303.

- *Minimum Functional Standards for Solid Waste Handling (WAC 173-304)*. This regulation applies to any non-dangerous wastes that are generated during the remedial action.

- *Minimum Standards for Construction and Maintenance of Wells, Regulation and Licensing of Well Contractors and Operators (Revised Code of Washington 18.104, WAC 173-160, 162)*. Resource protection wells will be constructed and maintained according to the appropriate regulations.

- *Washington Industrial Safety and Health Act, Chapter 296-62 and -155 WAC*. Site activities will be conducted in a manner compliant with Washington Industrial Safety and Health Act standards and regulations.

- *Maximum Environmental Noise Levels (WAC 173-60)*. Site activities will be conducted at appropriate noise levels, according to WAC 173-60.

7. Conceptual Site Model

A conceptual Site model was developed in accordance with the methods and procedures described in the MTCA (WAC 173-340-708) and presented in the RI Report. The source of contamination was identified as the former bulk plant operations, including the storage of gasoline, diesel and/or oil. Based on current and future land use, which may include the use of the Site as a public park, potential future receptors may include on-Site residents, children, recreational users, commercial workers, industrial workers and construction workers. Potentially complete pathways are presented on Figure 12 and summarized below.

Potential on-Site receptors may be exposed to constituents in surface and subsurface soils by direct contact. Routes of exposure by direct contact include incidental ingestion of soil and/or dermal contact with soil. The Site is not currently improved, thus no current on-Site human receptors have been identified. However, it is assumed that the Site may be redeveloped in the future to industrial, occupational, residential, or public park land use. Thus, potential future receptors that may be directly exposed to constituents in surface and/or subsurface soil at the Site may include on-Site residents, children, recreational users, commercial workers, industrial workers, and construction workers.

Constituents may leach from soil to groundwater beneath the Site by infiltration, resulting in potential direct contact exposures to constituents in groundwater. Routes of exposure by direct contact with groundwater include ingestion of tap water, dermal contact with tap water, and inhalation of volatile constituents released from tap water. However, groundwater at the Site is not currently used as a potable water source.

Therefore, tap water ingestion, dermal contact with tap water, and inhalation of volatile constituents in tap water are not complete exposure pathways for current on-Site and off-Site receptors. However, exposure pathways are potentially complete for future on-Site and off-Site receptors provided that the groundwater at the Site is considered potable under WAC 173-340-720(2).

Groundwater at the Site is generally encountered at depths ranging from approximately 3 to 5 feet bgs. In the future, it is possible that the Site or properties adjacent to the Site may be redeveloped and construction workers may encounter groundwater at shallow depths. Thus, direct contact (e.g., incidental ingestion and dermal contact) with groundwater may be a complete exposure pathway for construction workers.

Another potential transport mechanism at the Site may include volatilization of constituents in soil and/or groundwater to outdoor air and/or the indoor air of future on-Site or off-Site buildings, or air within a trench used by future on-Site or off-Site construction workers. Because the Site is not currently developed, no human receptors are likely to be affected under the current Site use. However, assuming hypothetical redevelopment for residential, commercial or industrial uses, the potential receptors that may be directly exposed to constituents in outdoor and/or indoor air at the Site in the future may include on-Site residents/children, commercial workers, industrial workers and construction workers.

Potential on-Site receptors may be exposed to constituents in surface water and sediments by direct contact. Routes of exposure by direct contact include incidental ingestion of and/or dermal contact with surface water and/or sediments. The Site is not currently developed, thus residents, children and recreational users are not likely to have direct contact with surface water or sediment. However, assuming hypothetical future development of the Site for residential purposes, residents, children, and recreational users could have direct contact with surface water and/or sediments in the future. Benthic organisms and fish may have direct contact with surface water and/or sediments based on current Site use.

A terrestrial ecological evaluation was conducted for the Site in accordance with WAC 173-340-7491. The purpose of the terrestrial ecological evaluation includes determining whether a release to soil threatens the terrestrial environment, to characterize potential threats to terrestrial plants and animals, and to establish Site-specific cleanup standards for the protection of terrestrial plants and animals. Per subsection 7491(c)(i) of Chapter 173-340 WAC, the Site qualifies for an exclusion from terrestrial ecological evaluation because there are less than 1.5 acres of contiguous undeveloped land on or within 500 feet of the Site. Based on the small size of the Site and because the vicinity is generally developed for residential, commercial and industrial purposes, terrestrial receptors (e.g., soil biota, plants, and animals) are unlikely to have direct contact with surface soil or groundwater.

8. Evaluation of Cleanup Action Alternatives

The purpose of the cleanup action alternatives evaluation (CAAE) is to identify, develop and evaluate potential remedial alternatives and to recommend remedial measures for the Site. The CAAE follows applicable state and federal regulations for remedial action projects. The CAAE approach is based on ARCADIS's discussions with Ecology and considers information from recently collected data as well as historical reports.

The selection of appropriate remedial actions must consider cleanup standards and technologies that protect human health and the environment by eliminating, reducing or otherwise controlling risks posed

through each exposure pathway and migration route. The number and types of cleanup alternatives to be evaluated must consider the characteristics and complexity of the Site. The evaluation of cleanup alternatives also recognizes the need for a phased approach to reduce the number of potential remedies and allow for better-informed decisions.

Ecology has established the following thresholds and other basic requirements pertaining to cleanup actions:

- Protect human health and the environment.
- Comply with cleanup standards.
- Comply with applicable and relevant state and federal laws.
- Provide for compliance monitoring.
- Use permanent solutions to the maximum extent practicable.
- Provide for a reasonable restoration time frame.
- Consider public concerns, if applicable to the project status and conditions.

When selecting a cleanup action, preference must be given to permanent solutions to the maximum extent practicable. A permanent solution is one in which cleanup standards can be met without further action being required, other than the approved disposal of residue from preferred treatment technologies. Ecology recognizes that permanent solutions may not be practical for all sites. ARCADIS evaluated the proposed cleanup action(s) based on criteria outlined in the MTCA Chapter 173-340-360(3), as follows:

- Protectiveness of human health and the environment.
- Permanence in reduction of toxicity, mobility and volume.
- Cost.
- Effectiveness over the long term.
- Management of short-term risks.
- Technical and administrative implementability.
- Consideration of public concerns.

The cleanup action selected will also provide for a reasonable restoration time frame and will include the following criteria:

- Potential risks posed to human health and the environment.
- Practicability of achieving a shorter restoration time frame.
- Current Site and surrounding area use.
- Potential future Site and surrounding area use.
- Availability of alternative water supplies, as applicable.
- Effectiveness and reliability of institutional controls.
- Ability to control and monitor migration of hazardous substances.
- Toxicity of the hazardous substances remaining at the Site.
- Natural attenuation and biodegradation.

The cleanup of contaminant-affected sites will be conducted using technologies that minimize the amount of untreated hazardous substances remaining at a site. Ecology established the following scale of preference for cleanup technologies, in descending order:

- Reuse or recycling.
- Destruction or detoxification.
- Separation or volume reduction.
- Immobilization of hazardous substances.
- On- or off-site disposal.
- Isolation or containment.
- Institutional controls and monitoring.

The cleanup action alternatives have been evaluated for their ability to meet the following standards:

- MTCA cleanup standards for the protection of human health (Method A Soil and Groundwater CULs for Unrestricted Land Use).
- Attainment of established soil and groundwater CULs (for current and potential future land uses).
- To the extent practicable, remediation of the sources of releases to reduce or eliminate further releases that might pose threats to human health or the environment.
- Compliance with applicable federal, state and local standards for management of wastes.

A combination of technologies is often used, with preference given to the use of alternatives higher in the preference list. Ecology anticipates that options falling lower in the preference list will be appropriate for some sites. In consideration of the MTCA standards and preferences regarding cleanup technology selection, proposed soil cleanup technologies were evaluated. The final cleanup technologies to be implemented toward the goal of reaching Site closure were assessed using the permanent solution criteria and a reasonable restoration time-frame as key considerations.

8.1 Cleanup Action Alternatives

Based on the quarterly groundwater monitoring data for the Site from fourth quarter 2010 through fourth quarter 2011, petroleum hydrocarbon constituents were either not detected or detected at concentrations less than MTCA Method A CULs. With groundwater concentrations below Method A CULs, cleanup action with respect to groundwater is not required.

Soil impacts are limited to petroleum hydrocarbon constituents at the Site based on the results of historical investigations conducted at the Site. This section identifies, screens, and evaluates alternatives for the soil cleanup of the lowland portion of the Site associated with historical bulk fueling operations.

8.1.1 Initial Screening

Multiple technologies are currently employed in the remediation of environmental sites, often being combined to achieve cleanup goals. These technologies include methods that manage exposure through administrative and engineered controls, removal of contaminated media, as well as, alternatives that use focused remediation to detoxify and degrade contaminants in site media. The current property owner has

expressed interest in redevelopment of the property and has communicated concerns regarding leaving contaminated media in place. In addition to the requirements outlined in WAC 173-340-360, the property owner's concerns regarding residual impacts in Site media were taken into account in the initial screening. An initial screening of remedial alternatives and a brief description of each technology evaluated is included below:

- Deed Restriction

An administrative control, such as a deed restriction, would be an effective means of managing exposure to Site contaminants. The deed restriction would limit the future uses of the Site and therefore limit exposure. This alternative meets the minimum requirements of WAC 173 -340-360; however, the remedy was not selected for further evaluation due to the potential for required long term monitoring and the property owner's intention to redevelop the Site as a park.

- Soil Capping

An engineered control, such as a soil cap, would implement a physical barrier to eliminate the potential risks associated with exposure to impacted Site media. Soil capping would be an effective means to limit exposure; however, the remedy would leave impacted media in place and would not address the soil point of compliance for the Site. This alternative meets the minimum requirements of WAC 173-340-360. However, this alternative would leave impacted soils in place and would likely require long-term compliance monitoring. This alternative was not selected for further evaluation because alternatives exist that would provide a more permanent remedy with readily quantifiable results.

- Anaerobic Biological Oxidation via Soil Amendments

Anaerobic biological oxidation (ABOx) of petroleum hydrocarbons relies on the use of non-oxygen electron accepting processes such as nitrate reduction, ferric iron reduction, sulfate reduction and methanogenesis to facilitate cellular respiration where the hydrocarbons are used as electron donors. This alternative would include the addition of relatively inert agents to Site soil to stimulate the production of naturally occurring bacteria. This alternative meets the minimum requirements of WAC 173 -340-360 and was selected for further evaluation.

- In Situ Chemical Oxidation via Persulfate Injection

The goal of in situ chemical oxidation (ISCO) is to destroy organic compounds through thermal or oxidative means. This alternative would inject a persulfate solution into the subsurface via a network of injection wells and would include pre-implementation work such as biogeochemical characterization, hydrostratigraphic investigation and pre-design evaluation. This alternative meets the minimum requirements of WAC 173 -340-360 and was selected for further evaluation.

- In-Situ Vitrification

In-situ vitrification is a process in which subsurface soils are subjected to high temperatures to melt and solidify its components thereby either volatilizing compounds that remain in the soil or encasing them within a solid matrix. This technology would be an effective means of treatment; however, its

implementation is costly and would potentially generate excessive heat in adjacent West Bay. This technology was not selected for further evaluation due to its cost and potential for causing environmental impacts to a surface water body

- Monitored Natural Attenuation

This alternative will leave the Site in its current condition, and no activities will be implemented to remove, treat, or contain COCs at the Site. Under this alternative, natural attenuation processes will continue to reduce COC concentrations over time and routine groundwater monitoring will be performed to document reductions in COC concentrations. Long-term monitoring of natural attenuation parameters and COC concentrations would be required to ensure that Site contaminants are immobile and decreasing in concentrations. This alternative was not selected for further evaluation because it does not meet the minimum requirements of WAC 173-340-360.

- Excavation and Off-Site Disposal

Excavation and off-Site disposal of impacted Site soils would remove soil impacts from the Site permanently. This remedial alternative would consist of a combination of soil excavation and soil sampling to remove impacted soil and to confirm remaining COC concentrations are below CULs within the soil point of compliance. This is a viable option given its permanence, simplicity, implementability, and cost. This alternative meets the minimum requirements of WAC 173-340-360 and was selected for further evaluation.

- No Action

The no action alternative would not require further remediation at the Site. This option is not feasible given the concentrations that have historically been detected in Site soil. This alternative was not selected for further evaluation because it does not meet the minimum requirements of WAC 173-340-360.

8.1.2 Detailed Evaluation of Alternatives

The following cleanup action alternatives were selected for further evaluation to address residual petroleum hydrocarbons and cPAHs in Site soil:

- Anaerobic Biological Oxidation via Soil Amendments
- ISCO via Persulfate Injection
- Excavation and Off-Site Disposal

Details of the proposed cleanup action alternatives are described in the following sections. Alternatives were compared to solution criteria as outlined in WAC 173-340-360(d). The remedial alternatives were chosen for further evaluation based on the remedy's ability to permanently address contamination in Site media. Remedial alternatives were assigned a numerical score from 1 (lowest benefit) to 5 (highest benefit) based on the effectiveness of the alternative meeting each of the solution criteria. Total scores for each alternative

were assigned based on the summation of the points allocated for the evaluation criteria. The total scores were then compared to the overall costs associated with implementation of the cleanup alternative.

8.1.2.1 Anaerobic Biological Oxidation via Soil Amendments

This alternative would enhance ABOx at the Site through surface application of powdered gypsum ($CaSO_4$) and Epsom salt ($MgSO_4*7H_2O$) to act as a sulfate source to stimulate the growth of naturally occurring, sulfate reducing bacterial populations. Implementation of the soil amendment alternative would consist of the removal of Site vegetation and the application and mixing of gypsum and Epsom salt into the topsoil Subsequent percolation would directly provide a longer-term source of sulfate for petroleum hydrocarbon constituents. The reaction provides an energy source to the bacteria and results in the oxidation and degradation of petroleum hydrocarbons.

As shown in the chemical reaction below, anaerobic biodegradation with sulfate as the electron acceptor yields various forms of sulfide.

$$C_{12}H_{26} + 9.25\ SO_4^{2-} + 1.875\ H^+ \rightarrow 4.625\ H_2S + 4.625\ HS^- + 12HCO_3^- + H_2O$$

The sulfide ion participates in acid-base reactions, and the form of sulfide produced is pH dependent. At near neutral pH levels associated with most groundwater, the dominant form of sulfide is hydrogen sulfide (H_2S). Sulfide is not anticipated to negatively impact groundwater quality because it will be removed from the water through precipitation reactions. The precipitation reaction between sulfide and ferrous iron is anticipated to be an important control on sulfide generation during anaerobic biological oxidation of petroleum hydrocarbons. In anaerobic conditions, naturally occurring iron-bearing minerals will be reduced, and will dissolve ferrous iron into groundwater, which will readily react with sulfide to precipitate iron sulfide minerals.

The solubility differences between Epsom salt and gypsum allow these amendments to provide a short- and long-term sulfate source. Epsom salt has a relatively high solubility (approximately 250 grams per liter [g/L] at 20^{o} C) and will therefore dissolve more rapidly than gypsum after placement. The relatively low solubility of gypsum (approximately 2 g/L at 20^{o} C) will provide a longer-term source of sulfate. Gypsum and Epsom salt will be applied to the ground surface during construction and will be dissolved and carried downward through vadose zone soils and to groundwater.

Calcium, magnesium and sulfate do not have established maximum contaminant levels (i.e. they do not pose significant risk to human health) but can impact water quality from an aesthetic standpoint. Secondary maximum contaminant levels (SMCLs) are established for sulfate and total dissolved solids, which includes calcium. However, SMCLs are established for odor and taste considerations, and as such should not be considered applicable at this Site. Additionally, attenuation of these constituents is rapid, as precipitation of sulfide solids is rapid and scavenging.

This alternative addresses the permanent solution criteria outlined in WAC 173-340-360(d), as follows:

- *Protection of human health and the environment – Score 3.* It is anticipated that this remedial alternative would reduce COC concentrations in the treatment area to concentrations below CULs. However, residual COCs may remain at the Site. Therefore, a score of 3 (moderate benefit) is assigned.

- *Permanence in reduction of toxicity, mobility and volume – Score 3.* This alternative would reduce COC mass through biological oxidation. The alternative was assigned a score of 3 (moderate benefit) due to its ability to reduce COC concentrations in Site media; however, residual COCs may remain at the Site at concentrations below CULs.

- *Cost – Score 3.* Costs to implement this alternative would be approximately $50,000 to $75,000 per application, dependent on the application depth and application density. Three applications are assumed for the purposes of this comparison. The costs associated with this alternative are moderate; therefore, a score of 3 (moderate benefit) was chosen.

- *Long-term effectiveness – Score 2*. The alternative would provide a long-term solution to Site contaminants; however, residual contaminants may remain on Site at concentrations below CULs. A score of 3 (moderate benefit) was assigned to reflect the potential for residual contamination.

- *Management of Short-Term Risks – Score 2*. The remedial alternative could be implemented quickly; however, the potential exists for airborne suspension of particulates during the application process. Soil erosion and runoff risks due to removal of Site vegetation are associated with this alternative as well. Additionally, Site groundwater may show a temporary decrease in aesthetic water quality due to the presence of sulfate reduction species. A score of 2 (low-moderate benefit) was assigned due to the risks associated Site soil erosion and runoff and the potential for short-term decreases in Site groundwater quality.

- *Implementability – Score 3*. This alternative could be easily implemented. However, its initiation would be limited by seasonal weather conditions and multiple applications may be necessary to achieve remedial goals. A score of 3 (moderate benefit) was chosen to reflect the potential for multiple applications and the seasonal application limitations.

- *Consideration of public concerns – Score 3*. Possible short-term risk to the local community may be present as a result of the airborne suspension of particulates during the application process. A score of 3 (moderate benefit) was assigned due to the risks associated with potential short term exposure to COCs off set by the overall time fame associated with those exposures.

- *Restoration Time Frame – Score 2.* This alternative could be implemented in a short time frame. However, the establishment of populations of sulfate reducing bacteria may require additional soil amendments. Additionally, confirmation sampling would be required to confirm the efficacy of the remedial alternative. This alternative was assigned a score of 2 (low-moderate benefit)

  Total Score – 21

  Total Implementation Cost – up to $225,000

8.1.2.2 ISCO via Persulfate Injection

The ISCO alternative would involve routine injections of a persulfate solution in order to enhance oxidation and promote transfer of electrons by producing sulfate radicals, thus accelerating petroleum hydrocarbon degradation. Implementation of this alternative would consist of injection pilot testing followed by full scale

remedial design and implementation, and confirmation sampling to confirm the efficacy of the injections. The pilot testing would consist of the installation of three injection wells, hydraulic conductivity testing, an initial persulfate injection and performance monitoring from the existing monitoring well network. Following the pilot test, two additional injection wells and two additional groundwater monitoring wells would be installed to facilitate injections and ongoing performance monitoring. Four additional injection events would be conducted following full scale remedial design. This remedial alternative would require a pilot test to collect data necessary to estimate the anticipated remedial timeframe; however, remedial operation including performance and groundwater monitoring is assumed to continue for 2 years.

This alternative addresses the permanent solution criteria outlined in WAC 173-340-360(d), as follows:

- *Protection of human health and the environment – Score 3.* It is anticipated that this remedial alternative would reduce COC concentrations in the treatment area to concentrations below CULs. However, residual COCs may remain at the Site. Therefore, a score of 3 (moderate benefit) is warranted.

- *Permanence in reduction of toxicity, mobility and volume – Score 3.* This alternative would reduce contaminant mass through chemical oxidation. The alternative was assigned a score of 3 (moderate benefit) due to its ability to reduce COC concentrations in Site media; however, residual COCs may remain at the Site at concentrations below CULs.

- *Cost – Score 3.* Implementation of this alternative would be approximately $350,000, inclusive of the pilot testing and four subsequent injections. The costs associated with this alternative are high; therefore, a score of 2 (low-moderate benefit) was chosen.

- *Long-term effectiveness – Score 3*. The alternative would provide a long term solution to Site contaminants; however, residual contaminant may remain on Site at concentrations below CULs. A score of 3 (moderate benefit) was assigned to reflect the potential for residual contamination.

- *Management of Short-Term Risks – Score 3*. Short term risks associated with this alternative include a temporary decrease in groundwater quality resulting from the persulfate injections. A score of 3 (moderate benefit) was assigned due to the risks associated with the decreases in Site groundwater quality.

- *Implementability – Score 2*. Pilot testing could be easily implemented. However, successful full scale implementation of the remedial alternative would depend on the ability to deliver the treatment reagents to the affected media, the oxidation reaction kinetics, and the ability to overcome natural oxidant demand of the soils/aquifer. Rate of carbon dioxide generation and the amount of heat generated due to reaction kinetics is often an important consideration for implementability from a health and safety perspective. Therefore, a score of 2 (low-moderate benefit) is warranted.

- *Consideration of public concerns – Score 4*. Short term risks to the local community are minimal; however, a score of 4 (moderate-high benefit) was assigned due to the few short term risks associated with the pilot test implementation and subsequent injections.

- *Restoration Time Frame – Score 2.* This alternative could be implemented in a short time frame. However, additional injections would be required to achieve remedial goals. This alternative was assigned a score of 2 (low-moderate benefit)

  Total Score – 23

  Total Implementation Cost – $350,000

8.1.2.3 Preferred Alternative - Excavation and Off-Site Disposal

The excavation and off-Site disposal alternative will involve additional soil characterization using a sampling grid to determine the final extent of excavation, followed by permanent removal of impacted soils for off-Site disposal at an approved facility. The initial horizontal extent of excavation proposed in the RI (ARCADIS 2012) along with the minimum excavation extent and the proposed soil sampling grid is shown on Figure 13.

8.1.2.3.1 Pre-excavation Soil Sampling

The initial horizontal extent proposed in the RI (ARCADIS 2012) was based on limited historical soil data. To further define vertical and horizontal excavation limits, sampling locations will be placed on 10 foot centers forming a 10 by 10 foot sampling grid surrounding previously identified areas of impacted soil within the Port of Olympia property boundary (GP-2,GP-5,GP-6 and MW-6R) and BNSF right of way (MW-11 and MW-12). ARCADIS will conduct a pre-excavation soil investigation by advancing a direct push soil boring at the center of each grid location to a depth of 10 feet bgs. One soil sample will be collected from 0-5 feet bgs and, and 5-10 feet bgs from each soil boring and submitted for GRO, DRO and cPAH analysis. Based on field screening, additional samples will be collected at different depths (or deeper) if necessary to delineate the vertical extent of contamination. For all grid locations with existing available data except MW-6R, soil samples will be collected between the 6.5 -10 foot intervals to delineate the vertical extent of the proposed excavation.

8.1.2.3.2 Excavation

The pre-excavation soil sampling data will be used to determine the horizontal and vertical excavation extent. Excavation limits will be extended to sampling locations where COC concentrations are confirmed to be below MTCA Method A CULs. No additional confirmation sampling will be done at the time of excavation unless existing grid data are not sufficient to demonstrate that concentrations are below Method A CULs. In that case, confirmation samples will be collected. Soils from grids that exceed MTCA Method A CULs will be excavated and disposed of at an appropriate off-Site disposal facility. The soils from grid location MW-6R will be excavated to a depth of 6 feet bgs because the soil sample obtained previously from this location at the 6-6.5' interval was below MTCA Method A CULs. Soils from all grids that do not exceed the CULs will be stockpiled and reused as excavation backfill in addition to imported granular fill. For example, if the 0-4 feet bgs grid sample is confirmed to contain concentrations less than MTCA Method A CULs, that soil would be stockpiled, and the impacted soil below that would be removed and disposed of. In grids where the 5-10 feet bgs sample exceeds MTCA Method A CULs, the excavation depth will be extended to obtain clean confirmation samples at the bottom.

The existing piping elbows that remain from historical site operations and that are exposed at the surface will be removed. The pipe will be cut at the soil excavation grade. The remaining pipe will be abandoned

and capped in place using pumped cement grout. Rail road ties (if removed) will be disposed of at an appropriate off-Site facility while steel rails (if removed) will be salvaged.

Depending on the results of the confirmation sampling, a minimum of approximately 370 cubic yards (CY) and up to approximately 2,225 CY of impacted soil will be excavated and disposed of at an appropriate off-site disposal facility. Figure 13 illustrates a plan view of the minimum excavation extent and approximate soil sample locations. Table 8 presents the estimated cost to complete the confirmation sampling grid and soil excavation.

Excavation and off-Site disposal addresses the permanent solution criteria outlined in WAC 173-340-360(d), as follows:

- *Protection of human health and the environment – Score 5*. Permanent removal of human health and ecological receptor threat from the Site. A score of 5 (highest benefit) was assigned due to the permanent nature of the alternative meeting the criteria.

- *Permanence in reduction of toxicity, mobility and volume – Score 5*. COC volume removed from the Site. A score of 5 (highest benefit) was assigned due to the permanent nature of the alternative meeting the criteria.

- *Cost – Score 2*. A minimum of $210,000 to $925,000 would be required to complete this alternative. The ultimate costs to complete the excavation will be dependent on the final excavation depth as determined by pre-excavation confirmation sampling. For the purposes of this CAP, an average cost of $ 550,000 will be assumed. A score of 2 (low-moderate benefit) was assigned due to the high costs associated with the alternative meeting the criteria.

- *Long-term effectiveness – Score 5*. Permanent removal of impacted material. A score of 5 (highest benefit) was assigned due to the permanent nature of the alternative meeting the criteria.

- *Management of Short-Term Risks – Score 4*. Material can be removed from the Site in a short time frame, eliminating impacts. The potential exists for airborne suspension of COCs during the excavation process and loading trucks. Additionally, soil erosion and runoff presents environmental risks associated with this alternative. Fugitive emissions during transportation of impacted soils may also impact the greater community. A score of 4 (moderate benefit) was assigned due to the risks associated with potential short term exposure to COCs and Site soil erosion and runoff.

- *Implementability – Score 3*. The equipment and resources required for this alternative are available. Landfill space is available. Lead time is required to schedule and coordinate resources. Seasonal weather conditions will limit the implementation time frame and shoring is required to implement the excavation. A score of 3 (moderate benefit) was assigned due to the availability of resources to implement the alternative; however, the benefit is offset by the implementation lead time and seasonal weather restrictions.

- *Consideration of public concerns – Score 3*. Permanent long-term reduction in toxicity, mobility and volume. Possible short-term risk to the local community due to transportation of impacted materials to

an off-Site landfill. A score of 3 (moderate benefit) was assigned due to the risks associated with potential short term exposure to COCs off set by the overall time fame associated with those exposures.

- *Restoration Time Frame – Score 5.* Implementation of this alternative would be impacted by seasonal weather conditions; however, the alternative could be implemented within the year from approval of the final Cleanup Action Plan (CAP). A score of 5 (highest benefit) was assigned due to the relatively short implementation time frame.

Total Score – 32

Total Implementation Costs – $ 550,000 average ($210,000 to $925,000)

8.2 Comparison and Recommended Corrective Action Alternative

A comparison of the corrective action alternatives is presented below.

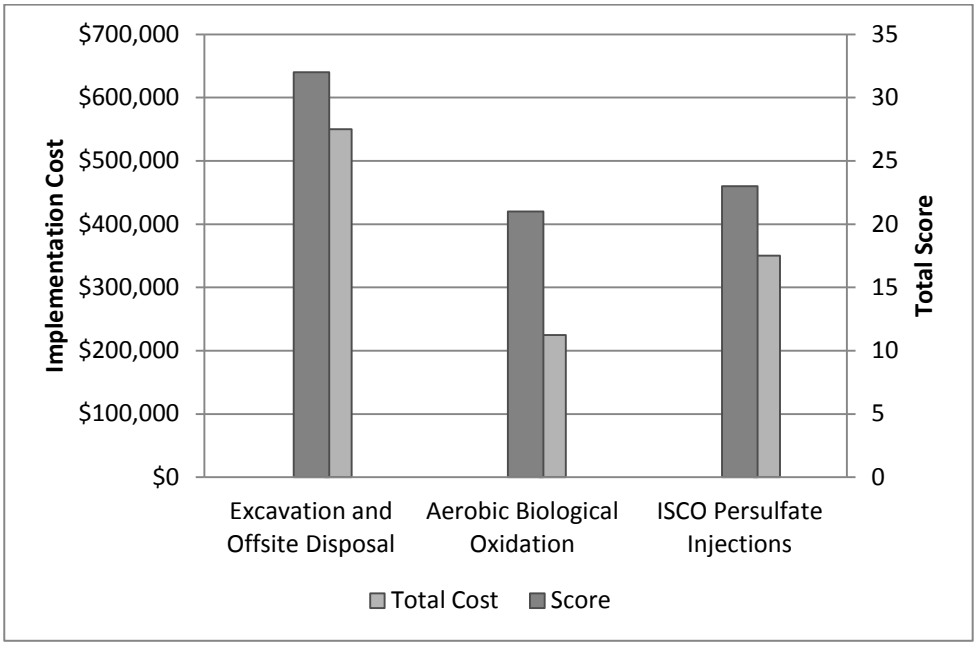

Figure 7A: Comparison of Corrective Action Alternatives

Excavation and off- Site disposal is the preferred remedial alternative. This remedy received the highest total score based on the evaluation criteria as defined in WAC 173-340-360. This score is due primarily to the permanent nature of the remedy and the ability to remove impacted media from the Site entirely. ABOx soil amendments and ISCO injections scored the same in regards to their total scores. Both ABOx and ISCO would require multiple treatments to achieve remedial goals. Alternatively, the excavation and off-Site disposal alternative would produce immediate results without the need for additional treatments or long term monitoring to ensure efficacy of cleanup.

Excavation and off-Site disposal satisfies the requirement to use permanent solutions to the maximum extent practicable based upon several criteria, including:

- Meeting MTCA cleanup standards for the protection of human health and terrestrial ecological receptors.

- Attaining established soil CULs protective of groundwater (for current and potential future land uses).

- Eliminating further releases that might pose threats to human health or the environment.

- Complying with applicable federal, state and local standards for management of wastes.

9. Implementation of Cleanup Action

9.1 Design and Planning Documents

This CAP has summarized the cleanup action alternatives, identified the CULs for Site COCs, described the proposed cleanup action and summarized the rationale for its selection. The CAP will be implemented in accordance with Agreed Order and the approach required by MTCA (WAC 173-340-400). ARCADIS will initiate work on the design phase of the project, including preparation of the following documents:

- Health and Safety Plan (HASP). A HASP will be updated prior to the beginning of field work at the Site. The HASP will document project hazards and hazard controls, scope of work, job safety analysis (JSA), emergency procedures and contact information.

- Work plan for proposed grid sampling and excavation. This document will include details of the pre-excavation soil and groundwater sampling work including sampling methods, locations, and depths; analytical methods; and , health and safety, and soil handling procedures,

- Construction Plans and Specifications (CPS). Per WAC 173-340-400(4) (b) this document will list: all permits and approvals required for excavation, preliminary excavation plans, confirmation soil sampling, special situations (for example when failing grid cells surround a clean grid), soil handling procedures, post-excavation groundwater sampling, temporary erosion & sedimentation control measures, stormwater pollution prevention plan, and fill material specifications, and traffic control.

- Cleanup Action Completion Report (As-built report). After completing the construction outlined in the CPS, ARCADIS will prepare a Cleanup Action Completion Report (as-built report). The completion report will be prepared in accordance with WAC 173-340-400(6)(b) (ii) and will include as-built drawings and specifications.

9.2 Groundwater Monitoring

Based on previous groundwater investigations conducted at the Site, concentrations of COCs detected in groundwater are below MTCA method A cleanup levels (Table 6). To assess completion of cleanup action, two groundwater monitoring events will be conducted at the Site: a pre-excavation sampling event to assess baseline conditions and a post-excavation sampling event to confirm no adverse impacts to groundwater.

Monitoring wells MW-6R, and MW-7 through MW-12 will be sampled for the list of dissolved phase COCs in Table 5A.

9.3 Permits/Other Requirements

The Cleanup Action will be conducted under an Ecology Agreed Order and thus will meet the permit exemption provisions of MTCA (WAC173-340-710[9]). This means that although the procedural requirements of most State and local laws are exempted, there remains the requirement that the Cleanup Action comply with the substantive requirements of these laws. Additionally, the exemption is not applicable if Ecology determines that the exemption would result in the loss of approval from a federal agency that may be necessary for the state to administer any federal law.

9.3.1 State Environmental Policy Act

The State Environmental Policy Act (SEPA) as authorized by the Revised Code of Washington (RCW) 43.21C and WAC 197-11 and other SEPA procedures (WAC 173-802) are intended to ensure that State and local government considers environmental values when making decisions. A SEPA checklist shall be prepared by the PLP or consultant and reviewed by the lead agency (Ecology) as part of the permitting process for the Cleanup Action. Ecology will then issue a determination.

9.3.2 City of Olympia Requirements

The substantive requirements of all applicable City of Olympia permits (such as Traffic Control Plan and Grading/Erosion Control Plan) shall be met. The City shall also be consulted to see if additional Site-specific requirements apply.

10. References

ARCADIS U.S., Inc. (ARCADIS) 2012. Remedial Investigation Report, Former ARCO Olympia Bulk Terminal, Industrial Petroleum Distributors Site (Facility Identification No. 1436), 1120 West Bay Drive, Olympia, Washington. January 30.

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Washington State Department of Ecology (Ecology). 2006. Letter from Steve Teel to Bob May and Scott Hooton Re: Sediment Screening Requirement and Potential Interim Action Former Industrial Petroleum Distributors (IPD) Site, Olympia, WA. July 31.

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Washington State Department of Water Resources. 1970. Geology and Related Groundwater Occurrence, Southeastern Mason County, Washington.

Tables

TABLE 1
GROUNDWATER ELEVATION DATA
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Groundwater Elevation Data	High or Low Tide	Well ID						
Date Measured		MW-6R feet	MW-7 feet	MW-8 feet	MW-9 feet	MW-10 feet	MW-11 feet	MW-12 feet
10/1/2010	Low	11.92	9.74	10.05	11.41	11.47	13.00	12.97
12/29/2010	High	12.34	12.33	11.73	12.12	12.33	13.65	13.65
3/17/2011	High	12.54	12.30	11.79	12.34	12.11	14.01	14.04
4/19/2011	Low	12.38	10.93	11.30	11.41	11.95	13.81	13.74
6/2/2011	High	12.33	9.74	10.37	10.65	11.84	13.79	13.71
6/2/2011	Low	12.26	9.64	10.34	10.93	11.91	13.63	13.59

Notes:
The groundwater elevation data measured approximately at high or low tides.

TABLE 2
ELECTRICAL CONDUCTIVITY VERSUS HIGH AND LOW TIDE
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Electrical Conductivity	High or Low Tide	Well ID						
Date Measured		MW-6R mS/cm	MW-7 mS/cm	MW-8 mS/cm	MW-9 mS/cm	MW-10 mS/cm	MW-11 mS/cm	MW-12 mS/cm
10/1/2010	High	0.145	1.795	2.71	0.220	0.185	0.175	0.174
10/1/2010	Low	--	--	--	--	--	--	--
12/30/2010	High	0.175	0.774	2.51	0.358	0.241	--	0.240
12/30/2010	Low	--	--	--	--	--	--	--
3/17/2011	High	0.189	0.359	3.051	0.496	0.276	0.313	0.278
3/17/2011	Low	--	--	--	--	--	--	--
6/3/2011	High	--	--	--	--	--	--	--
6/3/2011	Low	0.166	1.520	3.17	0.363	0.215	0.202	0.192

Notes:
mS/cm millisiemens per centimeter
-- not recorded

TABLE 3
HISTORICAL SOIL ANALYTICAL RESULTS
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Soil Cleanup Levels	Sample ID / Depth (bgs) / Date Collected																			
		S-1 5' 9/20/2000	S-2 7' 9/20/2000	S-3 6.5' 9/20/2000	S-4 5' 9/20/2000	S-5 5.5' 9/20/2000	S-6 5.5' 9/20/2000	IPD-1-3 3' 11/1/2001	IPD-2-4 4' 11/1/2001	IPD-3-2.5 2.5' 11/1/2001	IPD-4-4.5 4.5' 11/1/2001	IPD-5-4.5 4.5' 11/1/2001	IPD-6-5 5' 11/1/2001	WBTP-01 NS 3/9/2004	WBTP-02 NS 3/9/2004	WBTP-03 NS 3/9/2004	MW-IP-1 (MW-6) 1' 8/10/2004	MW-IP-3 (MW-6) 3' 8/10/2004	MW-IP-5 (MW-6) 5' 8/10/2004	MW-IP-7 (MW-6) 7' 8/10/2004	MW-IP-9 (MW-6) 9' 8/10/2004
Volatile Organic Compounds	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Benzene	0.03	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.100	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	5	--	--	--	--	--	--	<0.200	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	NE	--	--	--	--	--	--	<0.100	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	NE	--	--	--	--	--	--	<0.100	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	9	<0.05	<0.05	<0.05	<0.05	<0.05	**23.9**	<0.200	--	--	--	--	--	--	--	--	--	--	--	--	--
TPH - HCID																					
Gasoline Range Organics	NE	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--
Diesel Range Organics	NE	--	--	--	--	--	--	ND	ND	ND	ND	ND	ND	**DET**	ND	ND	--	--	--	--	--
Heavy Oil Range Organics	NE	--	--	--	--	--	--	**DET**	ND	ND	ND	ND	ND	ND	ND	ND	--	--	--	--	--
TPH-NWTPH	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Gasoline Range Organics	30	<10	--	--	--	--	<10	--	--	--	--	--	--	--	--	--	<20	<20	<20	<20	<20
Diesel Range Organics	2,000	**330**	<20	<20	<20	<20	**14,000**	<25	--	--	--	--	--	**570**	**1,100**	--	<50	<50	<50	<50	<50
Heavy Oil Range Organics	2,000	<40	<40	<40	<40	<40	<40	**296**	--	--	--	--	--	--	--	--	<100	<100	<100	<100	<100
PCBs	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
PCB-1016	(d)	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	--	--	--	--	--	--
PCB-1221	(d)	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	--	--	--	--	--	--
PCB-1232	(d)	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	--	--	--	--	--	--
PCB-1242	(d)	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	--	--	--	--	--	--
PCB-1248	(d)	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	--	--	--	--	--	--
PCB-1254	(d)	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	--	--	--	--	--	--
PCB-1260	(d)	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	--	--	--	--	--	--
PCB Mixtures	1	--	--	--	--	--	--	--	--	--	--	--	--	*0.175*	--	--	--	--	--	--	--
Metals	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Antimony	NE	--	--	--	--	--	--	--	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
Arsenic	20	--	--	--	--	--	--	**2.35**	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
Barium	NE	--	--	--	--	--	--	**64.5**	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
Cadmium	2	--	--	--	--	--	--	--	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
Chromium	(a)	--	--	--	--	--	--	**17.6**	--	--	--	--	--	ND^	**10**	ND^	--	--	--	--	--
Copper	NE	--	--	--	--	--	--	**25.1**	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
Lead (Total)	250	**11**	--	--	--	--	**30**	**27.4**	--	--	--	--	--	**8**	ND^	ND^	**50.3**	**51**	**724**	**8.28**	**2.46**
Mercury	2	--	--	--	--	--	--	--	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
Nickel	NE	--	--	--	--	--	--	**23.0**	--	--	--	--	--	ND^	ND^	**16**	--	--	--	--	--
Selenium	NE	--	--	--	--	--	--	--	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
Silver	NE	--	--	--	--	--	--	--	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
Thallium	NE	--	--	--	--	--	--	--	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
Zinc	NE	--	--	--	--	--	--	**39.5**	--	--	--	--	--	ND^	ND^	ND^	--	--	--	--	--
c-Polyaromatic Hydrocarbons	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Naphthalene	(b)	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnaphthalene	(b)	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	(b)	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalenes	5	--	--	--	--	--	--	**0.201**	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	NE	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	NE	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	NE	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) anthracene	(c)	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (a) pyrene	0.1	--	--	--	--	--	--	<0.134*	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (b) fluoranthene	(c)	--	--	--	--	--	--	**0.188**	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (g,h,i) perylene	NE	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo (k) fluoranthene	(c)	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	(c)	--	--	--	--	--	--	**0.185**	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo (a,h) anthracene	(c)	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	NE	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	NE	--	--	--	--	--	--	**0.312**	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno (1,2,3-cd) pyrene	(c)	--	--	--	--	--	--	<0.134	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	NE	--	--	--	--	--	--	**0.212**	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	NE	--	--	--	--	--	--	**0.235**	--	--	--	--	--	--	--	--	--	--	--	--	--
cPAH B(a)P Equivalents	0.1	--	--	--	--	--	--	**0.11**	--	--	--	--	--	--	--	--	--	--	--	--	--

TABLE 3
HISTORICAL SOIL ANALYTICAL RESULTS
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Notes:
Concentrations compared to the Model Toxics Control Act (MTCA) Method A soil cleanup levels for unrestricted land uses
presented in Table 740-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA Method A cleanup level for gasoline range total petroleum hydrocarbons is 100-mg/kg without benzene and 30-mg/kg with benzene present. Benzene
was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 30-mg/kg was utilized.
ft = feet
bgs = below ground surface
mg/kg = milligram per kilogram
NS = Depth not specified. Previous consultant stated that test pit soil samples were collected above the highest apparent water level. Water level was not specified.
NE = Cleanup level not evaluated under MTCA
ND = Not Detected (Hydrocarbon Identification Method)
ND^ = Reported by previous consultant as "Not Detected". Reporting and/or detection limit was not specified.
-- not analyzed
TPH = Total Petroleum Hydrocarbons
HCID = Laboratory analysis by Hydrocarbon Identification
NWTPH = Laboratory analysis by Northwest Method Total Petroleum Hydrocarbons
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
< = Not detected above the laboratory reporting limit (RL) and/or method detection limit
Bold = Chemical detected at a concentration above the laboratory reporting limit
Bolded and highlighted font indicates results above the MTCA Method A cleanup level
(a) = Analysis is for total chromium. No MTCA cleanup level has been established for total chromium.
(b) = MTCA cleanup level is 5-mg/kg for total concentration of naphthalene, 1-methylnaphthalene and 2-methylnaphthalene. Total concentration conservatively assumed
to be the sum any detected concentration and/or of half of the value of each RL if not detected
(c) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)
(d) = See MTCA cleanup level for PCB Mixtures. Per MTCA, cleanup level based on applicable federal law (40 CFR 761.61). This is a total value for all PCBs, conservatively assumed
to be the sum any detected concentration and/or of half of the value of each RL if not detected.
NA = Not applicable
* = Laboratory practical quantitation limit is elevated above the MTCA Method A cleanup level, but chemical was
not observed above the laboratory method detection limit

TABLE 4
HISTORICAL GROUNDWATER ANALYTICAL RESULTS
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Cleanup Levels	Sample ID Sample Location Type Date Collected											
		W-1 9/20/2000	W-2 9/20/2000	IPD-1 TP 2001	IPD-2 TP 2001	IPD-3 TP 2001	IPD-4 TP 2001	IPD-5 TP 2001	WBTP-01 TP 3/9/2004	WBTP-02 TP 3/9/2004	MW-6 MW 8/26/2004	MW-6 MW 11/12/2004	MW-6 MW 1/10/2005
Volatile Organic Compounds	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
Benzene	5	<1	<1	<1.00	<1.00	<1.00	**1.64**	<1.00	--	--	--	--	--
Ethylbenzene	700	<1	<1	<1.00	<1.00	<1.00	<1.00	<1.00	--	--	--	--	--
Toluene	1,000	<1	<1	<1.00	<1.00	**4.38**	<1.00	<1.00	--	--	--	--	--
Total Xylenes	1,000	<1	**170**	<2.00	<2.00	<2.00	**31.1**	**6.9**	--	--	--	--	--
TPH - HCID													
Gasoline Range Organics	--	--	--	ND	--	ND	ND	ND	--	--	<250	<250	<250
Diesel Range Organics	--	--	--	ND	DET	DET	ND	ND	--	--	<500	<500	<500
Heavy Oil Range Organics	--	--	--	ND	ND	DET	ND	ND	--	--	<500	<500	<500
TPH-NWTPH	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**
Gasoline Range Organics	800	<100	<100	<80	--	**1,930**	**149**	**254**	--	--	--	--	--
Diesel Range Organics	500	**35,000**	**280,000**	<333	**1,020**	**14,100**	<250	<250	<200**	<400**	--	--	--
Heavy Oil Range Organics	500	<400	<400	<240	<500	**590**	<500	<500	<200	<400	--	--	--
Metals	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**
Antimony	NE	--	--	**1.10**	<1.00	<1.00	<1.00	<1.00	<2.5	<2.5	--	--	--
Arsenic	5	--	--	**21.9**	<1.00	**2.01**	**1.32**	<1.00	**2.74**	**0.865**	--	--	--
Barium	NE	--	--	**112**	**18.6**	**72.2**	**31.40**	**27.9**	--	--	--	--	--
Beryllium	NE	--	--	<1.00	<1.00	<1.00	<1.00	<1.00	<0.5	<0.5	--	--	--
Cadmium	5	--	--	<1.00	<1.00	<1.00	<1.00	<1.00	<0.5	<0.5	--	--	--
Chromium	50	--	--	**24.0**	**4.92**	**20.7**	**7.76**	**6.33**	**3.57**	**6.05**	--	--	--
Copper	NE	--	--	**44.5**	**5.22**	**20.4**	**8.34**	**6.12**	<0.5	<0.5	--	--	--
Lead (Total)	15	<1	--	**49.9**	**2.64**	**5.15**	**1.78**	**1.40**	**0.535**	<0.5	ND^	--	--
Lead (Dissolved)	15	--	--	--	--	--	--	--	--	--	ND^	--	--
Mercury	2	--	--	--	--	--	--	--	<0.2	<0.2	--	--	--
Nickel	NE	--	--	**28.0**	**4.75**	**20.3**	**8.77**	**6.13**	**2.44**	**3.85**	--	--	--
Selenium	NE	--	--	**1.15**	<1.00	<1.00	<1.00	<1.00	<1	<1	--	--	--
Silver	NE	--	--	--	--	--	--	--	<0.5	<0.5	--	--	--
Thallium	NE	--	--	--	--	--	--	--	<0.5	<0.5	--	--	--
Zinc	NE	--	--	**85.7**	**18.3**	**35.6**	**21.5**	**11.7**	**7.89**	**8.58**	--	--	--
c-Polyaromatic Hydrocarbons	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**			**mg/L**
Naphthalene	(a)	--	--	<1.33	**10.6**	**6.30**	<1.00	**5.73**	<0.1	<0.1	--	--	--
1-Methylnaphthalene	(a)	--	--	--	--	--	--	--	**3.4**	**28**	--	--	--
2-Methylnaphthalene	(a)	--	--	--	--	--	--	--	**11**	**33**	--	--	--
Naphthalenes	160	--	--	**0.67**	**10.6**	**6.30**	**0.50**	**5.73**	--	--	--	--	--
Acenaphthene	NE	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Acenaphthylene	NE	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Anthracene	NE	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Benzo (a) anthracene	(b)	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Benzo (a) pyrene	0.1	--	--	<1.33*	<1.00*	<1.00*	<1.00*	<1.00*	<0.1	<0.1	--	--	--
Benzo (b) fluoranthene	(b)	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Benzo (g,h,i) perylene	NE	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Benzo (k) fluoranthene	(b)	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Chrysene	(b)	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Dibenzo (a,h) anthracene	(b)	--	--	<2.67	<2.00	<2.00	<2.00	<2.00	<0.1	<0.1	--	--	--
Fluoranthene	NE	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Fluorene	NE	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Indeno (1,2,3-cd) pyrene	(b)	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
Phenanthrene	NE	--	--	<1.33	<1.00	**2.28**	<1.00	<1.00	<0.1	<0.1	--	--	--
Pyrene	NE	--	--	<1.33	<1.00	<1.00	<1.00	<1.00	<0.1	<0.1	--	--	--
cPAH B(a)P Equivalents	0.1	--	--	**1.88**	**0.86**	**0.81**	**0.81**	**0.81**	--	--	--	--	--

TABLE 4
HISTORICAL GROUNDWATER ANALYTICAL RESULTS
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Notes:
Concentrations compared to the Model Toxics Control Act (MTCA) Method A groundwater cleanup levels presented in Table 720-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA cleanup level for gasoline range total petroleum hydrocarbons is 1000-µg/kg without benzene and 800-µg/kg with benzene present. Benzene was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 800-µg/kg was utilized.
TP = test pit
MW = monitoring well
µg/L = micrograms per kilogram
NE = Cleanup level not established under MTCA
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
ND = Not Detected (Hydrocarbon Identification Method)
ND^ = Reported by previous consultant as "Not Detected". Reporting and/or detection limit was not specified.
** Laboratory report in Appendix B of Parametrix's 2004 West Bay Phase II ESA indicated these constituents were ND. Table 2 of Delta's 2008 Remedial Investigation Work Plan reported TPH-D concentrations as 10,000 and 59,000 µg/L (WBTP-01 and WBTP-02, respectively). The 2008 RIWP did not provide a laboratory report.
-- = not applicable or analyzed
< = Chemical not detected above the laboratory reporting limit, method detection limit, or practical quantitation limit
Italics = Value calculated for comparison to MTCA cleanup level
ND' = Laboratory practical quantitation limit is elevated above the MTCA Method A cleanup level, but chemical was not observed above the laboratory reporting limit
Bold = Chemical detected at a concentration above the laboratory reporting limit
Bolded and highlighted font indicates results above the MTCA Method A cleanup level
(a) = See MTCA cleanup level for naphthalene. This is a total value for naphthalene, 1-methylnaphthalene and 2-methylnaphthalene
(b) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)

TABLE 5
SOIL ANALYTICAL RESULTS - AUGUST 23-25, 2010
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Cleanup Levels	Sample ID (Depth below ground surface in feet) Date Collected						
		GP-1 (2-2.5) 8/25/2010	GP-1 (4-4.5) 8/25/2010	GP-1 (6-6.5) 8/25/2010	GP-2 (2-2.5) 8/25/2010	GP-2 (4-4.5) 8/25/2010	GP-3 (2-2.5) 8/24/2010	GP-3 (4-4.5) 8/24/2010
Volatile Organic Compounds	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Benzene	0.03	<0.0047	<0.019	--	<0.0042	<0.0086	<0.0034	<0.0038
Ethylbenzene	6	<0.0047	<0.019	--	<0.0042	<0.0086	<0.0034	<0.0038
Toluene	7	<0.0047	**0.0342**	--	<0.0042	<0.0086	<0.0034	<0.0038
Total Xylenes	9	<0.014	<0.0567	--	<0.0126	<0.0259	<0.0101	<0.0113
Total Petroleum Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Gasoline Range Hydrocarbons	30	<8.6	<47*	--	<9.8	**264**	<6.2	<8.6
Diesel Range Organics	2,000	**30.4**	**60.9**	--	**732**	**3,120**	<21.8	**31.1**
Residual Range/Heavy Oil Organics	2,000	**198**	**481**	--	<124	**296**	<87.1	<103
RCRA 8 Metals	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Arsenic	20	<12.3	<4.8	--	<13.3	<4.4	<10.9	<12.4
Barium	NE	**80.6**	**52.7**	--	**53.6**	**50.0**	**107**	**101**
Cadmium	2	<6.2*	<2.4*	--	<6.6*	<2.2*	<5.5*	<6.2*
Chromium (total)	(a)	**26.7**	**10.4**	--	**24.6**	**17.5**	**34.5**	**40.4**
Lead	250	**4.7**	**5.2**	--	**4.1**	**4.9**	**5.2**	**4.0**
Mercury	2	<0.12	<0.27	--	<0.15	<0.24	<0.11	<0.12
Selenium	NE	<6.2	<2.4	--	<6.6	<2.2	<5.5	<6.2
Silver	NE	<6.2	<2.4	--	<6.6	<2.2	<5.5	<6.2
c-Polyaromatic Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Naphthalene	(b)	**0.0087**	<0.0178	<0.0451	<0.0104	**0.192**	<0.0075	<0.0087
1-Methylnaphthalene	(b)	<0.0087	<0.0178	<0.0451	**0.0217**	**0.449**	<0.0075	**0.0143**
2-Methylnaphthalene	(b)	**0.0111**	<0.0178	<0.0451	**0.0228**	**0.463**	<0.0075	**0.0199**
Naphthalenes	5	*0.0242*	*0.0267*	*0.0677*	*0.0497*	*1.10*	*0.011*	*0.039*
Acenaphthene	NE	<0.0087	<0.0178	<0.0451	<0.0104	**0.0896**	<0.0075	<0.0087
Acenaphthylene	NE	<0.0087	<0.0178	<0.0451	**0.0107**	**0.0688**	<0.0075	<0.0087
Anthracene	NE	<0.0087	<0.0178	<0.0451	<0.0104	**0.194**	<0.0075	<0.0087
Benzo (a) anthracene	(c)	<0.0087	<0.0178	<0.0451	<0.0104	**0.315**	<0.0075	<0.0087
Benzo (a) pyrene	0.1	<0.0087	<0.0178	<0.0451	<0.0104	**0.233**	<0.0075	<0.0087
Benzo (b) fluoranthene	(c)	<0.0087	<0.0178	<0.0451	<0.0104	**0.165**	<0.0075	<0.0087
Benzo (g,h,i) perylene	NE	<0.0087	<0.0178	<0.0451	<0.0104	**0.0429**	<0.0075	<0.0087
Benzo (k) fluoranthene	(c)	<0.0087	<0.0178	<0.0451	<0.0104	**0.205**	<0.0075	<0.0087
Chrysene	(c)	<0.0087	<0.0178	<0.0451	<0.0104	**0.338**	<0.0075	<0.0087
Dibenzo (a,h) anthracene	(c)	<0.0087	<0.0178	<0.0451	<0.0104	**0.0498**	<0.0075	<0.0087
Fluoranthene	NE	<0.0087	**0.0237**	**0.0540**	<0.0104	**0.488**	<0.0075	<0.0087
Fluorene	NE	<0.0087	<0.0178	<0.0451	**0.0136**	**0.294**	<0.0075	<0.0087
Indeno (1,2,3-cd) pyrene	(c)	<0.0087	<0.0178	<0.0451	<0.0104	**0.0550**	<0.0075	<0.0087
Phenanthrene	NE	**0.0114**	**0.0302**	<0.0451	**0.0383**	**0.999**	<0.0075	**0.0103**
Pyrene	NE	<0.0087	<0.0178	**0.0625**	<0.0104	**0.522**	<0.0075	<0.0087
cPAH B(a)P Equivalents	0.1	0.0044	0.0089	0.0226	0.00785	**0.315**	0.0038	0.0044

TABLE 5
SOIL ANALYTICAL RESULTS - AUGUST 23-25, 2010
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Cleanup Levels	Sample ID (Depth below ground surface in feet) Date Collected						
		GP-4 (2-2.5) 8/23/2010	GP-4 (4-4.5) 8/23/2010	GP-5 (2-2.5) 8/23/2010	GP-5 (4-4.5) 8/23/2010	GP-5 (6-6.5) 8/23/2010	GP-6 (2-2.5) 8/25/2010	GP-6 (4-4.5) 8/25/2010
Volatile Organic Compounds	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Benzene	0.03	<0.0033	<0.0033	<0.0034	<0.0095	--	<0.0031	<0.0029
Ethylbenzene	6	<0.0033	<0.0033	<0.0034	<0.0095	--	<0.0031	<0.0029
Toluene	7	<0.0033	<0.0033	<0.0034	<0.0095	--	<0.0031	<0.0029
Total Xylenes	9	<0.0099	<0.0099	<0.0102	**0.107**	--	<0.0094	<0.0087
Total Petroleum Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Gasoline Range Hydrocarbons	30	<7.6	<7.4	<7.2	**875**	--	<6.6	**486**
Diesel Range Organics	2,000	<24.7	<26.2	**31.8**	**3,780**	--	<23.3	**899**
Residual Range/Heavy Oil Organics	2,000	<98.6	<105	<98.8	**1,040**	--	<93.1	<98.7
RCRA 8 Metals	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Arsenic	20	<13.1	<12.6	<12.4	<21.0*	--	<11.5	<12.1
Barium	NE	**120**	**115**	**107**	**130**	--	**127**	**139**
Cadmium	2	<6.5*	<6.3*	<6.2*	<10.5*	--	<5.7*	<6.1*
Chromium (total)	(a)	**48.1**	**48.3**	**35.1**	**40.7**	--	**41.5**	**42.4**
Lead	250	**4.6**	**7.1**	**8.6**	**31.0**	--	**6.4**	**6.3**
Mercury	2	<0.13	<0.13	<0.11	<0.17	--	<0.093	<0.11
Selenium	NE	<6.5	<6.3	<6.2	<10.5	--	<5.7	<6.1
Silver	NE	<6.5	<6.3	<6.2	<10.5	--	<5.7	<6.1
c-Polyaromatic Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Naphthalene	(b)	<0.0086	<0.0089	**0.0556**	**4.090**	**0.988**	<0.0079	**0.141**
1-Methylnaphthalene	(b)	<0.0086	<0.0089	**0.0397**	**9.56**	**2.580**	<0.0079	**0.532**
2-Methylnaphthalene	(b)	<0.0086	<0.0089	**0.0771**	**12.300**	**2.840**	<0.0079	**0.627**
Naphthalenes	5	*0.013*	*0.013*	*0.172*	***25.95***	***6.408***	*0.019*	*1.30*
Acenaphthene	NE	<0.0086	<0.0089	<0.0083	**0.205**	**0.0646**	<0.0079	**0.0331**
Acenaphthylene	NE	<0.0086	<0.0089	**0.0105**	**0.155**	**0.0524**	<0.0079	**0.0323**
Anthracene	NE	<0.0086	<0.0089	**0.0214**	**0.0802**	<0.0288	<0.0079	**0.0113**
Benzo (a) anthracene	(c)	<0.0086	<0.0089	**0.0227**	**0.0231**	<0.0288	<0.0079	**0.0177**
Benzo (a) pyrene	0.1	<0.0086	<0.0089	**0.0216**	<0.0147	<0.0288	<0.0079	**0.0124**
Benzo (b) fluoranthene	(c)	<0.0086	<0.0089	**0.0269**	**0.0152**	<0.0288	<0.0079	**0.0081**
Benzo (g,h,i) perylene	NE	<0.0086	<0.0089	**0.0185**	<0.0147	<0.0288	<0.0079	<0.0077
Benzo (k) fluoranthene	(c)	<0.0086	<0.0089	**0.0219**	<0.0147	<0.0288	<0.0079	**0.0120**
Chrysene	(c)	<0.0086	<0.0089	**0.0312**	**0.0352**	<0.0288	<0.0079	**0.0202**
Dibenzo (a,h) anthracene	(c)	<0.0086	<0.0089	<0.0083	<0.0147	<0.0288	<0.0079	<0.0077
Fluoranthene	NE	<0.0086	<0.0089	**0.0645**	**0.0864**	**0.0517**	**0.0140**	**0.0359**
Fluorene	NE	<0.0086	<0.0089	<0.0083	**0.856**	**0.262**	<0.0079	**0.113**
Indeno (1,2,3-cd) pyrene	(c)	<0.0086	<0.0089	**0.0164**	<0.0147	<0.0288	<0.0079	<0.0077
Phenanthrene	NE	<0.0086	<0.0089	**0.0594**	**1.460**	**0.289**	**0.0109**	**0.152**
Pyrene	NE	<0.0086	<0.0089	**0.0530**	**0.125**	**0.048**	**0.0100**	**0.0426**
cPAH B(a)P Equivalents	0.1	0.0043	0.0045	0.0307	0.0123	0.022	0.0056	0.016

TABLE 5
SOIL ANALYTICAL RESULTS - AUGUST 23-25, 2010
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Cleanup Levels	Sample ID (Depth below ground surface in feet) Date Collected						
		GP-6 (6-6.5) 8/25/2010	GP-7 (2-2.5) 8/24/2010	GP-7 (6-6.5) 8/24/2010	GP-8 (2-2.5) 8/25/2010	GP-8 (4-4.5) 8/25/2010	GP-8 (6-6.5) 8/25/2010	GP-9 (2-2.5) 8/24/2010
Volatile Organic Compounds	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Benzene	0.03	<0.0038	<0.0041	<0.0031	<0.003	--	<0.0031	<0.0031
Ethylbenzene	6	<0.0038	<0.0041	<0.0031	<0.003	--	<0.0031	<0.0031
Toluene	7	<0.0038	<0.0041	<0.0031	<0.003	--	<0.0031	<0.0031
Total Xylenes	9	<0.0114	<0.0122	<0.0093	<0.009	--	<0.0093	<0.0092
Total Petroleum Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Gasoline Range Hydrocarbons	30	**94.4**	<7.3	<7.2	<6.2	--	<6.6	<7.2
Diesel Range Organics	2,000	**57.1**	<23	<24.5	<19.3	--	<22.3	<24.9
Residual Range/Heavy Oil Organics	2,000	<108	<92.1	<98.2	<77.1	--	<89.3	<99.6
RCRA 8 Metals	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Arsenic	20	<13.9	<11.5	<12.7	<10.3	--	<11.8	12.4
Barium	NE	**112**	**154**	**113**	**51**	--	**71.8**	**129**
Cadmium	2	<7.0*	<5.8*	<6.3*	<5.2*	--	<5.9*	<6.2*
Chromium (total)	(a)	**44.2**	**45**	**39.9**	**26.7**	--	**32.8**	**42.7**
Lead	250	**7.1**	**6.8**	**4.3**	**8.8**	--	**10.1**	**7.3**
Mercury	2	<0.11	<0.11	<0.12	<0.096	--	<0.10	<0.12
Selenium	NE	<7.0	<5.8	<6.3	<5.2	--	<5.9	<6.2
Silver	NE	<7.0	<5.8	<6.3	<5.2	--	<5.9	<6.2
c-Polyaromatic Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Naphthalene	(b)	**0.0135**	<0.0081	<0.0085	**0.0092**	**0.0089**	**0.0112**	**0.0181**
1-Methylnaphthalene	(b)	**0.0218**	<0.0081	<0.0085	**0.0090**	**0.0075**	**0.0102**	**0.0162**
2-Methylnaphthalene	(b)	**0.0217**	<0.0081	<0.0085	**0.0125**	**0.0109**	**0.0148**	**0.0248**
Naphthalenes	5	*0.0570*	*0.012*	*0.013*	*0.031*	*0.027*	*0.0362*	*0.0591*
Acenaphthene	NE	<0.0097	<0.0081	<0.0085	<0.0070	<0.0071	<0.0077	<0.0084
Acenaphthylene	NE	<0.0097	<0.0081	<0.0085	<0.0070	<0.0071	<0.0077	<0.0084
Anthracene	NE	<0.0097	<0.0081	<0.0085	<0.0070	<0.0071	<0.0077	**0.0126**
Benzo (a) anthracene	(c)	<0.0097	<0.0081	<0.0085	<0.0070	<0.0071	<0.0077	**0.0162**
Benzo (a) pyrene	0.1	<0.0097	<0.0081	<0.0085	<0.0070	<0.0071	<0.0077	**0.0147**
Benzo (b) fluoranthene	(c)	<0.0097	<0.0081	<0.0085	**0.0105**	**0.0085**	**0.0089**	**0.0239**
Benzo (g,h,i) perylene	NE	<0.0097	<0.0081	<0.0085	<0.0070	<0.0071	<0.0077	**0.0113**
Benzo (k) fluoranthene	(c)	<0.0097	<0.0081	<0.0085	**0.0078**	<0.0071	<0.0077	**0.0139**
Chrysene	(c)	<0.0097	<0.0081	<0.0085	**0.0111**	**0.0089**	**0.0092**	**0.0220**
Dibenzo (a,h) anthracene	(c)	<0.0097	<0.0081	<0.0085	<0.0070	<0.0071	<0.0077	<0.0084
Fluoranthene	NE	<0.0097	<0.0081	<0.0085	**0.0158**	**0.0143**	**0.0142**	**0.0424**
Fluorene	NE	<0.0097	<0.0081	<0.0085	<0.0070	<0.0071	<0.0077	<0.0084
Indeno (1,2,3-cd) pyrene	(c)	<0.0097	<0.0081	<0.0085	<0.0070	<0.0071	<0.0077	**0.0112**
Phenanthrene	NE	<0.0097	<0.0081	<0.0085	**0.0127**	**0.0122**	**0.0134**	**0.0323**
Pyrene	NE	<0.0097	<0.0081	<0.0085	**0.0124**	**0.0120**	**0.0110**	**0.0290**
cPAH B(a)P Equivalents	0.1	0.0064	0.0041	0.0043	0.0054	0.0048	0.0052	0.0214

TABLE 5
SOIL ANALYTICAL RESULTS - AUGUST 23-25, 2010
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Cleanup Levels	Sample ID (Depth below ground surface in feet) Date Collected						
		GP-9 (4-4.5) 8/24/2010	GP-9 (5.5-6) 8/24/2010	MW-6R (2-2.5) 8/23/2010	MW-6R (4-4.5) 8/23/2010	MW-6R (6-6.5) 8/23/2010	MW-7 (2-2.5) 8/24/2010	MW-7 (6-6.5) 8/24/2010
Volatile Organic Compounds	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Benzene	0.03	--	<0.0031	<0.0031	<0.0215	--	<0.0030	<0.0031
Ethylbenzene	6	--	<0.0031	<0.0031	<0.0215	--	<0.0030	<0.0031
Toluene	7	--	<0.0031	<0.0031	<0.0215	--	<0.0030	<0.0031
Total Xylenes	9	--	<0.0092	<0.0094	<0.0644	--	<0.0090	<0.0094
Total Petroleum Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Gasoline Range Hydrocarbons	30	--	**13.8**	<6.5	**665**	--	<4.9	<6.8
Diesel Range Organics	2,000	--	<25.0	<22.5	**7,060**	--	<20.3	<24.3
Residual Range/Heavy Oil Organics	2,000	--	<100	<89.9	**1,360**	--	<81.0	<97.4
RCRA 8 Metals	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Arsenic	20	--	<13.0	<12.0	<10.0	--	<10.5	<12.5
Barium	NE	--	**102**	**110**	<100	--	**84.1**	**123**
Cadmium	2	--	<6.5*	<6.0*	<5.0*	--	<5.2*	<6.2*
Chromium (total)	(a)	--	**36.5**	**39.4**	**5.0**	--	**22.8**	**34.4**
Lead	250	--	**10.7**	**4.3**	**12.6**	--	**6.6**	**10.7**
Mercury	2	--	<0.11	<0.11	<0.43	--	<0.11	<0.12
Selenium	NE	--	<6.5	<6.0	<5.0	--	<5.2	<6.2
Silver	NE	--	<6.5	<6.0	<5.0	--	<5.2	<6.2
c-Polyaromatic Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Naphthalene	(b)	**0.0110**	**0.0184**	<0.0080	**2.4800**	**0.0177**	<0.0072	**0.0092**
1-Methylnaphthalene	(b)	<0.0089	**0.0108**	<0.0080	**13.0000**	**0.0623**	<0.0072	<0.0085
2-Methylnaphthalene	(b)	**0.0123**	**0.018**	<0.0080	**16.7000**	**0.0568**	<0.0072	<0.0085
Naphthalenes	5	*0.028*	*0.047*	*0.012*	***32.18***	*0.137*	*0.0108*	*0.0170*
Acenaphthene	NE	<0.0089	<0.0086	<0.0080	**0.4860**	<0.0101	<0.0072	<0.0085
Acenaphthylene	NE	<0.0089	**0.0086**	<0.0080	**0.3300**	<0.0101	<0.0072	<0.0085
Anthracene	NE	<0.0089	**0.0205**	<0.0080	**0.1190**	<0.0101	<0.0072	<0.0085
Benzo (a) anthracene	(c)	**0.0143**	**0.0339**	<0.0080	<0.0358	<0.0101	<0.0072	<0.0085
Benzo (a) pyrene	0.1	**0.0142**	**0.0317**	<0.0080	<0.0358	<0.0101	<0.0072	<0.0085
Benzo (b) fluoranthene	(c)	**0.0163**	**0.0277**	<0.0080	<0.0358	<0.0101	<0.0072	<0.0085
Benzo (g,h,i) perylene	NE	<0.0089	**0.0177**	<0.0080	<0.0358	<0.0101	<0.0072	<0.0085
Benzo (k) fluoranthene	(c)	**0.0148**	**0.029**	<0.0080	<0.0358	<0.0101	<0.0072	<0.0085
Chrysene	(c)	**0.0184**	**0.0334**	<0.0080	**0.0395**	<0.0101	<0.0072	<0.0085
Dibenzo (a,h) anthracene	(c)	<0.0089	<0.0086	<0.0080	<0.0358	<0.0101	<0.0072	<0.0085
Fluoranthene	NE	**0.0405**	**0.0932**	<0.0080	**0.0544**	<0.0101	<0.0072	<0.0085
Fluorene	NE	<0.0089	**0.0167**	<0.0080	**1.6900**	<0.0101	<0.0072	<0.0085
Indeno (1,2,3-cd) pyrene	(c)	**0.0093**	**0.0172**	<0.0080	<0.0358	<0.0101	<0.0072	<0.0085
Phenanthrene	NE	**0.0253**	**0.0877**	<0.0080	**2.9000**	<0.0101	<0.0072	<0.0085
Pyrene	NE	**0.0290**	**0.0652**	<0.0080	**0.2120**	<0.0101	<0.0072	<0.0085
cPAH B(a)P Equivalents	0.1	0.0199	0.0428	0.0040	0.0183	0.00510	0.0036	0.0043

TABLE 5
SOIL ANALYTICAL RESULTS - AUGUST 23-25, 2010
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Cleanup Levels	Sample ID (Depth below ground surface in feet) Date Collected						
		MW-8 (2-2.5) 8/24/2010	MW-8 (6-6.5) 8/24/2010	MW-9 (2-2.5) 8/24/2010	MW-9 (6-6.5) 8/24/2010	MW-10 (2-2.5) 8/24/2010	MW-10 (4-4.5) 8/24/2010	MW-11 (2-2.5) 8/25/2010
Volatile Organic Compounds	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Benzene	0.03	<0.0036	<0.0036	<0.0042	<0.0032	<0.0039	<0.0033	<0.0033
Ethylbenzene	6	<0.0036	<0.0036	<0.0042	<0.0032	<0.0039	<0.0033	<0.0033
Toluene	7	<0.0036	<0.0036	<0.0042	<0.0032	<0.0039	<0.0033	<0.0033
Total Xylenes	9	<0.011	<0.0109	<0.013	<0.0097	<0.0116	<0.010	<0.010
Total Petroleum Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Gasoline Range Hydrocarbons	30	<7.0	<7.9	<9.0	<8.36	<8.1	<7.8	<7.0
Diesel Range Organics	2,000	<21.6	<25.4	<24.7	<25.6	<23.4	<26.9	**72.3**
Residual Range/Heavy Oil Organics	2,000	<86.3	<102	<98.7	<102	<93.4	<107	**176**
RCRA 8 Metals	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Arsenic	20	<10.9	<13.1	<10.0	<11.1	<12.4	<13.2	<11.2
Barium	NE	**131**	**140**	**156**	**126**	**118**	**126**	**131**
Cadmium	2	<5.5*	<6.6*	<5.0*	<5.6*	<6.2*	<6.6*	<5.6*
Chromium (total)	(a)	**41.7**	**41.9**	**49.0**	**46.0**	**45.8**	**42.0**	**28**
Lead	250	**5**	**4.1**	**7.7**	**6.1**	**4.9**	**14.0**	**58.3**
Mercury	2	<0.11	<0.12	<0.13	<0.11	<0.12	<0.14	**0.12**
Selenium	NE	<5.5	<6.6	<5.0	<5.6	<6.2	<6.6	<5.6
Silver	NE	<5.5	<6.6	<5.0	<5.6	<6.2	<6.6	<5.6
c-Polyaromatic Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Naphthalene	(b)	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.106**
1-Methylnaphthalene	(b)	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.146**
2-Methylnaphthalene	(b)	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.180**
Naphthalenes	5	*0.011*	*0.014*	*0.013*	*0.014*	*0.012*	*0.014*	*0.432*
Acenaphthene	NE	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	<0.0076
Acenaphthylene	NE	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0147**
Anthracene	NE	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0277**
Benzo (a) anthracene	(c)	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0461**
Benzo (a) pyrene	0.1	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0460**
Benzo (b) fluoranthene	(c)	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0566**
Benzo (g,h,i) perylene	NE	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0231**
Benzo (k) fluoranthene	(c)	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0356**
Chrysene	(c)	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0701**
Dibenzo (a,h) anthracene	(c)	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0087**
Fluoranthene	NE	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0943**
Fluorene	NE	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0120**
Indeno (1,2,3-cd) pyrene	(c)	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0210**
Phenanthrene	NE	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.125**
Pyrene	NE	<0.0074	<0.0090	<0.0087	<0.0089	<0.0081	<0.0089	**0.0860**
cPAH B(a)P Equivalents	0.1	0.0037	0.0045	0.0044	0.0045	0.0041	0.0045	0.0635

TABLE 5
SOIL ANALYTICAL RESULTS - AUGUST 23-25, 2010
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Cleanup Levels	Sample ID (Depth below ground surface in feet) Date Collected				
		MW-11 (4-4.5) 8/25/2010	MW-11 (6-6.5) 8/25/2010	MW-12 (2-2.5) 8/25/2010	MW-12 (4-4.5) 8/25/2010	MW-12 (6-6.5) 8/25/2010
Volatile Organic Compounds	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Benzene	0.03	<0.0036	--	<0.0034	<0.0035	--
Ethylbenzene	6	<0.0036	--	<0.0034	<0.0035	--
Toluene	7	<0.0036	--	<0.0034	<0.0035	--
Total Xylenes	9	<0.0108	--	<0.010	<0.011	--
Total Petroleum Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Gasoline Range Hydrocarbons	30	<7.4	--	<6.9	<7.2	--
Diesel Range Organics	2,000	**52.9**	--	**75.7**	**43.1**	--
Residual Range/Heavy Oil Organics	2,000	**142**	--	**153**	**154**	--
RCRA 8 Metals	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Arsenic	20	<11.5	--	<12.3	<11.4	--
Barium	NE	**132**	--	**146**	**103**	--
Cadmium	2	<5.8*	--	<6.2*	<5.7*	--
Chromium (total)	(a)	**31.6**	--	**39.9**	**27.9**	--
Lead	250	**55.2**	--	**17.0**	**49.7**	--
Mercury	2	**0.2**	--	<0.12	<0.11	--
Selenium	NE	<5.8	--	<6.2	<5.7	--
Silver	NE	<5.8	--	<6.2	<5.7	--
c-Polyaromatic Hydrocarbons	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Naphthalene	(b)	**0.0585**	**0.0891**	**0.147**	**0.101**	**0.0785**
1-Methylnaphthalene	(b)	**0.0814**	**0.105**	**0.141**	**0.110**	**0.0282**
2-Methylnaphthalene	(b)	**0.101**	**0.134**	**0.194**	**0.149**	**0.0458**
Naphthalenes	5	*0.241*	*0.3281*	*0.482*	*0.360*	*0.153*
Acenaphthene	NE	<0.0078	**0.0726**	**0.0186**	**0.0093**	<0.0117
Acenaphthylene	NE	**0.0105**	**0.0210**	**0.0205**	**0.0232**	<0.0117
Anthracene	NE	**0.0209**	**0.112**	**0.0517**	**0.0561**	**0.0225**
Benzo (a) anthracene	(c)	**0.0314**	**0.154**	**0.0871**	**0.0849**	**0.108**
Benzo (a) pyrene	0.1	**0.0328**	**0.168**	**0.0941**	**0.0861**	**0.114**
Benzo (b) fluoranthene	(c)	**0.0445**	**0.181**	**0.118**	**0.136**	**0.106**
Benzo (g,h,i) perylene	NE	**0.0181**	**0.0745**	**0.0504**	**0.0472**	**0.0548**
Benzo (k) fluoranthene	(c)	**0.0352**	**0.120**	**0.0866**	**0.0877**	**0.0882**
Chrysene	(c)	**0.0477**	**0.171**	**0.146**	**0.134**	**0.116**
Dibenzo (a,h) anthracene	(c)	<0.0078	**0.0270**	**0.0198**	**0.0174**	**0.0231**
Fluoranthene	NE	**0.0690**	**0.415**	**0.292**	**0.219**	**0.244**
Fluorene	NE	<0.0078	**0.0367**	**0.0206**	**0.0136**	**0.0126**
Indeno (1,2,3-cd) pyrene	(c)	**0.0173**	**0.0708**	**0.0480**	**0.0492**	**0.0532**
Phenanthrene	NE	**0.0733**	**0.426**	**0.257**	**0.143**	**0.0945**
Pyrene	NE	**0.0564**	**0.358**	**0.228**	**0.165**	**0.195**
cPAH B(a)P Equivalents	0.1	0.0465	**0.225**	**0.132**	**0.125**	**0.153**

TABLE 5
SOIL ANALYTICAL RESULTS - AUGUST 23-25, 2010
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Notes:
Concentrations compared to the Model Toxics Control Act (MTCA) Method A soil cleanup levels for unrestricted land uses presented in Table 740-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA cleanup level for gasoline range total petroleum hydrocarbons is 100-mg/kg without benzene and 30-mg/kg with benzene present. Benzene was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 30-mg/kg was utilized.
ft = Feet
bgs = Below ground surface
mg/kg = milligram per kilogram
NE = Cleanup level not established under MTCA
-- = not applicable or analyzed
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
< = Chemical not detected above the laboratory reporting limit
* = Laboratory practical quantitation limit is elevated above the MTCA Method A cleanup level, but chemical was not observed above the laboratory method detection limit
Italics = Value calculated for comparison to MTCA cleanup level
Bold = Chemical detected at a concentration above the laboratory reporting limit
Bolded and highlighted font indicates results above the MTCA Method A cleanup level
(a) = Analysis is for total chromium. No MTCA cleanup level has been established for total chromium.
(b) = MTCA cleanup level is 5-mg/kg for total concentration of naphthalene, 1-methylnaphthalene and 2-methylnaphthalene
(c) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)
Lab QA/QC surrogate recovery was outside control limits due to matrix interference for samples GP1-4-4.5, GP1-6-6.5, GP2-4-4.5, GP5-4-4.5, GP6-4-4.5, GP6-6-6.5

TABLE 6
SELECT GROUNDWATER ANALYTICAL RESULTS - OCTOBER 2010 TO SEPTEMBER 2011
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Groundwater Cleanup Levels	MW-6R					
		Date Collected					
		10/1/2010	12/30/2010	3/17/2011	6/11/2011	9/22/2011	12/22/2011
Volatile Organic Compounds	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Benzene	5	<1.0	<0.20	<1.0	<0.20	<0.20	<0.20
Toluene	1,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	700	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylenes	1,000	<2.0	<3.0	<2.0	<3.0	<3.0	<3.0
Total Petroleum Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Gasoline Range Organics	800	<50	<50.0	<50	<50.0	<50.0	<50.0
Diesel Range Organics	500	<120	<76	<120	<85	<75	<91
Residual Range/Heavy Oil Organics	500	<240	<380	<240^	<430	<380	<450
Metals	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Lead (Total)	15	<2.0^	<10.0	**5.4**	<10.0	<10.0	<10.0
Lead (Dissolved)	NE	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
c-Polyaromatic Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Naphthalene	(a)	**0.010**	<0.095	<0.47	<0.11	<0.094	<0.10
1-Methylnaphthalene	(a)	<0.0097	<0.095	<0.14	<0.11	<0.094	<0.10
2-Methylnaphthalene	(a)	<0.013	<0.095	<0.094	<0.11	<0.094	<0.10
Naphthalenes	160	*0.0210*	*0.143*	*0.352*	*0.165*	*0.141*	*0.150*
Acenaphthene	NE	<0.0097	<0.095	<0.094	<0.11	<0.094	<0.10
Acenaphthylene	NE	<0.0097	<0.095	<0.094	<0.11	<0.094	<0.10
Anthracene	NE	<0.0097	<0.095	<0.047	<0.11	<0.094	<0.10
Benzo (a) anthracene	(b)	<0.0097	<0.095	<0.094	<0.11	<0.094	<0.10
Benzo (a) pyrene	0.1	**0.019**	<0.095	<0.094	<0.11	<0.094	<0.10
Benzo (b) fluoranthene	(b)	**0.017**	<0.095	<0.094	<0.11	<0.094	<0.10
Benzo (g,h,i) perylene	NE	**0.013**	<0.095	<0.094	<0.11	<0.094	<0.10
Benzo (k) fluoranthene	(b)	<0.0097	<0.095	<0.094	<0.11	<0.094	<0.10
Chrysene	(b)	**0.011**	<0.095	<0.061	<0.11	<0.094	<0.10
Dibenzo (a,h) anthracene	(b)	<0.0097	<0.095	<0.094	<0.11	<0.094	<0.10
Fluoranthene	NE	**0.013**	<0.095	<0.061	<0.11	<0.094	<0.10
Fluorene	NE	<0.0097	<0.095	<0.094	<0.11	<0.094	<0.10
Indeno (1,2,3-cd) pyrene	(b)	**0.011**	<0.095	<0.094	<0.11	<0.094	<0.10
Phenanthrene	NE	<0.0097	<0.095	<0.094	<0.11	<0.094	<0.10
Pyrene	NE	**0.017**	<0.095	<0.061	<0.11	<0.094	<0.10
cPAH B(a)P Equivalents	0.1	*0.0234*	*0.0717*	*0.0708*	*0.0831*	*0.0710*	*0.0755*

Notes
Volatile Organic Compounds analyzed by USEPA Method 8260
Total petroleum hydrocarbons-gasoline range organics analyzed by Northwest Method NWTPH-Gx
Total petroleum hydrocarbons-diesel and residual/heavy oil range organics analyzed by Northwest Method NWTPH-Dx
Total and dissolved lead analyzed by USEPA Method 6010
c-Polyaromatic hydrocarbons analyzed by USEPA Method 8270
Concentrations compared to the Model Toxics Control Act (MTCA) Method A groundwater cleanup levels presented in Table 720-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA cleanup level for gasoline range total petroleum hydrocarbons is 1000-µg/kg without benzene and 800-µg/kg with benzene present. Benzene was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 800-µg/kg was utilized.
µg/L = micrograms per liter
NE = Cleanup level not established under MTCA
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
< = Chemical not detected above the laboratory reporting limit
Bold = Chemical detected at a concentration above the laboratory reporting limit
Italics = Value calculated for comparison to MTCA cleanup level
(a) = See MTCA cleanup level for naphthalenes. This is a total value for naphthalene, 1-methylnaphthalene and 2-methylnaphthalene
(b) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC exceeds the control limits

TABLE 6
SELECT GROUNDWATER ANALYTICAL RESULTS - OCTOBER 2010 TO SEPTEMBER 2011
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Groundwater Cleanup Levels	MW-7					
		Date Collected					
		10/1/2010	12/29/2010	3/17/2011	6/11/2011	9/22/2011	12/22/2011
Volatile Organic Compounds	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Benzene	5	<1.0	<0.20	<1.0	<0.20	<0.20	<0.20
Toluene	1,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	700	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylenes	1,000	<2.0	<3.0	<2.0	<3.0	<3.0	<3.0
Total Petroleum Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Gasoline Range Organics	800	<50	<50.0	<50	<50.0	<50.0	<50.0
Diesel Range Organics	500	**150**Y	<77	<120	<87	<75	<75
Residual Range/Heavy Oil Organics	500	<250	<380	<240^	<430	<380	<380
Metals	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Lead (Total)	15	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
Lead (Dissolved)	NE	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
c-Polyaromatic Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Naphthalene	(a)	**0.086**	<0.096	<0.47	<0.11	<0.094	<0.094
1-Methylnaphthalene	(a)	**0.23**	<0.096	<0.14	<0.11	**0.16**	**0.11**
2-Methylnaphthalene	(a)	**0.16**	<0.096	<0.094	<0.11	**0.13**	<0.094
Naphthalenes	160	*0.48*	*0.144*	*0.352*	*0.165*	*0.337*	*0.204*
Acenaphthene	NE	**0.051**	<0.096	<0.094	<0.11	<0.094	<0.094
Acenaphthylene	NE	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.094
Anthracene	NE	**0.011**	<0.096	<0.047	<0.11	<0.094	<0.094
Benzo (a) anthracene	(b)	**0.017**	<0.096	<0.094	<0.11	<0.094	<0.094
Benzo (a) pyrene	0.1	0.019	<0.096	<0.094	<0.11	<0.094	<0.094
Benzo (b) fluoranthene	(b)	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.094
Benzo (g,h,i) perylene	NE	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.094
Benzo (k) fluoranthene	(b)	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.094
Chrysene	(b)	<0.0097	<0.096	<0.061	<0.11	<0.094	<0.094
Dibenzo (a,h) anthracene	(b)	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.094
Fluoranthene	NE	**0.010**	<0.096	<0.061	<0.11	<0.094	<0.094
Fluorene	NE	**0.063**	<0.096	<0.094	<0.11	<0.094	<0.094
Indeno (1,2,3-cd) pyrene	(b)	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.094
Phenanthrene	NE	**0.048**	<0.096	<0.094	<0.11	<0.094	<0.094
Pyrene	NE	<0.0097	<0.096	<0.061	<0.11	<0.094	<0.094
cPAH B(a)P Equivalents	0.1	*0.0132*	*0.0725*	*0.0708*	*0.0831*	*0.0710*	*0.0710*

Notes
Volatile Organic Compounds analyzed by USEPA Method 8260
Total petroleum hydrocarbons-gasoline range organics analyzed by Northwest Method NWTPH-Gx
Total petroleum hydrocarbons-diesel and residual/heavy oil range organics analyzed by Northwest Method NWTPH-Dx
Total and dissolved lead analyzed by USEPA Method 6010
c-Polyaromatic hydrocarbons analyzed by USEPA Method 8270
Concentrations compared to the Model Toxics Control Act (MTCA) Method A groundwater cleanup levels presented in Table 720-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA cleanup level for gasoline range total petroleum hydrocarbons is 1000-µg/kg without benzene and 800-µg/kg with benzene present. Benzene was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 800-µg/kg was utilized.
µg/L = micrograms per liter
NE = Cleanup level not established under MTCA
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
< = Chemical not detected above the laboratory reporting limit
Bold = Chemical detected at a concentration above the laboratory reporting limit
Italics = Value calculated for comparison to MTCA cleanup level
(a) = See MTCA cleanup level for naphthalenes. This is a total value for naphthalene, 1-methylnaphthalene and 2-methylnaphthalene
(b) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC exceeds the control limits

TABLE 6
SELECT GROUNDWATER ANALYTICAL RESULTS - OCTOBER 2010 TO SEPTEMBER 2011
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Groundwater Cleanup Levels	MW-8					
		Date Collected					
		10/1/2010	12/29/2010	3/17/2011	6/11/2011	9/22/2011	12/22/2011
Volatile Organic Compounds	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Benzene	5	<1.0	**0.21**	<1.0	**0.26**	**0.35**	**0.23**
Toluene	1,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	700	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylenes	1,000	<2.0	<3.0	<2.0	<3.0	<3.0	<3.0
Total Petroleum Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Gasoline Range Hydrocarbons	800	<50	<50.0	<50	<50.0	<50.0	<50.0
Diesel Range Organics	500	**200**Y	<77	<120	<83	<75	<87
Residual Range/Heavy Oil Organics	500	<240	<380	<240^	<420	<380	<430
Metals	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Lead (Total)	15	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
Lead (Dissolved)	NE	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
c-Polyaromatic Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Naphthalene	(a)	**0.085**	<0.096	<0.47	<0.096	**0.12**	<0.11
1-Methylnaphthalene	(a)	**0.11**	<0.096	<0.14	<0.096	**0.13**	<0.11
2-Methylnaphthalene	(a)	**0.038**	<0.096	<0.094	<0.096	<0.094	<0.11
Naphthalenes	160	*0.23*	*0.144*	*0.352*	*0.144*	*0.297*	*0.165*
Acenaphthene	NE	**0.033**	<0.096	<0.094	<0.096	<0.094	<0.11
Acenaphthylene	NE	<0.0097	<0.096	<0.094	<0.096	<0.094	<0.11
Anthracene	NE	**0.018**	<0.096	<0.047	<0.096	<0.094	<0.11
Benzo (a) anthracene	(b)	<0.0097	<0.096	<0.094	<0.096	<0.094	<0.11
Benzo (a) pyrene	0.1	<0.019	<0.096	<0.094	<0.096	<0.094	<0.11
Benzo (b) fluoranthene	(b)	<0.0097	<0.096	<0.094	<0.096	<0.094	<0.11
Benzo (g,h,i) perylene	NE	<0.0097	<0.096	<0.094	<0.096	<0.094	<0.11
Benzo (k) fluoranthene	(b)	<0.0097	<0.096	<0.094	<0.096	<0.094	<0.11
Chrysene	(b)	**0.053**	<0.096	<0.061	<0.096	<0.094	<0.11
Dibenzo (a,h) anthracene	(b)	<0.0097	<0.096	<0.094	<0.096	<0.094	<0.11
Fluoranthene	NE	**0.011**	<0.096	<0.061	<0.096	<0.094	<0.11
Fluorene	NE	**0.029**	<0.096	<0.094	<0.096	<0.094	<0.11
Indeno (1,2,3-cd) pyrene	(b)	<0.0097	<0.096	<0.094	<0.096	<0.094	<0.11
Phenanthrene	NE	**0.028**	<0.096	<0.094	<0.096	<0.094	<0.11
Pyrene	NE	**0.010**	<0.096	<0.061	<0.096	<0.094	<0.11
cPAH B(a)P Equivalents	0.1	*0.0125*	*0.0725*	*0.0708*	*0.0725*	*0.0710*	*0.0831*

Notes
Volatile Organic Compounds analyzed by USEPA Method 8260
Total petroleum hydrocarbons-gasoline range organics analyzed by Northwest Method NWTPH-Gx
Total petroleum hydrocarbons-diesel and residual/heavy oil range organics analyzed by Northwest Method NWTPH-Dx
Total and dissolved lead analyzed by USEPA Method 6010
c-Polyaromatic hydrocarbons analyzed by USEPA Method 8270
Concentrations compared to the Model Toxics Control Act (MTCA) Method A groundwater cleanup levels presented in Table 720-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA cleanup level for gasoline range total petroleum hydrocarbons is 1000-µg/kg without benzene and 800-µg/kg with benzene present. Benzene was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 800-µg/kg was utilized.
µg/L = micrograms per liter
NE = Cleanup level not established under MTCA
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
< = Chemical not detected above the laboratory reporting limit
Bold = Chemical detected at a concentration above the laboratory reporting limit
Italics = Value calculated for comparison to MTCA cleanup level
(a) = See MTCA cleanup level for naphthalenes. This is a total value for naphthalene, 1-methylnaphthalene and 2-methylnaphthalene
(b) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC exceeds the control limits

TABLE 6
SELECT GROUNDWATER ANALYTICAL RESULTS - OCTOBER 2010 TO SEPTEMBER 2011
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Groundwater Cleanup Levels	MW-9					
		Date Collected					
		10/1/2010	12/292010	3/17/2002	6/11/2011	9/22/2011	12/22/2011
Volatile Organic Compounds	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Benzene	5	<1.0	**0.21**	<1.0	<0.20	**0.37**	**0.3**
Toluene	1,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	700	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylenes	1,000	<2.0	<3.0	<2.0	<3.0	<3.0	<3.0
Total Petroleum Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Gasoline Range Hydrocarbons	800	**110**	**56.5**	<50	**84.4**	**241**	**222**
Diesel Range Organics	500	**160**Y	<76	<120	<88	<75	<76
Residual Range/Heavy Oil Organics	500	<250	<380	<240^	<440	<380	<380
Metals	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Lead (Total)	15	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
Lead (Dissolved)	NE	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
c-Polyaromatic Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Naphthalene	(a)	**0.400**	0.59	<1.9	**0.36**	<0.094	**2.6**
1-Methylnaphthalene	(a)	**0.019**	<0.095	<0.38	<0.11	<0.094	**0.17**
2-Methylnaphthalene	(a)	**0.013**	<0.095	<0.94	<0.11	<0.094	<0.094
Naphthalenes	160	*0.43*	*0.390*	*0.352*	*0.470*	*0.141*	*2.817*
Acenaphthene	NE	<0.0094	<0.095	<0.094	<0.11	<0.094	<0.094
Acenaphthylene	NE	<0.0094	<0.095	<0.094	<0.11	<0.094	<0.094
Anthracene	NE	<0.0094	<0.095	<0.047	<0.11	<0.094	<0.094
Benzo (a) anthracene	(b)	<0.0094	<0.095	<0.094	<0.11	<0.094	<0.094
Benzo (a) pyrene	0.1	<0.019	<0.095	<0.094	<0.11	<0.094	<0.094
Benzo (b) fluoranthene	(b)	<0.0094	<0.095	<0.094	<0.11	<0.094	<0.094
Benzo (g,h,i) perylene	NE	<0.0094	<0.095	<0.094	<0.11	<0.094	<0.094
Benzo (k) fluoranthene	(b)	<0.0094	<0.095	<0.094	<0.11	<0.094	<0.094
Chrysene	(b)	<0.0094	<0.095	<0.061	<0.11	<0.094	<0.094
Dibenzo (a,h) anthracene	(b)	<0.0094	<0.095	<0.094	<0.11	<0.094	<0.094
Fluoranthene	NE	<0.0094	<0.095	<0.061	<0.11	<0.094	<0.094
Fluorene	NE	<0.0094	<0.095	<0.094	<0.11	<0.094	<0.094
Indeno (1,2,3-cd) pyrene	(b)	<0.0094	<0.095	<0.094	<0.11	<0.094	<0.094
Phenanthrene	NE	**0.011**	<0.095	<0.094	<0.11	<0.094	<0.094
Pyrene	NE	<0.0094	<0.095	<0.061	<0.11	<0.094	<0.094
cPAH B(a)P Equivalents	0.1	*0.0119*	*0.0717*	*0.0708*	*0.0831*	*0.0710*	*0.0710*

Notes
Volatile Organic Compounds analyzed by USEPA Method 8260
Total petroleum hydrocarbons-gasoline range organics analyzed by Northwest Method NWTPH-Gx
Total petroleum hydrocarbons-diesel and residual/heavy oil range organics analyzed by Northwest Method NWTPH-Dx
Total and dissolved lead analyzed by USEPA Method 6010
c-Polyaromatic hydrocarbons analyzed by USEPA Method 8270
Concentrations compared to the Model Toxics Control Act (MTCA) Method A groundwater cleanup levels presented in Table 720-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA cleanup level for gasoline range total petroleum hydrocarbons is 1000-µg/kg without benzene and 800-µg/kg with benzene present. Benzene was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 800-µg/kg was utilized.
µg/L = micrograms per liter
NE = Cleanup level not established under MTCA
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
< = Chemical not detected above the laboratory reporting limit
Bold = Chemical detected at a concentration above the laboratory reporting limit
Italics = Value calculated for comparison to MTCA cleanup level
(a) = See MTCA cleanup level for naphthalenes. This is a total value for naphthalene, 1-methylnaphthalene and 2-methylnaphthalene
(b) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC exceeds the control limits

TABLE 6
SELECT GROUNDWATER ANALYTICAL RESULTS - OCTOBER 2010 TO SEPTEMBER 2011
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Groundwater Cleanup Levels	MW-10					
		Date Collected					
		10/1/2010	12/29/2010	3/17/2011	6/11/2011	9/22/2011	12/22/2011
Volatile Organic Compounds	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Benzene	5	<1.0	<0.20	<1.0	<0.20	<0.20	<0.20
Toluene	1,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	700	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylenes	1,000	<2.0	<3.0	<2.0	<3.0	<3.0	<3.0
Total Petroleum Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Gasoline Range Hydrocarbons	800	<50	<50.0	<50	<50.0	<50.0	<50.0
Diesel Range Organics	500	<120	<77	<120	<86	<75	<75
Residual Range/Heavy Oil Organics	500	<240	<380	<240^	<430	<380	<380
Metals	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Lead (Total)	15	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
Lead (Dissolved)	NE	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
c-Polyaromatic Hydrocarbons	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
Naphthalene	(a)	<0.0094	<0.096	<0.47	<0.11	<0.094	<0.095
1-Methylnaphthalene	(a)	<0.0094	<0.096	<0.14	<0.11	<0.094	<0.095
2-Methylnaphthalene	(a)	<0.012	<0.096	<0.094	<0.11	<0.094	<0.095
Naphthalenes	160	*0.015*	*0.144*	*0.352*	*0.165*	*0.141*	*0.143*
Acenaphthene	NE	<0.0094	<0.096	<0.47	<0.11	<0.094	<0.095
Acenaphthylene	NE	<0.0094	<0.096	<0.38	<0.11	<0.094	<0.095
Anthracene	NE	<0.0094	<0.096	<0.19	<0.11	<0.094	<0.095
Benzo (a) anthracene	(b)	<0.0094	<0.096	<0.28	<0.11	<0.094	<0.095
Benzo (a) pyrene	0.1	<0.019	<0.096	<0.19	<0.11	<0.094	<0.095
Benzo (b) fluoranthene	(b)	<0.0094	<0.096	<0.38	<0.11	<0.094	<0.095
Benzo (g,h,i) perylene	NE	<0.0094	<0.096	<0.28	<0.11	<0.094	<0.095
Benzo (k) fluoranthene	(b)	<0.0094	<0.096	<0.28	<0.11	<0.094	<0.095
Chrysene	(b)	<0.0094	<0.096	<0.19	<0.11	<0.094	<0.095
Dibenzo (a,h) anthracene	(b)	<0.0094	<0.096	<0.28	<0.11	<0.094	<0.095
Fluoranthene	NE	<0.0094	<0.096	<0.24	<0.11	<0.094	<0.095
Fluorene	NE	<0.0094	<0.096	<0.28	<0.11	<0.094	<0.095
Indeno (1,2,3-cd) pyrene	(b)	<0.0094	<0.096	<0.28	<0.11	<0.094	<0.095
Phenanthrene	NE	<0.0094	<0.096	<0.38	<0.11	<0.094	<0.095
Pyrene	NE	<0.0094	<0.096	<0.28	<0.11	<0.094	<0.095
cPAH B(a)P Equivalents	0.1	*0.0119*	*0.0725*	*0.0708*	*0.0831*	*0.0710*	*0.0717*

Notes
Volatile Organic Compounds analyzed by USEPA Method 8260
Total petroleum hydrocarbons-gasoline range organics analyzed by Northwest Method NWTPH-Gx
Total petroleum hydrocarbons-diesel and residual/heavy oil range organics analyzed by Northwest Method NWTPH-Dx
Total and dissolved lead analyzed by USEPA Method 6010
c-Polyaromatic hydrocarbons analyzed by USEPA Method 8270
Concentrations compared to the Model Toxics Control Act (MTCA) Method A groundwater cleanup levels presented in Table 720-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA cleanup level for gasoline range total petroleum hydrocarbons is 1000-µg/kg without benzene and 800-µg/kg with benzene present. Benzene was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 800-µg/kg was utilized.
µg/L = micrograms per liter
NE = Cleanup level not established under MTCA
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
< = Chemical not detected above the laboratory reporting limit
Bold = Chemical detected at a concentration above the laboratory reporting limit
Italics = Value calculated for comparison to MTCA cleanup level
(a) = See MTCA cleanup level for naphthalenes. This is a total value for naphthalene, 1-methylnaphthalene and 2-methylnaphthalene
(b) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC exceeds the control limits

TABLE 6
SELECT GROUNDWATER ANALYTICAL RESULTS - OCTOBER 2010 TO SEPTEMBER 2011
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Groundwater Cleanup Levels	MW-11					
		Date Collected					
		10/1/2010	12/30/2010	3/17/2011	6/11/2011	9/22/2011	12/22/2011
Volatile Organic Compounds	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Benzene	5	<1.0	<0.20	<1.0	<0.20	<0.20	<0.20
Toluene	1,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	700	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylenes	1,000	<2.0	<3.0	<2.0	<3.0	<3.0	<3.0
Total Petroleum Hydrocarbons	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Gasoline Range Hydrocarbons	800	<50	<50.0	<50	<50.0	<50.0	<50.0
Diesel Range Organics	500	<120	**110**	<120	<84	<75	<86
Residual Range/Heavy Oil Organics	500	<240	<380	<240^	<420	<380	<430
Metals	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Lead (Total)	15	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
Lead (Dissolved)	NE	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
c-Polyaromatic Hydrocarbons	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Naphthalene	(a)	**0.012**	<0.095	<0.47	<0.11	<0.094	<0.11
1-Methylnaphthalene	(a)	<0.0098	<0.095	<0.14	<0.11	<0.094	<0.11
2-Methylnaphthalene	(a)	<0.013	<0.095	<0.094	<0.11	<0.094	<0.11
Naphthalenes	160	*0.023*	*0.143*	*0.352*	*0.165*	*0.141*	*0.165*
Acenaphthene	NE	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Acenaphthylene	NE	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Anthracene	NE	<0.0098	<0.095	<0.047	<0.11	<0.094	<0.11
Benzo (a) anthracene	(b)	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Benzo (a) pyrene	0.1	<0.020	<0.095	<0.094	<0.11	<0.094	<0.11
Benzo (b) fluoranthene	(b)	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Benzo (g,h,i) perylene	NE	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Benzo (k) fluoranthene	(b)	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Chrysene	(b)	<0.0098	<0.095	<0.061	<0.11	<0.094	<0.11
Dibenzo (a,h) anthracene	(b)	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Fluoranthene	NE	<0.0098	<0.095	<0.061	<0.11	<0.094	<0.11
Fluorene	NE	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Indeno (1,2,3-cd) pyrene	(b)	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Phenanthrene	NE	<0.0098	<0.095	<0.094	<0.11	<0.094	<0.11
Pyrene	NE	<0.0098	<0.095	<0.061	<0.11	<0.094	<0.11
cPAH B(a)P Equivalents	0.1	*0.0125*	*0.0717*	*0.0708*	*0.0831*	*0.0710*	*0.0831*

Notes
Volatile Organic Compounds analyzed by USEPA Method 8260
Total petroleum hydrocarbons-gasoline range organics analyzed by Northwest Method NWTPH-Gx
Total petroleum hydrocarbons-diesel and residual/heavy oil range organics analyzed by Northwest Method NWTPH-Dx
Total and dissolved lead analyzed by USEPA Method 6010
c-Polyaromatic hydrocarbons analyzed by USEPA Method 8270
Concentrations compared to the Model Toxics Control Act (MTCA) Method A groundwater cleanup levels presented in Table 720-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA cleanup level for gasoline range total petroleum hydrocarbons is 1000-µg/kg without benzene and 800-µg/kg with benzene present. Benzene was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 800-µg/kg was utilized.
µg/L = micrograms per liter
NE = Cleanup level not established under MTCA
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
< = Chemical not detected above the laboratory reporting limit
Bold = Chemical detected at a concentration above the laboratory reporting limit
Italics = Value calculated for comparison to MTCA cleanup level
(a) = See MTCA cleanup level for naphthalenes. This is a total value for naphthalene, 1-methylnaphthalene and 2-methylnaphthalene
(b) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC exceeds the control limits

TABLE 6
SELECT GROUNDWATER ANALYTICAL RESULTS - OCTOBER 2010 TO SEPTEMBER 2011
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Analysis	MTCA Method A Groundwater Cleanup Levels	MW-12					
		Date Collected					
		10/1/2010	12/30/2011	3/17/2011	6/11/2011	9/22/2011	12/22/2011
Volatile Organic Compounds	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Benzene	5	<1.0	<0.20	<1.0	<0.20	<0.20	<0.20
Toluene	1,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	700	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylenes	1,000	<2.0	<3.0	<2.0	<3.0	<3.0	<3.0
Total Petroleum Hydrocarbons	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Gasoline Range Hydrocarbons	800	<50	<50.0	<50	<50.0	<50.0	<50.0
Diesel Range Organics	500	<120	**89**	<120	<82	<75	<85
Residual Range/Heavy Oil Organics	500	<240	<380	<240^	<410	<380	<430
Metals	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Lead (Total)	15	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
Lead (Dissolved)	NE	<2.0^	<10.0	<2.0	<10.0	<10.0	<10.0
c-Polyaromatic Hydrocarbons	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Naphthalene	(a)	**0.019**	<0.096	<0.47	<0.11	<0.094	<0.11
1-Methylnaphthalene	(a)	<0.0097	<0.096	<0.14	<0.11	<0.094	<0.11
2-Methylnaphthalene	(a)	<0.013	<0.096	<0.094	<0.11	<0.094	<0.11
Naphthalenes	160	**0.031**	**0.144**	**0.352**	**0.165**	**0.141**	**0.165**
Acenaphthene	NE	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Acenaphthylene	NE	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Anthracene	NE	<0.0097	<0.096	<0.047	<0.11	<0.094	<0.11
Benzo (a) anthracene	(b)	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Benzo (a) pyrene	0.1	<0.019	<0.096	<0.094	<0.11	<0.094	<0.11
Benzo (b) fluoranthene	(b)	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Benzo (g,h,i) perylene	NE	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Benzo (k) fluoranthene	(b)	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Chrysene	(b)	<0.0097	<0.096	<0.061	<0.11	<0.094	<0.11
Dibenzo (a,h) anthracene	(b)	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Fluoranthene	NE	<0.0097	<0.096	<0.061	<0.11	<0.094	<0.11
Fluorene	NE	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Indeno (1,2,3-cd) pyrene	(b)	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Phenanthrene	NE	<0.0097	<0.096	<0.094	<0.11	<0.094	<0.11
Pyrene	NE	<0.0097	<0.096	<0.061	<0.11	<0.094	<0.11
cPAH B(a)P Equivalents	0.1	0.0120	0.0725	0.0708	0.0831	0.0710	0.0831

Notes:
Volatile Organic Compounds analyzed by USEPA Method 8260
Total petroleum hydrocarbons-gasoline range organics analyzed by Northwest Method NWTPH-Gx
Total petroleum hydrocarbons-diesel and residual/heavy oil range organics analyzed by Northwest Method NWTPH-Dx
Total and dissolved lead analyzed by USEPA Method 6010
c-Polyaromatic hydrocarbons analyzed by USEPA Method 8270
Concentrations compared to the Model Toxics Control Act (MTCA) Method A groundwater cleanup levels presented in Table 720-1 of Chapter 173-340 of the Washington Administrative Code (WAC)
The MTCA cleanup level for gasoline range total petroleum hydrocarbons is 1000-µg/kg without benzene and 800-µg/kg with benzene present. Benzene was observed in groundwater collected from sample ID-4 in 2001, thus the cleanup level of 800-µg/kg was utilized.
µg/L = micrograms per liter
NE = Cleanup level not established under MTCA
cPAH = Carcinogenic polyaromatic hydrocarbons
B(a)P = Benzo(a)pyrene
< = Chemical not detected above the laboratory reporting limit
Bold = Chemical detected at a concentration above the laboratory reporting limit
Italics = Value calculated for comparison to MTCA cleanup level
(a) = See MTCA cleanup level for naphthalenes. This is a total value for naphthalene, 1-methylnaphthalene and 2-methylnaphthalene
(b) = See MTCA cleanup level for B(a)P. Total concentration of cPAHs calculated using the toxicity equivalency method in WAC 173-340-708(8)
^ = ICV, CCV, ICB, CCB, ISA, ISB, CRI, CRA, DLCK, or MRL standard: Instrument related QC exceeds the control limits

TABLE 7A
SOIL POINTS OF COMPLIANCE
CLEANUP ACTION PLAN
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Constituent	Cleanup Level[1] (mg/kg)	Media	Point of Compliance Type	Specific Point of Compliance
GRO	30/100 [2]	soil	standard	ARCADIS analyzed soil for this constituent in 2010 during the remedial investigation. The concentration of GRO exceeded cleanup levels at several locations in the center of the site, but was below cleanup levels in soil samples collected from GP-1, GP-3, GP-4, GP-7 through GP-9, MW-7 through MW-12.
DRO	2000	soil	standard	ARCADIS analyzed soil for this constituent in 2010 during the remedial investigation. The concentration of DRO exceeded cleanup levels at several locations in the center of the site, but was below cleanup levels in soil samples collected from GP-1, GP-3, GP-4, GP-6 through GP-9, MW-7 through MW-12.
HO	2000	soil	standard	ARCADIS analyzed soil samples for this constituent in 2010 during the remedial investigation. Concentrations detected in soil were less than cleanup levels at all boring locations.
EDB	0.005	soil	standard	Full suite USEPA Method 8260B analysis was performed on soil samples in 2001 (samples IPD-1 through IPD-6). The 8260B analysis included assessment of n-hexane, methyl tertiary-butyl ether, EDC, and EDB. None of these compounds were reported to have been detected in soil or groundwater samples collected at the Site[6]
EDC	6	soil	standard	Full suite USEPA Method 8260B analysis was performed on soil samples in 2001 (samples IPD-1 through IPD-6). The 8260B analysis included assessment of n-hexane, methyl tertiary-butyl ether, EDC, and EDB. None of these compounds were reported to have been detected in soil or groundwater samples collected at the Site[6]
Benzene	0.03	soil	standard	ARCADIS analyzed soil samples for this constituent in 2010 during the remedial investigation. Concentrations detected in soil were less than cleanup levels at all boring locations.
Toluene	7	soil	standard	ARCADIS analyzed soil samples for this constituent in 2010 during the remedial investigation. Concentrations detected in soil were less than cleanup levels at all boring locations.
Ethylbenzene	6	soil	standard	ARCADIS analyzed soil samples for this constituent in 2010 during the remedial investigation. Concentrations detected in soil were less than cleanup levels at all boring locations.
Total xylenes	9	soil	standard	ARCADIS analyzed soil samples for this constituent in 2010 during the remedial investigation. Concentrations detected in soil were less than cleanup levels at all boring locations.
MTBE	0.1	soil	standard	Full suite USEPA Method 8260B analysis was performed on soil samples in 2001 (samples IPD-1 through IPD-6). The 8260B analysis included assessment of n-hexane, methyl tertiary-butyl ether, EDC, and EDB. None of these compounds were reported to have been detected in soil or groundwater samples collected at the Site[6]
n-Hexane	6	soil	standard	Full suite USEPA Method 8260B analysis was performed on soil samples in 2001 (samples IPD-1 through IPD-6). The 8260B analysis included assessment of n-hexane, methyl tertiary-butyl ether, EDC, and EDB. None of these compounds were reported to have been detected in soil or groundwater samples collected at the Site[6]
cPAHs	0.1[3]	soil	standard	ARCADIS analyzed soil for this constituent in 2010 during the remedial investigation. The concentration of cPAHs exceeded cleanup levels at several locations in the center of the site, but was below cleanup levels in soil samples collected from GP-1, GP-3 through GP-9, MW-6R, MW-7 through MW-10.
Naphthalenes	5[4]	soil	standard	ARCADIS analyzed soil for this constituent in 2010 during the remedial investigation. The concentration of Naphthalenes exceeded cleanup levels at several locations in the center of the site, but was below cleanup levels in soil samples collected from GP-1 through GP-4 and GP-6 through GP-9, MW-7 through MW-12.
PCBs	1[5]	soil	standard	PCBs were analyzed in soil at the Site in 2004 and were not detected[7]
Lead	250	soil	standard	ARCADIS analyzed soil samples for this constituent in 2010 during the remedial investigation. Concentrations detected in soil were less than cleanup levels at all boring locations.

mg/kg = milligrams per kilogram

[1]Cleanup levels from Ecology's MTCA Method A Cleanup Levels for Soil (WAC 173-340-900, Table 740-1)

[2]Method A CULs for GRO are determined based on the presence of benzene

[3] Based on benzo(a)pyrene equivalencies (WAC 173-340-900, Table 740-1).

[4] Calculated using procedures in WAC 173-340-747(4).

[5] Total value for all PCBs (mixtures)

[6] SECOR 2001. Final Remedial Investigation and Feasibility Study, Former Industrial Petroleum Distributors, 1117 West Bay Drive, Olympia, Washington. October 30.

[7]Parametrix 2004. West Bay Phase II Environmental Site Assessment, Prepared for City of Olympia Parks, Arts, and Recreation Department. June.

TABLE 7B
GROUNDWATER POINTS OF COMPLIANCE
CLEANUP ACTION PLAN
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

Constituent	Cleanup Level[1] (µg/L)	Media	Point of Compliance Type	Specific Point of Compliance
GRO	800/1,000[2]	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011
DRO	500	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011
HO	500	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011
EDB	0.01	groundwater	standard	Full suite USEPA Method 8260B analysis was performed on groundwater samples in 2001 (samples IPD-1 through IPD-6). The 8260B analysis included assessment of n-hexane, methyl tertiary-butyl ether, EDC, and EDB. None of these compounds were reported to have been detected in soil or groundwater samples collected at the Site[6]
EDC	5	groundwater	standard	Full suite USEPA Method 8260B analysis was performed on groundwater samples in 2001 (samples IPD-1 through IPD-6). The 8260B analysis included assessment of n-hexane, methyl tertiary-butyl ether, EDC, and EDB. None of these compounds were reported to have been detected in soil or groundwater samples collected at the Site[6]
Benzene	5	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011
Toluene	1,000	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011
Ethylbenzene	700	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011
Total xylenes	1,000	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011
MTBE	20	groundwater	standard	Full suite USEPA Method 8260B analysis was performed on groundwater samples in 2001 (samples IPD-1 through IPD-6). The 8260B analysis included assessment of n-hexane, methyl tertiary-butyl ether, EDC, and EDB. None of these compounds were reported to have been detected in soil or groundwater samples collected at the Site[6]
n-Hexane	6	groundwater	standard	Full suite USEPA Method 8260B analysis was performed on groundwater samples in 2001 (samples IPD-1 through IPD-6). The 8260B analysis included assessment of n-hexane, methyl tertiary-butyl ether, EDC, and EDB. None of these compounds were reported to have been detected in soil or groundwater samples collected at the Site[6]
cPAHs	0.1[3]	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011
Naphthalenes	160[4]	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011
PCBs	0.1[5]	groundwater	standard	PCBs were analyzed in groundwater at the Site in 2004 and were not detected[7]
Lead	15	groundwater	standard	Groundwater samples collected by ARCADIS from all current on-site wells (MW-6R, MW-7 through MW-12) have indicated concentrations less than the CLs from October 2010 through September 2011

µg/L = micrograms per liter

[1]Cleanup levels from Ecology's MTCA Method A Cleanup Levels for Ground Water (WAC 173-340-900, Table 720-1)

[2]Method A CULs for GRO are determined based on the presence of benzene

[3] Based on benzo(a)pyrene equivalencies (WAC 173-340-900, Table 740-1).

[4] Calculated using procedures in WAC 173-340-747(4).

[5] Total value for all PCBs (mixtures)

[6] SECOR 2001. Final Remedial Investigation and Feasibility Study, Former Industrial Petroleum Distributors, 1117 West Bay Drive, Olympia, Washington. October 30.

[7]Parametrix 2004. West Bay Phase II Environmental Site Assessment, Prepared for City of Olympia Parks, Arts, and Recreation Department. June.

TABLE 8
SOIL CONFIRMATION SAMPLING AND EXCAVATION COST ESTIMATE
Cleanup Action Plan
Former Industrial Petroleum Distributors Bulk Terminal
1120 West Bay Drive
Olympia, Washington

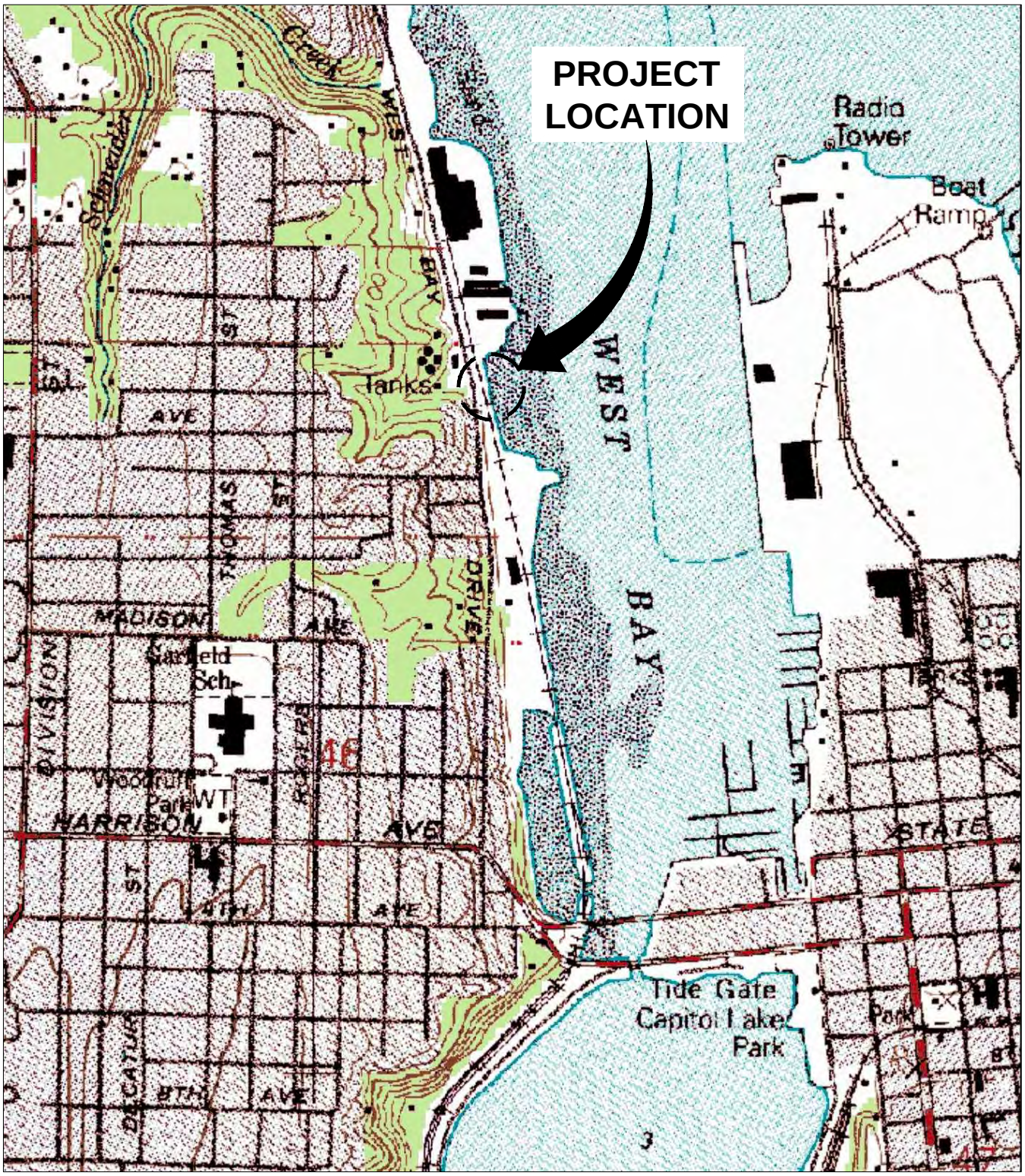
SOIL EXCAVATION ALTERNATIVE

Assumes excavating proposed excavation grids to 10 feet bgs for lower estimate and entire estimated extent to 10 feet bgs for higher estimate.

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)
Pre-Design Costs						
Surveying - Establish Grid points	1	Lump Sum	$3,000	$4,500	$3,000	$4,500
Soil investigation to delineate on the northern and eastern sides	1	Lump Sum	$40,114	$40,114	$40,114	$40,114
Soil CAP Design and Engineering Drawings	1	Lump Sum	$15,000	$22,500	$15,000	$22,500
Remediation Activities						
Mobilization/Demobilization	1	Lump Sum	$10,000	$15,000	$10,000	$15,000
Excavation	370	Cubic Yards	$22	$25	$8,140	$55,625
Material Handling - Impacted Soils	370	Cubic Yards	$9	$11	$3,330	$24,475
Material Stockpile Area & Management	1	Lump Sum	$4,000	$6,000	$4,000	$6,000
Truck Loading Area	1	Lump Sum	$5,000	$7,500	$5,000	$7,500
Transportation and Off-Site Disposal						
- Non-Hazardous Soil	590	Tons	$100	$110	$59,000	$391,600
Excavation Restoration Activities						
Furnish Backfill	590	Ton	$12	$15	$7,080	$53,400
Placement & Compaction of Backfill	370	Cubic Yards	$22	$25	$8,140	$55,625
Seeding/Mulching/Stabilization	1,000	Square Feet	$1	$3	$1,000	$18,000
Cut and remove existing piping, cement grout	1	Lump Sum	$10,000	$15,000	$10,000	$15,000
Management						
Project Management (8% of Overall Costs)	1	Lump Sum	$6,182	$55,547	$6,182	$55,547
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$12,683	$75,267	$12,683	$75,267

Complete Excavation Subtotal Cost	**$192,669**	**$840,153**
Contingency (10%)	**$19,267**	**$84,015**
Complete Excavation Cost	**$211,936**	**$924,168**

Figures



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., TUMWATER, WASHINGTON, 1959, PHOTOREVISED 1994.

0 1000' 2000'

Approximate Scale: 1 in. = 1000 ft.

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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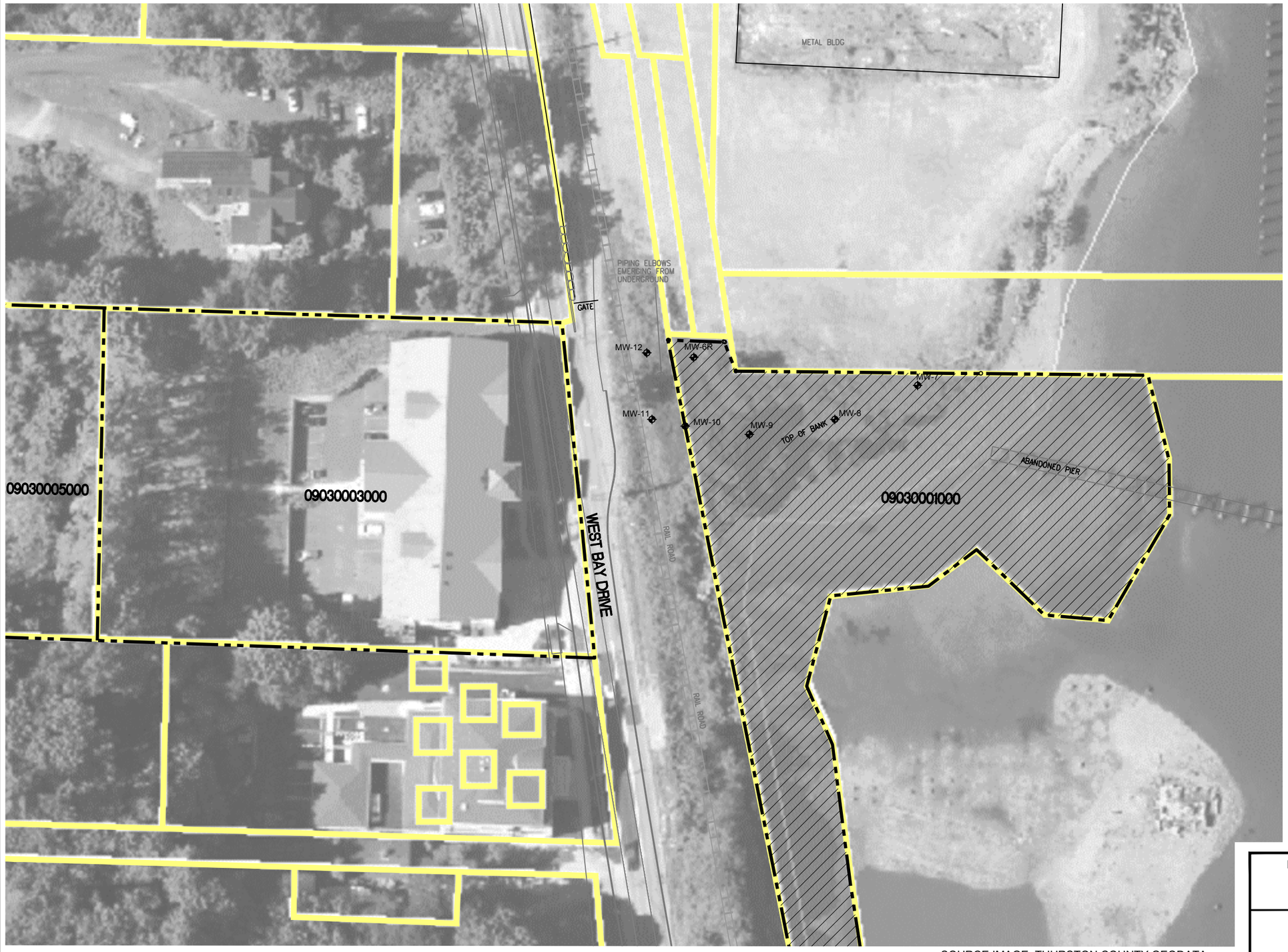
XREFS: IMAGES: PROJECTNAME: ---
TOPO BulkTerminal OlympiaWA.jpg



LEGEND

- SUBJECT PROPERTY LINE BOUNDARY
- MW-7 GROUND WATER MONITORING WELL LOCATION
- 09030001000 INDUSTRIAL PETROLEUM DISTRIBUTORS PROPERTY PARCEL NUMBER
- PARCEL BOUNDARY
- SITE

0 60' 120'

Approximate Scale: 1 in. = 60 ft.

SOURCE IMAGE: THURSTON COUNTY GEODATA CENTER

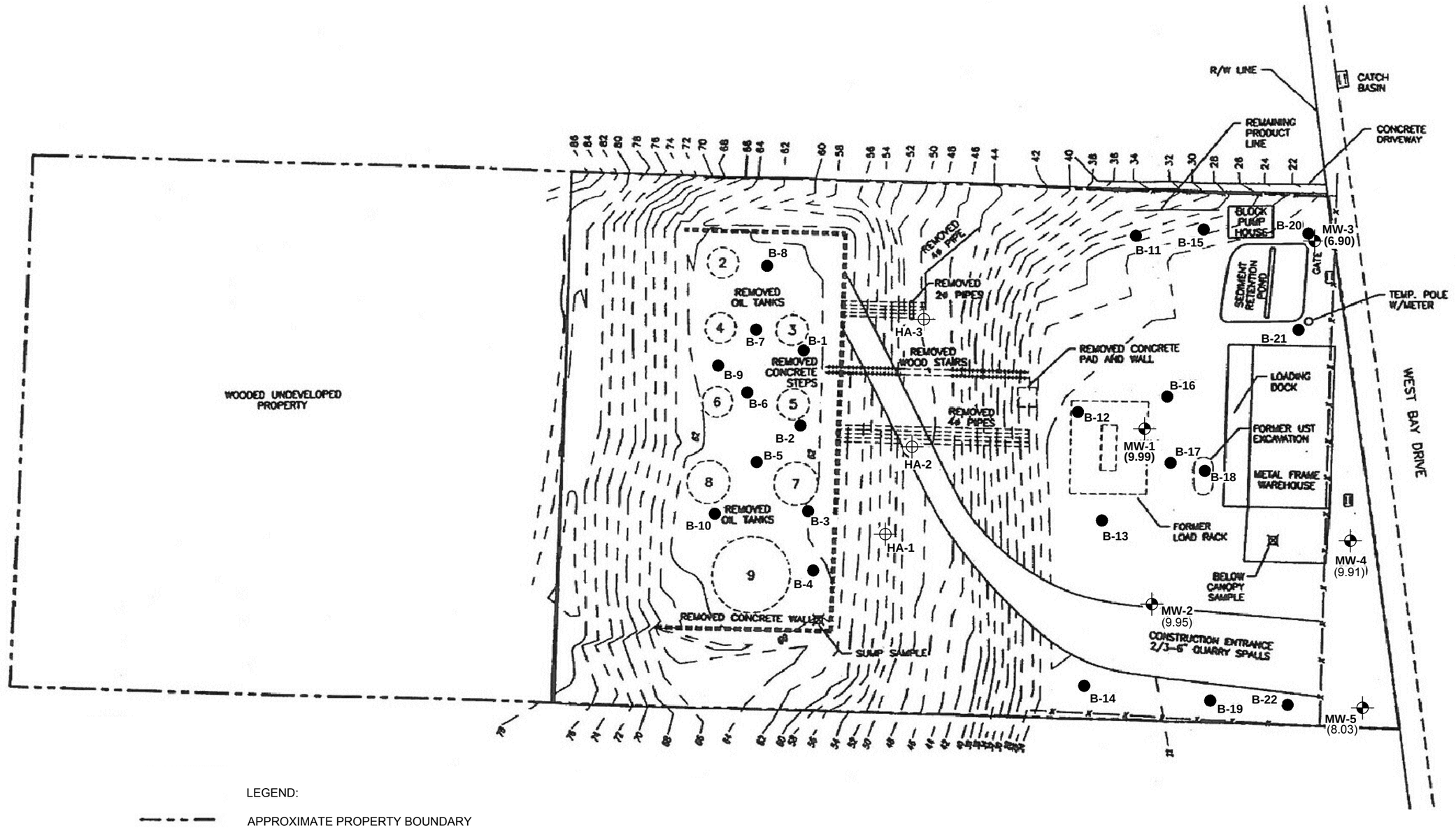
THIS MAP PREPARED FROM A FIELD SURVEY BY OTAK ON OCTOBER 7, 2010

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

SITE VICINITY MAP

ARCADIS

FIGURE
2



LEGEND:

- APPROXIMATE PROPERTY BOUNDARY
- FENCE
- B-1 BORING LOCATiON
- HA-1 HAND AUGER LOCATION
- MW-1 MONITORING WELL LOCATION
- CATCH BASIN SEDIMENT/ SURFACE SOIL SAMPLE LOCATION
- CATCH BASIN

REF: FIGURE 3 FROM FINAL REMEDIAL INVESTIGATION AND FEASIBILITY STUDY, PREPARED BY SECOR INTERNATIOAL INCORPORATED, OCTOBER 30, 2001.

0 40' 80'

Approximate Scale: 1 in. = 40 ft.

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

SAMPLE LOCATIONS

ARCADIS

FIGURE **3A**

LEGEND

SUBJECT PROPERTY LINE BOUNDARY

MW-7 GROUNDWATER MONITORING WELL LOCATION

GP-5 GEOPROBE LOCATION

ST01 APPROXIMATE SEDIMENT SAMPLE LOCATION

GP-1

GATE

PIPING ELBOWS EMERGING FROM UNDERGROUND

MW-12

MW-6R

GP-9

GP-5

GP-2

GP-3

MW-7

GP-4

GP-6

GP-7

MW-11

MW-8

MW-10

MW-9

TOP OF BANK

ST04

WEST BAY DRIVE

RAIL ROAD

GP-8

ST03

ABANDONED PIER

ST02

ST01

0 40' 80'

Approximate Scale: 1 in. = 40 ft.

THIS MAP PREPARED FROM A FIELD SURVEY BY OTAK ON MAY 13, 2010

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

SITE PLAN

ARCADIS

FIGURE
3B

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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XREFS: IMAGES: PROJECTNAME: ---

LEGEND

SUBJECT PROPERTY LINE BOUNDARY

MW-7 GROUNDWATER MONITORING WELL LOCATION

GP-5 SOIL BORING LOCATION

A A' CROSS SECTION LOCATION

GP-1

B

GATE

PIPING ELBOWS EMERGING FROM UNDERGROUND

MW-12

MW-6R

GP-9

GP-5

GP-4

GP-2

GP-3

MW-7

GP-7

GP-6

MW-11

MW-8

A

MW-10

MW-9

A'

TOP OF BANK

B'

GP-8

ABANDONED PIER

WEST BAY DRIVE

RAIL ROAD

0 40' 80'

Approximate Scale: 1 in. = 40 ft.

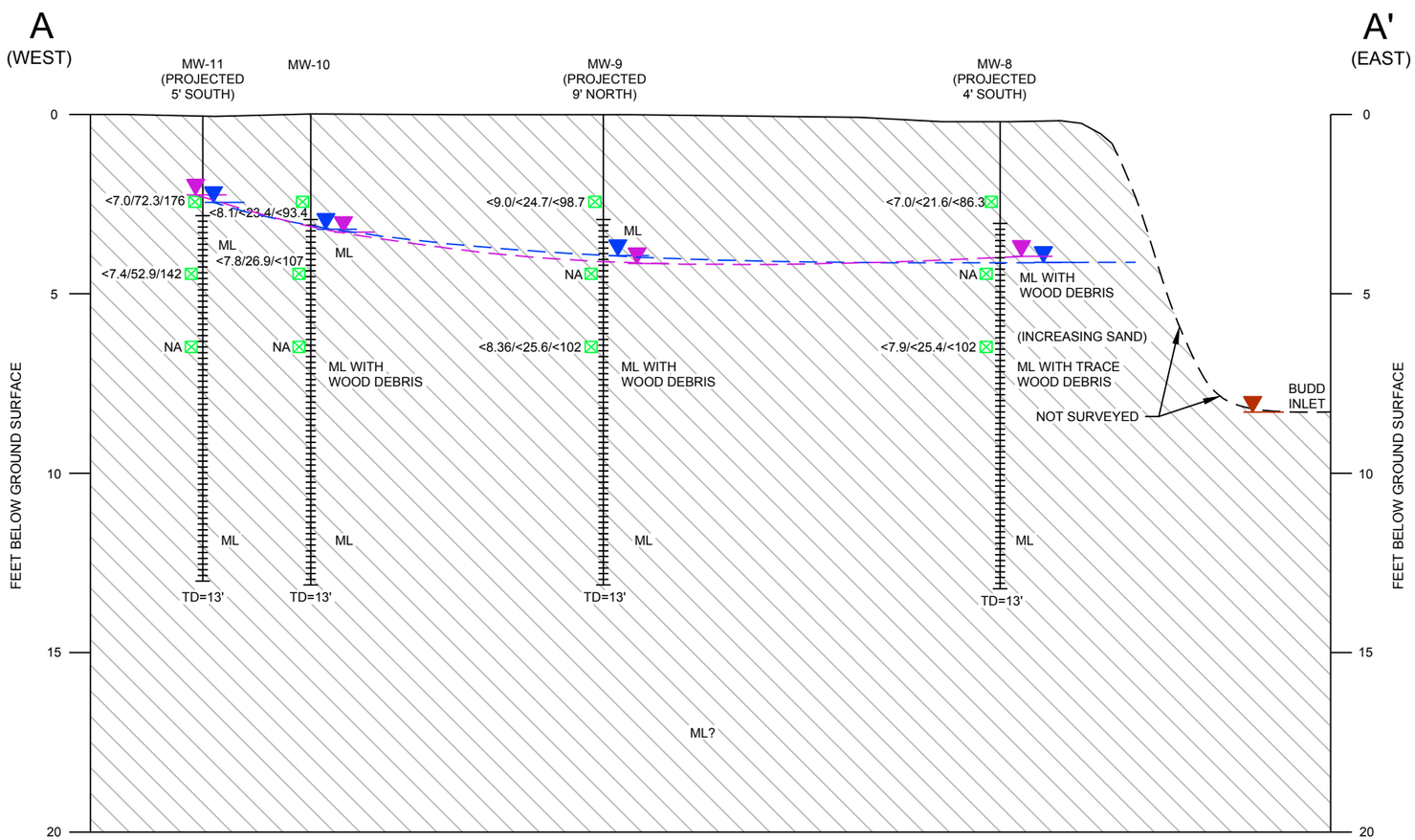
THIS MAP PREPARED FROM A FIELD SURVEYS BY OTAK IN MAY 2010 AND OCTOBER 2010.

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

CROSS-SECTION LOCATION MAP

ARCADIS

FIGURE 4



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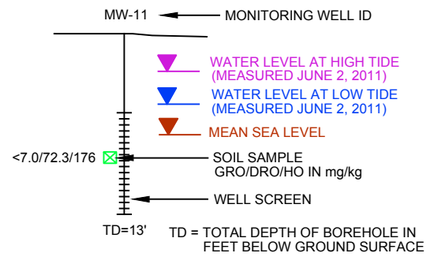

ML — INORGANIC SILTS AND VERY FINE SANDS
SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS

GRO TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
DRO TOTAL PETROLEUM HYDROCARBONS AS DIESEL
HO TOTAL PETROLEUM HYDROCARBONS AS HEAVY OIL
mg/kg MILLIGRAMS PER KILOGRAM
NA NOT ANALYZED
< LESS THAN THE SPECIFIED LABORATORY REPORTING LIMIT
? INFERRED SOIL TYPE

HIGH TIDE GROUNDWATER ELEVATION
LOW TIDE GROUNDWATER ELEVATION

MTCA-A MTCA-A MTCA METHOD A CLEANUP LEVELS

ALL LOCATIONS ARE APPROXIMATE

CONSTITUENT	CLEANUP LEVEL
GRO	30/100*
DRO	2,000
HO	2,000

* METHOD A CULs FOR GRO ARE DETERMINED BASED ON THE PRESENCE OF BENZENE

MEAN SEA LEVEL DATA AT 8.35 FEET OBTAINED FROM STATION No. 9446969 LOCATED APPROXIMATELY 0.5 MILE FROM SITE

VERTICAL EXAGGERATION = 4X

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

CROSS-SECTION A-A'

ARCADIS

FIGURE
5

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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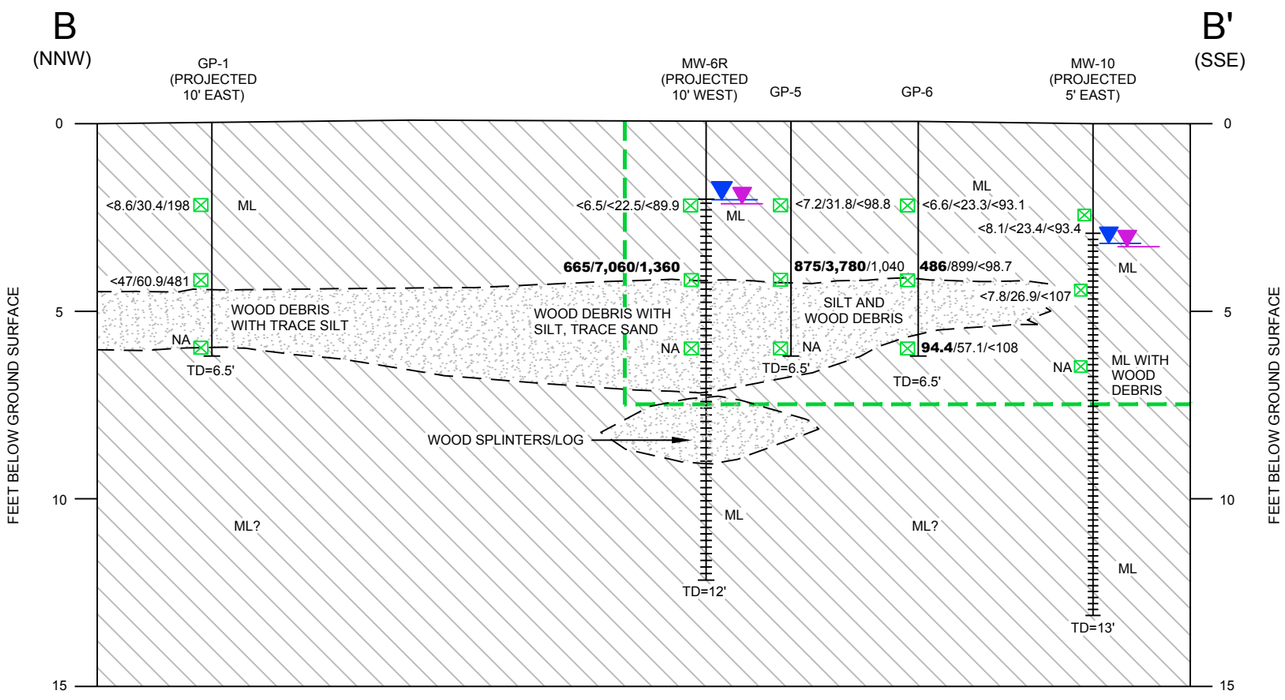

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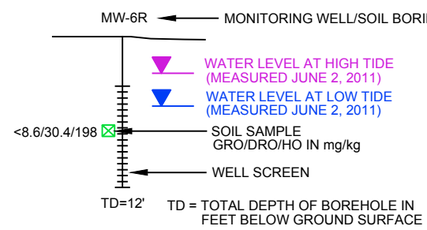


ML — INORGANIC SILTS AND VERY FINE SANDS
SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS

GRO TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
DRO TOTAL PETROLEUM HYDROCARBONS AS DIESEL
HO TOTAL PETROLEUM HYDROCARBONS AS HEAVY OIL
mg/kg MILLIGRAMS PER KILOGRAM
NA NOT ANALYZED
< LESS THAN THE SPECIFIED LABORATORY REPORTING LIMIT
? INFERRED SOIL TYPE

ESTIMATED EXTENT OF SOIL IMPACTED ABOVE MTCA-A

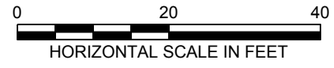
MTCA-A MTCA METHOD A CLEANUP LEVELS

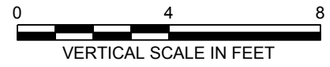
ALL LOCATIONS ARE APPROXIMATE

CONSTITUENT	CLEANUP LEVEL
GRO	30/100*
DRO	2,000
HO	2,000

* METHOD A CULs FOR GRO ARE DETERMINED BASED ON THE PRESENCE OF BENZENE

BOLD REPRESENTS ANALYTES DETECTED ABOVE MTCA-A CLEANUP LEVELS





VERTICAL EXAGGERATION = 4X

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

CROSS-SECTION B-B'

ARCADIS

FIGURE
6

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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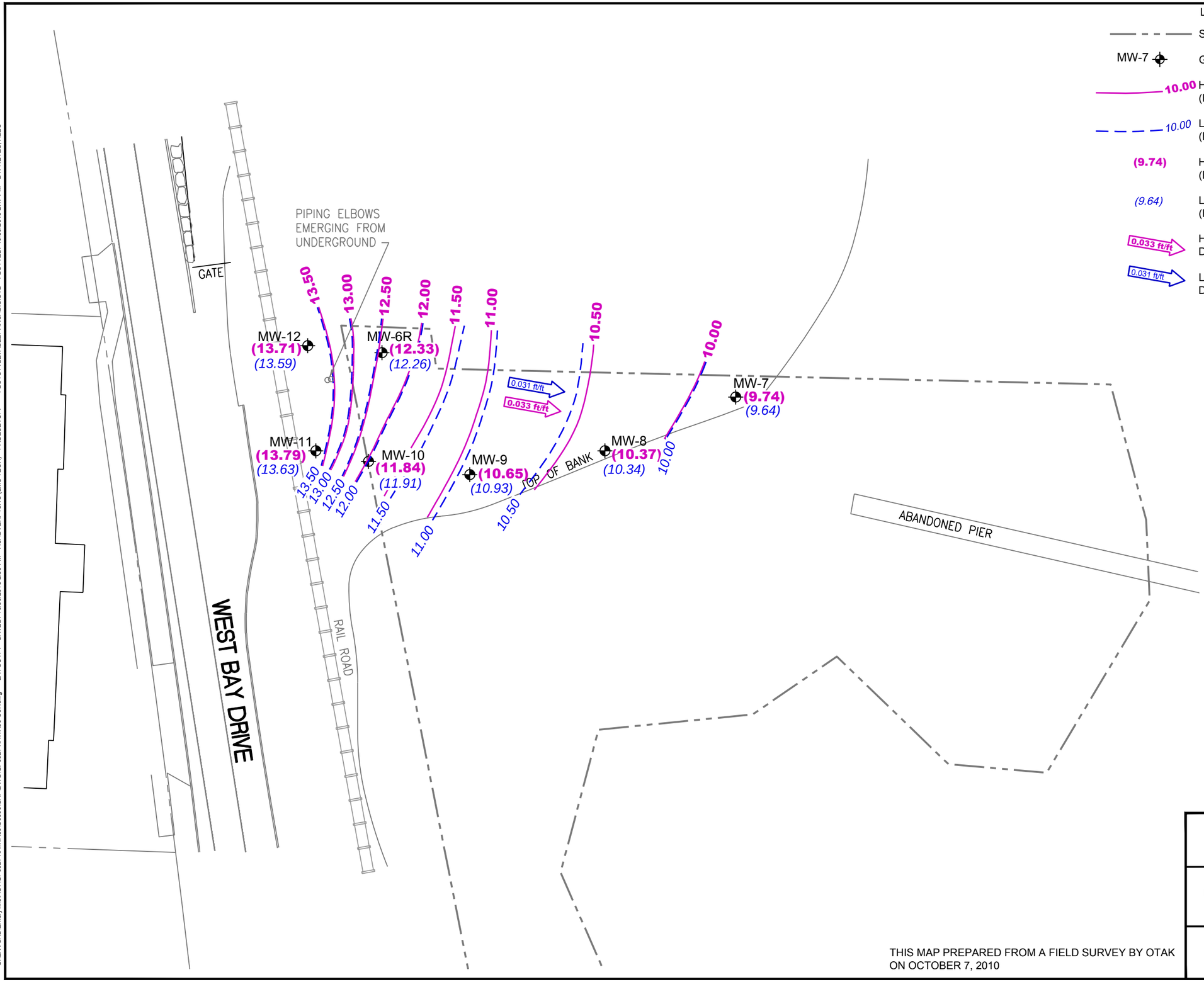


LEGEND

- SUBJECT PROPERTY LINE BOUNDARY
- MW-7 — GROUNDWATER MONITORING WELL LOCATION
- 10.00 — HIGH TIDE GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)
- 10.00 — LOW TIDE GROUNDWATER ELEVATION CONTOUR (FEET ABOVE MEAN SEA LEVEL)
- (9.74) — HIGH TIDE GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- (9.64) — LOW TIDE GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- 0.033 ft/ft — HIGH TIDE GROUNDWATER FLOW DIRECTION AND GRADIENT (FT/FT)
- 0.031 ft/ft — LOW TIDE GROUNDWATER FLOW DIRECTION AND GRADIENT (FT/FT)

0 40' 80'

Approximate Scale: 1 in. = 40 ft.

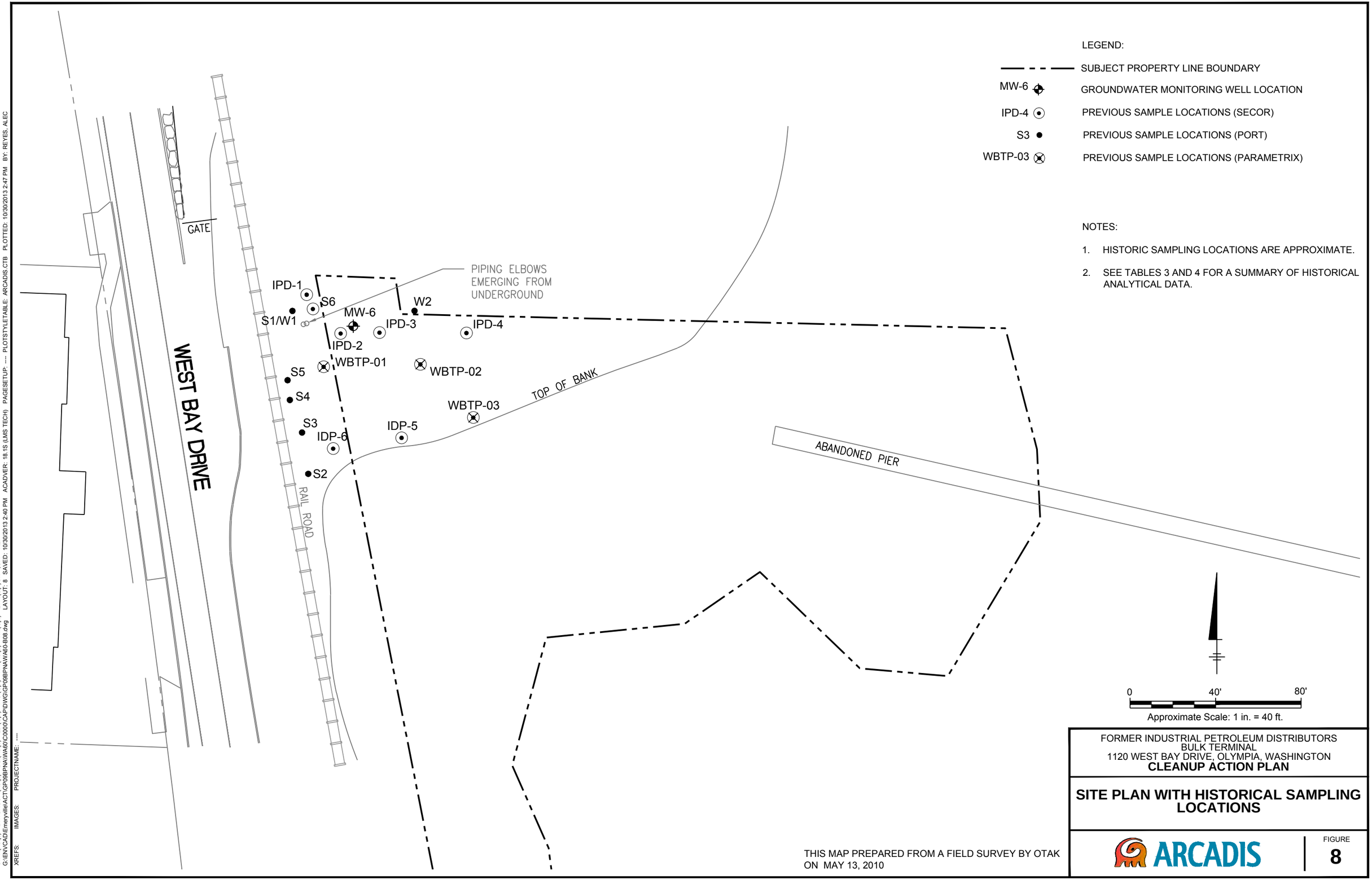
THIS MAP PREPARED FROM A FIELD SURVEY BY OTAK ON OCTOBER 7, 2010

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

GROUNDWATER ELEVATION CONTOUR MAP - HIGH AND LOW TIDE JUNE 2, 2011

ARCADIS

FIGURE 7



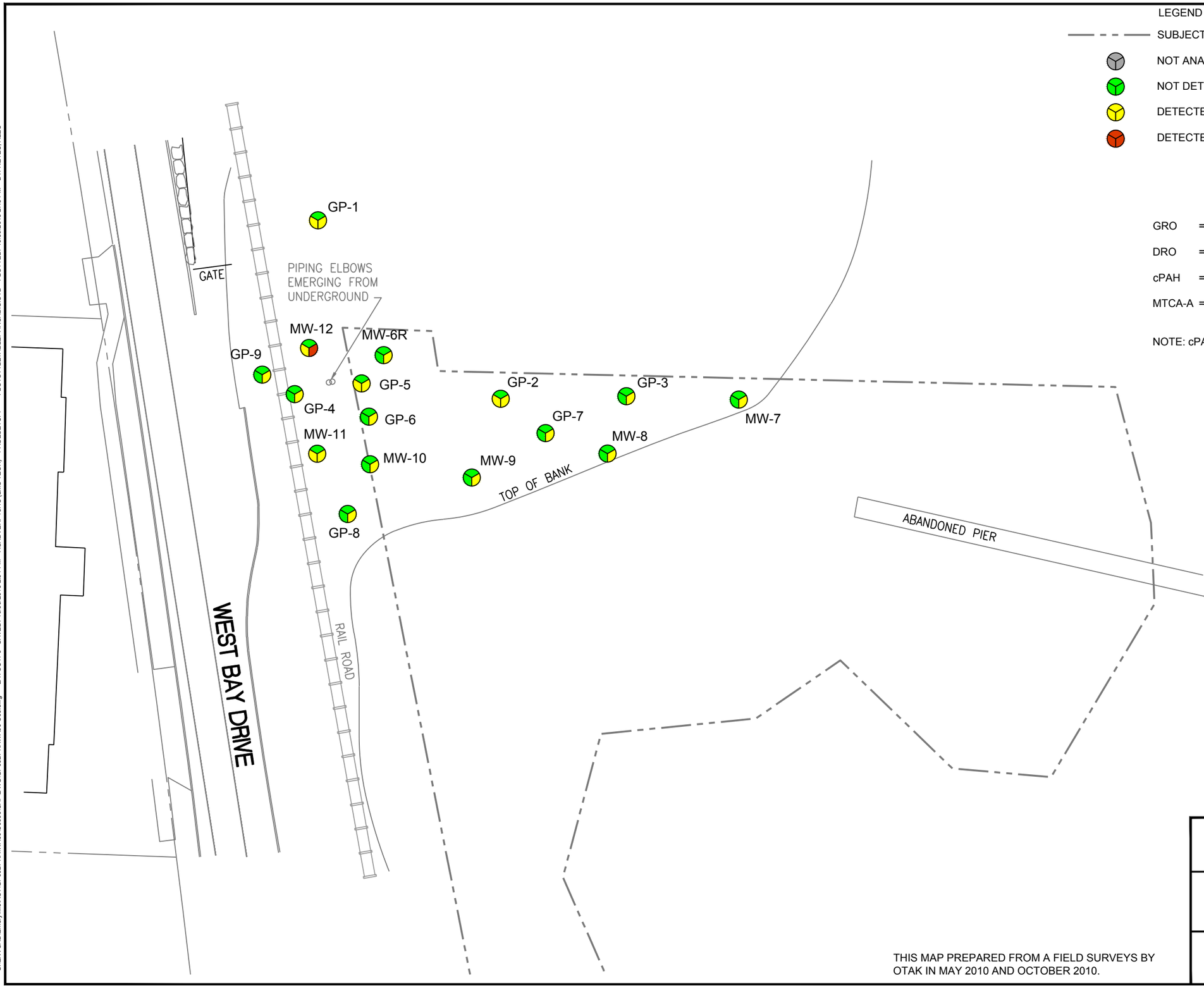
THIS MAP PREPARED FROM A FIELD SURVEY BY OTAK ON MAY 13, 2010

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

SITE PLAN WITH HISTORICAL SAMPLING LOCATIONS

ARCADIS

FIGURE
8



LEGEND

- SUBJECT PROPERTY LINE BOUNDARY
- NOT ANALYZED
- NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- DETECTED ≤ MTCA-A
- DETECTED ≥ MTCA-A

GRO / DRO cPAH

GRO = TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

DRO = TOTAL PETROLEUM HYDROCARBONS AS DIESEL

cPAH = CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS

MTCA-A = MTCA METHOD A CLEANUP LEVEL

NOTE: cPAH RESULTS ARE PRESENTED AS A SUM OF SEVEN cPAHs.

0 40' 80'

Approximate Scale: 1 in. = 40 ft.

THIS MAP PREPARED FROM A FIELD SURVEYS BY OTAK IN MAY 2010 AND OCTOBER 2010.

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

GRO, DRO, AND cPAH CONCENTRATIONS IN SOIL (2 - 2.5 FT BGS) - AUGUST 2010

ARCADIS

FIGURE 9

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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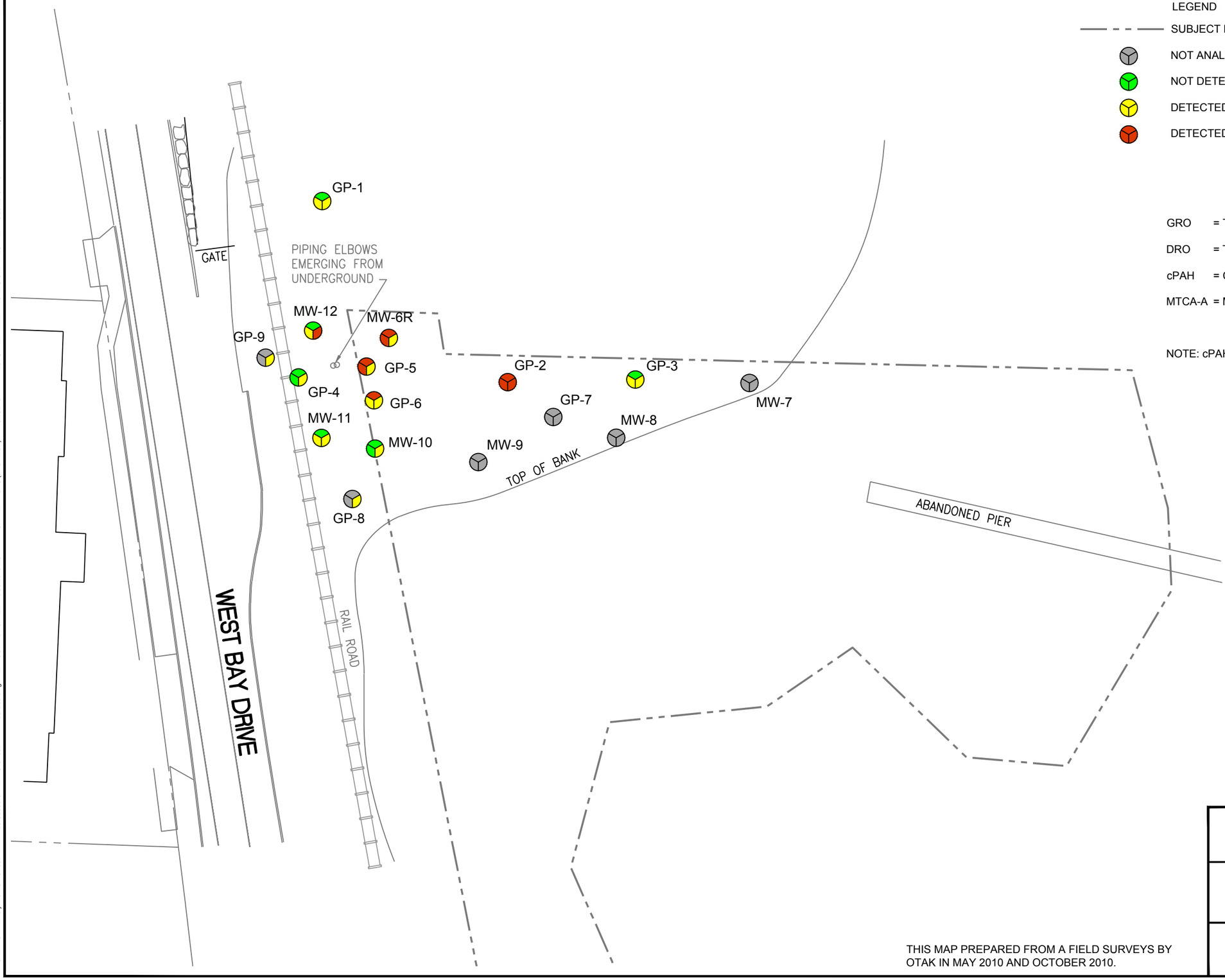


LEGEND

- SUBJECT PROPERTY LINE BOUNDARY
- NOT ANALYZED
- NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- DETECTED ≤ MTCA-A
- DETECTED ≥ MTCA-A

GRO / DRO cPAH

GRO = TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

DRO = TOTAL PETROLEUM HYDROCARBONS AS DIESEL

cPAH = CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS

MTCA-A = MTCA METHOD A CLEANUP LEVEL

NOTE: cPAH RESULTS ARE PRESENTED AS A SUM OF SEVEN cPAHs.

0 40' 80'

Approximate Scale: 1 in. = 40 ft.

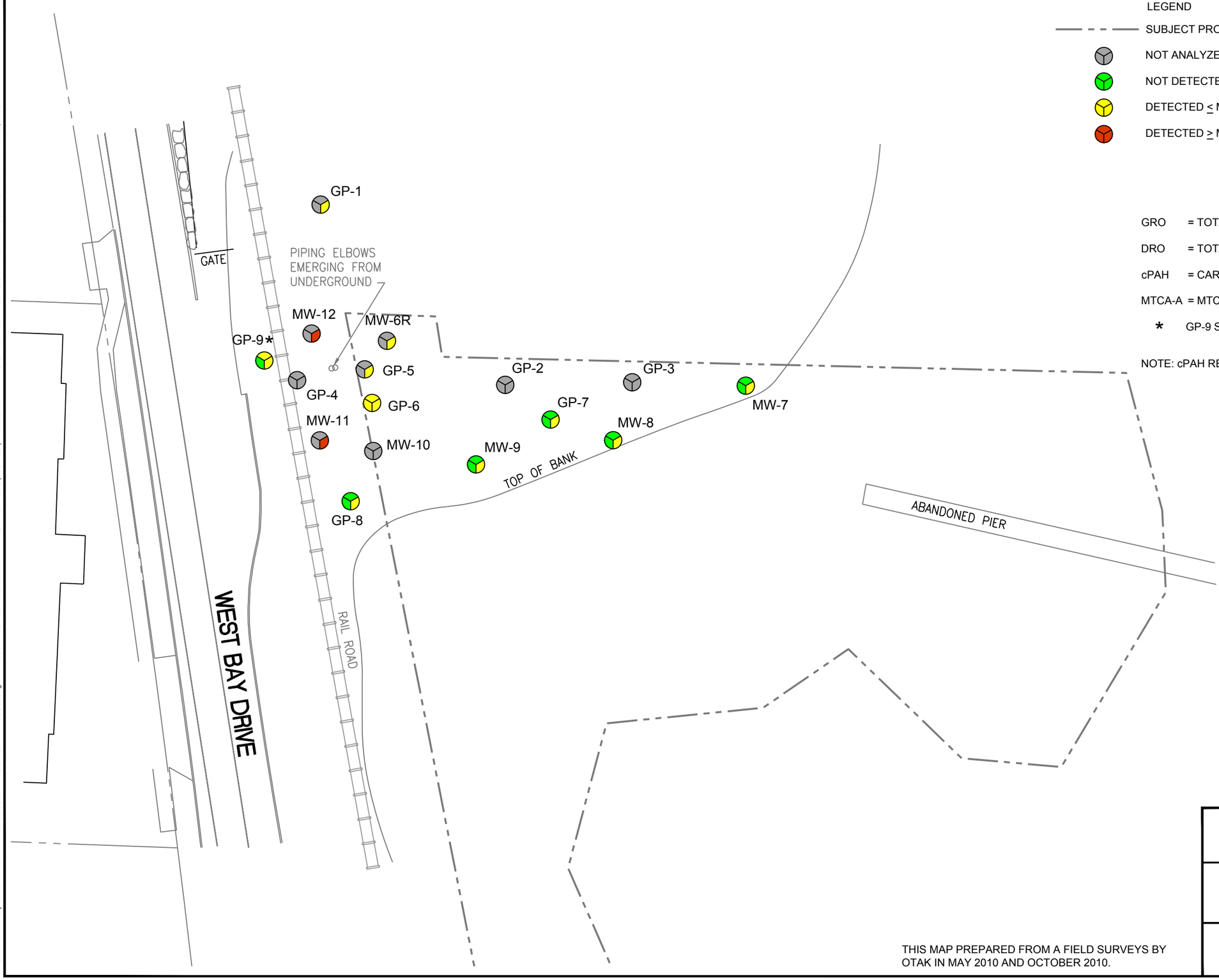
THIS MAP PREPARED FROM A FIELD SURVEYS BY OTAK IN MAY 2010 AND OCTOBER 2010.

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

GRO, DRO, AND cPAH CONCENTRATIONS IN SOIL (4 - 4.5 FT BGS) - AUGUST 2010

ARCADIS

FIGURE
10



LEGEND

- SUBJECT PROPERTY LINE BOUNDARY
- NOT ANALYZED
- NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- DETECTED ≤ MTCA-A
- DETECTED ≥ MTCA-A

GRO / DRO / cPAH

GRO = TOTAL PETROLEUM HYDROCARBONS AS GASOLINE

DRO = TOTAL PETROLEUM HYDROCARBONS AS DIESEL

cPAH = CARCINOGENIC POLYCYCLIC AROMATICHYDROCARBONS

MTCA-A = MTCA METHOD A CLEANUP LEVEL

* GP-9 SAMPLE WAS COLLECTED FROM 5.5 - 6 FT BGS INTERVAL

NOTE: cPAH RESULTS ARE PRESENTED AS A SUM OF SEVEN cPAHs.

0 40' 80'

Approximate Scale: 1 in. = 40 ft.

THIS MAP PREPARED FROM A FIELD SURVEYS BY OTAK IN MAY 2010 AND OCTOBER 2010.

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

GRO, DRO, AND cPAH CONCENTRATIONS IN SOIL (6 - 6.5 FT BGS) - AUGUST 2010

ARCADIS

FIGURE
11

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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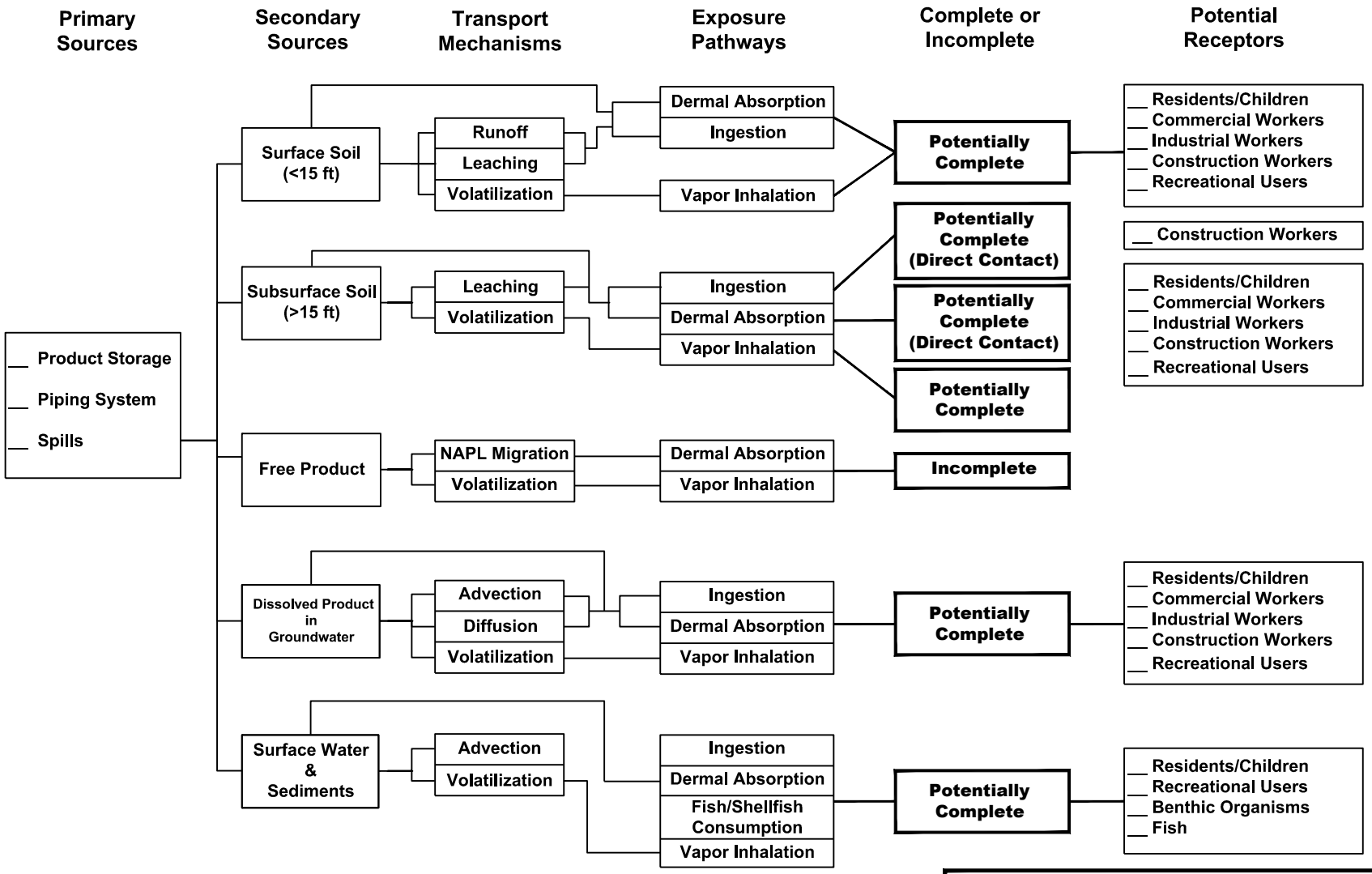
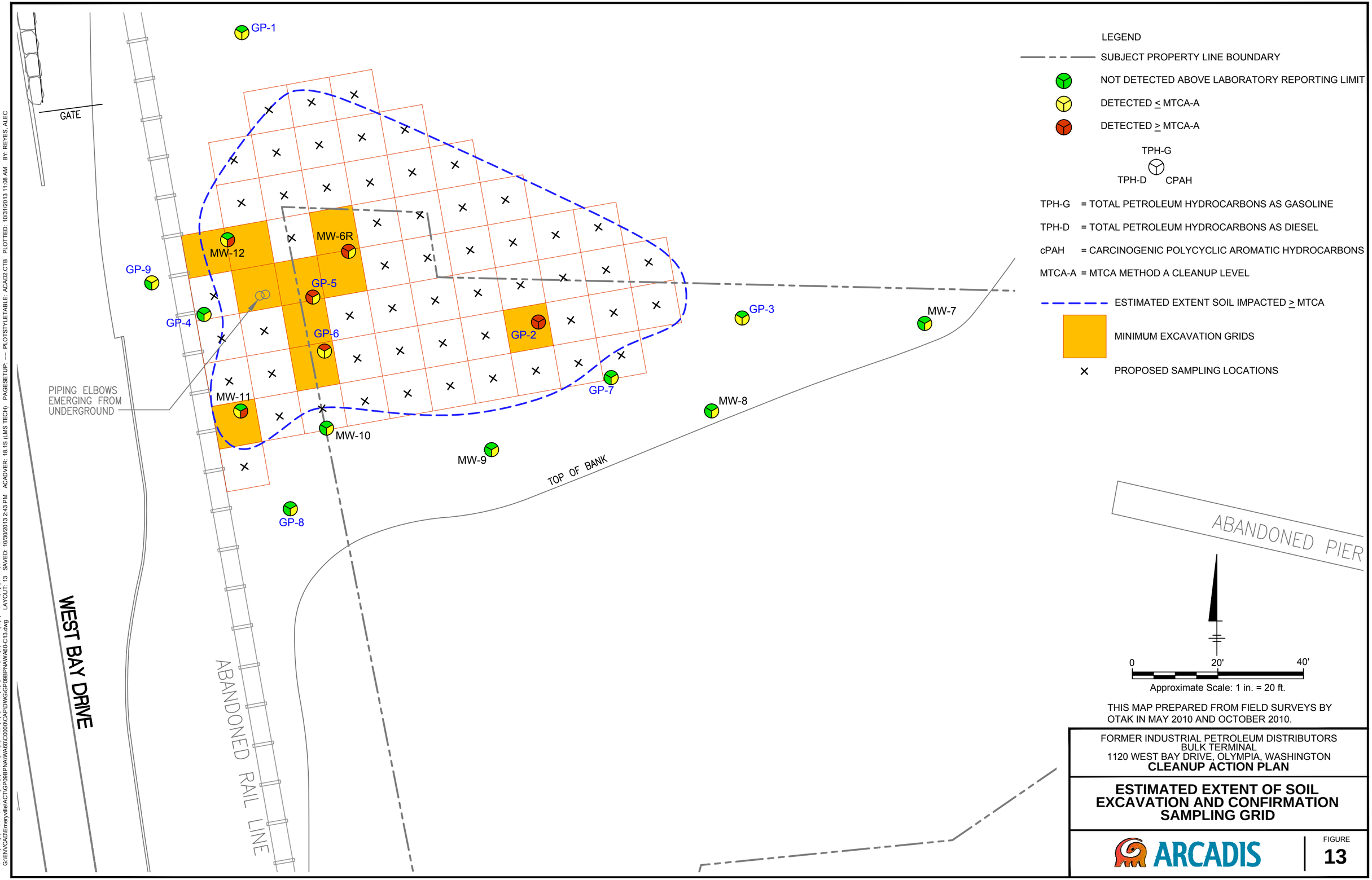


FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

CONCEPTUAL SITE MODEL

ARCADIS

FIGURE
12



THIS MAP PREPARED FROM FIELD SURVEYS BY OTAK IN MAY 2010 AND OCTOBER 2010.

FORMER INDUSTRIAL PETROLEUM DISTRIBUTORS
BULK TERMINAL
1120 WEST BAY DRIVE, OLYMPIA, WASHINGTON
CLEANUP ACTION PLAN

ESTIMATED EXTENT OF SOIL EXCAVATION AND CONFIRMATION SAMPLING GRID

ARCADIS

FIGURE
13

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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Appendix A

Integral Sediment Sampling Report

FINAL

FORMER IPD WEST OLYMPIA SITE
BUDD INLET SEDIMENT SCREENING

Sampling Report

December 17, 2009

Prepared for
Delta Consultants
4006 148th Avenue NE
Redmond, WA 98052

Prepared by:

David Serdar
Scientist

Reviewed by:

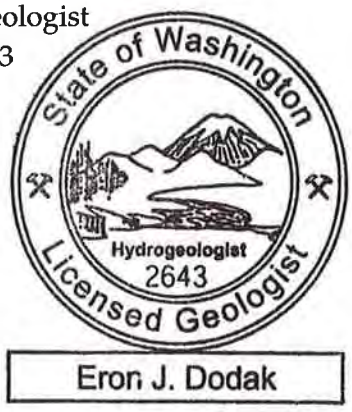
Sandy Browning
Managing Scientist

4/22/10

Eron J. Dodak, L.H.G.
Senior Hydrogeologist
License No. 2643

integral consulting inc.

1205 West Bay Drive NW
Olympia, WA 98502



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LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

ARI	Analytical Resources, Inc.
GC/FID	gas chromatography/flame ionization detection
GPS	global positioning system
HCID	hydrocarbon identification
IPD	Industrial Petroleum Distributors
MLLW	mean lower low water
TPH	total petroleum hydrocarbons
VOC	volatile organic compound

1 INTRODUCTION

Integral Consulting Inc. (Integral) conducted a screening survey of intertidal sediments located adjacent to the former Industrial Petroleum Distributors (IPD) Site in Olympia, Washington, during August 2009. The survey was requested by the Washington State Department of Ecology (Ecology) to assess whether marine sediments have been impacted by upland contamination or historical activities at the site. Ecology specified the approximate sampling locations, depth of sediments to be collected, and analytical screening requirements to be used for the survey (Teel 2006). These specifications were used as the basis for the sediment sampling section of the remedial investigation work plan for the site (Delta 2008).

This report describes the sediment sampling conducted at the site and results of the laboratory analysis. Copies of Ecology's letter requesting the survey, field notes, chain of custody documentation, and the laboratory data report are included in the appendices.

The objective of the survey was to screen intertidal sediments for petroleum hydrocarbons at the former IPD Site on the western side of Budd Inlet in Olympia, Washington, and to determine if subsequent sampling and analysis is warranted based on the screening results.

2 SAMPLING METHODS AND LABORATORY ANALYSIS

The sample design was based on the sampling scheme requested by Ecology (Teel 2006, Appendix A) and was incorporated in the remedial investigation work plan (Delta 2008). Samples were collected by Integral staff on August 20, 2009, with the assistance of Delta Environmental (Delta). Steve Teel from Ecology was onsite to discuss the sampling plan and to oversee sampling activities.

The sampling date and time was selected to coincide with a mid-day minus tide (–2.1 feet MLLW at 12:15 p.m.) so that all locations were accessible by foot. Four sampling locations were established along the entire length of the former pier at equidistant intervals of approximately 140 feet. Figure 1 shows a schematic of the planned sampling locations. Figure 2 shows actual sampling locations superimposed on an aerial photograph.

Sampling location coordinates were recorded at each location using a Garmin GPS V Personal Navigator with differential correction and subsequently resolved to within 1 meter of accuracy using offsets from known landmark positions. Sample coordinates are shown in Table 1.

Table 1. Sample Location Coordinates for Sediment Screening at Former IPD Site

Station Id	Latitude North	Longitude West
ST01	47^0 03' 17.4"	122^0 54' 40.4"
ST02	47^0 03' 17.6"	122^0 54' 43.0"
ST03	47^0 03' 18.1"	122^0 54' 44.6"
ST04	47^0 03' 18.2"	122^0 54' 46.8"

Samples were collected using a 10-cm internal diameter stainless steel hand coring device designed to collect a core from the sediment surface to a depth of 10 cm below surface. Several cores were required to provide sufficient sample volume at each location. Upon extraction of the initial core at each location, samples for volatile organic compound (VOC) analysis were collected from the side wall of the hole using a specially designed open-barrel syringe and placed in vials for VOC analysis. Observations on sediment consistency, content, odor, etc., were recorded in a field logbook. A copy of the field notes is included as Appendix B.

Extracted material was placed in a stainless steel bowl, homogenized, and placed in appropriate jars specially cleaned for priority pollutant analysis. Prior to sampling, all equipment coming into contact with samples was decontaminated by scrubbing with 1 percent Alconox solution, triple-rinsed with tap water, rinsed with distilled water, and then allowed to air-dry. Once dry, equipment was wrapped in aluminum foil (dull side in).

Samples were submitted to Analytical Resources, Incorporated (ARI; Tukwila, WA) for analysis of petroleum hydrocarbon identification (NWTPH-HCID Method) using Prep Method SW3550B and gas chromatography/flame ionization detection (GC/FID). Chain of custody documentation is in Appendix C. Samples were analyzed at maximum screening level of 100 mg/kg. Samples collected for analysis of VOCs using Method 5035 were available for analysis pending results of the HCID screen.

3 RESULTS

A summary of the laboratory results are shown in Table 2. The complete laboratory report is shown in Appendix D. Overall quality of the data was good. The method blank and o-terphenyl surrogate was within acceptable limits for all samples. No petroleum hydrocarbons were detected at 20 mg/kg in the gas range, 50 mg/kg in the diesel range, and 100 mg/kg in the oil range. Analysis of VOCs was not necessary based on these results.

Table 2. Summary of Laboratory Results for Sediments Collected August 20, 2009 at the Former IPD Site (concentrations in mg/kg [ppm], dry weight basis)

Station ID	Sample ID	Analysis Date	Gas	Diesel	Oil
ST01	Sediment-1	8/22/09	20 *U*	50 *U*	100 *U*
ST02	Sediment-2	8/22/09	20 *U*	50 *U*	100 *U*
ST03	Sediment-3	8/22/09	20 *U*	50 *U*	100 *U*
ST04	Sediment-4	8/22/09	20 *U*	50 *U*	100 *U*

U = Not detected at value shown.

4 CONCLUSIONS

Intertidal surface sediments located in Budd Inlet off of the former IPD Site have no measurable levels of petroleum hydrocarbons when analyzed at a maximum screening level of 100 mg/kg. Gas, diesel, and oil range hydrocarbons are not detectable at concentrations of 20, 50, and 100 mg/kg, respectively.

5 REFERENCES

Delta. 2008. Remedial Investigation Work Plan, Former Industrial Distributors Site, 1117 West Bay Drive Olympia, Washington. Delta Project G0CLG. Prepared for Atlantic Richfield Company, La Palma, CA. Delta Consultants, Redmond, WA.

Teel. 2006. Sediment Screening Requirement and Potential Interim Action, Former Industrial Petroleum Distributors (IPD) Site, Olympia, WA. Letter from Steve Teel, Department of Ecology, to Bob May, Disclaimer Trust of John J. O'Connell and Scott Hooten, Atlantic Richfield Company. July 31, 2006.

FIGURES

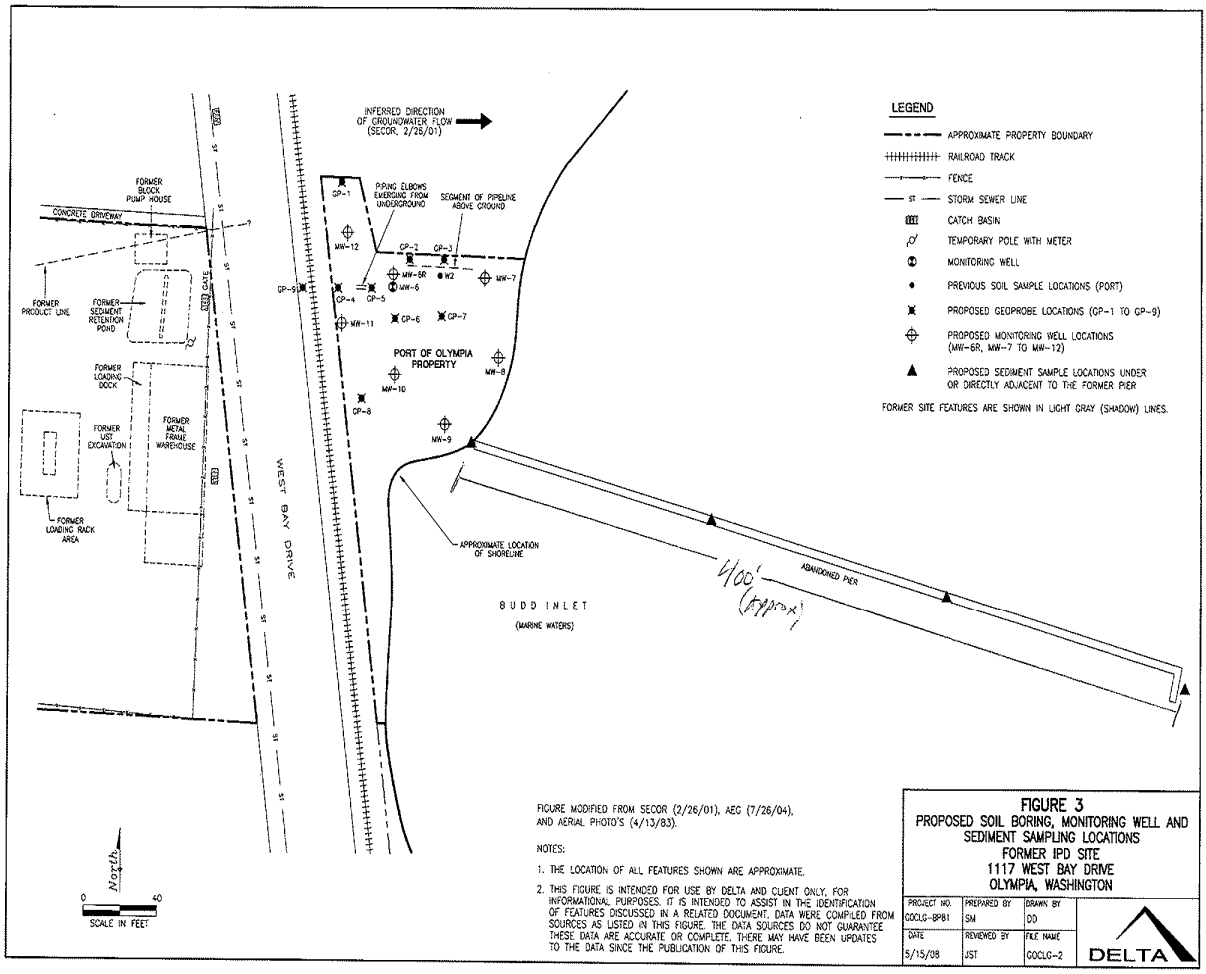

Figure 1. Schematic of Planned Sediment Sample Locations at the Former IPD Site.

Figure 2. Actual Sediment Sample Locations at the Former IPD Site (HHWHUB is a benchmark established by survey on August 20, 2009)

APPENDIX A

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300

CERTIFIED MAIL

July 31, 2006

Disclaimer Trust of John J. O'Connell
c/o Mr. Bob May, Trust Representative
18047 NE 88th Ct.
Redmond, WA 98052

Mr. Scott T. Hooton
Atlantic Richfield Company
295 SW 41st Street, Bldg. 13, STE N
Renton, WA 98055

Dear Mr. May and Mr. Hooton:

Re: Sediment Screening Requirement and Potential Interim Action
Former Industrial Petroleum Distributors (IPD) Site, Olympia, WA

As you know, further investigation is needed for the Port of Olympia portion of the site. Our letter of October 25, 2005 requested that a Remedial Investigation (RI) Work Plan be prepared and submitted to Ecology for review and comment. We understand that prior to beginning the RI, property access agreements would need to be negotiated by the Trust and ARCO from all affected property owners. The above letter also stated that the additional RI work shall include the further definition of the extent and type of residual soil contamination and groundwater characterization.

However, the potential for impact to sediments also needs to be assessed. To accomplish this, it will be necessary to collect four sediment screening samples (three locations beneath the former pier and one from the end of the pier). Sample locations beneath the pier should be spaced a consistent distance apart such that the entire length of the pier is characterized, beginning at the approximate mean higher high water level and ending at the sample location at the end of the pier. Samples should be collected from the top 10-centimeters only. Analyses shall initially consist of the hydrocarbon identification method (HCID) for all petroleum ranges. A screening level of **100 mg/kg** shall be used. If all sample results are less than this value, then no additional sediment characterization

will be necessary. However, if any sample results exceed this value, then additional analyses and/or sediment characterization will be necessary. Prior to conducting this work, a sediment sampling plan should be prepared and submitted to Ecology for review and approval. Sample methods should be consistent with the Ecology guidance document *Sediment Sampling and Analysis Plan Appendix (03-09-043, revised April 2003).*

On July 20, Mr. Hooton and I visited the site. During this visit, Mr. Hooton expressed the willingness to conduct an interim remedial action consisting of excavation and off-site disposal for soil contamination associated with the former product pipeline. Grab groundwater samples would also be collected during this work. Ecology supports the option of conducting such an interim action at the site. However, in order to do this, the Agreed Order (AO) will need to be amended, the Interim Action Work Plan would need to be reviewed and approved by Ecology. Following this, both the Interim Action Work Plan and the AO Amendment would need to undergo a 30-day public review and comment period. After considering public comments, the Interim Action Work Plan and AO Amendment can be finalized and implemented.

Please let me know as soon as possible if you would still like to conduct an interim remedial action so I can begin preparing the AO Amendment. You can contact me at (360) 407-6247 or via e-mail at stee461@ecy.wa.gov if you have questions about this letter or if you would like to schedule a meeting to further discuss these issues.

Sincerely,

ST Teel

Steve Teel, LHG
Hydrogeologist
Toxics Cleanup Program
Southwest Regional Office

ST/ksc:07062006 Port of Olympia

Cc: Mr. Jeffrey S. Thompson, Delta Environmental Consultants
Mr. Heber Kennedy, Port of Olympia
Bojo Investments LLC
Mr. Steve Wise, Code Enforcement Officer, City of Olympia, Public Works Dept.
Bob Warren – Ecology

APPENDIX B

"Outdoor writing products...
...for outdoor writing people."

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Integral Delta - Former IPD Olympia Site (BPOLY)

"Rite in the Rain"®
ALL-WEATHER
LEVEL
No. 311

August 2009

Intertidal Sediment Sampling

BPOLY (Former IPA site) 8/20/04 3

1/3

D. Serdar

BPoly Sediment Sampling

On Site:

D. Serdar, I. Stopakoff (Integral)

C. Crawford, S. Kennedy (Militka), D. Turnow (Delta)

1030 - Met C. Crawford on site - surveying high water station.

1100 - Met remainder of Delta crew. Went over safety plan and sampling plan. Discussions about determining sampling locations. Will use tape to measure from end to HW survey, then take equidistant measures.

1156 - Start of GPS readings at HWM surveyed by Delta.

1200 - Steve Teel on site - explained sampling method to him.

1230 - Walked out to end of pier to establish route.

1303 - Commenced sampling at Station 1 at end of pier (see opposite page)

Some heavy sheen - appeared like NAPL but then dissipated. Shells cleared from top surface. Many polychaetes, clams in hole. Sampled VOAs with 5035 syringe. Remaining

Samples collected with hand corer. 10cm deep.

1334 - Station 2 sampled. Similar to Station 1 but more watery and more mussel shells. Less sheen.

1402 - Station 3 - Sample at higher elevation - Sediment was much more de-watered. Fewer shells. Slight anoxic/black layer on surface/below surface. Shells on surface w/ juvenile crabs. Clam shells below surface.

1435 (1:35) Station 4 - sampled at high higher water. Sandy sediment with rocks under denser mat of salt grass (S. alterniflora). No shell debris and no marine worms.

Notes here by I.S.

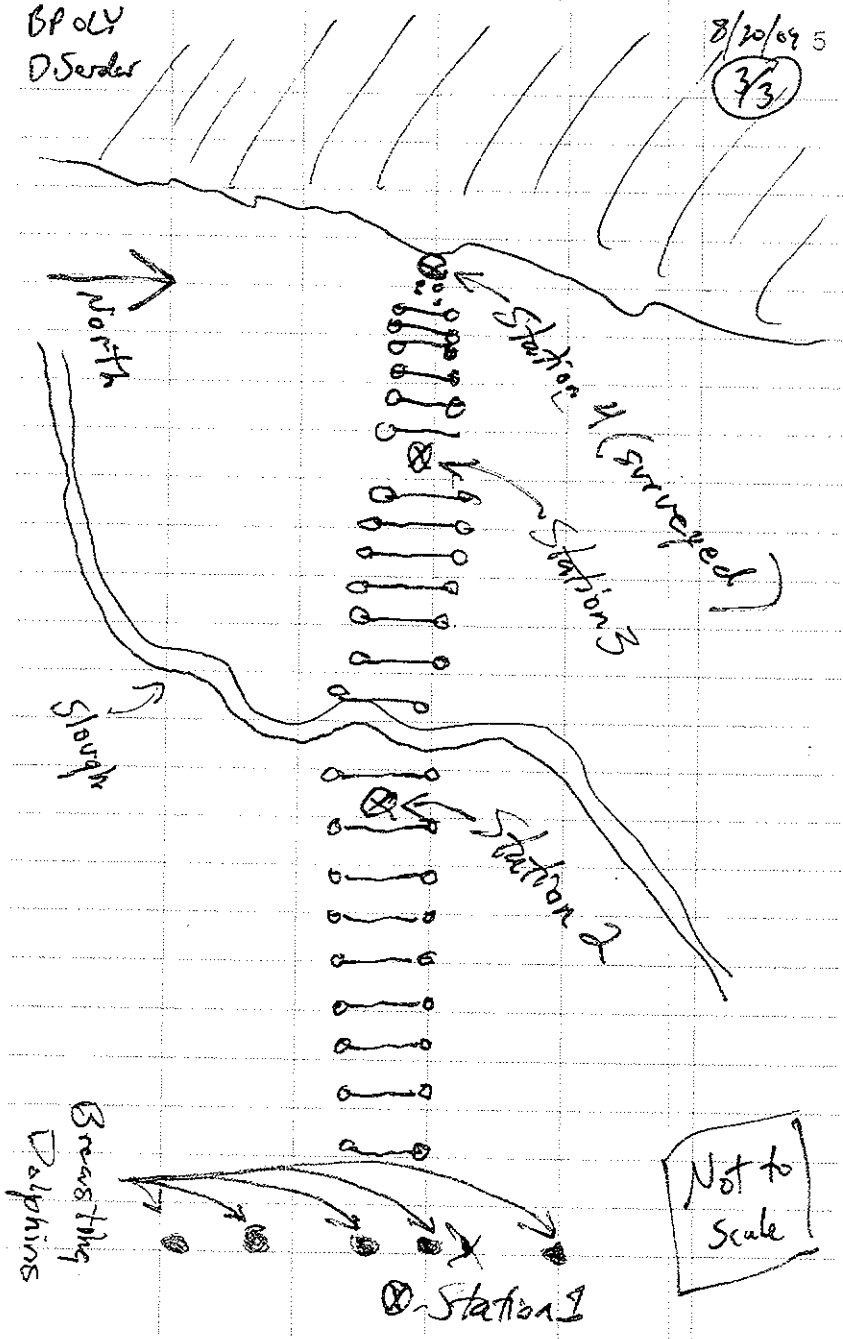
1500 - Sampling completed. COCs filled out and all jars labelled. Sarah M. assigned sample names:

Station 1 = Sediment 1
Station 2 = Sediment 2
Station 3 = Sediment 3
Station 4 = Sediment 4

1500 - Sarah M. will deliver samples to ARI. - Relinquished samples to her.

1820 - Decon and demobe back to office - (Oly)

Done for Day JMS



APPENDIX C

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: PL36	Turn-around Requested:	Page: 1 of 1	
ARI Client Company: Integral Consulting	Phone: 360-705-3534	Date: 8/20/09	Ice Present? Yes
Client Contact: Dave Serdar		No. of Coolers: 1	Cooler Temps: 1.6, 1.8
Client Project Name: BPOLY-I			
Client Project #: C578-001	Samplers: Integral		

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

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Hold/TPHD	TPHG	Total Solids						Notes/Comments
Sediment-1	8/20/09	1250	SEDIMENT	8	X	X*	X						
Sediment-2	"	1320	"	"	X	X*	X						
Sediment-3	"	1400	"	"	X	X*	X						
Sediment-4	"	1450	"	"	X	X*	X						

Comments/Special Instructions	Relinquished by: (Signature)	Printed Name	Company	Date & Time	Received by: (Signature)	Printed Name	Company	Date & Time	Relinquished by: (Signature)	Printed Name	Company	Date & Time	Received by: (Signature)	Printed Name	Company	Date & Time
*Hold - based on results of HCID screen.	Dave Serdar	Dave Serdar	Integral	8/20/09 1530	Sarah Milliken	Sarah Milliken	Delta Consultants	8/20/09 1530	Sarah Milliken	Sarah Milliken	Delta Consultants	8/20/09 1808	D. Peterson	D. Peterson	ARI	8/20/09 1808

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Integral Cons.
COC No(s): _____ (NA)
Assigned ARI Job No: PL36

Project Name: ~~BPoly-2~~ JW BPOLY-1
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____
Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 1.6 1.8
If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: 10186P

Cooler Accepted by: JP Date: 8/21/09 Time: 1805

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... (JW) (Bubble Wrap) (Wet Ice) Gel Packs Baggies (Foam Block) Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) .	(NA)	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	(NO)
Was sufficient amount of sample sent in each bottle?		(YES)	NO

Samples Logged by: JW Date: 8/21/09 Time: 0840

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:
Trip Blank 2 of 2 "pb" vials

By: JW Date: 8/21/09

Small Air Bubbles ~2 mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
•	•	●

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

APPENDIX D

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
NWTPH-HCID Method by GC/FID

Matrix: Sediment

QC Report No: PL36-Integral Consulting
Project: BPOLY-1
C578-001

Data Release Authorized:
Reported: 08/24/09

ARI ID	Sample ID	Extraction Date	Analysis Date	DL	Range	Result
MB-082209 09-19572	Method Blank	08/22/09	08/22/09	1.0	Gas Diesel Oil o-Terphenyl	< 20 U < 50 U < 100 U 104%
PL36A 09-19572	Sediment-1 HC ID: ---	08/22/09	08/22/09	1.0	Gas Diesel Oil o-Terphenyl	< 20 U < 50 U < 100 U 101%
PL36B 09-19573	Sediment-2 HC ID: ---	08/22/09	08/22/09	1.0	Gas Diesel Oil o-Terphenyl	< 20 U < 50 U < 100 U 86.4%
PL36C 09-19574	Sediment-3 HC ID: ---	08/22/09	08/22/09	1.0	Gas Diesel Oil o-Terphenyl	< 20 U < 50 U < 100 U 102%
PL36D 09-19575	Sediment-4 HC ID: ---	08/22/09	08/22/09	1.0	Gas Diesel Oil o-Terphenyl	< 20 U < 50 U < 100 U 103%

Reported in mg/kg (ppm)

Gas value based on total peaks in the range from Toluene to C12.
Diesel value based on the total peaks in the range from C12 to C24.
Oil value based on the total peaks in the range from C24 to C38.

ANALYTICAL RESOURCES INCORPORATED

HCID SURROGATE RECOVERY SUMMARY

Matrix: Sediment

QC Report No: PL36-Integral Consulting
Project: BPOLY-1
C578-001

Client ID	O-TER	TOT OUT
082209MB	104%	0
Sediment-1	101%	0
Sediment-2	86.4%	0
Sediment-3	102%	0
Sediment-4	103%	0

	LCS/MB LIMITS	QC LIMITS
(O-TER) = o-Terphenyl	(68-122)	(50-150)

Prep Method: SW3550B
Log Number Range: 09-19572 to 09-19575

ANALYTICAL RESOURCES INCORPORATED

TOTAL HCID RANGE HYDROCARBONS-EXTRACTION REPORT

Matrix: Sediment
Date Received: 08/20/09

ARI Job: PL36
Project: BPOLY-1
C578-001

ARI ID	Client ID	Sample Amt	Final Vol	Basis	Prep Date
09-19572-082209MB	Method Blank	10.0 g	5.00 mL	-	08/22/09
09-19572-PL36A	Sediment-1	4.62 g	5.00 mL	D	08/22/09
09-19573-PL36B	Sediment-2	3.81 g	5.00 mL	D	08/22/09
09-19574-PL36C	Sediment-3	6.27 g	5.00 mL	D	08/22/09
09-19575-PL36D	Sediment-4	8.51 g	5.00 mL	D	08/22/09

Basis: D=Dry Weight W=As Received