Chevron Environmental Management Company

Public Review Draft Final Feasibility Study Report Addendum

Former Unocal Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

August 19, 2024

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Contents

Acronyms and Abbreviations ..... **v**

1. Introduction **1-1**

1.1 Site Description 1-1

1.2 Final Feasibility Study Report Addendum Background 1-2

1.3 Previous Submittals and Historical Data 1-2

1.4 Land Use and Zoning 1-3

1.5 Figure Updates 1-3

1.5.1 Detention Basin 2 Excavation 1-4

1.6 Feasibility Study Addendum Organization 1-4

2. Nature and Extent of Contamination – Update **2-1**

2.1 Soil 2-1

2.2 Terrestrial Ecological Evaluation 2-1

2.3 Groundwater 2-3

2.3.1 Groundwater Elevation and Gradient Direction 2-3

2.3.2 Groundwater Quality 2-3

2.4 Light Nonaqueous Phase Liquid 2-4

3. Adjusted Cleanup Standards **3-1**

3.1 Terrestrial Ecological Evaluation for Soil 3-1

3.2 Direct Human Contact Soil Pathway 3-2

3.3 Groundwater/Surface Water Pathway 3-3

4. Updated Remedial Alternatives **4-1**

4.1 Remedial Technology 13: Engineered Cover 4-1

4.2 Summary of Updated Remedial Alternatives 4-2

4.3 Description of Updated Remedial Alternatives 4-2

4.3.1 Alternative 1: Monitored Natural Attenuation with Environmental Covenants 4-2

4.3.2 Alternative 4: Excavation 4-3

4.3.3 Alternative 6: Dual-Phase Extraction Treatment System Operation, Engineered Cover System, Contingency Plan, and Environmental Covenant 4-4

5. Sustainability Evaluation **5-7**

6. Updated Disproportionate Cost Analysis **6-1**

6.1.1 Protectiveness 6-1

6.1.2 Permanence 6-2

6.1.3 Long-Term Effectiveness 6-3
6.1.4 Management of Short-Term Risks 6-4
6.1.5 Technical and Administrative Implementability 6-5
6.1.6 Public Concerns 6-6
6.1.7 Cost 6-6
6.1.8 Disproportionate Cost Analysis Preliminary Summary 6-7
6.2 Final Disproportionate Cost Analysis 6-8
7. Recommended Remedial Alternative 7-1
8. Summary and Conclusions 8-1
9. Schedule 9-1
10. References 10-1

Tables

Table 2-1 COC Concentrations in Exceedance of CULs – Direct Contact
Table 2-2 POC Statistical Summary – Direct Contact
Table 2-3 COC Concentrations in Exceedance of PSVs – Buffer Zone
Table 2-4 COC Concentrations in Exceedance of PSVs – Interior
Table 2-5 Alternative POC Statistical Summary – Buffer Zone
Table 2-6 Alternative POC Statistical Summary – Interior
Table 2-7 Groundwater Gauging Data (2017 through 2024)
Table 2-8 Dissolved-Phase COC Concentrations (2017 through 2024)
Table 3-1 Ecologically Protective Soil Values for Use in the TEE (in text)
Table 3-2 Soil Cleanup and Remediation Levels (in text)
Table 3-3 Surface-Water CULs (in text)
Table 5-1 SiteWise™ Evaluation Summary (in text)
Table 6-1 Updated Disproportionate Cost Analysis
Table 5-2 Updated Alternative 1 Cost Analysis
Table 5-3 Updated Alternative 4 Cost Analysis
Table 5-4 Updated Alternative 6 Cost Analysis
Table 5-5 Cost Comparison of Remedial Alternatives (in text)
Table 5-6 DCA Summary (in text)

Figures

Figure 1 Site Location Map

Figure 2 Site Layout

Figure 3 Site Layout Area of the Lower Yard

Figure 4 Cross-Section Location Map

Figure 5 Lower Yard Geologic Cross-Section A-A’

Figure 6 Lower Yard Geologic Cross-Section B-B’

Figure 7 Southeast Lower Yard Geologic Cross-Section C-C’

Figure 8 Southeast Lower Yard Geologic Cross-Section D-D’

Figure 9 Top of 2008 and 2017 Gravel Backfill Elevations

Figure 10 Bottom of 2008 and 2017 Gravel Backfill Elevations

Figure 11 2007/2008 and 2017 Interim Action Final Excavation Limits and Volumes

Figure 12 Groundwater Elevations and Contours March 19, 2024

Figure 13 Groundwater GRO Concentrations March 18-21, 2024

Figure 14 Groundwater TPH DRO+HRO Concentrations March 18-21, 2024

Figure 15 Groundwater Benzene Concentration March 18-21, 2024

Figure 16 Groundwater cPAH Concentration March 18-21, 2024

Figure 17 Lower Yard Remaining Soil Impacts Map

Figure 18 Alternative 4: Excavation

Figure 19 Alternative 6: Dual-Phase Extraction Treatment System Operation, Engineered Cover System, Contingency Plan, and Environmental Covenant

Appendices

Appendix A 2017 Public Review Draft Final Feasibility Report

Appendix B Draft Site-Specific Terrestrial Ecological Evaluation

Appendix C Pro UCL Statistical Analysis

Appendix D Sustainability Evaluation

Acronyms and Abbreviations

95% UCL	95 percent upper confidence level
µg/L	microgram per liter
AO	Agreed Order
Arcadis	Arcadis U.S., Inc.
bgs	below ground surface
BNSF	BNSF Railway
CEMC	Chevron Environmental Management Company
CIPP	cast-in-place pipe
City	City of Edmonds
COC	constituent of concern
Comprehensive Plan	City of Edmonds Comprehensive Plan
COPEC	constituent of potential ecological concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
CUL	cleanup level
cy	cubic yard
DB-2	Detention Basin 2
DCA	disproportionate cost analysis
DPE	dual-phase extraction
Draft CAP	Draft Cleanup Action Plan
DRO	diesel-range organics
EC	Environmental Covenant
Ecology	Washington State Department of Ecology
FS Addendum	Public Review Draft Final Feasibility Study Report Addendum
FS Report	Public Review Draft Final Feasibility Report
GHG	greenhouse gas
GRO	gasoline-range organics
GSR	green and sustainable remediation
HRO	heavy-oil-range organics
IHS	indicator hazardous substance
LNAPL	light non-aqueous phase liquid
mg/kg	milligram per kilogram
MNA	monitored natural attenuation

MTCA	Model Toxics Control Act
NAVD 88	North American Vertical Datum of 1988
NRWQC	National Recommended Water Quality Criteria
POC	point of compliance
PSV	protective soil value
ROW	right of way
Site	former Unocal Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington
Site-Specific TEE Report	Draft Site-Specific Terrestrial Ecological Evaluation
SMP	Shoreline Master Program
TEE	terrestrial ecological evaluation
TEQ	toxic equivalency
TPH	total petroleum hydrocarbons
Unocal	Union Oil Company of California
USEPA	United States Environmental Protection Agency
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

1. Introduction

On behalf of Chevron Environmental Management Company (CEMC), Arcadis U.S., Inc. (Arcadis) prepared this Public Review Draft Final Feasibility Study Report Addendum (FS Addendum) for the former Union Oil Company of California (Unocal) Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road in Edmonds, Washington (Site; Figure 1). Agreed Order (AO) No. DE 4460 (Washington State Department of Ecology [Ecology] 2017b) required Unocal to remediate soil, groundwater, and sediment in the Lower Yard; monitor groundwater in the Lower Yard; prepare a Feasibility Study Report; and prepare a Draft Cleanup Action Plan (Draft CAP). The initial Public Review Draft Final Feasibility Report (FS Report) was submitted in 2017. This FS Addendum was prepared as requested by Ecology to re-evaluate remedial alternatives given current site conditions and following completion of 2017 interim remedial actions outlined in the FS Report, including the excavation of Detention Basin 2 (DB-2) and installation and operation of a dual-phase extraction (DPE) remediation system. The FS Report and the Draft Site-Specific Terrestrial Ecological Evaluation (Site-Specific TEE Report) are provided in Appendices A and B, respectively.

1.1 Site Description

The Site, as defined by the Model Toxics Control Act (MTCA), comprises the areas of the Lower Yard and the former Upper Yard. The Site Layout, as well as the areas of the Lower Yard, are shown on Figure 2.

The approximately 25-acre former Upper Yard is located south of the Lower Yard (Figure 2). Unocal sold the former Upper Yard to Point Edwards, LLC in October 2003 after Ecology confirmed that Unocal had completed cleanup activities in the Upper Yard (Ecology 2003). The Upper Yard was subsequently redeveloped as the Point Edwards condominium complex. The aquifer beneath the Site is considered a site-wide aquifer; therefore, groundwater constituents of concern (COCs) are the same for the former Upper Yard and the Lower Yard. Additionally, points of compliance (POCs) for the former Upper Yard are monitored at POC monitoring well locations in the Lower Yard.

The approximately 22-acre Lower Yard surrounds the former Upper Yard to the north, east, and west, and is currently owned by Unocal. The Lower Yard is currently a vacant property, with no permanent aboveground structures. A temporary storage shed, concrete pad, and remediation system enclosure are located along lower Unoco Road in the central portion of the Lower Yard. The Lower Yard stormwater system conveys direct precipitation and stormwater to Detention Basin 1.

Willow Creek runs along the northern portion of the western boundary and the entire eastern boundary of the Lower Yard. To the north and northeast of the Lower Yard beyond Willow Creek is Edmonds Marsh, which is a 23-acre freshwater and brackish water marsh. Willow Creek and Edmonds Marsh are directly connected to Puget Sound and are tidally influenced. At high tide, water flows from Puget Sound upstream in Willow Creek into Edmonds Marsh; at low tide, water drains from Edmonds Marsh through Willow Creek into Puget Sound. At its nearest point (the southwest corner of the Lower Yard), the Site is approximately 160 feet from the Puget Sound shoreline. The tidal variations in water levels in Puget Sound also influence groundwater elevations at the site perimeter.

A Washington State Department of Transportation (WSDOT) stormwater line crosses beneath the Lower Yard and discharges stormwater collected from State Route 104 to Puget Sound. According to a 1971 drainage plan (Washington State Highway Commission 1971), the WSDOT stormwater line is composed of sections of increasing diameter from 48 inches at the eastern part of the Lower Yard to 72 inches at the western part of the Lower Yard. The WSDOT stormwater line is made of asphalt-coated corrugated metal and crosses the Lower Yard at depths of 9 to 12 feet below ground surface (bgs) to the top of the pipe. The WSDOT stormwater line generally runs along the northern edge of lower Unoco Road and trends west across the Lower Yard to the tidal basin leading to Puget Sound (Figure 2). The WSDOT stormwater line was installed between 1972 and 1975 and is a major stormwater drainage structure for State Route 104. The WSDOT evaluated the stormwater line in 2011 and found its integrity to be sound, with no visible signs of deterioration.

A comprehensive description of the site was included in Section 2.1 of the FS Report (Appendix A).

1.2 Final Feasibility Study Report Addendum Background

The FS Report (Appendix A) was submitted to Ecology on June 16, 2017, and proposed Alternative 6: Excavation, DPE Treatment, and Limited Environmental Covenants (ECs) as the preferred remedial alternative. Following completed interim actions, including excavation of DB-2 and installation and operation of the DPE system, Chevron is submitting this FS Addendum with an updated disproportionate costs analysis (DCA). The updated DCA discussed in Section 6 below indicates that Alternative 6 is still the alternative that is permanent to the maximum extent practicable.

Ecology received the FS Report (Appendix A) with the plan to submit the document for public comment. However, after internal Ecology discussions, CEMC was informed that the FS Report and the Draft CAP would be submitted for public comment simultaneously. As discussed in Section 1.3, the FS Report assumed that the Lower Yard would be used as a future multimodal ferry terminal. However, since the submittal of the FS Report, plans for developing the Lower Yard as a ferry terminal have not been carried forward. With this uncertainty in proposed end use for the Lower Yard, the original simplified terrestrial ecological evaluation (TEE), which was provided as Appendix D to the Interim Action Report, Work Plan for 2007 Lower Yard Interim Action (SLR International Corp. 2007), has been updated to a Site-Specific TEE (Chapter 173-340-7492 Washington Administrative Code [WAC]) and is provided in Appendix B. The Site-Specific TEE Report proposes alternative POCs using ecologically protective soil values (PSVs) from Tables 749-2 and 749-3 of WAC Chapters 173-340-7490 through 173-340-7493 and from the Gasoline and Diesel Soil Concentrations Predicted to be Protective of Upland Ecological Receptors, Implementation Memorandum No. 19 (Ecology 2017c).

The Site-Specific TEE Report (Appendix B) adds the PSVs to the cleanup levels (CULs) proposed in the FS Report (Appendix A). With the updated PSVs and CULs, this FS Addendum describes changes to Alternatives 1, 4, and 6. These alternatives were re-evaluated to include the standard POC for soils (0 to 15 feet bgs) and the alternative POC proposed in the Site-Specific TEE Report (0 to 4 feet bgs). A revised DCA, which is included in Section 5, identifies Alternative 6 (i.e., continued operation of the DPE system, an engineered cover system, an EC, compliance monitoring with a contingency plan, if necessary) as the cleanup action that uses permanent solutions to the maximum extent practicable.

1.3 Previous Submittals and Historical Data

The specific data and documents referred to in this FS Addendum include those listed in the FS Report (Appendix A) along with the following reports:

- *Detention Basin 2 Excavation As-Built Report (Arcadis 2018a)*. Summarized the excavation of DB-2 as proposed in Alternative 6 of the FS Report (Appendix A).

- *Dual-Phase Extraction System As-Built Report (Arcadis 2018b)*. Summarized the installation and startup of the DPE system as proposed in Alternative 6 of the FS Report (Appendix A).
- *Dual-Phase Extraction System As-Built Report Addendum (Arcadis 2020)*. Summarized the expansion of the DPE system with the installation of four new DPE remediation wells designed to address groundwater exceedances of CULs in monitoring wells MW-101, MW-518, MW129R, and MW-E-R.

1.4 Land Use and Zoning

Historically, the City of Edmonds (City) land use policies and regulations affecting the Lower Yard were set out in the City of Edmonds Comprehensive Plan (Comprehensive Plan; City 2020), the City Code and, for portions of the Lower Yard within the jurisdiction of the State Shorelines Act, the Shoreline Master Program (SMP; City 2024). The Comprehensive Plan assigned the land use plan designation of Master Planned Development to the Lower Yard and identified the Lower Yard as the future location of Edmonds Crossing, the multimodal transportation center. This designation was based on plans of the WSDOT, which has been under contract to assume ownership of the Lower Yard since 2005. Since 2022, Ecology has stated that potential future use for the Lower Yard is Open Space. Presumably, Ecology reconsidered the Lower Yard future use based on current use, comments received from WSDOT, as well as publicly available information from the City of Edmonds.

The SMP (City 2024) designates the extreme southeastern portion of the Lower Yard near the Willow Creek Fish Hatchery as Natural Environment. Residential, commercial, industrial, and non-water-oriented recreational uses are not permitted within areas designated as Natural Environment. The SMP designates the land within 200 feet upland from the ordinary high-water mark of tidally influenced portions of the Edmonds Marsh (generally, the western half of Edmonds Marsh) as Urban Mixed Use IV. Residential uses are not permitted within areas designated as Urban Mixed Use IV; however, commercial and light industrial use is permitted.

The Upper Yard is zoned Master Plan-1, which allows for residential and commercial uses. Properties surrounding the Lower Yard consist of various commercial, recreational, and residential uses. The property immediately north-northeast of the Site (Edmonds Marsh), which is owned by the City, is designated as Open Space. Farther north, Harbor Square (a commercial development) is zoned commercial general. Land use in the town of Woodway, located immediately south of the Site, is primarily single-family residential. The properties east of the Lower Yard, to the east of State Route 104, are zoned under public use, multifamily, and single-family residential designations. The BNSF Railway right of way (ROW), Port of Edmonds Marina, Marina Beach Park, and Puget Sound shoreline to the west-northwest of the Site are zoned commercial waterfront.

1.5 Figure Updates

Figures in this FS Addendum were updated from the FS Report (Appendix A) to represent current site conditions. The base maps shown on Figures 2, 3, and 4 were updated to remove DB-2. Based on comments received during previous public comment periods, updates were also made to the cross-section figures showing site elevations related to the vertical datum. The updated elevation data are shown on Figures 5 through 8. Site elevations were erroneously shown as feet above mean sea level; however, the vertical datum used for elevation data was the North American Vertical Datum of 1988 (NAVD 88). The depth of the WSDOT stormwater line was determined by comparing the ground elevation to the depth to top of pipe from the as-built drawings in the Washington State Highway Commission Drainage Plan (Washington State Highway Commission 1971).

1.5.1 Detention Basin 2 Excavation

From July to October 2017, approximately 8,500 cubic yards (cy) of soil were excavated from the Lower Yard as part of the DB-2 excavation. Approximately 12,724 tons of soils were disposed offsite during the work. In addition, approximately 980 gallons of light nonaqueous phase liquid (LNAPL) and 47,800 gallons of impacted groundwater were removed and transported offsite. Approximately 3,550 tons of sand fill material were used for vadose zone backfill and 9,100 tons of gravel were used as saturated zone backfill within the excavated areas. Imported fill material was sourced from Cal Portland, located in DuPont, Washington. Sixty confirmation soil samples were collected during the DB-2 excavation; in 58 of the samples, COC concentrations did not exceed the established CULs. The area of the two confirmation samples with total petroleum hydrocarbon (TPH) concentrations greater than the CUL was subsequently overexcavated; TPH in the additional confirmation sample collected did not exceed the CUL. However, based on the Site-Specific TEE Report (Appendix B), with more conservative PSVs, several historical soil sample locations near the DB-2 excavation exceeded the PSVs, as further discussed below in Section 2.1. Details of the 2017 excavation were presented in the Detention Basin 2 Excavation As-Built Report (Arcadis 2018a). Historical excavation extents, depths, and volumes removed are shown on Figures 9, 10, and 11 along with the 2017 DB-2 excavation.

1.6 Feasibility Study Addendum Organization

The remaining sections of this FS Addendum are summarized below:

- *Section 2 – Nature and Extent of Contamination – Update.* Updates the nature and extent of contamination as of first quarter 2024. Updates the COCs and remaining soil and groundwater impacts at the Site.
- *Section 3 – Adjusted Cleanup Standards*. Describes changes by Ecology to MTCA-based cleanup standards and discusses PSVs for soil, groundwater, and surface water, including the updated TEE.
- *Section 4 – Updated Remedial Alternatives*. Adds an engineered cover system as a selected technology and updates three remedial alternatives that were originally proposed in the FS Report (Appendix A).
- *Section 5- Sustainability Evaluation.* Compares Alternatives 4 and 6 using Green and Sustainable Remediation (GSR) guidelines and requirements set by Ecology.
- *Section 6 – Updated Disproportionate Cost Analysis*. Presents an updated DCA and compares the three updated remedial alternatives.
- *Section 7 – Recommended Remedial Alternative.* Presents the recommended remedial alternative based on results of the updated DCA.
- *Section 8 – Summary and Conclusions*. Presents conclusions based on the information presented in this FS Addendum.
- *Section 9 – Schedule*. Discusses the activities that will be conducted following Ecology's approval of this FS Addendum.
- Section 10 – *References.* Lists the references cited throughout and used to prepare this FS Addendum.

2. Nature and Extent of Contamination – Update

This section presents an updated evaluation of the type of contaminants at the Site (nature) and the distribution of these contaminants vertically and horizontally across the Site (extent) following implementation of the 2017 interim remedial activities, including excavation of DB-2 (Arcadis 2018a) and installation and operation of a DPE system (Arcadis 2018b) as proposed in the FS Report (Appendix A).

2.1 Soil

Following implementation of the 2017 excavation activities, Arcadis conducted WSDOT stormwater line performance soil sampling according to the *Soil Sampling Work Plan* (Arcadis 2018c) during fourth quarter 2018, following 12 months of DPE system operation. A total of 19 soil borings were advanced and 46 soil samples were collected. Detailed results were provided in the *Dual-Phase Extraction System As-Built Report Addendum* (Arcadis 2020).

Following a MTCA compliance assessment, WAC 173-340-740(7) requires the 95 percent upper confidence limit on the mean (95% UCL) be less than the CUL, with less than 10 percent of the samples exceeding the CUL and no single sample exceeding twice the CUL. A summary of remaining soil samples with COC concentrations exceeding the CULs for the direct-contact POC for soils from 0 to 15 feet bgs are presented in Table 2-1. Statistical data for the direct-contact POC are presented in Table 2-2 and summarized below:

- *Arsenic*. Only two samples exceeded the CUL, with the 95% UCL less than the CUL. No samples exceeded twice the CUL; therefore, arsenic concentrations do not present an unacceptable risk for direct contact with arsenic-impacted soils.
- *Benzene*. The 95% UCL was less than the CUL, with only one sample exceeding the CUL. No samples were greater than twice the CUL; therefore, benzene concentrations do not present an unacceptable risk for direct contact with benzene-impacted soils.
- *TPH*. The 95% UCL was less than the CUL, with only 1.3 percent of samples exceeding the CUL (14 locations). However, seven of the samples exceeded twice the CUL and thus additional limited remedial actions will be implemented as part of an updated remedial alternatives analysis to mitigate the potential risk for direct contact with TPH-impacted soils.
- *Carcinogenic polycyclic aromatic hydrocarbon (cPAH) toxic equivalency (TEQ).* Historically, soil samples have been analyzed for the following seven cPAH constituents: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)flouoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The cPAH constituents are then adjusted for toxicity per WAC 173-340-708(8). The 95% UCL was less than the CUL with 0.3 percent (two locations) exceeding the CUL and one location exceeding twice the CUL; therefore, additional limited remedial actions will be implemented as part of an updated remedial alternatives analysis to mitigate the potential risk for direct contact with cPAH-impacted soils.

2.2 Terrestrial Ecological Evaluation

Arcadis prepared a Site-Specific TEE Report (Appendix B) in accordance with WAC 173-340-7490 and the Technical Document: Terrestrial Ecological Evaluations under the Model Toxics Control Act (Ecology 2017a).

The purpose of the TEE process is to identify and provide an additional level of scrutiny to areas that contain significant habitat, wildlife populations, and/or species requiring an additional level of protection (Ecology 2017a). In general, a site qualifies for exclusion from the TEE process if there is little or no threat to ecological receptors. A site qualifies for a simplified TEE if it does not contain significant habitat, sensitive areas, or threatened or endangered species. A site-specific TEE is required if a site is located on, or directly adjacent to, a natural area; if a site is used by a listed vulnerable species; if there is extensive habitat located onsite or near a site; or if Ecology determines that a site may present a risk to significant wildlife populations.

Ecology (2017a) guidance is used to determine if a TEE is required and, if so, whether the TEE is a simplified TEE or a site-specific TEE. Based on the process presented in the Ecology (2017a) guidance, a site-specific TEE is required for the Lower Yard. A site-specific TEE is required because although the Lower Yard only provides marginal habitat for ecological receptors, higher quality habitat exists adjacent to the Site in Edmonds Marsh and the adjacent tributary (Willow Creek). As such, the Site-Specific TEE Report (Appendix B) evaluates potential risks to terrestrial ecological receptors at the Lower Yard.

Four vegetation communities are found at the Lower Yard and adjacent areas, including emergent wetlands, forested/shrub wetlands, upland forest, and disturbed upland habitat. The majority of the Lower Yard consists of highly altered topography that is sparsely vegetated by non-native species. The habitat value of the disturbed areas of the Lower Yard is low due to sparse vegetative cover, low species diversity, and human activity, which limit wildlife use. Following MTCA compliance assessment, WAC 173-340-740(7) requires the 95% UCL be less than the PSV, with less than 10 percent of the samples exceeding the PSV and no single sample exceeding twice the PSV. The remaining soil samples with COC concentrations in exceedance of the PSVs for the alternative POCs listed in the Site-Specific TEE Report (Appendix B) are presented in Tables 2-3 and 2-4.

Results presented in the Site-Specific TEE Report (Appendix B) indicate the following:

- *Arsenic*. Only one sample exceeded the PSV in the buffer zone, with the 95% UCL for soil samples within the buffer zone and interior zone less than the PSV; therefore, arsenic concentrations do not present an unacceptable ecological risk at the Lower Yard.
- *Benzene*. Due to the limited number of samples collected from 0 to 4 feet bgs within the buffer zone, a 95% UCL could not be calculated; however, only one sample within the buffer zone exceeded the PSV. For the site interior, 16 samples exceeded the PSV, with the 95% UCL slightly exceeding the PSV; therefore, some additional limited remedial actions will be implemented as part of the updated remedial alternatives analysis to mitigate potential ecological exposure to benzene-impacted soil.
- *cPAHs.* As described above, historically, soil samples have been analyzed for the seven cPAH constituents. The cPAH constituents were then adjusted for toxicity per WAC 173-340-708(8). In the Site-Specific TEE Report (Appendix B), none of the seven cPAH constituents exceeded their respective PSV. Based on these results, the individual cPAH constituents do not present an unacceptable ecological risk at the Lower Yard.
- *Gasoline-range organics (GRO)*. The 95% UCL was less than the PSV within the buffer zone. For the site interior, the 95% UCL was less than the PSV, with 7.5 percent of the samples exceeding the PSV and 10 sample locations exceeding twice the PSV. Based on the statistical analysis, additional limited remedial actions may be implemented as part of an updated remedial alternatives analysis to mitigate potential ecological exposure to GRO-impacted soil.
- *Diesel-range organics (DRO) and heavy-oil-range organics (HRO)*. The 95% UCL exceeded the PSV in the buffer zone, greater than 10 percent of the samples exceeded the PSV, and six samples exceeded twice the

PSV. For the site interior, the 95% UCL was less than the PSV; however, 10.2 percent of the samples exceeded the PSV with 11 locations exceeding twice the PSV. Based on the statistical analysis, some additional limited remedial actions will be implemented to mitigate potential ecological exposure to DRO- and HRO-impacted soil.

The statistical analyses for the buffer zone and interior alternative POCs are presented in Tables 2-5 and 2-6, respectively. Comparison of the Lower Yard soil data to ecological PSVs indicates that soil remains in exceedance of PSVs in locations across the Lower Yard. To protect ecological receptors from potential contact with the identified impacted soils, installation of an engineered cover over these locations in the Lower Yard, including the interior and buffer zones, is included in the updated remedial alternative analysis. A comparison of the updated remedial alternatives analysis is included in Section 4.

2.3 Groundwater

Groundwater quality has been assessed at the Site since the late 1980s; only recent groundwater quality is discussed in this section. In accordance with AO No. DE 4460, groundwater monitoring was initiated and has been ongoing since completion of the 2007 and 2008 interim action activities.

2.3.1 Groundwater Elevation and Gradient Direction

Groundwater elevations in a majority of the Lower Yard remained consistent from October 2008 through January 2024, with average groundwater elevations ranging between 5 and 9 feet above NAVD 88 and corresponding to a depth to groundwater ranging from 0.71 to 27.37 feet bgs. Groundwater elevations in the southeast Lower Yard indicate the presence of an area of localized groundwater mounding, based on groundwater elevations in monitoring wells MW-500 and MW-501 generally several feet higher than nearby wells. In general, the seasonal variation includes the difference between the highest groundwater elevations observed during January and the lowest groundwater elevations observed between June and September.

Historically, the observed groundwater flow direction is to the north-northwest in the central portion of the Site (Central Lower Yard) and to the northwest in the western portion of the Site (Western Boundary, West/Northwest Lower Yard, and Southwest Lower Yard).

Measured depth to water and groundwater elevations from the March 2024 gauging event, as well as historical data, are presented in Table 2-7 Groundwater elevations and contours from the March 2024 gauging event are shown on Figure 12. The interpreted groundwater flow direction has generally been to the northwest for the Site with local variations: north to north-northwest in the central portion of the Site (Central Lower Yard), west-northwest to west in the western portion of the Site (Western Boundary, West/Northwest Lower Yard, and Southwest Lower Yard), and a mounding effect in the southeast Lower Yard. The 2024 groundwater flow directions were consistent with historical data.

2.3.2 Groundwater Quality

The most recent groundwater monitoring event was conducted in March 2024. During this event, all 53 wells were below the Site groundwater CULs with the exception of one total cPAH concentration at MW-126 (1.110 microgram per liter [µg/L] UU).[1] This exceedance of the CUL was caused by an elevated reporting limit, although

[11] UU = Individual constituents in the summation of cPAHs are all nondetect.

all cPAH concentrations were non-detect. CUL exceedances in groundwater from the last four quarterly events are summarized below:

- GRO concentrations exceeded the CUL of 1,000 µg/L in MW-101, MW-518, and MW-ER, with concentrations ranging from 1,100 µg/L (MW-101 and MW-101 [duplicate] on November 16, 2023) to 2,400 µg/L (MW-518 on June 6, 2023). Other exceedances of the CUL were observed but related to elevated laboratory reporting limits. No GRO exceedances were observed during the most recent groundwater sampling event in March 2024. Dissolved-phase GRO concentrations from the March 2024 sampling event are shown on Figure 13.
- DRO and HRO concentrations exceeded the CUL of 500 µg/L in MW-129R, MW-20R, MW-506, MW-507 (duplicate), and MW-E-R, with concentrations ranging from 650 µg/L (MW-ER on November 15, 2023) to 4,590 µg/L (MW-20R on September 14, 2023). Dissolved-phase DRO and HRO concentrations from the March 2024 sampling event are shown on Figure 14.
- The benzene reporting limit for samples collected from LM-2 during the March 7, September 13, and November 15, 2023 groundwater monitoring events exceeded the CUL of 1.6 µg/L; All sample results were non-detect, however confirmation of meeting CULs could not be made. It is likely that these high reporting limits were due to foaming of the samples that was noted during analysis. There were no other benzene exceedances during the last 4 quarters. Dissolved-phase benzene concentrations from the March 2024 sampling event are shown on Figure 15.
- Total cPAHs adjusted for toxicity exceeded the CUL of 0.05 µg/L in several wells during the last 4 quarters, ranging from 0.072 µg/L in MW-8R during the March 9, 2023 sampling event to 1.605 µg/L (0.019 µg/L) duplicate) in MW-14 during the November 16, 2023 sampling event. These results appear to be anomalous because total cPAHs adjusted for toxicity have only sporadically been detected and this does not indicate a continual trend of detections at the Site. Dissolved-phase total cPAHs adjusted for toxicity from the March 2024 sampling event are shown on Figure 16.

Groundwater analytical results for site COCs since 2017 are presented in Table 2-8.

2.4 Light Nonaqueous Phase Liquid

Since implementation of the 2017 excavation activities, no measurable LNAPL (i.e., free product as a “distinct separate layer” per WAC 173-340-200) remains in the central Lower Yard near DB-2.[2] No measurable LNAPL has been observed in the compliance monitoring wells installed within the DB-2 excavation area after implementation of the 2017 excavation activities (MW-533, MW-534, and MW-535) since installation in October 2017. The DB-2 excavation successfully removed LNAPL from this area. Groundwater elevation and LNAPL gauging data since the completion of interim remedial actions in 2017 are presented in Table 2-8.

From 2018 through 2021, 51 of the 52 groundwater compliance monitoring wells contained no LNAPL (measurable thickness or trace). Monitoring well MW-E-R, as well as eight of the nine piezometers used as observation wells for the DPE system, also contained no LNAPL (measurable thickness or trace) during this time.

Following the installation, operation, and expansion of the DPE system, LNAPL (measurable thickness or trace) was observed sporadically in two observation wells located near DPE wells designed to remediate remaining impacted soil. The LNAPL observations were associated with fluctuations of the groundwater table associated

[2] Per WAC 173-340-200, “’[f]ree Product’ means a nonaqueous phase liquid that is present in the soil, bedrock, ground water or surface water as a district [SIC] separate layer.”

with discontinuous DPE system operation due to maintenance issues (static and induced drawdown conditions), as summarized below:

- In 2019, groundwater compliance monitoring well MW-129R contained LNAPL thicknesses of 0.05 and 0.03 foot on August 15 and 21, respectively. These observations occurred 2 weeks after DPE system expansion and the installation of well DPE-18, which is located 8 feet from MW-129R. An oil-absorbent sock was placed in MW-129R on August 21 and weekly gauging of this well was started.[3] No LNAPL was measured in MW-129R after August 21. The oil-absorbent sock was replaced as needed and eventually removed on October 17. Weekly gauging was discontinued after December 10, 2019, following eight consecutive events without observation of LNAPL (see Table 2-8).
- In 2020, MW-129R contained an LNAPL thickness of 0.06 foot on February 24. A mechanical failure required DPE system shutdown from September 27, 2019 to January 31, 2020, when repairs were completed. Following 2 weeks of operation, on February 13, 2020, MW-129R was gauged to evaluate the influence of the DPE system on the well and no LNAPL was observed. However, following approximately 3 weeks of operation, on February 24, 2020, LNAPL was measured at 0.06 foot in MW-129R during the DPE system monitoring event. An oil-absorbent sock was placed in groundwater well MW-129R on February 24 and weekly gauging of this well was started. No LNAPL was measured in MW-129R after February 24. The oil-absorbent sock was replaced as needed and eventually removed on April 17. The gauging frequency was reduced from weekly to quarterly after June 6 and gauging was discontinued on September 18. A mechanical failure required DPE system shutdown on September 9, 2020.
- On July 16, 2021, MW-129R and piezometer PZ-2 contained LNAPL thicknesses of 0.03 and 0.02 foot, respectively (PZ-2 is located 8 feet from well DPE-1). These observations occurred 1 month after the DPE system restart, following a mechanical failure that required DPE system shutdown from September 9, 2020 to June 15, 2021, when repairs were completed. An oil-absorbent sock was placed in MW-129R and PZ-2 on July 16 and weekly gauging was started. No measurable LNAPL was observed in MW-129R or PZ-2 after July 16; however, trace LNAPL was observed on the interface probe and confirmed using bailers.
- In 2022, gauging of MW-129R and PZ-2 continued until trace amounts of LNAPL were no longer observed on the interface probe or bailer for a minimum of eight consecutive weeks. Gauging was discontinued on February 10 in MW-129R. No measurable LNAPL was observed in PZ-2 during the January 31 event; however, trace LNAPL was observed on the side of the interface probe. As a result, an oil-absorbent sock was again placed in PZ-2. The oil-absorbent sock was replaced as needed and eventually removed on February 10.
- Gauging of PZ-2 was discontinued on May 2. During the June 13 gauging event, trace LNAPL was observed on the side of the oil-water interface probe while gauging monitoring wells MW-129R and MW-ER (located approximately 9 feet from active extraction well DPE-17). A bailer was then used to further evaluate the presence of LNAPL and no measurable thickness was observed in the bailer in both wells (only trace LNAPL was observed on the side of the bailer). As a result, an oil-absorbent sock was placed in both wells and weekly gauging of these wells was started. The oil-absorbent socks were replaced as needed and eventually removed from both wells on July 27, 2022.

[3] Oil-absorbent socks are used as an LNAPL removal strategy and can be placed within groundwater monitoring wells at the air-water interface. The socks are constructed of a cellulose fiber that is hydrophobic and will absorb any trace LNAPL within the well. If evidence of LNAPL was observed on the oil-absorbent sock, the sock was removed and replaced.

- Gauging was discontinued on October 5 in MW-ER. On October 14, trace LNAPL was again observed on the side of the oil-water interface probe while gauging MW-129R. A bailer was then used to further evaluate the presence of LNAPL and no measurable thickness was observed in the bailer (only trace LNAPL was observed on the side of the bailer). As a result, an oil-absorbent sock was again placed in MW-129R. The oil-absorbent sock was replaced as needed and eventually removed on December 12, 2022. Weekly gauging was discontinued on March 6, 2023, when trace amounts of LNAPL were no longer observed on the interface probe or bailer for more than eight consecutive weeks.

The DPE system was designed to create an inward groundwater gradient, lowering the groundwater table toward DPE wells and surrounding nearby observation wells. When the groundwater table is lowered, any residual LNAPL in surrounding soils that is typically immobile under static conditions is pulled toward the wells through the change in groundwater gradient and induced vacuum. Observations of LNAPL during discontinuous DPE system operation (static and induced drawdown conditions [i.e., shutdown and following restart]) are therefore to be expected. However, the DPE system was also designed to reduce LNAPL mass through weathering. Under DPE system operation, the LNAPL undergoes biotic and abiotic transformation including volatilization, solubilization, and aerobic biodegradation, which in turn change the characteristics of the LNAPL such as the mass fraction (Johnson et al. 1990). Throughout the remediation timeframe, it is expected that weathering will continue until LNAPL is no longer measurable. Operation of the DPE system has successfully removed or weathered LNAPL to date as measurable LNAPL (a distinct separate layer) is no longer observed in any of the wells.

3. Adjusted Cleanup Standards

A cleanup standard consists of the following three elements [WAC 173-340-700(3)]:

- CUL, the concentration that must be met to protect human health and the environment.
- POC, the location where the CUL must be achieved.
- Other regulatory requirements commonly referred to as applicable or relevant and appropriate requirements that apply to a site because of the type of action or the location of the site (Appendix A).

Considering the possible end use of the Site as Open Space, the TEE identified CULs that are ecologically protective. This section discusses the change in cleanup standards based on the TEE.

3.1 Terrestrial Ecological Evaluation for Soil

The approach used in the Site-Specific TEE Report (Appendix B) is the comparison of site data to PSVs. This approach includes identifying the POC and PSVs. The standard POC of 0 to 15 feet bgs and an alternative POC of 0 to 4 feet bgs were evaluated for the TEE of the Lower Yard.

The Site-Specific TEE Report (Appendix B) compares the soil constituent of potential ecological concern (COPEC) concentrations to ecological PSVs. The COPECs are based on the indicator hazardous substances (IHSs) in the Lower Yard, which are GRO, the sum of DRO and HRO, benzene, cPAHs, and arsenic. The ecological PSVs are from WAC 173-340-7492 (Table 749-2), WAC 173-340-7493 (Table 749-3), and United States Environmental Protection Agency (USEPA [2018]) Region 4 guidance. For the TEE, two sets of PSVs are identified for arsenic, cPAHs, GRO, and the sum of DRO and HRO (the primary COPECs). The more conservative soil screening values for site-specific TEEs are applied to the proposed alternative POC (0 to 4 feet bgs) to include portions of the Lower Yard that are adjacent to better habitat (i.e., Edmonds Marsh and Willow Creek) identified as the buffer zone in the TEE. The less conservative soil screening values for generic TEEs are applied to interior portions of the Lower Yard because these areas provide relatively poor habitat and limited potential for ecological exposure. The PSVs are presented in Table 3-1, below.

Table 3-1 Ecologically PSVs for use in the TEE

COPEC	Ecological PSV (mg/kg)	Source
Arsenic [1]	10 (buffer zone) 95 (interior zone)	WAC Tables 749-2 and 749-3
Benzene	0.12	USEPA (2018)
1-methylnaphthalene 2-methylnaphthalene	29	EcoSSLs for PAHs
Benzo(a)anthracene	1.1	EcoSSLs for PAHs
Benzo(a)pyrene	12	WAC Tables 749-3

COPEC	Ecological PSV (mg/kg)	Source
Benzo(b)fluoranthene	1.1	EcoSSLs for PAHs
Benzo(k)fluoranthene	1.1	EcoSSLs for PAHs
Chrysene	1.1	EcoSSLs for PAHs
Dibenz(a,h)anthracene	1.1	EcoSSLs for PAHs
Indeno(1,2,3-cd)pyrene	1.1	EcoSSLs for PAHs
Benzo(g,h,i)perylene	1.1	EcoSSLs for PAHs
DRO and HRO[2]	200 (buffer zone) 460 (interior zone)	WAC Tables 749-2 and 749-3
GRO	120 (buffer zone) 200 (interior zone)	WAC Tables 749-2 and 749-3

Notes:
[1] The value for arsenic assumes arsenic (V).
[2] The value for DRO is applied to cumulative DRO and HRO.
mg/kg = milligram per kilogram

As described in Section 1.1 of the Site-Specific TEE Report (Appendix B)**,** the default POC is 0 to 15 feet bgs and the alternative POC for these values is 0 to 4 feet bgs.

3.2 Direct Human Contact Soil Pathway

Soil CULs identified in the FS Report (Appendix A) remain unchanged. The direct-contact soil values are presented in Table 3-2, below.

Table 3-2 Soil Cleanup and Remediation Levels

IHS	Soil CUL (mg/kg)
TPH[1]	2,775
Benzene[1]	18
Total cPAHs TEQ[1,2]	0.14
Arsenic[3]	20

Notes:
[1] Proposed soil CUL based on soil direct-contact pathway and proposed soil remedial level based on soil leaching pathway.
[2] Total cPAHs TEQ adjusted for toxicity based on WAC 173-340-708(8).
[3] Based on natural background concentrations [WAC 173-340-740(5)(c)].

3.3 Groundwater/Surface Water Pathway

The Ecology water quality standards and National Recommended Water Quality Criteria (NRWQC) are not established for TPH mixtures. MTCA allows the use of Method A groundwater CULs, where the beneficial use is drinking water (WAC 173-340-900, Table 720-1). Using MTCA Method A groundwater CULs protects both marine life and human ingestion of marine organisms.

The updated surface water CULs are the MTCA Method A CULs protective of groundwater which is also protective of surface water (Table 3-3, below).

Table 3-3. Surface Water CULs

IHS	Surface Water CUL (µg/L)
GRO[1]	1,000
DRO+HRO[2]	500
Benzene[3]	1.6
Total cPAHs TEQ[4]	0.05

Notes:
[1] Method A (WAC 173-340-900, Table 720-1).
[2] DRO+HRO is reported as the combination of the DRO (C12-C24) and HRO range (C24-C40) over the range of C12-C40.
[3] NRWQC for human health (considering human ingestion of marine organisms), WAC 173-201A-240. The benzene CUL has been revised from 16 µg/L to 1.6 µg/L since submittal of the FS Report (Appendix A).
[4] Total cPAHs TEQ adjusted for practical quantitation limit based on WAC 173-340-730(5)(c).

4. Updated Remedial Alternatives

With Ecology's determination that future site use may continue to be open space and completion of a Site-Specific TEE Report (Appendix B), remedial alternatives for the Site as proposed in the FS Report (Appendix A) have been revised. Interim remedial actions have achieved soil and groundwater CULs and PSVs, as identified in the Site-Specific TEE Report, throughout much of the Site. As part of the updated remedial alternatives, statistical analyses of soil compliance monitoring samples collected during the interim actions conducted to date include calculation of the 95% UCL for soil samples for two separate POCs using the USEPA's ProUCL software. For Alternative 6, statistical analysis was performed on COC data for the direct-contact POC from 0 to 15 feet bgs as well as the alternative POC proposed in the Site-Specific TEE Report (Appendix B) for 0 to 4 feet bgs within the buffer zone and interior portions of the Site. Results of the statistical analysis are provided in Appendix C. As discussed in Section 2.2, several locations have exceedances of PSVs within the alternative POC and the direct-contact POC.

MTCA compliance assessment, per WAC 173-340-740(7), requires that the 95% UCL on the mean be less than the CUL, with less than 10 percent of the samples exceeding the CUL and no single sample exceeding twice the CUL. This analysis is used for both the direct-contact POC from 0 to 15 feet bgs as well as the alternative POC detailed in the Site-Specific TEE Report (Appendix B). More than 1,000 samples have been collected on a 25-foot grid pattern throughout the Lower Yard (Figure 17). This systematic sampling design is an unbiased approach that results in COC concentrations representative of average exposure conditions across the entire Lower Yard.

Groundwater monitoring data are presented in progress reports submitted monthly, and groundwater monitoring will continue during the DPE system operation.

In addition to the remedial technologies developed in the FS Report (Appendix A), an engineered cover system will be included as part of Alternative 6 to address soils with COC concentrations greater than twice the CUL for the direct-contact pathway from 0 to 15 feet bgs and where PSVs are exceeded, as identified by the TEE. Alternative 6 will also include a contingency plan. If compliance monitoring conducted after DPE operations indicate that measurable LNAPL or dissolved-phase COC concentrations remain greater than CULs near the site boundary with Willow Creek for more than 3 quarters within a 2-year period, a contingency plan will be implemented to excavate remaining impacted soils directly upgradient of Willow Creek. If compliance monitoring after DPE operations indicate that dissolved-phase COC concentrations greater than CULs or measurable LNAPL remain in monitoring wells near the WSDOT stormwater line for more than 3 quarters within a 2-year period, additional contingency actions such as installation of a cast-in-place pipe (CIPP) liner within the stormwater line or another Ecology approved strategy may occur as part of the contingency plan.

4.1 Remedial Technology 13: Engineered Cover

Additional remedial actions must be implemented onsite to provide an ecological barrier between the ground surface and impacted soil containing COC concentrations that exceed PSVs within the alternative POC and/or exceed twice the CUL. To achieve this, an engineered cover will be constructed at locations where the soil concentrations are twice the CUL or PSV, or where warranted based on updated soil sampling. The engineered cover will consist of a woven geotextile fabric and 6-inch-thick aggregate cover placed over targeted locations. The woven geotextile will be used as a separation layer consisting of Mirafi 125 280i or approved similar fabric. The seams will overlap a minimum of 12 inches, with the edges of the fabric anchored a minimum of 6 inches into the ground or similarly secured. The fabric will be cut around existing wells and will overlap the concrete skirt of each well box a minimum of 3 inches, where practical. At the edges of the engineered cover and surrounding well boxes, Class 2 aggregate will be sloped 3:1, with a total thickness of approximately 6 inches. Design of the engineered cover may change based on field constraints.

This technology involves the implementation of a barrier system to mitigate potential direct contact by ecological receptors, and is not a standalone technology. Long-term maintenance will be required. The engineered cover will be used to supplement the technology identified as the preferred remedial alternative in the FS Report (Appendix A).

4.2 Summary of Updated Remedial Alternatives

This FS Addendum updates the proposed remedial alternatives presented in the FS Report (Appendix A). Changes to the remedial alternatives are listed below:

- Alternative 1: Excavation and Monitored Natural Attenuation (MNA) with ECs is now MNA with ECs. This alternative no longer includes the DB-2 excavation, which was subsequently performed.
- Alternative 4: Excavation with Limited EC is now Excavation. Alternative 4 no longer includes the completed DB-2 excavation but does include excavation of all soils in exceedance of CULs.
- Alternative 6: Excavation, DPE Treatment, and Limited EC is now DPE Treatment System Operation, Engineered Cover System, EC, and Compliance Monitoring with a Contingency Plan, if necessary. This alternative no longer includes the completed DB-2 excavation or installation of the DPE treatment system (also completed). These remedial alternatives are further described in Section 4.3.

4.3 Description of Updated Remedial Alternatives

The three potential remedial alternatives are described in Sections 4.3.1, 4.3.2, and 4.3.3.

4.3.1 Alternative 1: Monitored Natural Attenuation with Environmental Covenants

Alternative 1 involves shutdown of the existing DPE system followed by an MNA sampling program to address soil and groundwater impacts along the WSDOT stormwater line and at the site boundary along Willow Creek. The MNA program will include annual sampling and analysis for dissolved-phase COCs and biogeochemical parameters along a transect of wells. This program will be implemented until dissolved-phase COC concentrations are reduced to less than CULs.

In addition, as part of Alternative 1, ECs would be used to protect human health and the environment at the Site and would:

- Cover the entire Site, including the area already covered by the construction easement signed in October 1971 by the Washington State Attorney General's Office and Unocal.
- Protect against potential direct contact by Site occupants and workers with impacted soil or groundwater remaining at the Site through a Soil Management Plan.

- Protect against the potential vapor intrusion pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and requiring a new soil vapor assessment if the land use changes from its current approved use.
- Address subsurface use in the impacted area adjacent to the stormwater line and help guide potential future aboveground construction activities (e.g., installation of vapor barriers, building a structure over the storm drain).
- Restrict groundwater use.
- Require long-term maintenance and/or monitoring. The long-term monitoring program will rely on natural attenuation and will include up to 60 years of MNA sampling.

This alternative is based on the assumption that the future land use is Open Space.

It is anticipated that removal of the impacted soil completed as part of interim remedial actions and the overall reduction in LNAPL, coupled with MNA, will eventually remediate COC concentrations in groundwater to less than CULs. Currently, groundwater COCs are within 1 order of magnitude of CULs and overall are stable to decreasing, with some fluctuations observed in groundwater monitoring wells along Willow Creek. Excavation and operation of the DPE system at the Site has demonstrated that removal of secondary source material has resulted in an overall decrease in dissolved-phase concentrations.

The combined elements of Alternative 1 will be protective of human health and the environment; however, impacts will remain onsite.

4.3.2 Alternative 4: Excavation

This FS Addendum recognizes the completion of interim remedial actions and changes Alternative 4 by removing the already completed installation of the DPE system and excavation of DB-2. Alternative 4 involves soil excavation across the Site in locations where soil samples exceeded CULs or PSVs. This alternative includes excavation of soils within the WSDOT stormwater line areas, as shown on Figure 18, which will require removal and reinstallation of up to 600 feet of the WSDOT stormwater line. Removal of the existing WSDOT stormwater line poses significant logistical challenges that would require specialized geotechnical and structural engineering procedures. During previously implemented excavations over the WSDOT stormwater line (in 2001), the soils surrounding existing manholes became unstable and the excavation had to be stopped. During the 2011 WSDOT assessment, the WSDOT stormwater line appeared to be in adequate condition. However, given the considerable size and depth of the line, if soils are removed from the top or sides of the pipe, there is a significant risk of damage to the pipe, including outside of any planned excavation area. Prior to any excavation and following a geotechnical assessment, a groundwater dewatering system will be installed along with shoring including sheet piling. An estimated 24,000 tons of impacted soils will be removed from the Site by dump trucks to the Waste Management transfer facility in Seattle. Following truck transportation to the transfer facility, soil will be loaded onto rail cars for further transportation and disposal at Waste Management's Columbia Ridge Landfill, located in Arlington, Oregon. As described in the sustainability evaluation (Appendix D), using the industry standard GSR SiteWise™ tool, Alternative 4 would emit over 1,370 metric tons of carbon dioxide (CO_2).

Impacted soils will be removed in the targeted areas, addressing all soils with COC concentrations greater than CULs from 0 to 15 bgs. This alternative is based on the following assumptions and limitations:

- The intake portion of the construction dewatering system will extend to an elevation of approximately -15 feet NAVD 88 or lower (i.e., drain elevation) for a total depth of 30 feet bgs.

- Sheet piling of the excavation area will be required to effectively dewater the excavation area. Sheet-pile walls will also be required to remove soils along the toe of the southwest slope and along the boundary where the Site borders the BNSF ROW.
- The hydraulic conductivity of the sheet-pile walls is 0.003 foot per day.
- Faster dewatering rates during the initial phase of excavation may be required
- The excavation may encounter fill materials, beach deposits, and marsh deposits, and will terminate at the top of the Whidbey Formation, which is found at depths ranging from 8 to 15 feet bgs across the Lower Yard.
- The potential exists for pumping-induced saltwater intrusion to impact groundwater quality.

The proposed areas of excavation are shown on Figure 18 and include spot excavation at multiple locations in the Lower Yard, and around and near DB-2 and the WSDOT stormwater line. The removal of impacted soil is expected to result in conditions that meet applicable soil CULs. It is also expected that the removal of impacted soil and natural attenuation will remediate COC concentrations in groundwater to less than CULs. Previous excavation work at the Site has shown that removal of impacted soil has resulted in a decrease in dissolved-phase COC concentrations in the area. Compliance monitoring will be performed to assess residual groundwater COC concentrations relative to the CULs following excavation.

Impacted soils will be removed in the targeted areas under this alternative; however, it is expected that groundwater impacts greater than CULs will remain until CULs are met through further natural attenuation.

Alternative 4 will be protective of human health and the environment and will comply with the cleanup standard.

4.3.3 Alternative 6: Dual-Phase Extraction Treatment System Operation, Engineered Cover System, Contingency Plan, and Environmental Covenant

Alternative 6 involves continued operation of the DPE system for one year following additional optimization. Optimization will include focusing system operation of both air and groundwater extraction on areas where groundwater concentrations exceed CULs. Additional soil sampling will also be implemented to confirm areas with previous soil CUL and PSV exceedances, further refine the boundaries of the engineered cover system, and to confirm the effectiveness of the DPE system. If, following 1 year of DPE system operation, groundwater compliance monitoring indicates that dissolved-phase COC concentrations remain along Willow Creek and near the WSDOT stormwater line, additional compliance monitoring in these areas will be conducted for an additional 2 years. If compliance monitoring conducted after the 2-year period indicates that wells along Willow Creek or the WSDOT stormwater line remain greater than CULs for more than 3 quarters within a 2-year period, a contingency plan will be implemented.

The DPE system has operated on and off since 2017 with periods of downtime related to maintenance and operational issues. Operation of the DPE system has reduced dissolved-phase and soil COC concentrations within the system radius of influence, as evidenced by the 2018 confirmation soil sampling event. Impacted soil exceeding site CULs and PSVs remains in soils surrounding the WSDOT stormwater line and outside the system radius of influence. Fluctuations in dissolved-phase COC concentrations greater than CULs in MW-101 and MW-518 may indicate that residual concentrations remain in unexcavated soils immediately upgradient of these areas. If monitoring conducted after DPE operations indicates that measurable LNAPL or dissolved-phase COC concentrations remain greater than CULs in these areas for more than 3 quarters within a 2-year period, the contingency plan will be implemented to excavate these soils. If compliance monitoring conducted after DPE operations indicates that dissolved-phase COC concentrations greater than CULs or measurable LNAPL remain in monitoring wells near the WSDOT stormwater line for more than 3 quarters within a 2-year period, additional contingency actions such as installation of a CIPP liner within the stormwater line may be conducted as part of the contingency plan. To address the remaining soils not addressed in the contingency plan, the following steps will be taken:

- Cover the Site with an EC, including the area already covered by the construction easement signed in October 1971 by the Washington State Attorney General's Office and Unocal.
- Perform confirmation soil sampling of locations that previously exceeded the CUL or PSV to further refine the areas of the proposed engineered cover system.
- Protect potential site visitors, workers, and terrestrial ecological receptors from potential direct contact with impacted soil remaining at the locations presented in Tables 2-1, 2-3, and 2-4, and shown on Figure 19, with an engineered cover system.
- Require long-term maintenance and/or monitoring.
- Prepare a Soil Management Plan for additional impacted soils identified during any future Site development

In an update to Alternative 6, residual impacted soil and LNAPL were removed in the area of DB-2. Soil and groundwater remediation, through operation of the DPE system has been ongoing since 2017 near the WSDOT stormwater line. The DPE system was expanded to address groundwater exceedances in boundary wells MW-101, MW-518, and MW-ER. Continued operation and optimization of the DPE system, coupled with installation of an engineered cover, will be protective of human health and the environment through compliance with AO No. DE 4460 (Ecology 2017b). The alternative POC, as proposed in the Site-Specific TEE Report (Appendix B), includes analysis of soils from 0 to 4 feet bgs within the site interior and within the 10-meter buffer zone.

The existing layout of the DPE system, as well as the proposed location of the engineered cover, are shown on Figure 19.

The DPE system installed near the WSDOT stormwater line will continue to dewater soil, exposing any remaining soil impacts to volatilization through induced vapor flow and an increase in oxygen concentrations. The DPE system continues to remediate COCs in soil and minimize offsite migration of dissolved-phase COCs in groundwater. The DPE system has also reduced soil vapor concentrations in soils within the WSDOT stormwater line area as evidenced by a reduction in influent vapor concentrations monitored during DPE system operation. DPE system influent vapor concentrations have reached asymptotic levels, indicating a decrease in volatile petroleum hydrocarbon constituents in soil and groundwater.

Impacted soils will remain in certain areas under this alternative; therefore, it is expected that limited ECs will be implemented, including ECs that:

- Cover the Site, including the area already covered by the construction easement signed in October 1971 by the Washington State Attorney General's Office and Unocal.
- Protect against the potential vapor intrusion pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and requiring a new soil vapor assessment if the land use changes.
- Maintain the conditions of the TEE as listed in the Site-Specific TEE Report (Appendix B).

- Require long-term maintenance and/or monitoring.

The combined elements of Alternative 6 will be protective of human health and the environment and will comply with the cleanup standard.

5. Sustainability Evaluation

A sustainability evaluation to compare Alternatives 4 and 6 was conducted in accordance with current GSR guidelines and requirements set by Ecology (Ecology 2023). The quantitative analysis was completed using the GSR SiteWise™ tool developed by the Battelle Memorial Institute and the U.S. Department of Defense. SiteWise™ was developed using industry-standard guidance and assumptions; the remedial scenarios were scoped using fundamental engineering practices and design assumptions with support from product and manufacturer documentation, when available. This quantitative sustainability analysis included analysis of the following metrics:

- Greenhouse Gas (GHG) emissions footprint
- Energy Usage
- Air Emissions
- Water impacts
- Resource consumption and waste production
- Injury and fatality risk
- Social Cost of Carbon
- Climate Vulnerability

The sustainability evaluation is included as Appendix D. Table 5-1 below presents a summary of the SiteWise™ evaluation.

Table 5-1. SiteWise™ Evaluation Summary

Sustainability Metric	Alternative 4: Excavation	Alternative 6: DPE and Cover System
GHG Emissions (MT CO2e)	1370	94
Total Energy (MMBTU)	20627	2475
Total Water (gal)	0.00	40800
Onsite NO_x Emissions (MT)	0.31	0.0030
Onsite SO_x Emissions (MT)	0.072	0.00056
Onsite PM_{10} Emissions (MT)	0.023	0.00037
Total NOx Emissions (MT)	8.9	0.18
Total SOx Emissions (MT)	4.2	0.26
Total PM10 Emissions (MT)	6.1	0.07
Injury Risk (%)	0.17	0.016
Fatality Risk (%)	0.0016	0.00012

Acronyms and Abbreviations

BTU = British thermal unit
CO2e = carbon dioxide equivalent
gal = gallons
MM = metric million
MT = metric ton
NOx = nitrogen oxides
PM10 = particulate matter <0.01 mm diameter
SOx = sulfur oxides
% = percent

6. Updated Disproportionate Cost Analysis

The updated DCA involves comparing the costs and benefits of three updated alternatives and reselecting the alternative with incremental costs that are not disproportionate to the incremental benefits. As outlined in WAC 173-340-360(3)(e), costs are determined to be disproportionate to benefits if the incremental cost of a more expensive alternative compared to a lower cost alternative exceeds the incremental degree of benefits achieved by the more expensive alternative. Ecology may weight site-specific factors as described in WAC 173-340-360(5)(c)(i).

The evaluation criteria for the DCA are specified in WAC 173-340-360(5)(d). Ecology has weighted these criteria as follows:

- Protectiveness 30 percent (Section 6.1.1)
- Permanence: 20 percent (Section 6.1.2)
- Long-term effectiveness: 20 percent (Section 6.1.3)
- Management of implementation risks: 15 percent (Section 6.1.4)
- Technical and administrative implementability: 15 percent (Section 6.1.5)
- Public concerns: Incorporated into the above scored criteria (Section 6.1.6)
- Cost: Non-weighted (Section 6.1.7).

Table 6-1 presents the comparative analysis using Ecology's weighting and ranking. Each alternative was given a relative ranking between 1 and 5 (1 is lowest, 5 is highest). The alternative that ranked highest after this first analysis is considered the baseline analysis, is considered the most permanent by Ecology, and is the alternative that the other alternatives are compared to in the DCA.

6.1.1 Protectiveness

MTCA describes protectiveness as the overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, onsite and offsite risks resulting from implementing the alternative, and improvement of the overall environmental quality.

With proper implementation, the three updated alternatives are adequately protective of human health and the environment during implementation and after the remedial action has been completed. However, Alternatives 1 and 6 will leave impacts onsite, requiring long-term institutional controls, with Alternative 1 having a longer restoration timeframe.

Due to the excavation or segregation of soil containing concentrations greater than CULs, Alternatives 4 and 6 are more protective than Alternative 1, which leaves the most impacted soil in place and does not protect against ecological receptors identified in the Site-Specific TEE Report (Appendix B). Due to the extent of active remedial action in Alternatives 4 and 6, these alternatives are deemed to be more protective than Alternative 1.

Alternatives 4 and 6 are expected to reach groundwater CULs at the compliance wells through operation and optimization of the DPE system or removal of impacted soil. In the case of Alternative 6, treatment in the WSDOT stormwater line area has shown a reduction in soil and dissolved-phase concentrations through time. If compliance monitoring conducted after DPE operations indicate that dissolved-phase COCs remain greater than CULs or there is measurable LNAPL for more than 3 quarters within a 2-year period at the site boundary near Willow Creek or within the WSDOT stormwater line area, a contingency plan will be implemented.

Based on the degree of protectiveness, Ecology identified the following qualitative rankings for the DCA:

- *Highest (5).* Alternative 4 is the most protective alternative based on the remediation of impacted soil and groundwater with COC concentrations greater than CULs. An EC will be required until groundwater concentrations attenuate to less than CULs.
- *Medium (4).* Alternative 6 is less protective than Alternative 4 because soil with COC concentrations greater than CULs will remain in place in the WSDOT stormwater line area and at limited locations across the Site. The direct-contact pathway along with protection of ecological receptors identified in the Site-Specific TEE Report (Appendix B) will be addressed through the engineered cover. ECs will be required for any soil left in place with COC concentrations greater than CULs and a contingency plan will be implemented if compliance monitoring indicates that dissolved-phase COC concentrations remain greater than CULs near the WSDOT stormwater line or at the boundary of Willow Creek.
- *Lowest (3).* Alternative 1 is the least protective because onsite dissolved-phase groundwater COC concentrations, soil COC concentrations, and potentially non-mobile residual LNAPL may remain in place. ECs will be required for any soil or groundwater left in place with COC concentrations greater than CULs.

6.1.2 Permanence

According to WAC 173-340-360(5)(d)(ii), permanence refers to the degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, reduction or elimination of hazardous substance releases and sources of releases, degree of irreversibility of waste treatment process, and characteristics and quantity of treatment residuals generated.

Alternatives involving excavation provide the greatest degree of permanence, with the removal of impacted soil and any remaining LNAPL from the Site. Due to the extent of remedial action, Alternatives 4 and 6 are more permanent than Alternative 1. Alternative 4 removes the greatest quantity of impacted soil; therefore, it is expected to be the most permanent.

Based on the degree of permanence, Ecology identified the following qualitative rankings for the DCA:

- *Highest (5)*. Alternative 4 is the most permanent alternative based on the complete removal or treatment of soil with COC concentrations greater than CULs. Only limited ECs will be required.
- *Medium (4)*. Alternative 6 is less permanent because soil with COC concentrations greater than CULs will remain in place in the WSDOT stormwater line area and at limited locations across the Site. Compliance monitoring and a potential contingency plan will address remaining groundwater concentrations greater than CULs at the site boundary or near the WSDOT stormwater line, if necessary.
- *Lowest (3)*. Alternative 1 is the least permanent because onsite dissolved-phase groundwater COC concentrations, soil COC concentrations, and potentially non-mobile LNAPL will remain in place. Protectiveness will be addressed through ECs.

6.1.3 Long-Term Effectiveness

The following criteria will be considered when evaluating the long-term effectiveness of each alternative:

- Degree of certainty that the alternative will be successful
- How reliable the alternative will be while the hazardous substances remain onsite and exceed CULs
- Magnitude of residual risk associated with the alternative
- Effectiveness of controls that are in place to manage treatment residues or remaining wastes.

MTCA provides guidance for determining long-term effectiveness, as presented below in descending order:

- Destruction or detoxification
- Immobilization or solidification
- Onsite or offsite disposal at an appropriate waste disposal facility
- Onsite isolation or containment with attendant engineering controls
- Institutional controls and monitoring.

Alternative 4 removes the largest amount of impacted soil and any LNAPL from the Site in the shortest time, thereby providing the greatest immediate reduction in residual risk. It is expected that groundwater impacts will also be remediated by removal of secondary source material and by natural attenuation through time. Regular groundwater monitoring events will be used to track natural attenuation.

Alternative 6 offers a medium degree of long-term effectiveness because this alternative also removes impacts to soil and groundwater, and protects ecological receptors identified in the Site-Specific TEE Report (Appendix B). The time to achieve remediation goals using Alternative 6 is relatively longer than Alternative 4. Alternative 6 leaves some soil in place, requiring long-term maintenance of the engineered cover system. However, in the long term, it is expected that groundwater impacts will also be remediated by system optimization and natural attenuation. If compliance monitoring conducted after DPE operations indicate that dissolved-phase COCs remain at concentrations greater than CULs for more than 3 quarters within a 2-year period at the Site boundary near Willow Creek or within the WSDOT stormwater line area, a contingency plan will be implemented that offers a similar degree of long-term effectiveness compared to Alternative 4.

Alternative 1 offers the least amount of long-term effectiveness. Impacted groundwater, soil, and non-mobile LNAPL may remain onsite and long-term monitoring along with institutional controls will be used to reduce risks.

Based on the degree of long-term effectiveness, Ecology identified the following qualitative rankings for the DCA:

- *Highest (5).* Alternative 4 offers a high degree of long-term effectiveness based on complete removal of soil with COC concentrations greater than CULs. ECs will be limited for this alternative and groundwater compliance sampling will only be required for a short duration.
- *Medium (3).* Alternative 6 provides a medium degree of long-term effectiveness. Operation of the DPE system and construction of the engineered cover system removes the direct contact risk and protects ecological receptors. With the compliance monitoring and proposed contingency plan, Alternative 6 removes the long-term risk of soil leaching and groundwater potentially impacting surface water. ECs will be required for any soil left in place with COC concentrations greater than CULs or PSVs. Contaminated soil left in place will need to be managed for future site use.

- *Lowest (2).* Alternative 1 is the least effective for the long term because onsite dissolved-phase COC concentrations, soil COC concentrations, and potentially non-mobile LNAPL may remain in place and protectiveness will be addressed through long-term monitoring and ECs.

6.1.4 Management of Short-Term Risks

Management of short-term risks relates to the risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures to control the risk.

Alternative 4 (excavation) requires transport and offsite disposal, and involves greater short-term risk than Alternatives 1 and 6. Additionally, excavation to below the groundwater table will pose short-term risk to construction workers and potential releases to surface water through flooding. Onsite decontamination procedures must be implemented to reduce short-term risk to site workers and the public.

Alternative 4 includes the largest volume of excavated soil, takes place around the WSDOT stormwater line, and has the greatest short-term risk. Short-term risks associated with this alternative include risks to construction workers entering the excavation, which will require the use of extensive shoring and dewatering infrastructure. Risks of damage to the stormwater line will be inherent and may have significant impacts on the City including flooding. Previous excavation activities above the WSDOT stormwater line in 2001 destabilized soils around a manhole, stopping the excavation in that area. There will also be geotechnical risks related to slope stability affecting the adjacent Point Edwards Condominium property. The addition of approximately 500 round trips of dump trucks on local streets will also present increased risk to the public. A considerable amount of groundwater will need to be treated and discharged during the work. This activity offers greater short-term risk in terms of direct contact with site contaminants and worker safety through engulfment from heaving sands and crushing from floating of the WSDOT stormwater line. In addition, Alternative 4 will involve handling and pumping stormwater associated with the WSDOT stormwater line, increasing the risk of flooding to the area.

Alternative 6 has the second greatest short-term risk through operation of the DPE system and potential soil excavation as part of the contingency plan. The DPE system treats and disposes of groundwater at the permitted discharge point. Maintenance of the remediation system will be required under Alternative 6, posing a moderate short-term risk.

Based on the management of short-term risks, Ecology identified the following qualitative rankings for the DCA:

- *Highest (4).* Alternative 1 provides the least short-term risk because it does not involve removing any soil or groundwater during implementation and offers the greatest degree of management of short-term risk.
- *Medium (3).* Alternative 6 includes the removal, handling, and treatment of moderate volumes of groundwater during operation of the remediation system and offers a medium degree of management of short-term risk.
- *Lowest (1).* Alternative 4 presents the greatest short-term risk. This alternative includes removal of the largest volume of soil and groundwater during excavation activities, at and around the WSDOT stormwater line and at other locations across the Lower Yard, and the greatest potential for exposure of workers to direct contact with site contaminants or at risk of being crushed or engulfed. In addition, this alternative poses the greatest short-term risk to the public based on flooding potential, and the largest addition of GHG to the atmosphere by offsite truck disposal. Therefore, Alternative 4 offers the lowest degree of management of short-term risk.

6.1.5 Technical and Administrative Implementability

Technical and administrative implementability relates to the ability of an alternative to be implemented, including whether the alternative is technically possible, availability of necessary offsite facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.

All three updated alternatives will require long-term or post-remediation monitoring; therefore, rating the technical and administrative implementability was based on the amount of work required to install, excavate, or operate components of the alternative. ECs will be required under each alternative.

Alternative 1 is implementable in terms of technical and administrative complexities. Significant soil removal has already occurred at the Site and has reduced COC concentrations in groundwater to less than CULs. Long-term monitoring for up to 60 years can be implemented with long-term maintenance for the EC.

Alternative 4 is the least implementable in terms of technical and administrative complexities, but has the shortest implementation timeframe. As discussed in Section 4.3.2, significant engineering procedures will be required to successfully complete the removal of impacted soils. The excavation of some areas in the Lower Yard can be accomplished without extensive dewatering or shoring; however, excavation of the WSDOT stormwater line along with excavation of areas at the toe of the northwestern slope and along the BNSF boundaries will require considerable engineering measures to perform the work and manage risk. Excavation of the WSDOT stormwater line will require replacement of up to 600 linear feet of large-diameter piping and may destabilize other piping sections and manholes, requiring additional repairs.

Alternative 6 is more implementable than Alternative 4 because it includes optimization of a DPE system that has been in operation since 2017, coupled with the installation of an engineered cover system comprising readily available materials as discussed in Section 4.1. This alternative is less intrusive and will require fewer engineering controls than Alternative 4. Remediation through DPE is an accepted remedial approach that has already decreased dissolved-phase concentrations in wells near the WSDOT stormwater line, and is a widely used technology throughout the industry to remove petroleum hydrocarbon impacts in soil and groundwater. Regularly scheduled maintenance will be required to continue operation of the system. If compliance monitoring conducted after DPE operations indicate that dissolved-phase COC concentrations remain greater than CULs at the site boundary with Willow Creek or near the WSDOT stormwater line for more than 3 quarters within a 2-year period, limited soil excavation, installation of a CIPP liner, or other approved remedial alternative may be implemented as part of the contingency plan to address the area(s).

Based on the extent and complexity of earthwork and construction activities, the technical and administrative implementability Ecology identified the following qualitative rankings for the DCA:

- *Highest (4).* DPE system operation and optimization along with the engineered cover system proposed in Alternative 6 offers a high degree of technical and administrative implementability.
- *Medium (3).* Alternative 1 may be more difficult to implement than Alternative 6 due to the long-term nature of the monitoring program and the difficulty of obtaining Ecology's approval of this approach.
- *Medium (3).* Alternative 4 will require extensive dewatering and shoring, and removal and replacement of sections of the WSDOT stormwater line; although, excavation is a standard remediation practice.

6.1.6 Public Concerns

Ecology and CEMC will continue to keep the public informed, seek community input, and address any concerns throughout this project. Additional issues or concerns will be considered as part of the cleanup action selection process, per WAC 173-340-600. Public comments on this FS Addendum will be solicited from the community during the formal comment period, following Ecology's input. Common community concerns include noise, traffic, short- and long-term risks, and timeframe for any proposed cleanup actions. Based on previous public concerns noted during public meetings, the following has been incorporated into scoring the above criteria:

- Alternative 4 includes excavation of impacted soils, which addresses public concerns on permanence and long-term effectiveness. Excavation has the least impact to future property use. This alternative will be the most disruptive to the public, including the adjacent condominiums, by creating noise, dust, and high truck traffic through city streets. Transportation of soils for offsite disposal will increase overall CO_2 emissions by an estimated approximately 1,370 Metric tons as well as higher emissions for nitrogen oxides (NO_x), sulfur oxides (SO_x), and particulate matter. An increased injury and fatality risk is also inherent when compared to Alternative 6.
- The engineered cover system, compliance monitoring, and potential implementation of the contingency plan as proposed in Alternative 6 pose public concerns related to leaving shallow soils in place beneath the engineered cover system and deeper soils in place outside of the radius of influence of the DPE system and surrounding the WSDOT stormwater line. Alternative 6 will not increase noise or traffic, or contribute significantly to CO_2 emissions, but will leave impacted soil in place.
- Alternative 1 will likely have the greatest public concern and be least acceptable because it leaves the most impacted soil and groundwater onsite for the longest duration.

6.1.7 Cost

Cost refers to the cost of implementing the alternative, including construction, net present value of any long-term costs, and agency oversight costs that are recoverable. Long-term costs include operation and maintenance, monitoring, equipment replacement costs, and the cost of maintaining institutional controls. Costs were revised from the FS Report (Appendix A). Costs associated with Alternative 1 were revised to remove costs for excavation of DB-2. Alternative 4 costs were revised to remove costs associated with DB-2 excavation and include costs associated with excavation of all soils exceeding CULs or PSVs. Costs associated with Alternative 6 were revised to remove costs associated with installation of the DPE system and DB-2 excavation, and to add costs associated with the proposed engineered cover system.

Alternative 1 is the least expensive alternative. Long-term costs include continued groundwater monitoring at the Site coupled with ECs. The cost for Alternative 1 is estimated to range from approximately $1,599,000 to $2,015,000 (Table 6-2).

Alternative 4 is the most expensive alternative based on the excavation of remaining impacts in the identified areas across the Lower Yard and near the WSDOT stormwater line (Figure 18). To create a reasonable estimate for this FS Addendum, and based on previous experience at the Site, excavations were estimated to extend approximately 10 to 15 feet bgs. It is estimated that approximately 15,000 cy of material will be excavated and transported to an appropriate waste disposal facility. As mentioned above, excavation to 15 feet bgs near the WSDOT stormwater line will require extensive shoring and dewatering. To remove the impacted soils, the WSDOT stormwater line will need to be temporarily re-routed and replaced with new pipe within the same excavation, or permanently re-routed. Excavation of additional areas where COPECs exceed site CULs will also require shoring to protect the BNSF ROW and the toe of the northwest slope of the Lower Yard. These requirements contribute to the significant cost of this alternative. Long-term costs include continued groundwater monitoring at the Site for 3 years and ECs placed on the Site. The cost for implementing Alternative 4 is estimated to range from approximately $8,021,000 to $11,427,000. Of the total approximate costs for Alternative 4, the majority is related to re-routing, removal, and replacement of the WSDOT stormwater line, shoring, dewatering, and soil disposal (Table 6-3).

Alternative 6 is the second least expensive alternative because the DPE system is already in place and will be optimized to continue to address soil and groundwater concentrations for 1 additional year. Costs include addressing the remaining soils in place that exceed CULs and PSVs identified in the Site-Specific TEE Report (Appendix B) through the proposed engineered cover system. Long-term costs include continued groundwater monitoring at the Site for an additional 4 years and ECs placed on the Site. The total cost of Alternative 6 is estimated to be approximately $702,000 to $1,001,000 (Table 6-4).

A comparison of the costs for Alternatives 1, 4, and 6 is presented in Table 6-5, below.

Table 6-5 Cost Comparison of Remedial Alternatives

Remedial Alternative No.	Remedial Alternative	Total Lower Cost ($)	Total Upper Cost ($)
1	MNA with ECs	$1,599,000	$2,015,000
4	Excavation	$8,021,000	$11,427,000
6	DPE System Operation, Engineered Cover System, Contingency Plan, and Limited EC	$728,000	$1,027,000

Cost analysis does not have a DCA ranking but is considered in the incremental change between alternatives. The following alternatives are ranked from highest (least expensive) to lowest (most expensive):

- Alternative 6 is the least expensive alternative and will use remedial strategies already implemented under interim action
- Alternative 1 is the second least expensive alternative and includes 60 years of long-term monitoring.
- Alternative 4 is the most expensive alternative and includes excavation and replacement of the WSDOT stormwater line. The cost of this alternative is significantly greater due to the required replacement of the WSDOT stormwater line, the extensive dewatering and shoring required for excavation, and implementation of other best management practices for protection of the northwest slope and the BNSF ROW.

6.1.8 Disproportionate Cost Analysis Preliminary Summary

Based on the qualitative and quantitative assessment discussed above, Alternative 4 has the highest DCA relative benefit ranking of 4.1 using the weighted average proposed by Ecology for protectiveness, permanence, long-term effectiveness, management of short-term risks, and technical and administrative implementability. Therefore, Alternative 4 is considered the baseline alternative initially considered the most permanent by Ecology. Alternative 6 has an average qualitative score of 3.7, which is the second highest relative benefit ranking of the three updated alternatives. Due to implementation difficulties and cost associated with Alternative 4, Alternative 6 was selected as the next most permanent alternative as discussed in Section 6.2.

6.2 Final Disproportionate Cost Analysis

The alternative that ranked highest and that Ecology ranked as the most permanent after the first analysis is Alternative 4. Per WAC 173-340-360(3)(c)(i)(A), Alternative 4 was compared to Alternative 6, which is the next most permanent remedy of the updated alternatives presented.

The final DCA included two passes:

1. *First iteration*. The evaluation criteria were weighted using the qualitative assessment and rankings presented above. The incremental change in cost compared to the degree of benefit per WAC 173-340-360(5)(c)(iv)(A) is considered during the first iteration. The difference in cost between Alternative 6 and the baseline Alternative 4 is almost 1,000 percent, while the degree of benefit is approximately 12.3 percent. When making this comparison, the incremental cost of the baseline Alternative 4 substantially exceeds its incremental degree of benefit. Therefore, Alternative 6 becomes the new baseline alternative per WAC 173-340-360(5)(c)(iv)(B)(III).
2. *Second iteration*. the second iteration was performed per WAC 173-340-360(5)(c)(iv)(A) using the new baseline Alternative 6. Comparing the incremental change from Alternative 1 to the new baseline Alternative 6, the proportional cost increase is approximately 50 percent while the degree of benefit is a drop of approximately 23 percent. Compared to Alternative 1, the cost of Alternative 6 is less and with no incremental benefit; therefore, Alternative 6 is permanent to the maximum extent practicable per WAC 173-340-360(5)(c)(iv)(B)(III) (Table 6-1).

The two iterations of the DCA for Alternatives 4 and 6 are presented in Table 6-6, below.

Table 6-6 DCA Summary

DCA	Proportional Change in Cost from Alternative 6 to Baseline	Proportional Change in Degree of Benefit (Alternative 6 to Baseline)	Proportional Change (Cost/Benefit)	Disproportionality Test
First Iteration (Alternative 6 to baseline)	1008.15%	12.33%	61.77	The incremental benefit for the baseline does not exceed the benefit for Alternative 6; therefore, the baseline is not practicable.
Second Iteration (new baseline Alternative 6 to Alternative 1)	-51.44%	23.73%	-2.17	If proportional change is less than 1, the baseline (Alternative 6) is practicable

Note:
% = percent

7. Recommended Remedial Alternative

Alternative 6 (DPE Treatment System Operation, Engineered Cover System, Contingency Plan, and EC) is the recommended remedial alternative and is permanent to the maximum extent practicable.

The DPE system will continue to operate for 1 year, focusing soil and groundwater remediation near the WSDOT stormwater line and wells at the perimeter of the Site where periodic exceedances have recently occurred. Optimization of the system will occur to improve operational uptime and focus vapor-phase mass removal on wells with petroleum hydrocarbon impacts greater than CULs. Prior to construction of the engineered cover system, additional soil investigation will be conducted to further evaluate/confirm shallow soil quality in areas where COPECs previously exceeded the CULs or PSVs as identified in the Site-Specific TEE Report (Appendix B). If COPEC concentrations remain greater than the CULs or PSVs, an engineered cover system will be constructed to address the direct contact and TEE concerns in those areas. If compliance monitoring conducted after DPE operations indicate that dissolved-phase COCs remain greater than CULs and there is no measurable LNAPL for more than 3 quarters within a 2-year period in wells located along the site boundary with Willow Creek or within the WSDOT stormwater line area, a contingency plan, to be outlined in the Draft CAP, will be implemented to address the remaining impacts and potential surface water quality concerns.

8. Summary and Conclusions

Alternative 6 (DPE Treatment System Operation, Engineered Cover System, Contingency Plan, and Limited ECs) is the alternative that is most permanent to the maximum extent practicable. The alternative is technically and administratively feasible, and it offers a higher degree of short-term risk management than Alternative 4. Alternative 6 also presents a much lower risk to workers and the public, and uses less energy while also contributing less CO_2, NO_x, SO_x, and particulate matter to the atmosphere compared to Alternative 4. Alternative 6 will remove and/or destroy contaminants permanently and will cost less than Alternative 4. The increased incremental cost of Alternative 4 (due to the complexity and required engineering measures and controls) compared to Alternative 6 is disproportionate to the degree of benefits achieved. Therefore, Alternative 6 is the preferred remedial alternative for the Site.

9. Schedule

Following approval of this FS Addendum by Ecology as ready for public review, a Soil Sampling Plan will be prepared. Using results of the proposed soil sampling, a Draft CAP will be prepared and submitted to Ecology for review as required by AO No. DE 4460. The Draft CAP will present a preferred cleanup action, including contingency plans if the remedial goals of the feasibility study are not met.

Ecology will review the Draft CAP and use it as the basis for preparing Ecology's Draft CAP. Ecology's Draft CAP will be an exhibit to a new draft Consent Decree. The new draft Consent Decree will be issued for public comment and revisions made as necessary. Upon entry into Snohomish County Superior Court, the new Consent Decree will take effect and govern further actions at the Site.

10. References

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Tables

Table 2-1
COC Concentrations in Exceedance of CULs – Direct Contact
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Constituent	CUL (mg/kg)	Detected Concentration	Exceeds CUL	Exceeds 2x CUL	Sample Location
Arsenic	20	31	X		EX-B19-ZZ-1-1
		31	X		EX-B19-ZZ-1-2
Benzene	18	33	X		DPE-PSS-X9-7
Total cPAHs TEQ[1]	0.14	0.35	X	X	DPE-PSS-Y9-9
		0.19	X		SB-76-10.5
TPH [2]	2775	15,600	X	X	DPE-PSS-V10-5
		15,500	X	X	DPE-PSS-V10-10
		10,900	X	X	DPE-PSS-Y9-9
		10,590	X	X	DPE-PSS-N17-4
		9,060	X	X	DPE-PSS-Q14-6
		6,400	X	X	DPE-PSS-W8-6.5
		6,020	X	X	DPE-PSS-P15-6
		5,380	X		DPE-PSS-O16-4
		4,976	X		EX-B18-VV-1-6SW
		3,470	X		DPE-PSS-X8-12.5
		3,290	X		DPE-PSS-W8-8.5
		3,070	X		DPE-PSS-W9-6
		3,007	X		MW-129R-7.0
		2,923	X		SWLY-D-3 Wall-3.75

Notes:

[1]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) analyzed by USEPA 8270D SIM Total cPAHs calculated by summing the concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene and adjusted for toxicity using toxic equivalency (TEQ) factors to represent a total benzo(a)pyrene concentration (WAC 173-340-900).

[2]Total petroleum hydrocarbons (TPH) concentration calculated by summing the concentrations of GRO, DRO and HO. For results which do not exceed laboratory reporting limit (RL), half of the laboratory RL is added to determine TPH. concentration.

Acronyms and Abbreviations:

COC = constituent of concern

CUL = cleanup level

mg/kg = milligram per kilogram

X = sample exceedance

Table 2-2
POC Statistical Summary - Direct Contact
Public Review Draft Final Feasibility Study Report Addendum
Former Unocal Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds Washington

Constituent of Potential Concern (COPC)	Cleanup Level (mg/kg)	Number of Detections	Sample Size	Maximum Detect or Result[4]	95% UCL (mg/kg)	# Samples Exceeding CUL	% Samples Exceeding CUL	Does Maximum Detect Exceed CUL?	Does UCL Exceed CUL?	Samples Exceeding 2X CUL
Arsenic[1]	20	358	360	31	4.4	2 out of 360	0.6%	Yes	No	0 out of 360
Benzene[1]	18	109	1079	33	0.1	1 out of 1079	0.1%	Yes	No	0 out of 1079
Total Petroleum Hydrocarbons[1,2]	2775	424	1078	15,600	263.8	14 out of 1078	1.3%	Yes	No	7 out of 1078
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[1,3]	0.14	251	613	0.35	0.0	2 out of 613	0.3%	Yes	No	1 out of 613

Notes:

[1] = Reported sample values should be < 2X Cleanup Level and <10% of samples Exceed Cleanup Level

[2] = Results for TPH and cPAHs are the sum of multiple results that may include non-detect concentrations. Non-detects were incorporated in the calculations as one-half of the analytical limit. If parent and field duplicate results were

[3] = cPAH results are used a a surrogate to evaluate benzo(a)pryene and the presented cleanup level for cPAHs is based on benzo(a)pryene.

For all non-detect values, one-half of the analytical limit was screened against the Cleanup Level. For results that are the sum of multiple concentrations (i.e cPAHs and TPHs), the full result was screened against the Cleanup Level.

Red font indicates UCL(s) greater than the CUL or at least one sample exceeding 2X the CUL.

COPC = constituent of potential concern

cPAH = total carcinogenic polycyclic aromatic hydrocarbons toxic equivalent concentration

CUL = cleanup level

mg/kg = milligram per kilogram

UCL = 95% Upper Confidence Limit

2X = multiplied by two

= number

% = percent

Table 2-3
COC Concentrations in Exceedance of PSVs – Buffer Zone
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Constituent	CUL (mg/kg)	Detected Concentration	Exceeds CUL	Exceeds 2x CUL	Sample Location
Arsenic	10	10.6	X		DB1-A-30wall-3
Benzene	0.12	0.26	X	X	DB1-A-18Wall-2
GRO	260	356	X	X	DB1-A-25wall-3
		131	X		DB1-A-18Wall-2
DRO + HO	120	2,288	X	X	DB1-A-25wall-3
		1,440	X	X	EX-DB2-E0-1
		1,301	X	X	DB1-A-23wall-3
		1,179	X	X	DB1-A-3wall2-2.5
		1,065	X	X	EX-B5-B-20-4
		650	X	X	EX-DB2-F0-1
		504	X		DB1-A-31wall1-3
		429	X		DB1-A-4wall-2.5
		384	X		DB1-A-28wall-3
		378	X		EX-B8-G-4-WSW-4
		359	X		EX-B1-C-47-4
		290	X		B12-0.5-1

Acronyms and Abbreviations:

COC = constituent of concern

CUL = cleanup level

mg/kg = milligram per kilogram

PSV = protective soil value

X = sample exceedance

GRO = Total petroleum hydrocarbons with gasoline range organics

DRO+HO = Summation of total petroleum hydrocarbons with diesel range and heavy oil range organics

Table 2-4
COC Concentrations in Exceedance of PSVs – Interior
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Constituent	CUL (mg/kg)	Detected Concentration	Exceeds CUL	Exceeds 2x CUL	Sample Location
Benzene	0.12	4.5	X	X	SWLY-D-3 Wall-3.75
		4.4	X	X	EX-B1-D-43-4
		1.9	X	X	EX-B14-DD-7-2.5
		1.3	X	X	EX-B14-DD-NSW-2.5
		1.1	X	X	EX-B15-II-2-WSW-4
		0.48	X	X	EX-B13-BB-2-WSW-4
		0.40	X	X	EX-B14-EE-5-4
		0.36	X	X	EX-B15-HH-3-NSW-4
		0.30	X	X	SWLY-G-14-3.75
		0.26	X	X	EX-B14-EE-8-4
		0.21	X		EX-B14-FF-6-4
		0.16	X		EX-A3-BB-7-ESW-4
		0.16	X		EX-B1-E-42-NSW-4
		0.15	X		SWLY-A-7WALL-3.75
		0.14	X		EX-B13-GG-3-4
		0.13	X		SWLY-A-21WALL-3.75
GRO	200	2,440	X	X	SWLY-D-3 Wall-3.75
		2,000	X	X	EX-B1-D-43-4
		774	X	X	EX-B13-BB-2-WSW-4
		720	X	X	DPE-PSS-P16-1
		620	X	X	DPE-PSS-N17-4
		570	X	X	DPE-PSS-O16-4
		549	X	X	SWLY-A-7WALL-3.75
		527	X	X	SWLY-A-8WALL-3.75
		445	X	X	EX-B14-EE-5-4
		428	X	X	SWLY-A-17wall-3.75
		223	X		EX-B1-E-42-NSW-4
		210	X		DPE-PSS-Q15-1
		209	X		EX-B15-II-4-ESW-4
		201	X		EX-A1-F-18-4

Table 2-4
COC Concentrations in Exceedance of PSVs – Interior
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Constituent	CUL (mg/kg)	Detected Concentration	Exceeds CUL	Exceeds 2x CUL	Sample Location
DRO+HO	460	9,970	X	X	DPE-PSS-N17-4
		4,810	X	X	DPE-PSS-O16-4
		2,305	X	X	DPE-PSS-W11-2
		2,038	X	X	EX-A4-H-8-4
		1,359	X	X	EX-A1-F-18-4
		1,351	X	X	SWLY-A-17wall-3.75
		1,343	X	X	STRM-2wallW-3
		1,195	X	X	SWLY-I-21wall-3.75
		1,172	X	X	SWLY-A-12WALL-3.75
		1,135	X	X	EX-B13-BB-2-WSW-4
		1,010	X	X	DPE-PSS-W9-4
		829	X		EX-B15-II-4-ESW-4
		799	X		EX-B2-G-41-ESW-4
		667	X		EX-B14-FF-8-4SW
		629	X		SWLY-A-7WALL-3.75
		566	X		EX-B14-GG-WSW-4
		553	X		SWLY-A-4Wall-3.75
		506	X		EX-B1-F-43-4
		483	X		SWLY-D-3 Wall-3.75

Acronyms and Abbreviations:

COC = constituent of concern
CUL = cleanup level
mg/kg = milligram per kilogram
PSV = protective soil value
X = sample exceedance
GRO = Total petroleum hydrocarbons with gasoline range organics
DRO+HO = Summation of total petroleum hydrocarbons with diesel range and heavy oil range organics

Table 2-5
Alternative POC Statistical Summary - Buffer Zone
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Constituent of Potential Ecological Concern	Cleanup Level (mg/kg)	Number of Detections	Sample Size	Maximum Detect or Result[3]	95% UCL (mg/kg)	Number of Samples Exceeding CUL	Percent of Samples Exceeding CUL	Does UCL Exceed CUL?	Samples Exceeding 2 Times CUL
Arsenic	10	16	16	10.6	5.59	1 out of 16	6.3%	No	0 out of 16
Benzene[1]	0.12	4	38	0.26	NC	1 out of 38	2.6%	NA	1 out of 38
DRO+HRO[2]	260	28	37	2,288	538.7	12 out of 37	32.4%	Yes	6 out of 37
Gasoline-range organics	120	11	38	356	55.0	2 out of 38	5.3%	No	1 out of 38

Notes:

[1] Reported sample values should be less than 2 times the CUL and less than 10 percent of samples exceed CUL.

[2] Results for DRO+HRO are the sum of multiple results that may include nondetect concentrations. Nondetects were incorporated in the calculations as one-half of the analytical limit. If parent and field duplicate results were reported, the maximum of two detections was selected, the minimum of two nondetect concentrations was selected, or the detected concentration was selected if one detection and one nondetect concentration were reported.

[3] Maximum detect is presented for arsenic, benzene, and gasoline-range organics. Maximum calculated result is presented for DRO+HRO.

1. For all nondetect values, one-half of the analytical limit was screened against the CUL. For results that are the sum of multiple concentrations (i.e., DRO+HRO and cPAHs), the full result was screened against the CUL.

2. Red font indicates UCLs greater than the CUL or at least one sample exceeding 2 times the CUL.

Acronyms and Abbreviations:

95% UCL = 95 percent upper confidence limit
% = percent
bgs = below ground surface
cPAH = carcinogenic polycyclic aromatic hydrocarbon
CUL = cleanup level
DRO+HRO = sum of diesel-range organics and heavy-oil-range organics
mg/kg = milligram per kilogram
NA = not applicable
NC = not calculated; insufficient data to calculate 95% UCL
UCL = upper confidence limit

Table 2-6
Alternative POC Statistical Summary - Interior
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

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Constituent of Potential Ecological Concern	Cleanup Level (mg/kg)	Number of Detections	Sample Size	Maximum Detect or Result[3]	95% UCL (mg/kg)	Number of Samples Exceeding CUL	Percent of Samples Exceeding CUL	Does UCL Exceed CUL?	Samples Exceeding 2 Times CUL
Arsenic[1]	95	40	41	30.9	6.38	0 out of 41	0.0%	No	0 out of 41
Benzene[1]	0.12	25	187	4.47	0.16	16 out of 187	8.6%	Yes	10 out of 187
DRO+HRO[1, 2]	460	100	187	9,970	334.5	19 out of 187	10%	No	11 out of 187
Gasoline-range organics[1]	200	69	187	2,440	96	14 out of 187	7.5%	No	10 out of 187

Notes:

[1] Reported sample values should be less than 2 times the CUL and less than 10 percent of samples exceed CUL.

[2] Results for DRO+HRO are the sum of multiple results that may include nondetect concentrations. Nondetects were incorporated in the calculations as one-half of the analytical limit. If parent and field duplicate results were reported, the maximum of two detections was selected, the minimum of two nondetect concentrations was selected, or the detected concentration was selected if one detection and one nondetect concentration were reported.

[3] Maximum detect is presented for arsenic, benzene, and gasoline-range organics. Maximum calculated result is presented for DRO+HRO.

1. For all nondetect values, one-half of the analytical limit was screened against the CUL. For results that are the sum of multiple concentrations (i.e., DRO+HRO and cPAHs), the full result was screened against the CUL.

2. Red font indicates UCL(s) greater than the CUL or at least one sample exceeding 2 times the CUL.

Acronyms and Abbreviations:

95% UCL = 95 percent upper confidence limit
% = percent
bgs = below ground surface
cPAH = carcinogenic polycyclic aromatic hydrocarbon
CUL = cleanup level
DRO+HRO = sum of diesel-range organics and heavy-oil-range organics
mg/kg = milligram per kilogram
UCL = upper confidence limit

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
LM-2	07/24/17	11:40	8.14	1.62	--	NP	6.52	--
LM-2	03/19/18	13:30	8.14	1.70	--	NP	6.44	--
LM-2	06/26/18	10:11	8.14	1.92	--	NP	6.22	--
LM-2	09/21/18	8:41	8.14	2.60	--	NP	5.54	--
LM-2	11/26/18	13:11	8.14	1.22	--	NP	6.92	PID: 0.6
LM-2	03/18/19	9:59	8.14	1.78	--	NP	6.36	--
LM-2	06/17/19	11:27	8.14	1.85	--	NP	6.29	--
LM-2	09/16/19	12:52	8.14	1.63	--	NP	6.51	--
LM-2	12/10/19	09:44	8.14	1.69	--	NP	6.45	--
LM-2	03/12/20	13:01	8.14	1.58	--	NP	6.56	--
LM-2	06/22/20	12:10	8.14	1.62	--	NP	6.52	--
LM-2	09/18/20	12:12	8.14	1.79	--	NP	6.35	--
LM-2	11/02/20	11:45	8.14	1.62	--	NP	6.52	--
LM-2	03/01/21	12:44	8.14	1.42	--	NP	6.72	--
LM-2	06/22/21	9:44	8.14	1.51	--	NP	6.63	--
LM-2	08/23/21	11:56	8.14	1.46	--	NP	6.68	--
LM-2	11/05/21	11:34	8.14	1.84	--	NP	6.30	PID: 0.1
LM-2	03/04/22	10:52	8.14	1.15	--	NP	6.99	--
LM-2	06/14/22	10:44	8.14	0.95	--	NP	7.19	--
LM-2	08/23/22	9:05	8.14	1.44	--	NP	6.70	--
LM-2	11/09/22	11:09	8.14	0.95	--	NP	7.19	--
LM-2	03/06/23	10:54	8.14	1.02	--	NP	7.12	PID: 0.1
LM-2	04/03/23	12:36	8.14	1.79	--	NP	6.35	Resample - not used in contouring
LM-2	06/05/23	12:20	8.14	1.54	--	NP	6.60	PID: 0.0
LM-2	09/11/23	9:30	8.14	1.69	--	NP	6.45	PID: 0.0
LM-2	11/16/23	10:37	8.14	0.71	--	NP	7.43	PID: 0.0
LM-2	03/19/24	9:15	8.14	0.63	--	NP	7.51	PID:0.0
MW-E	07/24/17	12:45	14.42	7.29	--	NP	7.13	--

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

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Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-E-R	03/19/18	12:43	14.30	6.89	--	NP	7.41	--
MW-E-R	06/26/18	10:20	14.30	7.41	--	NP	6.89	--
MW-E-R	09/21/18	8:17	14.30	7.35	--	NP	6.95	--
MW-E-R	11/26/18	12:27	14.30	6.93	--	NP	7.37	--
MW-E-R	02/07/19	10:05	14.30	7.10	--	NP	7.20	Not part of the quarterly monitoring program; gauged out of low tide window
MW-E-R	03/18/19	9:31	14.30	7.05	--	NP	7.25	--
MW-E-R	06/17/19	11:12	14.30	7.20	--	NP	7.10	--
MW-E-R	09/16/19	12:33	14.30	7.13	--	NP	7.17	--
MW-E-R	12/10/19	10:12	14.30	7.51	--	NP	6.79	--
MW-E-R	03/12/20	13:42	14.30	7.02	--	NP	7.28	--
MW-E-R	06/22/20	12:25	14.30	6.97	--	NP	7.33	--
MW-E-R	09/18/20	11:42	14.30	7.28	--	NP	7.02	--
MW-E-R	11/02/20	11:25	14.30	7.00	--	NP	7.30	--
MW-E-R	03/01/21	11:34	14.30	6.65	--	NP	7.65	--
MW-E-R	06/22/21	9:26	14.30	7.02	--	NP	7.28	PID: 1.6
MW-E-R	08/23/21	11:30	14.30	7.23	--	NP	7.07	PID: 3.0
MW-E-R	11/05/21	11:20	14.30	6.45	--	NP	7.85	PID: 0.1
MW-E-R	03/04/22	10:52	14.30	6.45	--	NP	7.85	PID: 0.2
MW-E-R	06/14/22	11:12	14.30	6.62	--	NP	7.68	No measurable LNAPL. Trace LNAPL observed on probe and bailer tip only. PID: 0.3
MW-E-R	08/23/22	8:49	14.30	7.10	--	NP	7.20	PID: 2.6
MW-E-R	11/09/22	10:44	14.30	6.55	--	NP	7.75	PID: 0.7
MW-E-R	03/06/23	10:12	14.30	6.40	--	NP	7.90	--
MW-E-R	06/05/23	12:49	14.30	6.89	--	NP	7.41	PID: 1.1
MW-E-R	09/11/23	9:34	14.30	7.30	--	NP	7.00	PID: 8.0
MW-E-R	11/16/23	9:45	14.30	6.53	--	NP	7.77	PID: 8.0
MW-E-R	03/19/24	9:30	14.30	6.14	--	NP	8.16	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-8R	07/24/17	11:31	13.82	8.31	--	NP	5.51	--
MW-8R	03/19/18	12:13	13.82	7.98	--	NP	5.84	--
MW-8R	06/26/18	9:50	13.82	8.56	--	NP	5.26	--
MW-8R	09/21/18	8:37	13.82	8.44	--	NP	5.38	--
MW-8R	11/26/18	12:37	13.82	7.85	--	NP	5.97	--
MW-8R	03/18/19	9:12	13.82	8.42	--	NP	5.40	--
MW-8R	06/17/19	10:51	13.82	8.39	--	NP	5.43	--
MW-8R	09/16/19	12:03	13.82	8.22	--	NP	5.60	--
MW-8R	12/10/19	9:30	13.82	8.06	--	NP	5.76	--
MW-8R	03/12/20	13:15	13.82	8.28	--	NP	5.54	--
MW-8R	06/22/20	12:20	13.82	8.30	--	NP	5.52	--
MW-8R	09/18/20	12:11	13.82	8.33	--	NP	5.49	--
MW-8R	11/02/20	11:50	13.82	8.51	--	NP	5.31	--
MW-8R	03/01/21	12:20	13.82	8.23	--	NP	5.59	--
MW-8R	06/22/21	8:58	13.82	8.45	--	NP	5.37	--
MW-8R	08/23/21	11:49	13.82	8.26	--	NP	5.56	--
MW-8R	11/05/21	11:53	13.82	8.15	--	NP	5.67	--
MW-8R	03/04/22	11:14	13.82	7.43	--	NP	6.39	--
MW-8R	06/14/22	10:19	13.82	7.80	--	NP	6.02	--
MW-8R	08/23/22	8:38	13.82	8.23	--	NP	5.59	--
MW-8R	11/09/22	10:34	13.82	7.40	--	NP	6.42	--
MW-8R	03/06/23	10:17	13.82	7.54	--	NP	6.28	PID: 0.1
MW-8R	06/05/23	11:54	13.82	8.18	--	NP	5.64	PID: 0.0
MW-8R	09/11/23	8:46	13.82	8.24	--	NP	5.58	PID: 0.0
MW-8R	11/16/23	10:05	13.82	7.42	--	NP	6.40	PID: 0.0
MW-8R	03/19/24	8:48	13.82	7.63	--	NP	6.19	PID: 0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

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Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-101	07/24/17	11:44	14.99	8.99	--	NP	6.00	--
MW-101	03/19/18	12:29	14.99	8.64	--	NP	6.35	--
MW-101	06/26/18	10:07	14.99	9.41	--	NP	5.58	--
MW-101	09/21/18	9:04	14.99	9.17	--	NP	5.82	--
MW-101	11/26/18	12:54	14.99	8.69	--	NP	6.30	PID: 0.1
MW-101	02/07/19	12:34	14.99	8.65	--	NP	6.34	Not part of the quarterly monitoring program; gauged out of low tide window
MW-101	03/18/19	9:22	14.99	8.90	--	NP	6.09	--
MW-101	06/17/19	11:09	14.99	9.01	--	NP	5.98	--
MW-101	09/16/19	12:07	14.99	8.91	--	NP	6.08	--
MW-101	12/10/19	9:39	14.99	8.96	--	NP	6.03	--
MW-101	03/12/20	13:19	14.99	9.06	--	NP	5.93	--
MW-101	06/22/20	12:13	14.99	9.00	--	NP	5.99	--
MW-101	09/18/20	12:42	14.99	9.12	--	NP	5.87	--
MW-101	11/02/20	11:32	14.99	9.01	--	NP	5.98	--
MW-101	03/01/21	12:33	14.99	8.79	--	NP	6.20	--
MW-101	06/22/21	9:25	14.99	9.06	--	NP	5.93	PID: 0.9
MW-101	08/23/21	12:00	14.99	9.00	--	NP	5.99	PID: 1.0
MW-101	11/05/21	11:46	14.99	7.97	--	NP	7.02	--
MW-101	03/04/22	11:07	14.99	8.10	--	NP	6.89	PID: 0.3
MW-101	06/14/22	10:33	14.99	8.55	--	NP	6.44	PID: 0.1
MW-101	08/23/22	8:49	14.99	8.97	--	NP	6.02	PID: 0.2
MW-101	11/09/22	10:44	14.99	8.19	--	NP	6.80	--
MW-101	03/06/23	10:24	14.99	8.26	--	NP	6.73	--
MW-101	06/05/23	12:09	14.99	8.86	--	NP	6.13	PID: 0.1
MW-101	09/11/23	9:17	14.99	9.12	--	NP	5.87	PID: 0.5
MW-101	11/16/23	10:25	14.99	8.18	--	NP	6.81	PID: 0.2
MW-101	03/19/24	8:59	14.99	8.20	--	NP	6.79	PID: 0.1

Table 2-7
Groundwater Gauging Data (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-104	07/24/17	11:43	14.08	8.35	--	NP	5.73	--
MW-104	03/19/18	12:27	14.08	7.99	--	NP	6.09	--
MW-104	06/26/18	10:00	14.08	8.71	--	NP	5.37	--
MW-104	09/21/18	9:02	14.08	8.54	--	NP	5.54	--
MW-104	11/26/18	12:53	14.08	7.82	--	NP	6.26	PID: 0.2
MW-104	03/18/19	9:21	14.08	8.23	--	NP	5.85	--
MW-104	06/17/19	11:07	14.08	8.47	--	NP	5.61	--
MW-104	09/16/19	12:06	14.08	8.23	--	NP	5.85	--
MW-104	12/10/19	9:36	14.08	8.18	--	NP	5.90	--
MW-104	03/12/20	13:20	14.08	8.36	--	NP	5.72	--
MW-104	06/22/20	12:15	14.08	8.48	--	NP	5.60	--
MW-104	09/18/20	12:40	14.08	8.48	--	NP	5.60	--
MW-104	11/02/20	11:36	14.08	9.33	--	NP	4.75	--
MW-104	03/01/21	12:30	14.08	8.12	--	NP	5.96	--
MW-104	06/22/21	9:23	14.08	8.47	--	NP	5.61	--
MW-104	08/23/21	11:57	14.08	8.41	--	NP	5.67	--
MW-104	11/05/21	11:47	14.08	7.10	--	NP	6.98	--
MW-104	03/04/22	11:08	14.08	7.39	--	NP	6.69	--
MW-104	06/14/22	10:31	14.08	8.01	--	NP	6.07	--
MW-104	08/23/22	8:47	14.08	8.40	--	NP	5.68	--
MW-104	11/09/22	10:41	14.08	7.46	--	NP	6.62	--
MW-104	03/06/23	10:22	14.08	7.50	--	NP	6.58	--
MW-104	06/05/23	12:02	14.08	8.30	--	NP	5.78	PID: 0.0
MW-104	09/11/23	9:15	14.08	8.46	--	NP	5.62	PID: 0.0
MW-104	11/16/23	10:24	14.08	7.42	--	NP	6.66	PID: 0.0
MW-104	03/19/24	8:57	14.08	7.51	--	NP	6.57	PID:0.3

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Groundwater Gauging Data (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

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Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-108	07/24/17	11:25	12.40	7.08	--	NP	5.32	--
MW-108	03/19/18	13:38	12.40	5.81	--	NP	6.59	--
MW-108	06/26/18	9:59	12.40	6.44	--	NP	5.96	--
MW-108	09/21/18	8:33	12.40	6.12	--	NP	6.28	--
MW-108	11/26/18	13:14	12.40	5.35	--	NP	7.05	--
MW-108	03/18/19	9:01	12.40	5.65	--	NP	6.75	--
MW-108	06/17/19	11:41	12.40	5.83	--	NP	6.57	--
MW-108	09/16/19	13:04	12.40	5.74	--	NP	6.66	--
MW-108	12/10/19	9:48	12.40	5.99	--	NP	6.41	--
MW-108	03/12/20	13:04	12.40	5.65	--	NP	6.75	--
MW-108	06/22/20	11:41	12.40	5.73	--	NP	6.67	--
MW-108	09/18/20	12:05	12.40	5.78	--	NP	6.62	--
MW-108	11/02/20	11:41	12.40	5.75	--	NP	6.65	--
MW-108	03/01/21	12:37	12.40	5.54	--	NP	6.86	--
MW-108	06/22/21	9:49	12.40	5.67	--	NP	6.73	--
MW-108	08/23/21	12:00	12.40	5.70	--	NP	6.70	--
MW-108	11/05/21	11:37	12.40	5.10	--	NP	7.30	--
MW-108	03/04/22	10:55	12.40	5.11	--	NP	7.29	--
MW-108	06/14/22	11:21	12.40	5.13	--	NP	7.27	--
MW-108	08/23/22	9:12	12.40	5.77	--	NP	6.63	--
MW-108	11/09/22	11:15	12.40	5.08	--	NP	7.32	--
MW-108	03/06/23	11:03	12.40	5.25	--	NP	7.15	--
MW-108	06/05/23	12:26	12.40	5.62	--	NP	6.78	PID: 0.0
MW-108	09/11/23	9:35	12.40	4.80	--	NP	7.60	PID: 0.0
MW-108	11/16/23	9:35	12.40	4.80	--	NP	7.60	PID: 0.0
MW-108	03/19/24	8:26	12.40	4.90	--	NP	7.50	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-109	07/24/17	--	--	--	--	--	--	Unable to access
MW-109	03/19/18	13:40	13.53	6.68	--	NP	6.85	--
MW-109	06/26/18	9:54	13.53	7.50	--	NP	6.03	--
MW-109	09/21/18	8:35	13.53	7.13	--	NP	6.40	--
MW-109	11/26/18	13:18	13.53	6.20	--	NP	7.33	--
MW-109	03/18/19	8:59	13.53	6.60	--	NP	6.93	--
MW-109	06/17/19	11:33	13.53	6.81	--	NP	6.72	--
MW-109	09/16/19	13:08	13.53	6.78	--	NP	6.75	--
MW-109	12/10/19	9:52	13.53	7.21	--	NP	6.32	--
MW-109	03/12/20	13:06	13.53	6.59	--	NP	6.94	--
MW-109	06/22/20	11:47	13.53	6.82	--	NP	6.71	--
MW-109	09/18/20	12:00	13.53	6.78	--	NP	6.75	--
MW-109	11/02/20	11:38	13.53	6.71	--	NP	6.82	--
MW-109	03/01/21	12:40	13.53	6.56	--	NP	6.97	--
MW-109	06/22/21	9:52	13.53	6.85	--	NP	6.68	--
MW-109	08/23/21	--	--	--	--	--	--	Well could not be gauged due to fallen tree
MW-109	11/05/21	--	--	--	--	--	--	Well could not be gauged due to fallen tree
MW-109	03/04/22	12:10	13.53	6.30	--	NP	7.23	--
MW-109	06/14/22	12:01	13.53	6.43	--	NP	7.10	--
MW-109	08/23/22	--	13.53	--	--	NP	--	Well Inaccessible
MW-109	11/09/22	11:19	13.53	6.27	--	NP	7.26	--
MW-109	03/06/23	11:07	13.53	6.41	--	NP	7.12	--
MW-109	06/05/23	12:30	13.53	6.90	--	NP	6.63	PID: 0.0
MW-109	09/11/23	9:53	13.53	7.29	--	NP	6.24	PID: 0.0
MW-109	11/16/23	9:30	13.53	6.00	--	NP	7.53	PID: 0.0
MW-109	03/19/24	8:24	13.53	6.11	--	NP	7.42	PID:0.0
MW-122	07/24/17	--	--	--	--	--	--	Deep well - not part of the monitoring network

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-126	07/24/17	11:43	12.40	5.95	--	NP	6.45	--
MW-126	03/19/18	12:24	12.40	4.70	--	NP	7.70	--
MW-126	06/26/18	10:03	12.40	4.48	--	NP	7.92	--
MW-126	09/21/18	8:50	12.40	5.74	--	NP	6.66	--
MW-126	11/26/18	12:45	12.40	4.90	--	NP	7.50	--
MW-126	03/18/19	9:48	12.40	4.94	--	NP	7.46	--
MW-126	06/17/19	11:03	12.40	5.58	--	NP	6.82	--
MW-126	09/16/19	12:25	12.40	5.89	--	NP	6.51	--
MW-126	12/10/19	10:13	12.40	5.61	--	NP	6.79	--
MW-126	03/12/20	12:54	12.40	5.15	--	NP	7.25	--
MW-126	06/22/20	11:38	12.40	5.59	--	NP	6.81	--
MW-126	09/18/20	11:40	12.40	6.13	--	NP	6.27	--
MW-126	11/02/20	11:28	12.40	5.82	--	NP	6.58	--
MW-126	03/01/21	11:52	12.40	4.81	--	NP	7.59	--
MW-126	06/22/21	9:11	12.40	5.65	--	NP	6.75	--
MW-126	08/23/21	11:08	12.40	5.93	--	NP	6.47	--
MW-126	11/05/21	10:53	12.40	4.57	--	NP	7.83	--
MW-126	03/04/22	11:30	12.40	4.03	--	NP	8.37	PID: 0.4
MW-126	06/14/22	9:54	12.40	4.61	--	NP	7.79	--
MW-126	08/23/22	8:14	12.40	5.58	--	NP	6.82	--
MW-126	11/09/22	11:40	12.40	4.35	--	NP	8.05	--
MW-126	03/06/23	10:45	12.40	3.80	--	NP	8.60	PID: 0.2
MW-126	06/05/23	13:14	12.40	5.10	--	NP	7.30	PID: 0.0
MW-126	09/11/23	9:04	12.40	5.39	--	NP	7.01	PID: 0.0
MW-126	11/16/23	10:09	12.40	4.37	--	NP	8.03	PID: 0.0
MW-126	03/19/24	9:26	12.40	4.16	--	NP	8.24	PID: 0.1

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-129R	07/24/17	12:57	12.92	5.62	--	NP	7.30	Film observed during gauging, confirmed with bailer
MW-129R	03/19/18	12:45	12.92	5.53	--	NP	7.39	--
MW-129R	06/26/18	10:23	12.92	5.95	--	NP	6.97	--
MW-129R	09/21/18	8:15	12.92	6.00	--	NP	6.92	--
MW-129R	11/26/18	12:29	12.92	5.43	--	NP	7.49	PID: 42.1
MW-129R	02/07/19	10:21	12.92	5.64	--	NP	7.28	Not part of the quarterly monitoring program; gauged out of low tide window
MW-129R	03/18/19	9:36	12.92	5.45	--	NP	7.47	--
MW-129R	06/17/19	11:10	12.92	5.72	--	NP	7.20	--
MW-129R	09/16/19	12:30	12.92	5.68	--	NP	7.24	--
MW-129R	12/10/19	10:08	12.92	5.76	--	NP	7.16	--
MW-129R	03/12/20	13:45	12.92	5.40	--	NP	7.52	--
MW-129R	06/22/20	12:30	12.92	5.38	--	NP	7.54	--
MW-129R	09/18/20	11:50	12.92	5.79	--	NP	7.13	--
MW-129R	11/02/20	11:29	12.92	5.58	--	NP	7.34	--
MW-129R	03/01/21	11:31	12.92	4.90	--	NP	8.02	--
MW-129R	06/22/21	9:20	12.92	5.41	--	NP	7.51	--
MW-129R	08/23/21	11:28	12.92	5.75	--	NP	7.17	--
MW-129R	11/05/21	11:17	12.92	5.06	--	NP	7.86	PID: 101.9
MW-129R	03/04/22	10:54	12.92	4.98	--	NP	7.94	PID: 1.9
MW-129R	06/14/22	11:06	12.92	4.17	--	NP	8.75	No measurable LNAPL. Trace LNAPL observed on probe and bailer tip only.
MW-129R	08/23/22	8:47	12.92	5.60	--	NP	7.32	PID: 0.1
MW-129R	11/09/22	10:41	12.92	4.87	--	NP	8.05	PID: 6.5
MW-129R	03/06/23	10:09	12.92	4.81	--	NP	8.11	No evidence of LNAPL.
MW-129R	06/05/23	12:49	12.92	5.40	--	NP	7.52	PID: 1.1
MW-129R	09/11/23	9:31	12.92	5.85	--	NP	7.07	PID: 0.0
MW-129R	11/16/23	9:51	12.92	4.29	--	NP	8.63	PID: 46.3
MW-129R	03/19/24		12.92	4.34	--	NP	8.58	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-13U	07/24/17	12:15	25.60	17.03	--	NP	8.57	--
MW-13U	03/19/18	12:44	25.60	17.03	--	NP	8.57	--
MW-13U	06/26/18	11:20	25.60	17.57	--	NP	8.03	--
MW-13U	09/21/18	9:42	25.60	17.49	--	NP	8.11	--
MW-13U	11/26/18	12:51	25.60	17.30	--	NP	8.30	--
MW-13U	03/18/19	10:06	25.60	17.05	--	NP	8.55	--
MW-13U	06/17/19	10:34	25.60	17.39	--	NP	8.21	--
MW-13U	09/16/19	11:54	25.60	17.40	--	NP	8.20	--
MW-13U	12/10/19	9:02	25.60	17.40	--	NP	8.20	--
MW-13U	03/12/20	12:57	25.60	17.12	--	NP	8.48	--
MW-13U	06/22/20	12:50	25.60	17.19	--	NP	8.41	--
MW-13U	09/18/20	13:09	25.60	17.49	--	NP	8.11	--
MW-13U	11/02/20	12:14	25.60	17.31	--	NP	8.29	--
MW-13U	03/01/21	12:22	25.60	16.68	--	NP	8.92	--
MW-13U	06/22/21	10:24	25.60	17.14	--	NP	8.46	--
MW-13U	08/23/21	11:00	25.60	17.33	--	NP	8.27	--
MW-13U	11/05/21	10:45	25.60	16.95	--	NP	8.65	--
MW-13U	03/04/22	11:37	25.60	16.61	--	NP	8.99	--
MW-13U	06/14/22	9:52	25.60	16.84	--	NP	8.76	--
MW-13U	08/23/22	8:10	25.60	17.18	--	NP	8.42	--
MW-13U	11/09/22	11:18	25.60	17.01	--	NP	8.59	--
MW-13U	03/06/23	10:23	25.60	16.54	--	NP	9.06	--
MW-13U	06/05/23	13:20	25.60	16.82	--	NP	8.78	PID: 0.0
MW-13U	09/11/23	9:51	25.60	17.25	--	NP	8.35	PID: 0.0
MW-13U	11/16/23	10:30	25.60	16.96	--	NP	8.64	PID: 0.0
MW-13U	03/19/24		25.60	16.30	--	NP	9.30	PID:0.0
MW-131	07/24/17	--	--	--	--	--	--	Not part of the monitoring network
MW-131	03/19/18	--	--	--	--	--	--	Not part of the monitoring network
MW-131	06/26/18	10:30	12.53	6.22	--	NP	6.31	Not part of the monitoring network
MW-131	09/21/18	--	12.53	--	--	--	--	Not part of the monitoring network

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-134X	07/24/17	12:31	35.13	26.02	--	NP	9.11	--
MW-134X	03/19/18	12:51	35.13	26.10	--	NP	9.03	--
MW-134X	06/26/18	10:35	35.13	26.41	--	NP	8.72	--
MW-134X	09/21/18	8:56	35.13	26.40	--	NP	8.73	--
MW-134X	11/26/18	12:45	35.13	26.19	--	NP	8.94	--
MW-134X	03/18/19	10:02	35.13	26.05	--	NP	9.08	--
MW-134X	06/17/19	10:44	35.13	26.42	--	NP	8.71	--
MW-134X	09/16/19	12:02	35.13	26.41	--	NP	8.72	--
MW-134X	12/10/19	9:13	35.13	26.48	--	NP	8.65	--
MW-134X	03/12/20	13:09	35.13	26.25	--	NP	8.88	--
MW-134X	06/22/20	13:00	35.13	26.30	--	NP	8.83	--
MW-134X	09/18/20	13:00	35.13	26.37	--	NP	8.76	--
MW-134X	11/02/20	12:28	35.13	26.22	--	NP	8.91	--
MW-134X	03/01/21	12:15	35.13	25.70	--	NP	9.43	--
MW-134X	06/22/21	10:08	35.13	26.11	--	NP	9.02	--
MW-134X	08/23/21	11:04	35.13	26.42	--	NP	8.71	--
MW-134X	11/05/21	10:52	35.13	26.13	--	NP	9.00	--
MW-134X	03/04/22	11:43	35.13	25.84	--	NP	9.29	--
MW-134X	06/14/22	10:06	35.13	26.03	--	NP	9.10	--
MW-134X	08/23/22	8:13	35.13	26.25	--	NP	8.88	--
MW-134X	11/09/22	11:12	35.13	26.32	--	NP	8.81	--
MW-134X	03/06/23	10:31	35.13	25.86	--	NP	9.27	--
MW-134X	06/05/23	13:27	35.13	25.90	--	NP	9.23	PID: 0.0
MW-134X	09/11/23	9:42	35.13	26.26	--	NP	8.87	PID: 0.0
MW-134X	11/16/23	10:21	35.13	26.19	--	NP	8.94	PID: 0.0
MW-134X	03/19/24		35.13	25.39	--	NP	9.74	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)		Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-135	07/24/17	11:50	18.13		10.88	--	NP	7.25	--
MW-135	03/19/18	12:34	18.13		10.51	--	NP	7.62	--
MW-135	06/26/18	9:57	18.13		11.59	--	NP	6.54	--
MW-135	09/21/18	9:18	18.13		11.21	--	NP	6.92	--
MW-135	11/26/18	12:39	18.13		11.09	--	NP	7.04	--
MW-135	03/18/19	9:57	18.13		10.76	--	NP	7.37	--
MW-135	06/17/19	10:58	18.13		11.06	--	NP	7.07	--
MW-135	09/16/19	12:20	18.13		11.01	--	NP	7.12	--
MW-135	12/10/19	9:49	18.13		8.19	--	NP	9.94	--
MW-135	03/12/20	13:26	18.13		10.69	--	NP	7.44	--
MW-135	06/22/20	13:45	18.13		11.49	--	NP	6.64	Gauged within 1:37 hour of low tide.
MW-135	09/18/20	12:44	18.13		11.02	--	NP	7.11	--
MW-135	11/02/20	12:16	18.13		11.05	--	NP	7.08	--
MW-135	03/01/21	12:01	18.13		10.48	--	NP	7.65	--
MW-135	06/22/21	9:12	18.13		11.06	--	NP	7.07	--
MW-135	08/23/21	11:12	18.13		11.14	--	NP	6.99	--
MW-135	11/05/21	11:05	18.13		10.71	--	NP	7.42	--
MW-135	03/04/22	11:12	18.13		9.90	--	NP	8.23	--
MW-135	06/14/22	10:18	18.13		10.42	--	NP	7.71	--
MW-135	08/23/22	8:24	18.13		11.25	--	NP	6.88	--
MW-135	11/09/22	10:32	18.13		11.03	--	NP	7.10	--
MW-135	03/06/23	10:00	18.13		10.23	--	NP	7.90	--
MW-135	06/05/23	12:24	18.13		--	--	--	--	Loose well casing - Unable to gauge
MW-135	09/11/23	--	18.13		--	--	--	--	Loose well casing - Unable to gauge
MW-135	11/16/23	--	--	--	--	--	--	--	--
MW-135	03/19/24		18.13			--	NP		Inaccessible

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-136	07/24/17	11:52	15.99	8.12	--	NP	7.87	--
MW-136	03/19/18	12:49	15.99	7.88	--	NP	8.11	--
MW-136	06/26/18	11:28	15.99	8.32	--	NP	7.67	--
MW-136	09/21/18	9:17	15.99	8.25	--	NP	7.74	--
MW-136	11/26/18	12:38	15.99	8.03	--	NP	7.96	--
MW-136	03/18/19	9:54	15.99	7.74	--	NP	8.25	--
MW-136	06/17/19	10:50	15.99	7.40	--	NP	8.59	--
MW-136	09/16/19	12:11	15.99	8.27	--	NP	7.72	--
MW-136	12/10/19	9:39	15.99	8.45	--	NP	7.54	--
MW-136	03/12/20	13:47	15.99	7.92	--	NP	8.07	--
MW-136	06/22/20	12:49	15.99	8.22	--	NP	7.77	--
MW-136	09/18/20	12:48	15.99	8.39	--	NP	7.60	--
MW-136	11/02/20	12:12	15.99	8.17	--	NP	7.82	--
MW-136	03/01/21	12:04	15.99	7.95	--	NP	8.04	--
MW-136	06/22/21	8:58	15.99	8.27	--	NP	7.72	PID: 0.1
MW-136	08/23/21	11:09	15.99	8.65	--	NP	7.34	--
MW-136	11/05/21	11:02	15.99	7.84	--	NP	8.15	--
MW-136	03/04/22	11:13	15.99	7.72	--	NP	8.27	PID: 0.3
MW-136	06/14/22	10:23	15.99	8.06	--	NP	7.93	--
MW-136	08/23/22	9:58	15.99	8.43	--	NP	7.56	--
MW-136	11/09/22	10:31	15.99	8.24	--	NP	7.75	--
MW-136	03/06/23	10:02	15.99	7.82	--	NP	8.17	--
MW-136	06/05/23	12:33	15.99	8.29	--	NP	7.70	PID: 0.0
MW-136	09/11/23	9:15	15.99	8.47	--	NP	7.52	PID: 0.3
MW-136	11/16/23	10:05	15.99	7.84	--	NP	8.15	PID: 0.1

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-139R	07/24/17	11:50	13.84	7.42	--	NP	6.42	--
MW-139R	03/19/18	12:33	13.84	7.01	--	NP	6.83	--
MW-139R	06/26/18	10:17	13.84	7.63	--	NP	6.21	--
MW-139R	09/21/18	9:13	13.84	7.40	--	NP	6.44	--
MW-139R	11/26/18	13:05	13.84	7.16	--	NP	6.68	--
MW-139R	03/18/19	9:18	13.84	7.18	--	NP	6.66	--
MW-139R	06/17/19	11:19	13.84	7.22	--	NP	6.62	--
MW-139R	09/16/19	12:11	13.84	7.18	--	NP	6.66	--
MW-139R	12/10/19	9:42	13.84	7.36	--	NP	6.48	--
MW-139R	03/12/20	13:16	13.84	7.10	--	NP	6.74	--
MW-139R	06/22/20	12:09	13.84	7.09	--	NP	6.75	--
MW-139R	09/18/20	11:26	13.84	7.31	--	NP	6.53	--
MW-139R	11/02/20	11:26	13.84	7.22	--	NP	6.62	--
MW-139R	03/01/21	12:37	13.84	6.92	--	NP	6.92	--
MW-139R	06/22/21	9:29	13.84	7.12	--	NP	6.72	--
MW-139R	08/23/21	12:06	13.84	7.12	--	NP	6.72	--
MW-139R	11/05/21	11:42	13.84	7.43	--	NP	6.41	--
MW-139R	03/04/22	11:05	13.84	6.40	--	NP	7.44	--
MW-139R	06/14/22	10:37	13.84	6.63	--	NP	7.21	--
MW-139R	08/23/22	8:51	13.84	7.12	--	NP	6.72	--
MW-139R	11/09/22	10:48	13.84	6.44	--	NP	7.40	--
MW-139R	03/06/23	10:35	13.84	6.57	--	NP	7.27	--
MW-139R	06/05/23	12:13	13.84	6.98	--	NP	6.86	PID: 0.0
MW-139R	09/11/23	9:21	13.84	7.30	--	NP	6.54	PID: 0.0
MW-139R	03/19/24	9:04	13.84	6.52	--	NP	7.32	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-143	07/24/17	11:41	11.94	5.65	--	NP	6.29	--
MW-143	03/19/18	12:23	11.94	4.53	--	NP	7.41	--
MW-143	06/26/18	10:00	11.94	4.57	--	NP	7.37	--
MW-143	09/21/18	8:48	11.94	5.76	--	NP	6.18	--
MW-143	11/26/18	12:44	11.94	5.04	--	NP	6.90	PID: 13.6
MW-143	03/18/19	9:50	11.94	5.01	--	NP	6.93	--
MW-143	06/17/19	11:01	11.94	5.76	--	NP	6.18	--
MW-143	09/16/19	12:27	11.94	4.36	--	NP	7.58	--
MW-143	12/10/19	10:18	11.94	4.34	--	NP	7.60	--
MW-143	03/12/20	12:57	11.94	4.02	--	NP	7.92	--
MW-143	06/22/20	11:39	11.94	5.43	--	NP	6.51	--
MW-143	09/18/20	11:42	11.94	5.90	--	NP	6.04	--
MW-143	11/02/20	11:32	11.94	4.74	--	NP	7.20	--
MW-143	03/01/21	11:49	11.94	3.30	--	NP	8.64	--
MW-143	06/22/21	9:09	11.94	5.40	--	NP	6.54	PID: 1.1
MW-143	08/23/21	11:10	11.94	5.49	--	NP	6.45	PID: 1.0
MW-143	11/05/21	10:55	11.94	4.49	--	NP	7.45	--
MW-143	03/04/22	11:38	11.94	4.11	--	NP	7.83	--
MW-143	06/14/22	9:57	11.94	4.47	--	NP	7.47	PID: 1.0
MW-143	08/23/22	8:16	11.94	5.13	--	NP	6.81	PID: 0.8
MW-143	11/09/22	11:39	11.94	4.24	--	NP	7.70	PID: 0.7
MW-143	03/06/23	10:42	11.94	3.80	--	NP	8.14	PID: 0.4
MW-143	06/05/23	13:10	11.94	4.56	--	NP	7.38	PID: 0.5
MW-143	09/11/23	9:06	11.94	4.99	--	NP	6.95	PID: 2.2, organic odor
MW-143	11/16/23	10:11	11.94	4.22	--	NP	7.72	PID: 1.2
MW-143	03/19/24	9:25	11.94	2.55	--	NP	9.39	PID: 0.2

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-147	07/24/17	11:28	11.02	5.78	--	NP	5.24	--
MW-147	03/19/18	12:11	11.02	5.31	--	NP	5.71	--
MW-147	06/26/18	9:50	11.02	5.96	--	NP	5.06	--
MW-147	09/21/18	8:31	11.02	5.84	--	NP	5.18	--
MW-147	11/26/18	12:33	11.02	4.88	--	NP	6.14	--
MW-147	03/18/19	9:08	11.02	8.12	--	NP	2.90	Depth to water value is an anomaly
MW-147	06/17/19	10:45	11.02	5.90	--	NP	5.12	--
MW-147	09/16/19	12:00	11.02	5.54	--	NP	5.48	--
MW-147	12/10/19	9:22	11.02	5.29	--	NP	5.73	--
MW-147	03/12/20	13:11	11.02	5.62	--	NP	5.40	--
MW-147	06/22/20	12:23	11.02	5.86	--	NP	5.16	--
MW-147	09/18/20	12:16	11.02	5.80	--	NP	5.22	--
MW-147	11/02/20	11:56	11.02	5.73	--	NP	5.29	--
MW-147	03/01/21	12:14	11.02	5.60	--	NP	5.42	--
MW-147	06/22/21	8:53	11.02	5.93	--	NP	5.09	--
MW-147	08/23/21	11:42	11.02	5.79	--	NP	5.23	--
MW-147	11/05/21	11:56	11.02	3.47	--	NP	7.55	--
MW-147	03/04/22	11:18	11.02	3.18	--	NP	7.84	--
MW-147	06/14/22	10:14	11.02	5.04	--	NP	5.98	Tree roots present in well
MW-147	08/23/22	8:35	11.02	5.71	--	NP	5.31	--
MW-147	11/09/22	10:30	11.02	3.31	--	NP	7.71	--
MW-147	03/06/23	10:05	11.02	3.97	--	NP	7.05	PID: 0.1
MW-147	06/05/23	11:48	11.02	5.72	--	NP	5.30	PID: 0.0
MW-147	09/11/23	8:47	11.02	5.72	--	NP	5.30	PID: 0.0
MW-147	11/16/23	10:00	11.02	3.80	--	NP	7.22	PID: 0.0
MW-147	03/19/24	8:49	11.02	4.63	--	NP	6.39	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-149R	07/24/17	11:21	12.18	7.28	--	NP	4.90	--
MW-149R	03/19/18	12:09	12.18	6.49	--	NP	5.69	--
MW-149R	06/26/18	9:38	12.18	7.40	--	NP	4.78	--
MW-149R	09/21/18	8:24	12.18	7.34	--	NP	4.84	--
MW-149R	11/26/18	12:26	12.18	5.94	--	NP	6.24	--
MW-149R	03/18/19	9:00	12.18	6.67	--	NP	5.51	--
MW-149R	06/17/19	10:33	12.18	7.38	--	NP	4.80	--
MW-149R	09/16/19	11:57	12.18	6.85	--	NP	5.33	--
MW-149R	12/10/19	9:16	12.18	6.41	--	NP	5.77	--
MW-149R	03/12/20	13:07	12.18	6.88	--	NP	5.30	--
MW-149R	06/22/20	12:28	12.18	7.41	--	NP	4.77	--
MW-149R	09/18/20	12:24	12.18	7.26	--	NP	4.92	--
MW-149R	11/02/20	12:04	12.18	6.92	--	NP	5.26	--
MW-149R	03/01/21	12:06	12.18	6.57	--	NP	5.61	--
MW-149R	06/22/21	8:43	12.18	7.41	--	NP	4.77	--
MW-149R	08/23/21	11:35	12.18	7.24	--	NP	4.94	--
MW-149R	11/05/21	12:00	12.18	5.58	--	NP	6.60	--
MW-149R	03/04/22	11:21	12.18	5.85	--	NP	6.33	--
MW-149R	06/14/22	10:08	12.18	6.63	--	NP	5.55	--
MW-149R	08/23/22	8:29	12.18	7.13	--	NP	5.05	--
MW-149R	11/09/22	10:23	12.18	5.79	--	NP	6.39	--
MW-149R	03/06/23	9:58	12.18	5.92	--	NP	6.26	--
MW-149R	06/05/23	11:35	12.18	7.03	--	NP	5.15	PID: 0.0
MW-149R	09/11/23	8:35	12.18	7.06	--	NP	5.12	PID: 0.0
MW-149R	11/16/23	9:11	12.18	5.86	--	NP	6.32	PID: 0.0
MW-149R	03/19/24	8:39	12.18	5.94	--	NP	6.24	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-150	07/24/17	11:19	12.36	6.96	--	NP	5.40	--
MW-150	03/19/18	12:09	12.36	6.36	--	NP	6.00	--
MW-150	06/26/18	9:40	12.36	7.02	--	NP	5.34	--
MW-150	09/21/18	8:20	12.36	7.14	--	NP	5.22	--
MW-150	11/26/18	12:24	12.36	6.22	--	NP	6.14	--
MW-150	03/18/19	8:59	12.36	6.68	--	NP	5.68	--
MW-150	06/17/19	10:35	12.36	7.11	--	NP	5.25	--
MW-150	09/16/19	11:55	12.36	6.91	--	NP	5.45	--
MW-150	12/10/19	9:14	12.36	6.64	--	NP	5.72	--
MW-150	03/12/20	13:05	12.36	6.63	--	NP	5.73	--
MW-150	06/22/20	12:29	12.36	6.92	--	NP	5.44	--
MW-150	09/18/20	12:50	12.36	7.12	--	NP	5.24	--
MW-150	11/02/20	12:08	12.36	7.15	--	NP	5.21	--
MW-150	03/01/21	12:03	12.36	7.54	--	NP	4.82	--
MW-150	06/22/21	8:36	12.36	7.13	--	NP	5.23	--
MW-150	08/23/21	11:29	12.36	7.04	--	NP	5.32	--
MW-150	11/05/21	12:04	12.36	5.70	--	NP	6.66	--
MW-150	03/04/22	11:22	12.36	5.74	--	NP	6.62	--
MW-150	06/14/22	10:05	12.36	6.46	--	NP	5.90	--
MW-150	08/23/22	8:27	12.36	6.96	--	NP	5.40	--
MW-150	11/09/22	10:21	12.36	5.99	--	NP	6.37	--
MW-150	03/06/23	9:56	12.36	5.85	--	NP	6.51	--
MW-150	06/05/23	11:31	12.36	--	--	--	--	Well obstruction - Unable to gauge
MW-150	09/11/23	8:29	12.36	6.98	--	NP	5.38	PID: 0.0, well obstruction at 7 feet bgs
MW-150	11/16/23	9:40	12.36	6.21	--	NP	6.15	PID: 0.0, well obstruction at 7 feet bgs
MW-150	03/19/24	8:36	12.36	6.15	--	NP	6.21	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-151	07/24/17	--	--	--	--	--	--	Not part of the monitoring network
MW-151	03/19/18	--	--	--	--	--	--	Not part of the monitoring network
MW-151	06/26/18	9:44	11.05	5.80	--	NP	5.25	Not part of the monitoring network
MW-151	09/21/18	--	11.05	--	--	--	--	Not part of the monitoring network
MW-151	03/01/21	12:12	11.05	5.13	--	NP	5.92	Not part of the monitoring network
MW-151	06/22/21	8:50	11.05	5.79	--	NP	5.26	Not part of the monitoring network
MW-151	08/23/21	11:25	11.05	5.69	--	--	5.36	Not part of the monitoring network
MW-151	06/14/22	--	11.05	--	--	--	--	Not part of the monitoring network
MW-151	08/23/22	8:25	11.05	5.64	--	NP	5.41	Not part of the monitoring network
MW-151	11/09/22	10:27	11.05	4.43	--	NP	6.62	Not part of the monitoring network

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-20R	07/24/17	11:41	12.17	6.88	--	NP	5.29	--
MW-20R	03/19/18	12:20	12.17	6.44	--	NP	5.73	--
MW-20R	06/26/18	9:59	12.17	7.08	--	NP	5.09	--
MW-20R	09/21/18	8:59	12.17	6.95	--	NP	5.22	--
MW-20R	11/26/18	12:52	12.17	5.96	--	NP	6.21	--
MW-20R	03/18/19	9:19	12.17	6.59	--	NP	5.58	--
MW-20R	06/17/19	11:05	12.17	6.97	--	NP	5.20	--
MW-20R	09/16/19	12:05	12.17	6.59	--	NP	5.58	--
MW-20R	12/10/19	9:33	12.17	6.40	--	NP	5.77	--
MW-20R	03/12/20	13:23	12.17	6.77	--	NP	5.40	--
MW-20R	06/22/20	12:17	12.17	6.98	--	NP	5.19	--
MW-20R	09/18/20	12:37	12.17	6.89	--	NP	5.28	--
MW-20R	11/02/20	11:40	12.17	6.70	--	NP	5.47	--
MW-20R	03/01/21	12:27	12.17	6.64	--	NP	5.53	--
MW-20R	06/22/21	9:21	12.17	6.96	--	NP	5.21	PID: 9.3
MW-20R	08/23/21	11:54	12.17	6.89	--	NP	5.28	--
MW-20R	11/05/21	11:49	12.17	5.58	--	NP	6.59	--
MW-20R	03/04/22	11:10	12.17	5.93	--	NP	6.24	--
MW-20R	06/14/22	10:27	12.17	6.51	--	NP	5.66	--
MW-20R	08/23/22	8:44	12.17	6.88	--	NP	5.29	--
MW-20R	11/09/22	10:37	12.17	5.77	--	NP	6.40	--
MW-20R	03/06/23	10:20	12.17	5.92	--	NP	6.25	--
MW-20R	06/05/23	12:05	12.17	6.82	--	NP	5.35	PID: 0.0
MW-20R	09/11/23	9:13	12.17	6.93	--	NP	5.24	PID: 0.0
MW-20R	11/16/23	10:22	12.17	5.70	--	NP	6.47	PID: 0.0
MW-20R	03/19/24	8:51	12.17	5.85	--	NP	6.32	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-203	07/24/17	12:25	31.15	22.29	--	NP	8.86	--
MW-203	03/19/18	12:48	31.15	22.35	--	NP	8.80	--
MW-203	06/26/18	10:40	31.15	22.37	--	NP	8.78	--
MW-203	09/21/18	8:59	31.15	22.75	--	NP	8.40	--
MW-203	11/26/18	12:49	31.15	22.58	--	NP	8.57	--
MW-203	03/18/19	10:17	31.15	23.35	--	NP	7.80	--
MW-203	06/17/19	10:38	31.15	22.78	--	NP	8.37	--
MW-203	09/16/19	11:57	31.15	22.69	--	NP	8.46	--
MW-203	12/10/19	9:08	31.15	22.78	--	NP	8.37	--
MW-203	03/12/20	13:02	31.15	22.48	--	NP	8.67	--
MW-203	06/22/20	12:55	31.15	22.52	--	NP	8.63	--
MW-203	09/18/20	13:04	31.15	22.79	--	NP	8.36	--
MW-203	11/02/20	12:12	31.15	22.60	--	NP	8.55	--
MW-203	03/01/21	12:20	31.15	21.97	--	NP	9.18	--
MW-203	06/22/21	10:17	31.15	22.44	--	NP	8.71	--
MW-203	08/23/21	11:02	31.15	22.61	--	NP	8.54	--
MW-203	11/05/21	10:48	31.15	22.35	--	NP	8.80	--
MW-203	03/04/22	11:40	31.15	22.05	--	NP	9.10	--
MW-203	06/14/22	9:56	31.15	22.24	--	NP	8.91	--
MW-203	08/23/22	8:13	31.15	22.53	--	NP	8.62	--
MW-203	11/09/22	11:15	31.15	22.45	--	NP	8.70	--
MW-203	03/06/23	10:26	31.15	21.98	--	NP	9.17	--
MW-203	06/05/23	13:22	31.15	22.16	--	NP	8.99	PID: 0.1
MW-203	09/11/23	9:46	31.15	22.57	--	NP	8.58	PID: 0.0
MW-203	11/16/23	10:25	31.15	27.37	--	NP	3.78	PID: 0.0
MW-203	03/19/24		31.15	21.65	--	NP	9.50	PID:0.0
MW-301	07/24/17	--	--	--	--	--	--	Offsite well - Not part of the monitoring network

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

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Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-500	07/24/17	11:58	16.64	5.85	--	NP	10.79	--
MW-500	03/19/18	12:58	16.64	3.85	--	NP	12.79	--
MW-500	06/26/18	10:10	16.64	5.84	--	NP	10.80	--
MW-500	09/21/18	9:05	16.64	7.28	--	NP	9.36	--
MW-500	11/26/18	12:33	16.64	4.65	--	NP	11.99	--
MW-500	03/18/19	9:42	16.64	3.79	--	NP	12.85	--
MW-500	06/17/19	11:02	16.64	5.84	--	NP	10.80	--
MW-500	09/16/19	12:24	16.64	7.20	--	NP	9.44	--
MW-500	12/10/19	9:53	16.64	5.78	--	NP	10.86	--
MW-500	03/12/20	14:00	16.64	4.00	--	NP	12.64	--
MW-500	06/22/20	12:36	16.64	5.03	--	NP	11.61	--
MW-500	09/18/20	12:33	16.64	6.70	--	NP	9.94	--
MW-500	11/02/20	12:05	16.64	5.88	--	NP	10.76	--
MW-500	03/01/21	11:59	16.64	3.78	--	NP	12.86	--
MW-500	06/22/21	9:16	16.64	5.89	--	NP	10.75	--
MW-500	08/23/21	11:22	16.64	6.98	--	NP	9.66	--
MW-500	11/05/21	11:12	16.64	3.05	--	NP	13.59	--
MW-500	03/04/22	11:10	16.64	2.54	--	NP	14.10	--
MW-500	06/14/22	10:47	16.64	4.35	--	NP	12.29	--
MW-500	08/23/22	8:30	16.64	6.15	--	NP	10.49	--
MW-500	11/09/22	10:36	16.64	4.76	--	NP	11.88	--
MW-500	03/06/23	9:58	16.64	2.82	--	NP	13.82	--
MW-500	06/05/23	12:20	16.64	5.29	--	NP	11.35	PID: 0.0
MW-500	09/11/23	9:11	16.64	7.18	--	NP	9.46	PID: 0.0
MW-500	11/16/23	10:00	16.64	4.62	--	NP	12.02	PID: 0.0
MW-500	03/19/24		16.64	3.75	--	NP	12.89	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-501	07/24/17	12:02	15.24	4.67	--	NP	10.57	--
MW-501	03/19/18	13:09	15.24	4.69	--	NP	10.55	--
MW-501	06/26/18	10:15	15.24	4.90	--	NP	10.34	--
MW-501	09/21/18	9:20	15.24	6.71	--	NP	8.53	--
MW-501	11/26/18	12:32	15.24	6.39	--	NP	8.85	--
MW-501	03/18/19	9:39	15.24	5.35	--	NP	9.89	--
MW-501	06/17/19	11:06	15.24	4.99	--	NP	10.25	--
MW-501	09/16/19	12:26	15.24	6.44	--	NP	8.80	--
MW-501	12/10/19	9:58	15.24	7.20	--	NP	8.04	--
MW-501	03/12/20	14:05	15.24	5.21	--	NP	10.03	--
MW-501	06/22/20	12:33	15.24	6.92	--	NP	8.32	--
MW-501	09/18/20	12:29	15.24	5.94	--	NP	9.30	--
MW-501	11/02/20	12:03	15.24	6.41	--	NP	8.83	--
MW-501	03/01/21	11:56	15.24	4.36	--	NP	10.88	--
MW-501	06/22/21	9:18	15.24	4.82	--	NP	10.42	PID: 0.6
MW-501	08/23/21	11:25	15.24	6.00	--	NP	9.24	--
MW-501	11/05/21	11:15	15.24	4.74	--	NP	10.50	PID: 3.2
MW-501	03/04/22	11:09	15.24	4.81	--	NP	10.43	PID: 0.2
MW-501	06/14/22	10:53	15.24	4.30	--	NP	10.94	PID: 0.1
MW-501	08/23/22	8:32	15.24	5.22	--	NP	10.02	PID: 0.5
MW-501	11/09/22	10:39	15.24	6.75	--	NP	8.49	PID: 0.2
MW-501	03/06/23	9:57	15.24	4.13	--	NP	11.11	--
MW-501	06/05/23	12:15	15.24	4.46	--	NP	10.78	PID: 0.6
MW-501	09/11/23	9:07	15.24	6.41	--	NP	8.83	PID: 1.0
MW-501	11/16/23	9:56	15.24	6.70	--	NP	8.54	PID: 1.0
MW-501	03/19/24		15.24	4.23	--	NP	11.01	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-502	07/24/17	11:51	13.00	5.35	--	NP	7.65	--
MW-502	03/19/18	12:50	13.00	5.22	--	NP	7.78	--
MW-502	06/26/18	10:24	13.00	5.96	--	NP	7.04	--
MW-502	09/21/18	8:14	13.00	5.72	--	NP	7.28	--
MW-502	11/26/18	12:57	13.00	5.56	--	NP	7.44	--
MW-502	03/18/19	9:31	13.00	5.35	--	NP	7.65	--
MW-502	06/17/19	11:30	13.00	5.62	--	NP	7.38	--
MW-502	09/16/19	13:04	13.00	5.51	--	NP	7.49	--
MW-502	12/10/19	10:05	13.00	5.52	--	NP	7.48	--
MW-502	03/12/20	13:39	13.00	5.23	--	NP	7.77	--
MW-502	06/22/20	12:35	13.00	5.32	--	NP	7.68	--
MW-502	09/18/20	13:01	13.00	5.72	--	NP	7.28	--
MW-502	11/02/20	12:03	13.00	5.46	--	NP	7.54	--
MW-502	03/01/21	11:52	13.00	4.86	--	NP	8.14	--
MW-502	06/22/21	8:42	13.00	5.34	--	NP	7.66	PID: 0.2
MW-502	08/23/21	11:52	13.00	5.50	--	NP	7.50	--
MW-502	11/05/21	10:58	13.00	4.87	--	NP	8.13	PID: 0.1
MW-502	03/04/22	11:20	13.00	4.55	--	NP	8.45	--
MW-502	06/14/22	11:40	13.00	4.90	--	NP	8.10	--
MW-502	08/23/22	8:36	13.00	5.32	--	NP	7.68	--
MW-502	11/09/22	11:29	13.00	4.89	--	NP	8.11	--
MW-502	03/06/23	9:50	13.00	4.51	--	NP	8.49	--
MW-502	06/05/23	11:36	13.00	4.98	--	NP	8.02	PID: 0.0
MW-502	09/11/23	9:03	13.00	5.42	--	NP	7.58	PID: 0.0
MW-502	11/16/23	9:36	13.00	4.94	--	NP	8.06	PID: 0.0
MW-502	03/19/24		13.00	4.36	--	NP	8.64	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-503	07/24/17	11:53	12.22	5.38	--	NP	6.84	Well damaged
MW-503	03/19/18	12:48	12.22	5.12	--	NP	7.10	--
MW-503	06/26/18	11:05	12.22	5.80	--	NP	6.42	--
MW-503	09/21/18	9:31	12.22	5.36	--	NP	6.86	--
MW-503	11/26/18	13:01	12.22	5.18	--	NP	7.04	--
MW-503	03/18/19	9:32	12.22	5.49	--	NP	6.73	--
MW-503	06/17/19	11:28	12.22	5.34	--	NP	6.88	--
MW-503	09/16/19	13:06	12.22	5.18	--	NP	7.04	--
MW-503	12/10/19	10:03	12.22	5.39	--	NP	6.83	--
MW-503	03/12/20	13:41	12.22	5.22	--	NP	7.00	--
MW-503	06/22/20	12:37	12.22	5.22	--	NP	7.00	--
MW-503	09/18/20	13:03	12.22	5.33	--	NP	6.89	--
MW-503	11/02/20	12:18	12.22	7.23	--	NP	4.99	--
MW-503	03/01/21	11:51	12.22	4.98	--	NP	7.24	--
MW-503	06/22/21	8:47	12.22	5.24	--	NP	6.98	PID: 0.2
MW-503	08/23/21	11:49	12.22	5.18	--	NP	7.04	--
MW-503	11/05/21	11:48	12.22	4.54	--	NP	7.68	PID: 0.2
MW-503	03/04/22	11:22	12.22	4.52	--	NP	7.70	--
MW-503	06/14/22	11:39	12.22	4.79	--	NP	7.43	--
MW-503	08/23/22	9:11	12.22	5.22	--	NP	7.00	--
MW-503	11/09/22	11:37	12.22	4.57	--	NP	7.65	--
MW-503	03/06/23	10:39	12.22	4.64	--	NP	7.58	--
MW-503	06/05/23	13:33	12.22	5.08	--	NP	7.14	PID: 0.0
MW-503	09/11/23	8:59	12.22	5.30	--	NP	6.92	PID: 0.0
MW-503	11/16/23	9:41	12.22	4.04	--	NP	8.18	PID: 0.0
MW-503	03/19/24		12.22	4.61	--	NP	7.61	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-504	07/24/17	12:00	13.32	6.85	--	NP	6.47	--
MW-504	03/19/18	12:42	13.32	6.56	--	NP	6.76	--
MW-504	06/26/18	10:26	13.32	7.13	--	NP	6.19	--
MW-504	09/21/18	8:49	13.32	6.94	--	NP	6.38	--
MW-504	11/26/18	13:03	13.32	6.70	--	NP	6.62	PID: 0.9
MW-504	03/18/19	10:25	13.32	6.71	--	NP	6.61	--
MW-504	06/17/19	11:26	13.32	6.75	--	NP	6.57	--
MW-504	09/16/19	12:44	13.32	6.65	--	NP	6.67	--
MW-504	12/10/19	10:01	13.32	6.90	--	NP	6.42	--
MW-504	03/12/20	13:43	13.32	6.62	--	NP	6.70	--
MW-504	06/22/20	12:39	13.32	6.60	--	NP	6.72	--
MW-504	09/18/20	13:05	13.32	6.80	--	NP	6.52	--
MW-504	11/02/20	11:52	13.32	6.78	--	NP	6.54	--
MW-504	03/01/21	11:47	13.32	6.44	--	NP	6.88	--
MW-504	06/22/21	9:59	13.32	6.62	--	NP	6.70	--
MW-504	08/23/21	11:45	13.32	6.63	--	NP	6.69	--
MW-504	11/05/21	11:43	13.32	5.93	--	NP	7.39	--
MW-504	03/04/22	11:03	13.32	5.88	--	NP	7.44	--
MW-504	06/14/22	11:37	13.32	6.16	--	NP	7.16	--
MW-504	08/23/22	8:53	13.32	6.63	--	NP	6.69	--
MW-504	11/09/22	10:49	13.32	5.93	--	NP	7.39	--
MW-504	03/06/23	10:41	13.32	6.88	--	NP	6.44	--
MW-504	06/05/23	11:46	13.32	6.49	--	NP	6.83	PID: 0.0
MW-504	09/11/23	8:57	13.32	6.81	--	NP	6.51	PID: 0.0
MW-504	03/19/24		13.32	6.06	--	NP	7.26	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-505	07/24/17	12:17	11.42	4.92	--	NP	6.50	--
MW-505	03/19/18	12:40	11.42	4.65	--	NP	6.77	--
MW-505	06/26/18	10:21	11.42	5.23	--	NP	6.19	--
MW-505	09/21/18	9:35	11.42	5.05	--	NP	6.37	--
MW-505	11/26/18	13:04	11.42	4.78	--	NP	6.64	--
MW-505	03/18/19	10:21	11.42	4.76	--	NP	6.66	--
MW-505	06/17/19	11:24	11.42	4.83	--	NP	6.59	--
MW-505	09/16/19	12:43	11.42	4.71	--	NP	6.71	--
MW-505	12/10/19	9:58	11.42	4.95	--	NP	6.47	--
MW-505	03/12/20	13:39	11.42	4.68	--	NP	6.74	--
MW-505	06/22/20	12:41	11.42	4.65	--	NP	6.77	--
MW-505	09/18/20	13:07	11.42	4.92	--	NP	6.50	--
MW-505	11/02/20	11:54	11.42	4.77	--	NP	6.65	--
MW-505	03/01/21	11:48	11.42	4.49	--	NP	6.93	--
MW-505	06/22/21	9:55	11.42	4.69	--	NP	6.73	--
MW-505	08/23/21	--	--	--	--	--	--	Well could not be gauged due to wasps
MW-505	11/05/21	11:04	11.42	4.02	--	--	7.40	--
MW-505	03/04/22	11:03	11.42	3.97	--	NP	7.45	--
MW-505	06/14/22	11:35	11.42	4.23	--	NP	7.19	--
MW-505	08/23/22	9:06	11.42	4.70	--	NP	6.72	--
MW-505	11/09/22	10:50	11.42	4.02	--	NP	7.40	--
MW-505	03/06/23	11:04	11.42	4.16	--	NP	7.26	--
MW-505	06/05/23	11:48	11.42	5.54	--	NP	5.88	PID: 0.0
MW-505	09/11/23	8:54	11.42	4.91	--	NP	6.51	PID: 0.0
MW-505	11/16/23	10:53	11.42	4.14	--	NP	7.28	PID: 0.0
MW-505	03/19/24		11.42	4.12	--	NP	7.30	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-506	07/24/17	12:01	13.44	6.91	--	NP	6.53	--
MW-506	03/19/18	12:43	13.44	6.60	--	NP	6.84	--
MW-506	06/26/18	10:20	13.44	7.21	--	NP	6.23	--
MW-506	09/21/18	8:47	13.44	7.01	--	NP	6.43	--
MW-506	11/26/18	13:06	13.44	6.78	--	NP	6.66	--
MW-506	03/18/19	10:22	13.44	6.80	--	NP	6.64	--
MW-506	06/17/19	11:16	13.44	6.82	--	NP	6.62	--
MW-506	09/16/19	12:36	13.44	6.73	--	NP	6.71	--
MW-506	12/10/19	10:20	13.44	6.95	--	NP	6.49	--
MW-506	03/12/20	13:41	13.44	6.69	--	NP	6.75	--
MW-506	06/22/20	11:29	13.44	6.69	--	NP	6.75	--
MW-506	09/18/20	12:19	13.44	6.88	--	NP	6.56	--
MW-506	11/02/20	11:50	13.44	6.80	--	NP	6.64	--
MW-506	03/01/21	11:45	13.44	6.50	--	NP	6.94	--
MW-506	06/22/21	9:45	13.44	6.69	--	NP	6.75	--
MW-506	08/23/21	11:32	13.44	6.70	--	NP	6.74	--
MW-506	11/05/21	11:24	13.44	6.00	--	NP	7.44	--
MW-506	03/04/22	10:56	13.44	5.94	--	NP	7.50	--
MW-506	06/14/22	11:31	13.44	6.21	--	NP	7.23	--
MW-506	08/23/22	8:54	13.44	6.69	--	NP	6.75	--
MW-506	11/09/22	10:47	13.44	6.00	--	NP	7.44	--
MW-506	03/06/23	10:45	13.44	6.17	--	NP	7.27	--
MW-506	06/05/23	12:10	13.44	6.54	--	NP	6.90	PID: 0.0
MW-506	09/11/23	8:51	13.44	6.89	--	NP	6.55	PID: 0.0
MW-506	11/16/23	10:55	13.44	6.05	--	NP	7.39	PID: 0.0
MW-506	03/19/24		13.44	6.13	--	NP	7.31	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-507	07/24/17	12:05	13.60	7.07	--	NP	6.53	--
MW-507	03/19/18	12:42	13.60	6.82	--	NP	6.78	--
MW-507	06/26/18	10:16	13.60	7.37	--	NP	6.23	--
MW-507	09/21/18	8:44	13.60	7.21	--	NP	6.39	--
MW-507	11/26/18	13:08	13.60	6.85	--	NP	6.75	--
MW-507	03/18/19	10:19	13.60	6.93	--	NP	6.67	--
MW-507	06/17/19	11:18	13.60	7.00	--	NP	6.60	--
MW-507	09/16/19	12:38	13.60	6.89	--	NP	6.71	--
MW-507	12/10/19	10:22	13.60	7.12	--	NP	6.48	--
MW-507	03/12/20	13:37	13.60	6.88	--	NP	6.72	--
MW-507	06/22/20	11:35	13.60	6.86	--	NP	6.74	--
MW-507	09/18/20	12:16	13.60	7.02	--	NP	6.58	--
MW-507	11/02/20	11:49	13.60	6.91	--	NP	6.69	--
MW-507	03/01/21	11:43	13.60	6.67	--	NP	6.93	--
MW-507	06/22/21	9:43	13.60	6.85	--	NP	6.75	--
MW-507	08/23/21	11:56	13.60	6.86	--	NP	6.74	--
MW-507	11/05/21	11:27	13.60	6.10	--	NP	7.50	--
MW-507	03/04/22	10:57	13.60	5.99	--	NP	7.61	--
MW-507	06/14/22	11:29	13.60	6.41	--	NP	7.19	--
MW-507	08/23/22	8:56	13.60	6.85	--	NP	6.75	--
MW-507	11/09/22	11:03	13.60	6.13	--	NP	7.47	--
MW-507	03/06/23	10:45	13.60	6.31	--	NP	7.29	--
MW-507	06/05/23	11:50	13.60	6.79	--	NP	6.81	PID: 0.0
MW-507	09/11/23	8:43	13.60	7.11	--	NP	6.49	PID: 0.0
MW-507	11/16/23	10:50	13.60	6.18	--	NP	7.42	PID: 0.0
MW-507	03/19/24		13.60	6.21	--	NP	7.39	PID:0.0
MW-508[DB2]	07/24/17	12:06	13.31	6.81	--	NP	6.50	--

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-509	07/24/17	11:53	10.28	3.80	--	NP	6.48	--
MW-509	03/19/18	12:35	10.28	3.58	--	NP	6.70	--
MW-509	06/26/18	10:19	10.28	4.06	--	NP	6.22	--
MW-509	09/21/18	9:19	10.28	3.85	--	NP	6.43	--
MW-509	11/26/18	13:18	10.28	3.64	--	NP	6.64	--
MW-509	03/18/19	10:10	10.28	3.63	--	NP	6.65	--
MW-509	06/17/19	11:22	10.28	3.69	--	NP	6.59	--
MW-509	09/16/19	13:09	10.28	3.61	--	NP	6.67	--
MW-509	12/10/19	9:57	10.28	3.81	--	NP	6.47	--
MW-509	03/12/20	13:35	10.28	3.56	--	NP	6.72	--
MW-509	06/22/20	12:08	10.28	3.53	--	NP	6.75	--
MW-509	09/18/20	11:30	10.28	3.75	--	NP	6.53	--
MW-509	11/02/20	12:33	10.28	3.86	--	NP	6.42	--
MW-509	03/01/21	11:41	10.28	3.37	--	NP	6.91	--
MW-509	06/22/21	9:49	10.28	3.57	--	NP	6.71	--
MW-509	08/23/21	12:06	10.28	5.56	--	NP	4.72	--
MW-509	11/05/21	11:37	10.28	2.88	--	NP	7.40	--
MW-509	03/04/22	12:10	10.28	2.84	--	NP	7.44	--
MW-509	06/14/22	10:55	10.28	3.09	--	NP	7.19	--
MW-509	08/23/22	8:53	10.28	3.56	--	NP	6.72	--
MW-509	11/09/22	11:49	10.28	2.89	--	NP	7.39	--
MW-509	03/06/23	10:30	10.28	3.01	--	NP	7.27	--
MW-509	06/05/23	13:24	10.28	5.44	--	NP	4.84	PID: 0.0
MW-509	09/11/23	8:38	10.28	3.76	--	NP	6.52	PID: 0.0
MW-509	11/16/23	10:41	10.28	2.95	--	NP	7.33	PID: 0.0
MW-509	03/19/24		10.28	3.01	--	NP	7.27	PID:0.0
MW-510[DB2]	07/24/17	13:00	12.53	6.60	--	NP	5.93	--

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-511	07/24/17	11:49	15.20	8.06	--	NP	7.14	--
MW-511	03/19/18	12:42	15.20	7.92	--	NP	7.28	--
MW-511	06/26/18	11:06	15.20	8.70	--	NP	6.50	--
MW-511	09/21/18	9:40	15.20	8.35	--	NP	6.85	--
MW-511	11/26/18	12:53	15.20	8.33	--	NP	6.87	--
MW-511	03/18/19	9:29	15.20	8.12	--	NP	7.08	--
MW-511	06/17/19	11:47	15.20	8.32	--	NP	6.88	--
MW-511	09/16/19	11:52	15.20	8.27	--	NP	6.93	--
MW-511	12/10/19	10:31	15.20	8.13	--	NP	7.07	--
MW-511	03/12/20	12:54	15.20	8.10	--	NP	7.10	--
MW-511	06/22/20	11:53	15.20	7.98	--	NP	7.22	--
MW-511	09/18/20	12:35	15.20	8.47	--	NP	6.73	--
MW-511	11/02/20	12:05	15.20	8.19	--	NP	7.01	--
MW-511	03/01/21	12:25	15.20	7.51	--	NP	7.69	--
MW-511	06/22/21	10:13	15.20	8.00	--	NP	7.20	--
MW-511	08/23/21	10:57	15.20	8.13	--	NP	7.07	--
MW-511	11/05/21	11:13	15.20	7.39	--	NP	7.81	--
MW-511	03/04/22	11:32	15.20	7.30	--	NP	7.90	--
MW-511	06/14/22	9:51	15.20	7.49	--	NP	7.71	--
MW-511	08/23/22	8:02	15.20	7.92	--	NP	7.28	--
MW-511	11/09/22	11:20	15.20	7.39	--	NP	7.81	--
MW-511	03/06/23	10:18	15.20	7.00	--	NP	8.20	--
MW-511	06/05/23	13:18	15.20	7.50	--	NP	7.70	PID: 0.0
MW-511	09/11/23	9:58	15.20	7.94	--	NP	7.26	PID: 0.0
MW-511	11/16/23	9:30	15.20	7.80	--	NP	7.40	PID: 0.0
MW-511	03/19/24		15.20	6.85	--	NP	8.35	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-512	07/24/17	12:25	13.19	6.73	--	NP	6.46	--
MW-512	03/19/18	12:54	13.19	6.44	--	NP	6.75	--
MW-512	06/26/18	11:08	13.19	7.08	--	NP	6.11	--
MW-512	09/21/18	9:34	13.19	6.84	--	NP	6.35	--
MW-512	11/26/18	13:14	13.19	6.62	--	NP	6.57	--
MW-512	03/18/19	9:25	13.19	6.64	--	NP	6.55	--
MW-512	06/17/19	11:41	13.19	6.66	--	NP	6.53	--
MW-512	09/16/19	12:41	13.19	6.59	--	NP	6.60	--
MW-512	12/10/19	10:24	13.19	6.82	--	NP	6.37	--
MW-512	03/12/20	13:24	13.19	6.58	--	NP	6.61	--
MW-512	06/22/20	11:56	13.19	6.53	--	NP	6.66	--
MW-512	09/18/20	12:34	13.19	6.76	--	NP	6.43	--
MW-512	11/02/20	11:56	13.19	6.70	--	NP	6.49	--
MW-512	03/01/21	12:31	13.19	6.40	--	NP	6.79	--
MW-512	06/22/21	10:16	13.19	6.55	--	NP	6.64	PID: 0.6
MW-512	08/23/21	12:19	13.19	6.55	--	NP	6.64	--
MW-512	11/05/21	11:19	13.19	5.88	--	NP	7.31	--
MW-512	03/04/22	11:25	13.19	5.83	--	NP	7.36	--
MW-512	06/14/22	11:11	13.19	6.10	--	NP	7.09	--
MW-512	08/23/22	8:40	13.19	6.58	--	NP	6.61	--
MW-512	11/09/22	11:40	13.19	5.89	--	NP	7.30	--
MW-512	03/06/23	11:01	13.19	6.01	--	NP	7.18	--
MW-512	06/05/23	13:30	13.19	6.45	--	NP	6.74	PID: 0.0
MW-512	09/11/23	10:03	13.19	6.75	--	NP	6.44	PID: 0.0
MW-512	11/16/23	10:37	13.19	5.96	--	NP	7.23	PID: 0.0
MW-512	03/19/24		13.19	6.00	--	NP	7.19	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-513	07/24/17	12:01	11.09	4.62	--	NP	6.47	--
MW-513	03/19/18	13:24	11.09	4.35	--	NP	6.74	--
MW-513	06/26/18	10:12	11.09	4.92	--	NP	6.17	--
MW-513	09/21/18	9:29	11.09	4.70	--	NP	6.39	--
MW-513	11/26/18	13:09	11.09	4.49	--	NP	6.60	--
MW-513	03/18/19	10:08	11.09	4.49	--	NP	6.60	--
MW-513	06/17/19	11:38	11.09	4.54	--	NP	6.55	--
MW-513	09/16/19	12:38	11.09	4.46	--	NP	6.63	--
MW-513	12/10/19	10:26	11.09	4.68	--	NP	6.41	--
MW-513	03/12/20	13:29	11.09	4.40	--	NP	6.69	--
MW-513	06/22/20	12:01	11.09	4.39	--	NP	6.70	--
MW-513	09/18/20	12:35	11.09	4.60	--	NP	6.49	--
MW-513	11/02/20	12:26	11.09	4.53	--	NP	6.56	--
MW-513	03/01/21	11:34	11.09	4.22	--	NP	6.87	--
MW-513	06/22/21	10:06	11.09	4.43	--	NP	6.66	--
MW-513	08/23/21	12:17	11.09	4.40	--	NP	6.69	--
MW-513	11/05/21	11:26	11.09	3.74	--		7.35	--
MW-513	03/04/22	11:27	11.09	3.66	--	NP	7.43	--
MW-513	06/14/22	11:06	11.09	3.93	--	NP	7.16	--
MW-513	08/23/22	9:14	11.09	4.42	--	NP	6.67	--
MW-513	11/09/22	11:51	11.09	3.73	--	NP	7.36	--
MW-513	03/06/23	10:53	11.09	3.85	--	NP	7.24	--
MW-513	06/05/23	13:26	11.09	4.28	--	NP	6.81	PID: 0.0
MW-513	09/11/23	10:08	11.09	4.60	--	NP	6.49	PID: 0.0
MW-513	11/16/23	10:43	11.09	3.81	--	NP	7.28	PID: 0.0
MW-513	03/19/24		11.09	3.84	--	NP	7.25	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-514	07/24/17	12:39	11.39	4.92	--	NP	6.47	--
MW-514	03/19/18	12:55	11.39	4.65	--	NP	6.74	--
MW-514	06/26/18	10:10	11.39	5.23	--	NP	6.16	--
MW-514	09/21/18	9:31	11.39	5.01	--	NP	6.38	--
MW-514	11/26/18	13:12	11.39	4.81	--	NP	6.58	--
MW-514	03/18/19	9:24	11.39	4.91	--	NP	6.48	--
MW-514	06/17/19	11:36	11.39	4.84	--	NP	6.55	--
MW-514	09/16/19	12:40	11.39	4.78	--	NP	6.61	--
MW-514	12/10/19	10:27	11.39	4.97	--	NP	6.42	--
MW-514	03/12/20	13:28	11.39	4.71	--	NP	6.68	--
MW-514	06/22/20	11:59	11.39	5.70	--	NP	5.69	--
MW-514	09/18/20	12:37	11.39	4.90	--	NP	6.49	--
MW-514	11/02/20	12:30	11.39	4.79	--	NP	6.60	--
MW-514	03/01/21	11:28	11.39	4.52	--	NP	6.87	--
MW-514	06/22/21	10:08	11.39	4.72	--	NP	6.67	--
MW-514	08/23/21	12:15	11.39	4.71	--	NP	6.68	--
MW-514	11/05/21	11:22	11.39	4.03	--	NP	7.36	PID: 0.1
MW-514	03/04/22	11:26	11.39	3.97	--	NP	7.42	--
MW-514	06/14/22	11:07	11.39	4.24	--	NP	7.15	--
MW-514	08/22/22	9:16	11.39	4.73	--	NP	6.66	Roots present in well
MW-514	11/09/22	11:42	11.39	4.04	--	NP	7.35	--
MW-514	03/06/23	10:57	11.39	4.05	--	NP	7.34	--
MW-514	06/05/23	13:27	11.39	4.61	--	NP	6.78	PID: 0.0
MW-514	09/11/23	10:05	11.39	4.92	--	NP	6.47	PID: 0.0
MW-514	11/16/23	10:40	11.39	4.12	--	NP	7.27	PID: 0.0
MW-514	03/19/24	10:05	11.39	4.14	--	NP	7.25	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-515	07/24/17	11:55	11.60	5.11	--	NP	6.49	--
MW-515	03/19/18	12:31	11.60	4.83	--	NP	6.77	--
MW-515	06/26/18	10:11	11.60	5.44	--	NP	6.16	--
MW-515	09/21/18	9:22	11.60	5.22	--	NP	6.38	--
MW-515	11/26/18	13:03	11.60	5.01	--	NP	6.59	--
MW-515	03/18/19	10:05	11.60	5.00	--	NP	6.60	--
MW-515	06/17/19	11:42	11.60	5.03	--	NP	6.57	--
MW-515	09/16/19	12:37	11.60	4.98	--	NP	6.62	--
MW-515	12/10/19	9:59	11.60	5.16	--	NP	6.44	--
MW-515	03/12/20	13:35	11.60	4.92	--	NP	6.68	--
MW-515	06/22/20	--	11.60	--	--	--	--	Wasp nest in well box. Well neither gauged nor sampled. Nest removed.
MW-515	09/18/20	12:40	11.60	5.11	--	NP	6.49	--
MW-515	11/02/20	12:30	11.60	5.04	--	NP	6.56	--
MW-515	03/01/21	11:36	11.60	4.72	--	NP	6.88	--
MW-515	06/22/21	10:00	11.60	4.93	--	NP	6.67	--
MW-515	08/23/21	12:08	11.60	4.91	--	NP	6.69	--
MW-515	11/05/21	11:34	11.60	4.23	--	NP	7.37	--
MW-515	03/04/22	11:28	11.60	4.17	--	NP	7.43	--
MW-515	06/14/22	10:57	11.60	4.45	--	NP	7.15	--
MW-515	08/23/22	8:55	11.60	4.92	--	NP	6.68	--
MW-515	11/09/22	11:48	11.60	4.25	--	NP	7.35	--
MW-515	03/06/23	10:30	11.60	4.37	--	NP	7.23	--
MW-515	06/05/23	13:22	11.60	4.80	--	NP	6.80	PID: 0.0
MW-515	09/11/23	8:36	11.60	5.10	--	NP	6.50	PID: 0.0
MW-515	11/16/23	10:44	11.60	4.32	--	NP	7.28	PID: 0.0
MW-515	03/19/24	10:10	11.60	4.37	--	NP	7.23	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-516	07/24/17	11:58	11.25	4.82	--	NP	6.43	--
MW-516	03/19/18	12:29	11.25	4.51	--	NP	6.74	--
MW-516	06/26/18	10:09	11.25	5.09	--	NP	6.16	--
MW-516	09/21/18	9:24	11.25	4.86	--	NP	6.39	--
MW-516	11/26/18	12:58	11.25	4.65	--	NP	6.60	--
MW-516	03/18/19	10:03	11.25	4.67	--	NP	6.58	--
MW-516	06/17/19	11:44	11.25	4.70	--	NP	6.55	--
MW-516	09/16/19	12:36	11.25	4.62	--	NP	6.63	--
MW-516	12/10/19	10:00	11.25	4.84	--	NP	6.41	--
MW-516	03/12/20	13:33	11.25	4.58	--	NP	6.67	--
MW-516	06/22/20	12:04	11.25	4.55	--	NP	6.70	--
MW-516	09/18/20	12:41	11.25	4.78	--	NP	6.47	--
MW-516	11/02/20	12:28	11.25	4.69	--	NP	6.56	--
MW-516	03/01/21	11:38	11.25	4.37	--	NP	6.88	--
MW-516	06/22/21	10:02	11.25	4.59	--	NP	6.66	--
MW-516	08/23/21	12:10	11.25	4.57	--	NP	6.68	--
MW-516	11/05/21	11:31	11.25	3.90	--	NP	7.35	--
MW-516	03/04/22	11:30	11.25	3.83	--	NP	7.42	--
MW-516	06/14/22	10:59	11.25	4.11	--	NP	7.14	--
MW-516	08/23/22	8:56	11.25	4.59	--	NP	6.66	--
MW-516	11/09/22	11:47	11.25	3.91	--	NP	7.34	--
MW-516	03/06/23	10:28	11.25	4.04	--	NP	7.21	--
MW-516	06/05/23	13:20	11.25	4.48	--	NP	6.77	PID: 0.0
MW-516	09/11/23	8:34	11.25	4.79	--	NP	6.46	PID: 0.0
MW-516	11/16/23	10:45	11.25	3.97	--	NP	7.28	PID: 0.0
MW-516	03/19/24		11.25	4.01	--	NP	7.24	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-517	07/24/17	12:00	12.00	5.55	--	NP	6.45	--
MW-517	03/19/18	12:28	12.00	5.27	--	NP	6.73	--
MW-517	06/26/18	10:08	12.00	5.82	--	NP	6.18	--
MW-517	09/21/18	9:26	12.00	5.62	--	NP	6.38	--
MW-517	11/26/18	13:02	12.00	5.42	--	NP	6.58	--
MW-517	03/18/19	10:02	12.00	5.41	--	NP	6.59	--
MW-517	06/17/19	11:46	12.00	5.45	--	NP	6.55	--
MW-517	09/16/19	12:35	12.00	5.39	--	NP	6.61	--
MW-517	12/10/19	10:02	12.00	5.58	--	NP	6.42	--
MW-517	03/12/20	13:31	12.00	5.32	--	NP	6.68	--
MW-517	06/22/20	12:02	12.00	5.29	--	NP	6.71	--
MW-517	09/18/20	12:43	12.00	5.52	--	NP	6.48	--
MW-517	11/02/20	12:22	12.00	5.45	--	NP	6.55	--
MW-517	03/01/21	11:40	12.00	5.14	--	NP	6.86	--
MW-517	06/22/21	10:04	12.00	5.33	--	NP	6.67	--
MW-517	08/23/21	12:12	12.00	5.32	--	NP	6.68	--
MW-517	11/05/21	11:28	12.00	4.64	--	NP	7.36	--
MW-517	03/04/22	11:31	12.00	4.60	--	NP	7.40	--
MW-517	06/14/22	11:02	12.00	4.86	--	NP	7.14	--
MW-517	08/23/22	8:58	12.00	5.35	--	NP	6.65	--
MW-517	11/09/22	11:46	12.00	4.64	--	NP	7.36	--
MW-517	03/06/23	10:26	12.00	4.79	--	NP	7.21	--
MW-517	06/05/23	13:18	12.00	5.22	--	NP	6.78	PID: 0.0
MW-517	09/11/23	8:28	12.00	5.52	--	NP	6.48	PID: 0.0
MW-517	11/16/23	10:46	12.00	4.73	--	NP	7.27	PID: 0.0
MW-517	03/19/24		12.00	4.78	--	NP	7.22	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-518	07/24/17	11:47	14.60	8.62	--	NP	5.98	--
MW-518	03/19/18	12:33	14.60	8.29	--	NP	6.31	--
MW-518	06/26/18	10:15	14.60	8.95	--	NP	5.65	--
MW-518	09/21/18	9:07	14.60	8.73	--	NP	5.87	--
MW-518	11/26/18	13:07	14.60	8.12	--	NP	6.48	--
MW-518	02/07/19	11:58	14.60	8.24	--	NP	6.36	Not part of the quarterly monitoring program; gauged out of low tide window
MW-518	03/18/19	9:20	14.60	8.51	--	NP	6.09	--
MW-518	06/17/19	11:17	14.60	8.63	--	NP	5.97	--
MW-518	09/16/19	12:09	14.60	8.41	--	NP	6.19	--
MW-518	12/10/19	9:41	14.60	8.47	--	NP	6.13	--
MW-518	03/12/20	13:18	14.60	8.50	--	NP	6.10	--
MW-518	06/22/20	12:11	14.60	8.57	--	NP	6.03	--
MW-518	09/18/20	12:44	14.60	8.68	--	NP	5.92	--
MW-518	11/02/20	11:29	14.60	8.46	--	NP	6.14	--
MW-518	03/01/21	12:35	14.60	8.37	--	NP	6.23	--
MW-518	06/22/21	9:27	14.60	8.53	--	NP	6.07	--
MW-518	08/23/21	12:03	14.60	8.52	--	NP	6.08	--
MW-518	11/05/21	11:44	14.60	7.58	--	NP	7.02	--
MW-518	03/04/22	11:06	14.60	7.72	--	NP	6.88	--
MW-518	06/14/22	10:36	14.60	8.12	--	NP	6.48	--
MW-518	08/23/22	8:49	14.60	8.49	--	NP	6.11	--
MW-518	11/09/22	10:46	14.60	7.65	--	NP	6.95	--
MW-518	03/06/23	10:33	14.60	7.83	--	NP	6.77	--
MW-518	06/05/23	12:11	14.60	8.40	--	NP	6.20	PID: 0.0
MW-518	09/11/23	9:14	14.60	8.63	--	NP	5.97	PID: 0.0
MW-518	11/16/23	10:26	14.60	7.69	--	NP	6.91	PID: 0.0
MW-518	03/19/24	9:01	14.60	7.77	--	NP	6.83	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-519	07/24/17	11:45	12.60	7.02	--	NP	5.58	--
MW-519	03/19/18	12:19	12.60	6.70	--	NP	5.90	--
MW-519	06/26/18	9:55	12.60	7.29	--	NP	5.31	--
MW-519	09/21/18	8:45	12.60	7.17	--	NP	5.43	--
MW-519	11/26/18	12:42	12.60	6.60	--	NP	6.00	--
MW-519	03/18/19	9:52	12.60	7.18	--	NP	5.42	--
MW-519	06/17/19	10:59	12.60	7.11	--	NP	5.49	--
MW-519	09/16/19	12:29	12.60	6.94	--	NP	5.66	--
MW-519	12/10/19	10:10	12.60	6.83	--	NP	5.77	--
MW-519	03/12/20	12:59	12.60	7.00	--	NP	5.60	--
MW-519	06/22/20	11:41	12.60	6.99	--	NP	5.61	--
MW-519	09/18/20	11:54	12.60	7.05	--	NP	5.55	--
MW-519	11/02/20	11:40	12.60	7.28	--	NP	5.32	--
MW-519	03/01/21	11:49	12.60	6.96	--	NP	5.64	--
MW-519	06/22/21	9:06	12.60	7.14	--	NP	5.46	--
MW-519	08/23/21	11:17	12.60	7.00	--	NP	5.60	--
MW-519	11/05/21	10:49	12.60	5.93	--	NP	6.67	--
MW-519	03/04/22	11:29	12.60	6.19	--	NP	6.41	--
MW-519	06/14/22	9:59	12.60	6.52	--	NP	6.08	--
MW-519	08/23/22	8:19	12.60	6.96	--	NP	5.64	--
MW-519	11/09/22	11:35	12.60	6.16	--	NP	6.44	--
MW-519	03/06/23	10:10	12.60	6.28	--	NP	6.32	--
MW-519	06/05/23	12:03	12.60	6.83	--	NP	5.77	PID: 0.0
MW-519	09/11/23	8:55	12.60	6.98	--	NP	5.62	PID: 0.0
MW-519	11/16/23	10:07	12.60	6.19	--	NP	6.41	PID: 0.0
MW-519	03/19/24	9:22	12.60	6.36	--	NP	6.24	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-520	07/24/17	11:34	13.31	7.71	--	NP	5.60	--
MW-520	03/19/18	12:17	13.31	7.42	--	NP	5.89	--
MW-520	06/26/18	9:57	13.31	7.96	--	NP	5.35	--
MW-520	09/21/18	8:41	13.31	7.88	--	NP	5.43	--
MW-520	11/26/18	12:40	13.31	7.31	--	NP	6.00	--
MW-520	03/18/19	9:55	13.31	7.86	--	NP	5.45	--
MW-520	06/17/19	10:57	13.31	7.81	--	NP	5.50	--
MW-520	09/16/19	12:31	13.31	7.65	--	NP	5.66	--
MW-520	12/10/19	10:06	13.31	7.54	--	NP	5.77	--
MW-520	03/12/20	13:01	13.31	7.71	--	NP	5.60	--
MW-520	06/22/20	11:42	13.31	7.68	--	NP	5.63	--
MW-520	09/18/20	11:55	13.31	7.74	--	NP	5.57	--
MW-520	11/02/20	11:43	13.31	7.98	--	NP	5.33	--
MW-520	03/01/21	12:26	13.31	7.66	--	NP	5.65	--
MW-520	06/22/21	9:04	13.31	7.84	--	NP	5.47	--
MW-520	08/23/21	11:19	13.31	7.67	--	NP	5.64	--
MW-520	11/05/21	11:00	13.31	6.63	--	NP	6.68	--
MW-520	03/04/22	11:28	13.31	6.88	--	NP	6.43	--
MW-520	06/14/22	10:21	13.31	7.22	--	NP	6.09	--
MW-520	08/23/22	8:21	13.31	7.66	--	NP	5.65	--
MW-520	11/09/22	11:30	13.31	6.86	--	NP	6.45	--
MW-520	03/06/23	10:12	13.31	7.00	--	NP	6.31	PID: 0.1
MW-520	06/05/23	11:59	13.31	7.50	--	NP	5.81	PID: 0.0
MW-520	09/11/23	8:54	13.31	7.67	--	NP	5.64	PID: 0.0
MW-520	11/16/23	10:05	13.31	6.89	--	NP	6.42	PID: 0.0
MW-520	03/19/24	9:20	13.31	7.08	--	NP	6.23	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-521	07/24/17	11:36	12.18	6.67	--	NP	5.51	--
MW-521	03/19/18	12:19	12.18	6.33	--	NP	5.85	--
MW-521	06/26/18	9:55	12.18	6.89	--	NP	5.29	--
MW-521	09/21/18	8:44	12.18	6.76	--	NP	5.42	--
MW-521	11/26/18	12:41	12.18	6.21	--	NP	5.97	--
MW-521	03/18/19	9:53	12.18	6.77	--	NP	5.41	--
MW-521	06/17/19	10:53	12.18	6.71	--	NP	5.47	--
MW-521	09/16/19	12:30	12.18	6.53	--	NP	5.65	--
MW-521	12/10/19	10:08	12.18	6.43	--	NP	5.75	--
MW-521	03/12/20	13:02	12.18	6.61	--	NP	5.57	--
MW-521	06/22/20	11:43	12.18	6.58	--	NP	5.60	--
MW-521	09/18/20	12:35	12.18	6.36	--	NP	5.82	--
MW-521	11/02/20	11:45	12.18	6.87	--	NP	5.31	--
MW-521	03/01/21	11:24	12.18	6.57	--	NP	5.61	--
MW-521	06/22/21	9:02	12.18	6.73	--	NP	5.45	--
MW-521	08/23/21	11:22	12.18	6.58	--	NP	5.60	--
MW-521	11/05/21	10:58	12.18	5.51	--	NP	6.67	--
MW-521	03/04/22	11:27	12.18	5.79	--	NP	6.39	--
MW-521	06/14/22	10:01	12.18	6.13	--	NP	6.05	--
MW-521	08/23/22	8:23	12.18	6.55	--	NP	5.63	--
MW-521	11/09/22	11:33	12.18	5.76	--	NP	6.42	--
MW-521	03/06/23	10:10	12.18	5.90	--	NP	6.28	PID: 0.1
MW-521	06/05/23	12:01	12.18	6.43	--	NP	5.75	PID: 0.0
MW-521	09/11/23	8:51	12.18	6.58	--	NP	5.60	PID: 0.0
MW-521	11/16/23	10:06	12.18	5.78	--	NP	6.40	PID: 0.0
MW-521	03/19/24	9:21	12.18	5.96	--	NP	6.22	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-522	07/24/17	11:32	13.82	5.36	--	NP	8.46	--
MW-522	03/19/18	12:15	13.82	8.01	--	NP	5.81	--
MW-522	06/26/18	9:52	13.82	8.58	--	NP	5.24	--
MW-522	09/21/18	8:39	13.82	8.43	--	NP	5.39	--
MW-522	11/26/18	12:38	13.82	7.83	--	NP	5.99	--
MW-522	03/18/19	9:17	13.82	8.41	--	NP	5.41	--
MW-522	06/17/19	10:55	13.82	8.39	--	NP	5.43	--
MW-522	09/16/19	12:04	13.82	8.22	--	NP	5.60	--
MW-522	12/10/19	9:32	13.82	8.07	--	NP	5.75	--
MW-522	03/12/20	13:16	13.82	8.27	--	NP	5.55	--
MW-522	06/22/20	12:19	13.82	8.26	--	NP	5.56	--
MW-522	09/18/20	12:08	13.82	8.30	--	NP	5.52	--
MW-522	11/02/20	11:45	13.82	8.52	--	NP	5.30	--
MW-522	03/01/21	12:21	13.82	8.23	--	NP	5.59	--
MW-522	06/22/21	9:00	13.82	8.40	--	NP	5.42	--
MW-522	08/23/21	11:52	13.82	8.26	--	NP	5.56	--
MW-522	11/05/21	11:51	13.82	7.14	--	NP	6.68	--
MW-522	03/04/22	11:12	13.82	7.42	--	NP	6.40	--
MW-522	06/14/22	10:19	13.82	7.81	--	NP	6.01	--
MW-522	08/23/22	8:41	13.82	8.23	--	NP	5.59	--
MW-522	11/09/22	10:36	13.82	7.36	--	NP	6.46	--
MW-522	03/06/23	10:15	13.82	7.52	--	NP	6.30	PID: 0.1
MW-522	06/05/23	11:58	13.82	8.11	--	NP	5.71	PID: 0.0
MW-522	09/11/23	8:48	13.82	8.25	--	NP	5.57	PID: 0.0
MW-522	11/16/23	10:05	13.82	7.41	--	NP	6.41	PID: 0.0
MW-522	03/19/24	8:49	13.82	7.61	--	NP	6.21	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

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Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-523	07/24/17	11:29	13.53	7.96	--	NP	5.57	--
MW-523	03/19/18	12:12	13.53	7.68	--	NP	5.85	--
MW-523	06/26/18	9:47	13.53	8.26	--	NP	5.27	--
MW-523	09/21/18	8:34	13.53	8.13	--	NP	5.40	--
MW-523	11/26/18	12:35	13.53	7.57	--	NP	5.96	--
MW-523	03/18/19	9:15	13.53	8.13	--	NP	5.40	--
MW-523	06/17/19	10:49	13.53	8.11	--	NP	5.42	--
MW-523	09/16/19	12:01	13.53	7.92	--	NP	5.61	--
MW-523	12/10/19	9:25	13.53	7.78	--	NP	5.75	--
MW-523	03/12/20	13:13	13.53	7.97	--	NP	5.56	--
MW-523	06/22/20	12:21	13.53	7.98	--	NP	5.55	--
MW-523	09/18/20	12:14	13.53	8.02	--	NP	5.51	--
MW-523	11/02/20	11:53	13.53	8.21	--	NP	5.32	--
MW-523	03/01/21	12:17	13.53	7.91	--	NP	5.62	--
MW-523	06/22/21	8:55	13.53	8.10	--	NP	5.43	--
MW-523	08/23/21	11:46	13.53	7.98	--	NP	5.55	--
MW-523	11/05/21	11:54	13.53	6.85	--	NP	6.68	--
MW-523	03/04/22	11:16	13.53	7.12	--	NP	6.41	--
MW-523	06/14/22	10:17	13.53	7.47	--	NP	6.06	--
MW-523	08/23/22	8:38	13.53	7.97	--	NP	5.56	--
MW-523	11/09/22	10:32	13.53	7.10	--	NP	6.43	--
MW-523	03/06/23	10:07	13.53	7.25	--	NP	6.28	--
MW-523	06/05/23	11:52	13.53	7.80	--	NP	5.73	PID: 0.0
MW-523	09/11/23	8:44	13.53	7.95	--	NP	5.58	PID: 0.0
MW-523	11/16/23	10:03	13.53	7.13	--	NP	6.40	PID: 0.0
MW-523	03/19/24	8:47	13.53	7.33	--	NP	6.20	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-524	07/24/17	11:25	13.16	7.78	--	NP	5.38	--
MW-524	03/19/18	12:10	13.16	7.30	--	NP	5.86	--
MW-524	06/26/18	9:45	13.16	7.95	--	NP	5.21	--
MW-524	09/21/18	8:28	13.16	7.94	--	NP	5.22	--
MW-524	11/26/18	12:28	13.16	7.19	--	NP	5.97	--
MW-524	03/18/19	9:03	13.16	7.65	--	NP	5.51	--
MW-524	06/17/19	10:41	13.16	7.91	--	NP	5.25	--
MW-524	09/16/19	11:59	13.16	7.71	--	NP	5.45	--
MW-524	12/10/19	9:19	13.16	7.46	--	NP	5.70	--
MW-524	03/12/20	13:09	13.16	7.61	--	NP	5.55	--
MW-524	06/22/20	12:25	13.16	7.77	--	NP	5.39	--
MW-524	09/18/20	12:17	13.16	7.83	--	NP	5.33	--
MW-524	11/02/20	11:59	13.16	7.92	--	NP	5.24	--
MW-524	03/01/21	12:09	13.16	7.58	--	NP	5.58	--
MW-524	06/22/21	8:48	13.16	7.92	--	NP	5.24	--
MW-524	08/23/21	11:39	13.16	7.29	--	NP	5.87	--
MW-524	11/05/21	11:58	13.16	6.23	--	NP	6.93	--
MW-524	03/04/22	11:19	13.16	6.32	--	NP	6.84	--
MW-524	06/14/22	10:11	13.16	7.31	--	NP	5.85	--
MW-524	08/23/22	8:32	13.16	7.75	--	NP	5.41	--
MW-524	11/09/22	10:25	13.16	6.56	--	NP	6.60	--
MW-524	03/06/23	10:02	13.16	6.78	--	NP	6.38	--
MW-524	06/05/23	11:45	13.16	7.05	--	NP	6.11	PID: 0.0
MW-524	09/11/23	8:38	13.16	7.76	--	NP	5.40	PID: 0.0
MW-524	11/16/23	9:56	13.16	6.85	--	NP	6.31	PID: 0.0
MW-524	03/19/24	8:41	13.16	6.94	--	NP	6.22	PID: 0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-525	07/24/17	13:06	12.62	6.65	--	NP	5.97	--
MW-525	03/19/18	12:25	12.62	6.37	--	NP	6.25	--
MW-525	06/26/18	10:02	12.62	6.84	--	NP	5.78	--
MW-525	09/21/18	8:14	12.62	6.66	--	NP	5.96	--
MW-525	11/26/18	12:17	12.62	6.15	--	NP	6.47	--
MW-525	03/18/19	9:46	12.62	6.64	--	NP	5.98	--
MW-525	06/17/19	11:50	12.62	6.88	--	NP	5.74	--
MW-525	09/16/19	12:19	12.62	6.62	--	NP	6.00	--
MW-525	12/10/19	10:18	12.62	6.48	--	NP	6.14	--
MW-525	03/12/20	13:20	12.62	6.73	--	NP	5.89	--
MW-525	06/22/20	11:33	12.62	6.60	--	NP	6.02	--
MW-525	09/18/20	11:58	12.62	6.80	--	NP	5.82	--
MW-525	11/02/20	11:35	12.62	6.57	--	NP	6.05	--
MW-525	03/01/21	11:43	12.62	6.26	--	NP	6.36	--
MW-525	06/22/21	9:16	12.62	6.53	--	NP	6.09	--
MW-525	08/23/21	11:00	12.62	6.41	--	NP	6.21	--
MW-525	11/05/21	11:06	12.62	5.50	--	NP	7.12	--
MW-525	03/04/22	11:37	12.62	5.63	--	NP	6.99	--
MW-525	06/14/22	10:24	12.62	5.94	--	NP	6.68	--
MW-525	08/23/22	8:09	12.62	6.37	--	NP	6.25	--
MW-525	11/09/22	11:46	12.62	5.59	--	NP	7.03	--
MW-525	03/06/23	11:14	12.62	5.61	--	NP	7.01	--
MW-525	06/05/23	13:05	12.62	6.16	--	NP	6.46	PID: 0.0
MW-525	09/11/23	8:58	12.62	6.41	--	NP	6.21	PID: 0.0
MW-525	11/16/23	10:19	12.62	5.56	--	NP	7.06	PID: 0.0
MW-525	03/19/24	8:54	12.62	5.60	--	NP	7.02	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-526	07/24/17	11:03	12.90	5.49	--	NP	7.41	--
MW-526	03/19/18	12:52	12.90	5.45	--	NP	7.45	--
MW-526	06/26/18	11:00	12.90	6.12	--	NP	6.78	--
MW-526	09/21/18	9:36	12.90	5.96	--	NP	6.94	--
MW-526	11/26/18	12:55	12.90	5.80	--	NP	7.10	--
MW-526	02/07/19	11:27	12.90	5.40	--	NP	7.50	Not part of the quarterly monitoring program; gauged out of low tide window
MW-526	03/18/19	9:28	12.90	5.59	--	NP	7.31	--
MW-526	06/17/19	11:45	12.90	5.89	--	NP	7.01	--
MW-526	09/16/19	12:42	12.90	5.58	--	NP	7.32	--
MW-526	12/10/19	10:11	12.90	5.48	--	NP	7.42	--
MW-526	03/12/20	13:26	12.90	5.43	--	NP	7.47	--
MW-526	06/22/20	11:55	12.90	5.31	--	NP	7.59	--
MW-526	09/18/20	12:33	12.90	6.00	--	NP	6.90	--
MW-526	11/02/20	11:54	12.90	5.44	--	NP	7.46	--
MW-526	03/01/21	12:29	12.90	4.84	--	NP	8.06	--
MW-526	06/22/21	8:35	12.90	5.28	--	NP	7.62	PID: 0.3
MW-526	08/23/21	12:20	12.90	5.66	--	NP	7.24	--
MW-526	11/05/21	11:17	12.90	4.66	--	NP	8.24	--
MW-526	03/04/22	11:23	12.90	4.53	--	NP	8.37	--
MW-526	06/14/22	11:15	12.90	4.84	--	NP	8.06	--
MW-526	08/23/22	8:43	12.90	6.58	--	NP	6.32	--
MW-526	11/09/22	11:23	12.90	4.55	--	NP	8.35	--
MW-526	03/06/23	10:16	12.90	4.36	--	NP	8.54	--
MW-526	06/05/23	13:01	12.90	5.05	--	NP	7.85	PID: 0.0
MW-526	09/11/23	9:56	12.90	5.66	--	NP	7.24	PID: 0.0
MW-526	11/16/23	11:01	12.90	4.55	--	NP	8.35	PID: 0.0
MW-526	03/19/24		12.90	4.34	--	NP	8.56	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-527	07/24/17	11:56	19.09	9.90	--	NP	9.19	--
MW-527	03/19/18	12:56	19.09	8.97	--	NP	10.12	--
MW-527	06/26/18	9:50	19.09	9.75	--	NP	9.34	--
MW-527	09/21/18	9:09	19.09	9.91	--	NP	9.18	--
MW-527	11/26/18	12:35	19.09	9.10	--	NP	9.99	--
MW-527	03/18/19	9:47	19.09	8.89	--	NP	10.20	--
MW-527	06/17/19	10:56	19.09	9.89	--	NP	9.20	--
MW-527	09/16/19	12:15	19.09	9.81	--	NP	9.28	--
MW-527	12/10/19	9:23	19.09	9.49	--	NP	9.60	--
MW-527	03/12/20	13:51	19.09	8.84	--	NP	10.25	--
MW-527	06/22/20	12:40	19.09	9.51	--	NP	9.58	--
MW-527	09/18/20	12:41	19.09	10.10	--	NP	8.99	--
MW-527	11/02/20	12:07	19.09	9.51	--	NP	9.58	--
MW-527	03/01/21	12:10	19.09	7.39	--	NP	11.70	--
MW-527	06/22/21	9:07	19.09	9.72	--	NP	9.37	--
MW-527	08/23/21	11:18	19.09	10.29	--	NP	8.80	PID: 1.0
MW-527	11/05/21	11:09	19.09	7.75	--	NP	11.34	PID: 2.8
MW-527	03/04/22	11:18	19.09	5.73	--	NP	13.36	PID: 1.6
MW-527	06/14/22	10:41	19.09	9.12	--	NP	9.97	--
MW-527	08/23/22	8:26	19.09	10.06	--	NP	9.03	PID: 1.5
MW-527	11/09/22	10:23	19.09	9.27	--	NP	9.82	PID: 2.4
MW-527	03/06/23	10:07	19.09	6.31	--	NP	12.78	--
MW-527	06/05/23	12:40	19.09	9.63	--	NP	9.46	PID: 0.0
MW-527	09/11/23	9:24	19.09	10.38	--	NP	8.71	PID: 2.1
MW-527	11/16/23	10:12	19.09	9.19	--	NP	9.90	PID: 5.4
MW-527	03/19/24		19.09	8.68	--	NP	10.41	PID: 0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-528	07/24/17	11:54	19.74	10.59	--	NP	9.15	--
MW-528	03/19/18	12:52	19.74	9.38	--	NP	10.36	--
MW-528	06/26/18	9:44	19.74	10.62	--	NP	9.12	--
MW-528	09/21/18	9:11	19.74	11.00	--	NP	8.74	--
MW-528	11/26/18	12:36	19.74	10.01	--	NP	9.73	--
MW-528	03/18/19	9:51	19.74	9.23	--	NP	10.51	--
MW-528	06/17/19	10:52	19.74	10.62	--	NP	9.12	--
MW-528	09/16/19	12:13	19.74	11.03	--	NP	8.71	--
MW-528	12/10/19	9:30	19.74	10.32	--	NP	9.42	--
MW-528	03/12/20	13:33	19.74	9.34	--	NP	10.40	--
MW-528	06/22/20	12:44	19.74	9.56	--	NP	10.18	--
MW-528	09/18/20	12:43	19.74	10.99	--	NP	8.75	--
MW-528	11/02/20	12:11	19.74	10.40	--	NP	9.34	--
MW-528	03/01/21	12:07	19.74	8.70	--	NP	11.04	--
MW-528	06/22/21	8:54	19.74	10.50	--	NP	9.24	--
MW-528	08/23/21	11:15	19.74	11.11	--	NP	8.63	--
MW-528	11/05/21	11:05	19.74	8.67	--	NP	11.07	--
MW-528	03/04/22	11:15	19.74	7.96	--	NP	11.78	PID: 0.01
MW-528	06/14/22	10:31	19.74	9.52	--	NP	10.22	--
MW-528	08/23/22	8:22	19.74	10.72	--	NP	9.02	--
MW-528	11/09/22	10:29	19.74	10.45	--	NP	9.29	--
MW-528	03/06/23	10:04	19.74	8.52	--	NP	11.22	--
MW-528	06/05/23	12:35	19.74	10.08	--	NP	9.66	PID: 0.0
MW-528	09/11/23	9:17	19.74	11.21	--	NP	8.53	PID: 0.0
MW-528	11/16/23	10:08	19.74	9.82	--	NP	9.92	PID: 0.0
MW-528	03/19/24		19.74	8.79	--	NP	10.95	PID:0.0
MW-529[DB2]	07/24/17	12:15	10.12	4.29	--	NP	5.83	--

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-530	07/24/17	11:30	11.02	4.97	--	NP	6.05	--
MW-530	03/19/18	13:31	11.02	4.93	--	NP	6.09	--
MW-530	06/26/18	10:04	11.02	5.38	--	NP	5.64	--
MW-530	09/21/18	8:40	11.02	5.33	--	NP	5.69	--
MW-530	11/26/18	13:12	11.02	4.20	--	NP	6.82	--
MW-530	03/18/19	9:07	11.02	5.64	--	NP	5.38	--
MW-530	06/17/19	--	--	--	--	--	--	Well Damaged - Repaired on 06/28/19
MW-530	09/16/19	12:55	12.73	6.62	--	NP	6.11	--
MW-530	12/10/19	9:44	12.73	6.58	--	NP	6.15	--
MW-530	03/12/20	13:02	12.73	6.71	--	NP	6.02	--
MW-530	06/22/20	12:14	12.73	6.89	--	NP	5.84	--
MW-530	09/18/20	12:09	12.73	6.79	--	NP	5.94	--
MW-530	11/02/20	11:43	12.73	6.53	--	NP	6.20	--
MW-530	03/01/21	12:47	12.73	6.67	--	NP	6.06	--
MW-530	06/22/21	9:41	12.73	6.84	--	NP	5.89	--
MW-530	08/23/21	11:58	12.73	6.73	--	NP	6.00	--
MW-530	11/05/21	11:36	12.73	5.92	--	NP	6.81	--
MW-530	03/04/22	10:58	12.73	6.14	--	NP	6.59	--
MW-530	06/14/22	10:43	12.73	6.36	--	NP	6.37	--
MW-530	08/23/22	9:08	12.73	6.79	--	NP	5.94	--
MW-530	11/09/22	11:11	12.73	5.89	--	NP	6.84	--
MW-530	03/06/23	10:56	12.73	6.11	--	NP	6.62	PID: 0.1
MW-530	06/05/23	12:22	12.73	6.78	--	NP	5.95	PID: 0.0
MW-530	09/11/23	9:32	12.73	6.89	--	NP	5.84	PID: 0.1
MW-530	11/16/23	10:35	12.73	5.63	--	NP	7.10	PID: 3.7
MW-530	03/19/24	9:12	12.73	5.78	--	NP	6.95	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-531	07/24/17	11:45	13.26	7.69	--	NP	5.57	--
MW-531	03/19/18	12:22	13.26	7.35	--	NP	5.91	--
MW-531	06/26/18	10:05	13.26	7.93	--	NP	5.33	--
MW-531	09/21/18	8:53	13.26	7.81	--	NP	5.45	--
MW-531	11/26/18	12:50	13.26	7.25	--	NP	6.01	--
MW-531	03/18/19	9:56	13.26	7.83	--	NP	5.43	--
MW-531	06/17/19	11:52	13.26	7.80	--	NP	5.46	--
MW-531	09/16/19	12:33	13.26	7.60	--	NP	5.66	--
MW-531	12/10/19	10:04	13.26	7.47	--	NP	5.79	--
MW-531	03/12/20	13:18	13.26	7.66	--	NP	5.60	--
MW-531	06/22/20	11:48	13.26	7.64	--	NP	5.62	--
MW-531	09/18/20	12:01	13.26	7.70	--	NP	5.56	--
MW-531	11/02/20	11:38	13.26	7.92	--	NP	5.34	--
MW-531	03/01/21	12:56	13.26	7.63	--	NP	5.63	--
MW-531	06/22/21	9:14	13.26	7.79	--	NP	5.47	--
MW-531	08/23/21	11:14	13.26	7.62	--	NP	5.64	--
MW-531	11/05/21	11:03	13.26	6.56	--	NP	6.70	--
MW-531	03/04/22	11:32	13.26	6.85	--	NP	6.41	--
MW-531	06/14/22	10:22	13.26	7.16	--	NP	6.10	--
MW-531	08/23/22	8:59	13.26	7.61	--	NP	5.65	--
MW-531	11/09/22	11:43	13.26	6.81	--	NP	6.45	--
MW-531	03/06/23	11:15	13.26	6.32	--	NP	6.94	--
MW-531	06/05/23	13:15	13.26	7.50	--	NP	5.76	PID: 0.0
MW-531	09/11/23	9:11	13.26	7.63	--	NP	5.63	PID: 0.0
MW-531	11/16/23	10:21	13.26	6.81	--	NP	6.45	PID: 0.0
MW-531	03/19/24	9:31	13.26	7.00	--	NP	6.26	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-532	07/24/17	11:13	13.38	7.49	--	NP	5.89	--
MW-532	03/19/18	12:25	13.38	7.33	--	NP	6.05	--
MW-532	06/26/18	10:06	13.38	7.75	--	NP	5.63	--
MW-532	09/21/18	8:55	13.38	7.71	--	NP	5.67	--
MW-532	11/26/18	12:47	13.38	6.97	--	NP	6.41	--
MW-532	03/18/19	9:59	13.38	7.68	--	NP	5.70	--
MW-532	06/17/19	11:54	13.38	7.98	--	NP	5.40	--
MW-532	09/16/19	12:24	13.38	7.60	--	NP	5.78	--
MW-532	12/10/19	10:17	13.38	7.30	--	NP	6.08	--
MW-532	03/12/20	13:36	13.38	7.63	--	NP	5.75	--
MW-532	06/22/20	11:35	13.38	7.54	--	NP	5.84	--
MW-532	09/18/20	12:06	13.38	7.81	--	NP	5.57	--
MW-532	11/02/20	11:51	13.38	7.58	--	NP	5.80	--
MW-532	03/01/21	12:53	13.38	7.24	--	NP	6.14	--
MW-532	06/22/21	9:18	13.38	7.45	--	NP	5.93	--
MW-532	08/23/21	11:03	13.38	7.34	--	NP	6.04	--
MW-532	11/05/21	11:09	13.38	6.18	--	NP	7.20	--
MW-532	03/04/22	11:31	13.38	6.04	--	NP	7.34	--
MW-532	06/14/22	10:26	13.38	6.62	--	NP	6.76	--
MW-532	08/23/22	8:12	13.38	7.24	--	NP	6.14	--
MW-532	11/09/22	11:48	13.38	6.45	--	NP	6.93	--
MW-532	03/06/23	11:17	13.38	6.28	--	NP	7.10	--
MW-532	06/05/23	13:08	13.38	6.96	--	NP	6.42	PID: 0.0
MW-532	09/11/23	9:01	13.38	7.17	--	NP	6.21	PID: 0.0
MW-532	03/19/24	9:29	13.38	6.30	--	NP	7.08	PID: 0.1

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-533	03/19/18	12:36	11.79	5.10	--	NP	6.69	--
MW-533	06/26/18	9:46	11.79	5.58	--	NP	6.21	--
MW-533	09/21/18	8:27	11.79	5.49	--	NP	6.30	--
MW-533	11/26/18	12:21	11.79	4.60	--	NP	7.19	--
MW-533	03/18/19	9:16	11.79	5.54	--	NP	6.25	--
MW-533	06/17/19	11:21	11.79	5.27	--	NP	6.52	--
MW-533	09/16/19	12:13	11.79	5.17	--	NP	6.62	--
MW-533	12/10/19	9:47	11.79	5.34	--	NP	6.45	--
MW-533	03/12/20	13:14	11.79	5.08	--	NP	6.71	--
MW-533	06/22/20	12:02	11.79	5.15	--	NP	6.64	--
MW-533	09/18/20	11:46	11.79	5.28	--	NP	6.51	--
MW-533	11/02/20	11:16	11.79	5.11	--	NP	6.68	--
MW-533	03/01/21	12:39	11.79	4.94	--	NP	6.85	--
MW-533	06/22/21	9:35	11.79	5.10	--	NP	6.69	--
MW-533	08/23/21	11:42	11.79	5.10	--	NP	6.69	--
MW-533	11/05/21	11:40	11.79	4.43	--	NP	7.36	--
MW-533	03/04/22	11:03	11.79	4.46	--	NP	7.33	--
MW-533	06/14/22	10:39	11.79	4.70	--	NP	7.09	--
MW-533	08/23/22	9:01	11.79	5.13	--	NP	6.66	--
MW-533	11/09/22	11:03	11.79	4.48	--	NP	7.31	--
MW-533	03/06/23	10:50	11.79	4.65	--	NP	7.14	--
MW-533	06/05/23	12:15	11.79	5.04	--	NP	6.75	PID: 0.0
MW-533	09/11/23	9:24	11.79	5.32	--	NP	6.47	PID: 0.1
MW-533	11/16/23	10:30	11.79	4.27	--	NP	7.52	PID: 0.0
MW-533	03/19/24	9:05	11.79	4.49	--	NP	7.30	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-534	03/19/18	12:37	10.28	3.63	--	NP	6.65	--
MW-534	06/26/18	9:41	10.28	4.00	--	NP	6.28	--
MW-534	09/21/18	8:24	10.28	3.94	--	NP	6.34	--
MW-534	11/26/18	12:23	10.28	3.30	--	NP	6.98	--
MW-534	03/18/19	9:27	10.28	3.61	--	NP	6.67	--
MW-534	06/17/19	11:20	10.28	3.68	--	NP	6.60	--
MW-534	09/16/19	12:39	10.28	3.54	--	NP	6.74	--
MW-534	12/10/19	9:51	10.28	3.76	--	NP	6.52	--
MW-534	03/12/20	13:33	10.28	3.50	--	NP	6.78	--
MW-534	06/22/20	12:19	10.28	5.32	--	NP	4.96	--
MW-534	09/18/20	11:34	10.28	3.71	--	NP	6.57	--
MW-534	11/02/20	11:21	10.28	3.55	--	NP	6.73	--
MW-534	03/01/21	11:37	10.28	3.39	--	NP	6.89	--
MW-534	06/22/21	9:33	10.28	3.52	--	NP	6.76	--
MW-534	08/23/21	11:37	10.28	3.46	--	NP	6.82	--
MW-534	11/05/21	11:30	10.28	3.06	--	NP	7.22	--
MW-534	03/04/22	10:34	10.28	3.15	--	NP	7.13	--
MW-534	06/14/22	10:50	10.28	3.00	--	NP	7.28	--
MW-534	08/23/22	8:58	10.28	3.50	--	NP	6.78	--
MW-534	11/09/22	11:07	10.28	2.93	--	NP	7.35	--
MW-534	03/06/23	10:46	10.28	3.09	--	NP	7.19	--
MW-534	06/05/23	11:53	10.28	3.46	--	NP	6.82	PID: 0.0
MW-534	09/11/23	8:40	10.28	3.74	--	NP	6.54	PID:0.1
MW-534	11/16/23	10:49	10.28	2.78	--	NP	7.50	PID:0.1
MW-534	03/19/24		10.28	2.78	--	NP	7.50	PID:0.0

Table 2-7
Groundwater Gauging Data (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

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Monitoring Well	Date	Time	Top of Casing Elevation (feet)	Depth to Water (top of casing) (feet)	Depth to LNAPL (feet)	LNAPL Thickness (feet)	Groundwater Elevation (feet amsl)	Comment
MW-535	03/19/18	12:40	11.55	4.90	--	NP	6.65	--
MW-535	06/26/18	9:48	11.55	5.36	--	NP	6.19	--
MW-535	09/21/18	8:26	11.55	5.33	--	NP	6.22	--
MW-535	11/26/18	12:22	11.55	4.18	--	NP	7.37	--
MW-535	03/18/19	9:12	11.55	4.71	--	NP	6.84	--
MW-535	06/17/19	11:23	11.55	5.09	--	NP	6.46	--
MW-535	09/16/19	12:15	11.55	4.97	--	NP	6.58	--
MW-535	12/10/19	9:48	11.55	5.12	--	NP	6.43	--
MW-535	03/12/20	13:12	11.55	4.88	--	NP	6.67	--
MW-535	06/22/20	12:05	11.55	4.96	--	NP	6.59	--
MW-535	09/18/20	11:38	11.55	4.98	--	NP	6.57	--
MW-535	11/02/20	11:19	11.55	4.78	--	NP	6.77	--
MW-535	03/01/21	12:43	11.55	4.79	--	NP	6.76	--
MW-535	06/22/21	9:37	11.55	4.93	--	NP	6.62	--
MW-535	08/23/21	11:40	11.55	4.90	--	NP	6.65	--
MW-535	11/05/21	11:32	11.55	4.19	--	NP	7.36	--
MW-535	03/04/22	11:01	11.55	4.29	--	NP	7.26	--
MW-535	06/14/22	10:41	11.55	4.50	--	NP	7.05	--
MW-535	08/23/22	9:01	11.55	4.92	--	NP	6.63	--
MW-535	11/09/22	11:07	11.55	4.27	--	NP	7.28	--
MW-535	03/06/23	10:52	11.55	4.46	--	NP	7.09	--
MW-535	06/05/23	12:17	11.55	4.92	--	NP	6.63	PID: 0.0
MW-535	09/11/23	9:27	11.55	5.09	--	NP	6.46	PID: 0.1
MW-535	11/16/23	10:33	11.55	3.96	--	NP	7.59	PID: 0.0
MW-535	03/19/24	9:09	13:12	4.42	--	NP	7.13	PID:0.0

Acronyms and Abbreviations:
-- = not measured
amsl = above mean sea level
bgs = below ground surface
[DB2] = wells and piezometers located within the Detention Basin 2 (DB-2) excavation footprint and decommissioned during the construction work related to DB-2 excavation activities in August 2017.
LNAPL = light nonaqueous phase liquid
NP = not present
PID = photo ionization detector

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Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
LM-2*	07/26/17	25	U	NA		NA		NA		0.008		48	U	--		2,500	U	110	U	--		158
LM-2*	03/20/18	2.9		NA		NA		NA		0.109		95		--		500	U	100	U	--		195
LM-2*	06/27/18	5.0	U	NA		NA		NA		0.008	UU	260		--		500	U	220		--		480
LM-2*	09/20/18	0.5	U	NA		NA		NA		0.008	UU	54	U	--		19	U	120	U	--		174
LM-2*	11/27/18	5.0	U	NA		NA		NA		0.008	UU	46	U	--		190	U	100	U	--		146
LM-2*	03/19/19	0.0	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
LM-2*	06/20/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		190	U	100	U	--		146
LM-2*	09/17/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		190	U	100	U	--		146
LM-2*	12/11/19	2.0	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
LM-2*	03/11/20	2.0	U	NA		NA		NA		0.008	UU	150		--		19	U	100	U	--		250
LM-2*	06/23/20	2.0	U	NA		NA		NA		0.009	UU	50	U	--		140	J	110	U	--		160
LM-2*	09/21/20	4.0	U	NA		NA		NA		0.009	UU	50	U	--		190	U	110	U	--		160
LM-2*	11/03/20	2.0	U	NA		NA		NA		0.008	UU	46	U	--		19	J	100	U	--		146
LM-2*	03/02/21	0.2	U	NA		NA		NA		0.009	UU	49	UJ	--		19	U	110	UJ	--		159
LM-2*	06/23/21	6.0	U	NA		NA		NA		0.010	UJ	49	U	--		19	U	110	U	--		159
LM-2*	08/24/21	3.0	U	NA		NA		NA		0.010	UU	51	U	--		19	U	110	U	--		161
LM-2*	11/03/21	3.0	U	NA		NA		NA		0.009	UU	49	U	--		20	J	110	U	--		159
LM-2*	03/02/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
LM-2*	06/14/22	15.0	U	NA		NA		NA		0.009	UU	46	U	--		220	U	100	U	--		146
LM-2*	08/24/22	1.5	U	NA		NA		NA		0.009	UU	47	U	--		2,100	J	100	U	--		147
LM-2*	09/27/22	0.3	U	NA		NA		NA		0.009	J	49	J	--		840	J	110	U	--		159
LM-2*	11/08/22	0.3	U	NA		NA		NA		0.009	UU	46	UJ	--		860	U	100	UJ	--		146
LM-2*	03/07/23	6.0	U	NA		NA		NA		0.012	J	48	UJ	--		2,200	U	110	UJ	--		158
LM-2* (Field Filtered)	03/07/23	3.0	U	NA		NA		NA		0.009	UU	47	UJ	--		2,200	U	100	UJ	--		147
LM-2*	04/03/23	0.3	U	NA		NA		NA		0.009	UU	48	UJ	--		43	UJ	110	UJ	--		158
LM-2*	06/06/23	1.5	U	NA		NA		NA		0.012	UU	50	UJ	--		65	J	110	UJ	--		160
LM-2*	09/13/23	5.0	U	NA		NA		NA		0.009	UU	100	U	6100		250	U	260	U	5500	U	360
LM-2*	11/15/23	5.0	U	NA		NA		NA		0.009	UU	110	UJ	4700	J	250	UB	4400	J	280	UJ	4510
LM-2	03/20/24	0.30	U	NA		NA		NA		0.009	UU	100	UJ	4000	J	430	U	260	J	3600	UJ	360

Table 2-8
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Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
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Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-101*	07/25/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-101* (Duplicate)	07/25/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-101*	03/22/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	440		--		487
MW-101*	06/28/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-101*	09/18/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		140		110	U	--		160
MW-101* (Duplicate)	09/18/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		140		100	U	--		147
MW-101*	11/28/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		900		100	U	--		145
MW-101*	02/07/19	0.0	U	NA		NA		NA		0.008		46	U	--		19	U	100	U	--		146
MW-101*	03/20/19	0.0	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-101*	06/18/19	0.5	U	NA		NA		NA		0.008	UU	120		--		27	J	110	U	--		230
MW-101*	09/18/19	0.2	U	NA		NA		NA		0.008	UU	48	U	--		650		110	U	--		158
MW-101*	12/12/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		470		100	U	--		145
MW-101* (Duplicate)	12/12/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		510		100	U	--		145
MW-101*	03/10/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		420		100	U	--		146
MW-101* (Duplicate)	03/10/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		410		100	U	--		147
MW-101*	06/24/20	0.2	U	NA		NA		NA		0.009	UU	47	U	--		1,200		100	U	--		147
MW-101*	09/22/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		1,800		110	U	--		158
MW-101* (Duplicate)	09/22/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		1,700		110	U	--		157
MW-101*	11/06/20	0.2	U	NA		NA		NA		0.009	UU	75	J	--		1,600		110	U	--		185
MW-101*	03/02/21	0.2	U	NA		NA		NA		0.009	UU	46	UJ	--		330		100	UJ	--		146
MW-101* (Duplicate)	03/02/21	0.2	U	NA		NA		NA		0.009	UU	48	UJ	--		330		110	UJ	--		158
MW-101*	06/24/21	0.3	U	NA		NA		NA		0.009	UJ	70	J	--		1,400		110	U	--		180
MW-101*	08/26/21	0.3	U	NA		NA		NA		0.009	UU	66	J	--		850		110	U	--		176
MW-101* (Duplicate)	08/26/21	0.3	U	NA		NA		NA		0.009	UU	47	J	--		880		100	U	--		147
MW-101*	11/01/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		290		100	U	--		146
MW-101* (Duplicate)	11/01/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		570		100	U	--		147
MW-101*	03/01/22	0.3	U	NA		NA		NA		0.010	UU	47	U	--		210	J	100	U	--		147
MW-101* (Duplicate)	03/01/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		190	J	100	U	--		147
MW-101*	06/15/22	0.3	U	NA		NA		NA		0.009	UU	51	U	--		990		110	U	--		161
MW-101* (Duplicate)	06/15/22	0.3	U	NA		NA		NA		0.009	UU	51	U	--		1,100		110	U	--		161
MW-101*	08/24/22	0.3	U	NA		NA		NA		0.009	UU	79	J	--		1,500		100	U	--		179
MW-101* (Duplicate)	08/24/22	0.3	U	NA		NA		NA		0.009	UU	84	J	--		1,500		100	U	--		184
MW-101*	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	58	J	--		1,300	J	--	R	--		--
MW-101* (Duplicate)	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	67	J	--		1,400	J	--	R	--		--
MW-101*	03/08/23	0.3	U	NA		NA		NA		0.010	UU	51	UJ	--		350		110	UJ	--		161
MW-101* (Duplicate)	03/08/23	0.3	U	NA		NA		NA		0.010	UU	52	UJ	--		360		110	UJ	--		162
MW-101*	06/07/23	0.3	U	NA		NA		NA		0.010	UU	52	U	--		800		120	U	--		172
MW-101* (Duplicate)	06/07/23	0.3	U	NA		NA		NA		0.009	UU	55	J	--		820		110	U	--		165
MW-101*	09/13/23	1.0	U	NA		NA		NA		0.009	UU	64	J	1300	J	1,400		250	UJ	250	UJ	314
MW-101* (Duplicate)	09/13/23	1.0	U	NA		NA		NA		0.009	UU	100	UJ	790	J	1,400		260	UJ	260	UJ	360
MW-101*	11/16/23	1.0	U	NA		NA		NA		0.009	UU	110	U	1100		1,100		270	U	270	U	380
MW-101* (Duplicate)	11/16/23	1.0	U	NA		NA		NA		0.010	UU	110	U	980		1,100		290	U	290	U	400
MW-101	03/20/24	0.30	U	NA		NA		NA		0.010	UU	110	U	1800		940		280	U	280	U	390
MW-101 (Duplicate)	03/20/24	0.30	U	NA		NA		NA		0.009	UU	110	U	2100		910		270	U	270	U	380

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Public Review Draft Final Feasibility Study Report Addendum
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Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-104*	07/26/17	0.5	U	NA		NA		NA		0.008	UU	45	U	--		120		100	U	--		145
MW-104*	03/20/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		91		100	U	--		146
MW-104*	06/27/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-104*	09/17/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-104*	11/27/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		36		100	U	--		147
MW-104*	03/19/19	0.03	U	NA		NA		NA		0.008	UU	46	U	--		400		100	U	--		146
MW-104*	06/20/19	0.5	U	NA		NA		NA		0.008	UU	47	U	--		64	J	100	U	--		147
MW-104*	09/17/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		59	J	100	U	--		145
MW-104*	12/12/19	0.2	U	NA		NA		NA		0.008	UU	280		--		52	J	130	J	--		410
MW-104*	03/11/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		27	J	110	U	--		157
MW-104* (Duplicate)	03/11/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		26	J	100	U	--		146
MW-104*	07/01/20	0.2	U	NA		NA		NA		0.028		50	J	--		190	J	130	J	--		180
MW-104*	09/21/20	0.2	U	NA		NA		NA		0.009	UU	110		--		48	J	100	U	--		210
MW-104*	11/04/20	0.2	U	NA		NA		NA		0.009	UJ	680	J	--		19	UB	640		--		1320
MW-104*	03/01/21	0.2	U	NA		NA		NA		0.009	UU	48	U	--		270		110	U	--		158
MW-104* (Duplicate)	03/01/21	0.2	U	NA		NA		NA		0.009	UU	46	U	--		290		100	U	--		146
MW-104*	06/23/21	0.3	U	NA		NA		NA		0.009	UU	55	U	--		210	J	120	U	--		175
MW-104* (Duplicate)	06/23/21	0.3	U	NA		NA		NA		0.012	UBJ	55	U	--		200	J	120	U	--		175
MW-104*	08/23/21	0.3	U	NA		NA		NA		0.009	UU	49	U	--		61	J	110	U	--		159
MW-104*	11/02/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		150	J	100	U	--		147
MW-104*	03/02/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		110	J	100	U	--		146
MW-104*	06/14/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		140	J	110	U	--		159
MW-104*	08/23/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		210	J	100	U	--		146
MW-104*	11/08/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		50	J	110	U	--		159
MW-104*	03/07/23	0.3	U	NA		NA		NA		0.009	UU	49	UJ	--		140	J	110	UJ	--		159
MW-104*	06/06/23	0.3	U	NA		NA		NA		0.009	UU	47	U	--		74	J	100	U	--		147
MW-104*	09/13/23	1.0	U	NA		NA		NA		0.023	J	100	U	48	J	250	U	260	U	260	U	360
MW-104*	11/15/23	1.0	U	NA		NA		NA		0.009	UU	110	U	78	J	250	U	280	U	280	U	390
MW-104	03/18/24	0.30	U	NA		NA		NA		0.009	UU	100	U	140		55	J	110	J	250	U	210

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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-126	07/25/17	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-126	03/22/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	110	U	--		157
MW-126	06/29/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-126	09/18/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-126	11/30/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-126 (Duplicate)	11/30/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-126	03/21/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-126	06/19/19	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-126	09/19/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-126	12/11/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-126	03/09/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-126	06/24/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-126	09/23/20	0.2	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-126	11/06/20	0.2	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-126	03/04/21	0.2	U	NA		NA		NA		0.009	UU	50	UJ	--		19	J	110	UJ	--		160
MW-126	06/23/21	0.3	U	NA		NA		NA		0.009	UU	110		--		19	U	100	U	--		210
MW-126	08/25/21	0.3	U	NA		NA		NA		0.010	UU	50	UJ	--		19	U	110	U	--		160
MW-126	11/01/21	0.3	U	NA		NA		NA		0.009	UU	48	U	--		35	J	110	U	--		158
MW-126	02/28/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-126	06/15/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		22	U	100	U	--		147
MW-126	08/22/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-126	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		43	UJ	--	R	--		--
MW-126	03/09/23	0.3	U	NA		NA		NA		0.009	UU	50	UJ	--		43	U	110	UJ	--		160
MW-126	06/09/23	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	340		--		387
MW-126	09/14/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	280	U	280	U	390
MW-126	11/16/23	1.0	U	NA		NA		NA		1.110	J	100	U	85	J	250	U	260	U	260	U	360
MW-126	03/21/24	0.30	U	NA		NA		NA		1.110	UU	110	UJ	110	U	47	J	270	U	270	U	380

Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L) B		T		E		X		Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-129R*	07/26/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		93		100	U	--		146
MW-129R*	03/20/18	0.2	U	NA		NA		NA		0.008	UU	1900		--		50	U	110	U	--		2010
MW-129R*	06/27/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-129R*	09/17/18	0.5	U	NA		NA		NA		0.008	UU	81		--		38		110	U	--		191
MW-129R*	11/28/18	0.5	U	NA		NA		NA		0.008	UU	550		--		32		130		--		680
MW-129R*	02/07/19	0.0	U	NA		NA		NA		0.008	UU	46	J	--		33	J	100	U	--		146
MW-129R*	03/19/19	0.0	U	NA		NA		NA		0.008	UU	46	U	--		34	J	100	U	--		146
MW-129R*	06/20/19	0.5	U	NA		NA		NA		0.008	UU	240		--		19	U	100	U	--		340
MW-129R*	09/17/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		56	J	100	U	--		146
MW-129R*	12/11/19	0.2	U	NA		NA		NA		0.008	UU	62	J	--		37	J	110	U	--		172
MW-129R*	03/11/20	0.2	U	NA		NA		NA		0.008	UU	1200		--		34	J	460		--		1660
MW-129R* (Duplicate)	03/11/20	0.2	U	NA		NA		NA		0.008	UU	560		--		47	J	100	U	--		660
MW-129R*	06/24/20	0.2	U	NA		NA		NA		0.008	UU	51	J	--		53	J	100	U	--		151
MW-129R* (Duplicate)	06/24/20	0.2	U	NA		NA		NA		0.008	UU	59	J	--		45	J	100	U	--		159
MW-129R*	09/21/20	0.2	U	NA		NA		NA		0.008	UU	61	J	--		36	J	100	U	--		161
MW-129R*	11/04/20	0.2	U	NA		NA		NA		0.009	UU	88	J	--		19	UB	110	J	--		198
MW-129R*	03/02/21	0.2	U	NA		NA		NA		0.009	UU	46	U	--		110	J	100	U	--		146
MW-129R*	06/22/21	0.3	U	NA		NA		NA		0.009	UU	72	J	--		58	J	110	U	--		182
MW-129R*	08/24/21	0.3	U	NA		NA		NA		0.010	UU	620		--		140	J	120	U	--		740
MW-129R*	11/02/21	0.3	U	NA		NA		NA		0.009	UU	78	J	--		100	J	110	U	--		188
MW-129R*	03/02/22	0.3	U	NA		NA		NA		0.009	UU	56	J	--		40	J	110	U	--		166
MW-129R*	06/14/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		30	J	100	U	--		147
MW-129R*	08/23/22	0.3	U	NA		NA		NA		0.009	UU	530		--		210	J	110	U	--		640
MW-129R*	11/08/22	0.3	U	NA		NA		NA		0.009	UU	170		--		43	U	100	U	--		270
MW-129R*	03/07/23	0.3	U	NA		NA		NA		0.009	UU	83	J	--		43	U	110	UJ	--		193
MW-129R*	06/06/23	0.3	U	NA		NA		NA		0.009	UU	51	U	--		58	J	110	U	--		161
MW-129R*	09/13/23	1.0	U	NA		NA		NA		0.009	UU	2400		20000		170	J	200	J	2000		2600
MW-129R*	11/15/23	1.0	U	NA		NA		NA		0.009	UU	85	J	860		250	U	240	J	270	U	325
MW-129R	03/18/24	0.30	U	NA		NA		NA		0.011	J	370		1400		250	U	280	U	510		650

Table 2-8
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-139R*	07/27/17	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-139R*	03/22/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-139R*	06/28/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-139R*	09/19/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-139R*	11/28/18	0.5	U	NA		NA		NA		0.010	UU	47	U	--		19	U	100	U	--		147
MW-139R*	03/20/19	0.0	U	NA		NA		NA		0.010	UU	47	U	--		19	U	100	U	--		147
MW-139R*	06/18/19	0.5	U	NA		NA		NA		0.008	UU	75	J	--		19	U	110	U	--		185
MW-139R*	09/18/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-139R*	12/09/19	0.2	U	NA		NA		NA		0.008	UU	50	U	--		19	U	110	U	--		160
MW-139R*	03/10/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-139R*	06/24/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-139R*	09/21/20	0.2	U	NA		NA		NA		0.008	UU	360		--		19	U	500		--		860
MW-139R*	11/03/20	0.2	U	NA		NA		NA		0.009	UU	50	U	--		19	U	110	U	--		160
MW-139R* (Duplicate)	11/03/20	0.2	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-139R*	03/03/21	0.2	U	NA		NA		NA		0.009	UU	58	J	--		19	U	100	U	--		158
MW-139R*	06/22/21	0.3	U	NA		NA		NA		0.010	UU	52	U	--		19	U	120	U	--		172
MW-139R*	08/25/21	0.3	U	NA		NA		NA		0.009	UU	48	UJ	--		19	U	110	U	--		158
MW-139R*	11/03/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-139R* (Duplicate)	11/03/21	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-139R*	02/28/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-139R*	06/15/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		22	U	100	U	--		146
MW-139R*	08/24/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		1	U	100	U	--		146
MW-139R*	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		43	UJ	--	R	--		--
MW-139R*	03/07/23	0.3	U	NA		NA		NA		0.010	UU	51	UJ	--		43	U	110	UJ	--		161
MW-139R*	06/08/23	0.3	U	NA		NA		NA		0.009	UU	50	U	--		43	U	110	U	--		160
MW-139R*	09/14/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	280	U	280	U	390
MW-139R*	11/15/23	1.0	U	NA		NA		NA		0.010	UU	100	U	100	U	250	U	260	U	260	UB	360
MW-139R	03/18/24	0.30	U	NA		NA		NA		0.009	UU	100	U	120		250	U	260	U	260	U	360

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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-143	07/25/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-143	03/22/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-143	06/29/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-143	09/18/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-143	11/30/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-143	03/21/19	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-143	06/19/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-143	09/19/19	0.2	U	NA		NA		NA		0.008	UU	49	U	--		19	U	110	U	--		159
MW-143	12/11/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-143	03/09/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-143	06/24/20	0.2	U	NA		NA		NA		0.009	UU	47	U	--		24	J	100	U	--		147
MW-143	09/23/20	1.0	U	NA		NA		NA		0.009	UU	48	U	--		24	J	110	U	--		158
MW-143	11/06/20	0.2	UJ	NA		NA		NA		0.008	UU	46	UJ	--		19	U	100	UJ	--		146
MW-143	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		32	J	100	UJ	--		147
MW-143	06/23/21	1.5	U	NA		NA		NA		0.009	UU	46	U	--		34	J	100	U	--		146
MW-143	08/25/21	1.5	U	NA		NA		NA		0.010	UU	50	UJ	--		27	J	110	U	--		160
MW-143	11/01/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-143	03/01/22	0.3	U	NA		NA		NA		0.009	UU	50	U	--		19	U	110	U	--		160
MW-143	06/15/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		22	U	110	U	--		158
MW-143	08/22/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-143	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		43	UJ	--	R	--		--
MW-143	03/09/23	0.3	U	NA		NA		NA		0.009	UU	51	UJ	--		43	U	110	UJ	--		161
MW-143	06/09/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-143	09/14/23	1.0	U	NA		NA		NA		0.010	UU	110	UJ	230	J	250	U	270	UJ	270	UJ	380
MW-143	11/14/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	UB	260	J	270	U	270	U	380
MW-143	03/21/24	0.30	U	NA		NA		NA		0.009	UU	100	U	610		59	J	110	J	260	U	210

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11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-20R*	07/26/17	1.6		NA		NA		NA		0.008	UU	46	U	--		64		100	U	--		146
MW-20R*	03/22/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-20R*	06/29/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-20R*	09/18/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		19	U	110	U	--		160
MW-20R*	11/29/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-20R* (Duplicate)	11/29/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-20R*	03/20/19	0.0	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-20R*	06/19/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-20R* (Duplicate)	06/19/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-20R*	09/18/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-20R*	12/12/19	1.0		NA		NA		NA		0.009	UU	50	U	--		34	J	110	U	--		160
MW-20R*	03/10/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-20R*	07/01/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-20R*	09/23/20	0.2	U	NA		NA		NA		0.008	UU	49	U	--		19	U	110	U	--		159
MW-20R*	11/06/20	0.2	U	NA		NA		NA		0.008	UU	49	U	--		19	U	110	U	--		159
MW-20R*	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		19	U	100	UJ	--		147
MW-20R*	06/23/21	0.3	U	NA		NA		NA		0.010	UU	53	U	--		19	U	120	U	--		173
MW-20R*	08/25/21	0.3	U	NA		NA		NA		0.009	UU	47	UJ	--		19	U	100	U	--		147
MW-20R*	11/03/21	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-20R*	02/28/22	0.3	U	NA		NA		NA		0.009	UU	45	U	--		19	U	100	U	--		145
MW-20R*	06/15/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		22	U	110	U	--		157
MW-20R*	08/24/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-20R*	11/11/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		43	U	110	U	--		158
MW-20R*	03/09/23	0.6	J	NA		NA		NA		0.009	UU	48	UJ	--		43	U	110	UJ	--		158
MW-20R*	06/07/23	0.3	U	NA		NA		NA		0.009	UU	48	U	--		43	U	110	U	--		158
MW-20R*	09/14/23	1.0	U	NA		NA		NA		0.009	UU	290	J	130	J	250	U	250	UJ	4,300	J	540
MW-20R*	11/16/23	1.0	U	NA		NA		NA		0.596	J	110	U	110	U	250	U	270	U	270	U	380
MW-20R	03/19/24	0.30	U	NA		NA		NA		0.009	UU	100	U	53	J	250	U	260	U	260	U	360

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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-502	07/26/17	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-502 (Duplicate)	07/26/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-502	03/21/18	0.2	U	NA		NA		NA		0.008	UU	48	U	--		50	U	110	U	--		158
MW-502	06/27/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		50	U	110	U	--		160
MW-502	09/20/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-502	11/28/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-502	03/20/19	0.0	U	NA		NA		NA		0.008	UU	57	U	--		19	U	130	U	--		187
MW-502	06/18/19	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-502 (Duplicate)	06/18/19	0.5	U	NA		NA		NA		0.013	UU	46	U	--		19	U	100	U	--		146
MW-502	09/18/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-502 (Duplicate)	09/18/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-502	12/09/19	0.2	U	NA		NA		NA		0.008	UU	52	U	--		19	U	120	U	--		172
MW-502	03/09/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-502	07/01/20	0.2	U	NA		NA		NA		0.078		51	U	--		19	U	110	U	--		161
MW-502	09/21/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-502	11/03/20	0.2	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-502	03/02/21	0.2	U	NA		NA		NA		0.009	UU	47	U	--		19	U	110	U	--		157
MW-502	06/21/21	0.3	U	NA		NA		NA		0.015	UJ	53	U	--		19	U	120	U	--		173
MW-502	08/25/21	0.3	U	NA		NA		NA		0.010	UU	51	U	--		19	U	110	U	--		161
MW-502	11/02/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-502	03/01/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-502	06/15/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		22	U	100	U	--		146
MW-502	08/22/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-502	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		43	UJ	--	R	--		--
MW-502	03/08/23	0.3	U	NA		NA		NA		0.009	UU	51	UJ	--		43	U	110	UJ	--		161
MW-502	06/09/23	0.3	U	NA		NA		NA		0.009	UU	50	UJ	--		43	U	110	UJ	--		160
MW-502	09/12/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	280	U	280	U	390
MW-502	11/14/23	1.0	U	NA		NA		NA		0.009	UU	100	UJ	100	UB	250	U	260	U	260	UJ	360
MW-502	03/19/24	0.30	U	NA		NA		NA		0.009	UU	100	U	260		250	U	260	U	260	U	360

Table 2-8
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-503	03/21/18	0.2	U	NA		NA		NA		0.008	UU	48	U	--		50	U	110	U	--		158
MW-503	06/28/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		50	U	110	U	--		158
MW-503 (Duplicate)	06/28/18	0.5	U	NA		NA		NA		0.008	UU	49	U	--		50	U	110	U	--		159
MW-503	09/20/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-503	11/28/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-503	03/20/19	0.0	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-503	06/18/19	0.5	U	NA		NA		NA		0.037	UU	46	U	--		19	U	100	U	--		146
MW-503	09/18/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-503	12/09/19	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-503	03/10/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-503	06/25/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-503	09/21/20	0.2	U	NA		NA		NA		0.008	UU	49	U	--		19	U	110	U	--		159
MW-503	11/03/20	0.2	U	NA		NA		NA		0.009	UU	420		--		19	U	430		--		850
MW-503	03/01/21	0.2	U	NA		NA		NA		0.009	UU	45	U	--		19	U	100	U	--		145
MW-503 (Duplicate)	03/01/21	0.2	U	NA		NA		NA		0.009	UU	180		--		41	J	710		--		890
MW-503	06/21/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-503 (Duplicate)	06/21/21	0.3	U	NA		NA		NA		0.235	J	46	U	--		19	U	100	U	--		146
MW-503	08/25/21	0.3	U	NA		NA		NA		0.010	UU	50	UJ	--		19	U	110	U	--		160
MW-503 (Duplicate)	08/25/21	0.3	U	NA		NA		NA		0.010	UU	49	UJ	--		19	U	110	U	--		159
MW-503	11/01/21	0.3	U	NA		NA		NA		0.010	UU	51	U	--		19	U	110	U	--		161
MW-503	03/01/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-503	06/14/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		22	U	100	U	--		147
MW-503	08/24/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		43	U	110	U	--		158
MW-503	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		43	UJ	--	R	--		--
MW-503	03/07/23	0.3	U	NA		NA		NA		0.009	UU	49	UJ	--		43	U	110	UJ	--		159
MW-503	06/06/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	310		--		356
MW-503	09/12/23	1.0	U	NA		NA		NA		0.009	UU	110	U	72	J	250	U	270	U	270	U	380
MW-503	11/14/23	1.0	U	NA		NA		NA		0.010	UU	120	U	120	UB	250	U	300	U	140	J	420
MW-503	03/19/24	0.30	U	NA		NA		NA		0.009	UU	100	U	91	J	250	U	260	U	260	U	360

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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-504	07/26/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-504	03/21/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-504	06/28/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-504	09/20/18	0.5	U	NA		NA		NA		0.008	UU	51	U	--		19	U	110	U	--		161
MW-504	11/28/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-504	03/20/19	0.0	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-504	06/18/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-504	09/18/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		21	J	100	U	--		145
MW-504	12/09/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-504	03/10/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-504	06/25/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-504	09/22/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		28	J	110	U	--		158
MW-504	11/05/20	0.2	U	NA		NA		NA		0.009	UU	--	R	--		19	U	120	J	--		--
MW-504	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		19	U	100	UJ	--		147
MW-504	06/24/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		22	J	100	U	--		147
MW-504	08/25/21	0.3	U	NA		NA		NA		0.010	UU	51	UJ	--		19	U	110	U	--		161
MW-504	11/01/21	0.3	U	NA		NA		NA		0.009	UU	51	U	--		19	J	110	U	--		161
MW-504	03/01/22	0.3	U	NA		NA		NA		0.009	UU	45	U	--		19	U	100	U	--		145
MW-504	06/16/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		22	U	110	U	--		158
MW-504	08/22/22	0.3	U	NA		NA		NA		0.009	UU	50	U	--		43	U	110	U	--		160
MW-504	11/07/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-504	03/08/23	0.3	U	NA		NA		NA		0.009	UU	51	UJ	--		43	U	110	UJ	--		161
MW-504	06/06/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-504	09/12/23	1.0	U	NA		NA		NA		0.010	UU	110	U	71	J	250	U	280	U	280	U	390
MW-504	11/14/23	1.0	U	NA		NA		NA		0.009	UU	100	UJ	100	U	1,300	U	260	U	260	U	360
MW-504	03/19/24	0.30	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	280	U	280	U	390

Table 2-8
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Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-505	07/26/17	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-505	03/21/18	0.2	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-505	06/28/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-505	09/20/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-505 (Duplicate)	09/20/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-505	11/28/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-505	03/20/19	0.0	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-505 (Duplicate)	03/20/19	0.0	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-505	06/19/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-505	09/18/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	J	100	U	--		146
MW-505	12/09/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		22	J	110	U	--		157
MW-505	03/09/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-505	06/25/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-505	09/21/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-505	11/04/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	UB	100	U	--		146
MW-505	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		24	J	100	UJ	--		147
MW-505	06/23/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		21	J	100	U	--		147
MW-505	08/23/21	Wasp nest in well box. Well neither gauged nor sampled. Nest removed.												--						--		--
MW-505	11/01/21	0.3	U	NA		NA		NA		0.009	UU	50	U	--		25	J	110	U	--		160
MW-505	03/01/22	0.3	U	NA		NA		NA		0.009	UJ	45	U	--		19	J	100	U	--		145
MW-505	06/16/22	0.3	U	NA		NA		NA		0.009	UU	50	U	--		22	U	110	U	--		160
MW-505	08/22/22	0.3	U	NA		NA		NA		0.010	UU	52	U	--		43	U	120	U	--		172
MW-505	11/07/22	0.3	U	NA		NA		NA		0.009	UU	53	U	--		43	U	120	U	--		173
MW-505	03/08/23	0.3	U	NA		NA		NA		0.009	UU	50	UJ	--		43	U	110	UJ	--		160
MW-505	06/07/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-505	09/12/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	280	U	280	U	390
MW-505	11/14/23	1.0	U	NA		NA		NA		0.010	UU	110	UJ	110	UB	250	U	260	U	260	UJ	370
MW-505	03/19/24	0.30	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	270	U	270	U	380

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11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-506	07/27/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-506	03/21/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-506 (Duplicate)	03/21/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-506	06/28/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-506	09/19/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-506	11/28/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-506	03/20/19	0.03	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-506	06/19/19	0.5	U	NA		NA		NA		0.008	UU	52	U	--		19	U	120	U	--		172
MW-506	09/19/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		23	J	100	U	--		146
MW-506	12/09/19	0.2	U	NA		NA		NA		0.008	UU	49	U	--		19	U	110	U	--		159
MW-506	03/10/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-506	06/24/20	0.2	U	NA		NA		NA		0.008	UU	50	U	--		30	J	110	U	--		160
MW-506	09/21/20	0.2	U	NA		NA		NA		0.009	UU	47	U	--		28	J	110	U	--		157
MW-506	11/05/20	0.2	U	NA		NA		NA		0.008	UU	--	R	--		33	J	--	R	--		--
MW-506	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		24	J	100	UJ	--		147
MW-506	06/23/21	0.3	U	NA		NA		NA		0.010	UU	46	UF1	--		41	J	100	U	--		146
MW-506	08/26/21	0.3	U	NA		NA		NA		0.009	UU	48	UJ	--		25	J	110	U	--		158
MW-506	11/03/21	0.3	U	NA		NA		NA		0.009	UU	50	U	--		19	U	110	U	--		160
MW-506	02/28/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		23	J	100	U	--		146
MW-506	06/16/22	0.3	U	NA		NA		NA		0.010	UJ	48	U	--		22	J	110	U	--		158
MW-506	08/22/22	0.3	U	NA		NA		NA		0.009	UU	51	U	--		43	U	110	U	--		161
MW-506	11/07/22	0.3	U	NA		NA		NA		0.009	UU	47	UJ	--		43	U	100	UJ	--		147
MW-506	03/08/23	0.3	U	NA		NA		NA		0.009	UU	49	UJ	--		43	U	110	UJ	--		159
MW-506	06/05/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-506	09/14/23	1.0	U	NA		NA		NA		0.010	UU	120	U	770		250	U	160	J	310	U	280
MW-506	11/14/23	1.0	U	NA		NA		NA		0.009	UU	110	UJ	350		1,300	U	270	U	890	J	380
MW-506	03/18/24	0.30	U	NA		NA		NA		0.009	UU	110	U	570		250	U	120	J	270	U	230

Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-507	07/27/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-507 (Duplicate)	07/27/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-507	03/21/18	0.2	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-507	06/28/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-507	09/19/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-507 (Duplicate)	09/19/18	0.5	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-507	11/28/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-507	03/20/19	0.0	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-507	06/19/19	0.5	U	NA		NA		NA		0.008	UU	52	U	--		19	U	120	U	--		172
MW-507 (Duplicate)	06/19/19	0.5	U	NA		NA		NA		0.008	UU	52	U	--		19	U	110	U	--		162
MW-507	09/19/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-507 (Duplicate)	09/19/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-507	12/09/19	0.2	U	NA		NA		NA		0.030	UU	50	U	--		19	U	110	U	--		160
MW-507	03/09/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-507	06/24/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-507	09/21/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-507	11/05/20	0.2	U	NA		NA		NA		0.009	UU	--	R	--		19	U	--	R	--		--
MW-507	03/03/21	0.2	U	NA		NA		NA		0.009	UU	50	UJ	--		19	U	110	UJ	--		160
MW-507	06/24/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-507	08/26/21	0.3	U	NA		NA		NA		0.009	UU	49	UJ	--		19	U	110	U	--		159
MW-507	11/03/21	0.3	U	NA		NA		NA		0.010	UU	54	U	--		19	U	120	U	--		174
MW-507	03/01/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-507	06/16/22	0.3	U	NA		NA		NA		0.010	UJ	47	U	--		22	U	110	U	--		157
MW-507	08/22/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-507	11/07/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		43	U	110	U	--		158
MW-507	03/08/23	0.3	U	NA		NA		NA		0.168		50	UJ	--		43	U	110	UJ	--		160
MW-507	06/05/23	0.3	U	NA		NA		NA		0.010	UU	51	U	--		43	U	110	UJ	--		161
MW-507 (Duplicate)	06/05/23	0.3	U	NA		NA		NA		0.009	UU	140		--		43	U	1500	J	--		1640
MW-507	09/12/23	1.0	U	NA		NA		NA		0.009	UU	120	U	88	J	250	U	290	U	290	U	410
MW-507 (Duplicate)	09/12/23	1.0	U	NA		NA		NA		0.009	UU	110	UJ	110	UJ	250	U	280	UJ	280	UJ	390
MW-507	11/14/23	1.0	U	NA		NA		NA		0.009	UU	110	UJ	110	UB	250	U	270	U	270	UJ	380
MW-507 (Duplicate)[10]	11/14/23	1.0	U	NA		NA		NA		0.009	UU	110	U	54	J	250	U	280	U	280	U	390
MW-507	03/18/24	0.30	U	NA		NA		NA		0.009	UU	110	U	54	J	250	U	270	U	270	U	380
MW-507 (Duplicate)	03/18/24	0.30	U	NA		NA		NA		0.009	UU	110	U	72	J	250	U	280	U	280	U	390

Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-508[DB2]	07/27/17	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-509	07/27/17	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-509	03/21/18	0.2	U	NA		NA		NA		0.008	UU	49	U	--		50	U	110	U	--		159
MW-509	06/28/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	110	U	--		157
MW-509	09/19/18	0.5	U	NA		NA		NA		0.008	UU	82		--		19	U	110	U	--		192
MW-509	11/28/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-509	03/20/19	0.0	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-509	06/19/19	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-509	09/19/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-509	12/09/19	0.2	U	NA		NA		NA		0.008	UU	50	U	--		19	U	440		--		490
MW-509	03/09/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-509	06/25/20	0.2	U	NA		NA		NA		0.008	UU	140	B	--		19	U	100	U	--		240
MW-509	09/21/20	0.2	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-509	11/05/20	0.2	U	NA		NA		NA		0.008	UU	--	R	--		19	U	--	R	--		--
MW-509	03/02/21	0.2	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-509	06/21/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-509	08/24/21	0.3	U	NA		NA		NA		0.009	UU	45	U	--		19	U	100	U	--		145
MW-509	11/03/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	110	U	--		157
MW-509	02/28/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-509	06/16/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		22	U	100	U	--		146
MW-509	08/24/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-509	11/07/22	0.3	U	NA		NA		NA		0.009	UU	47	UJ	--		43	U	100	UJ	--		147
MW-509	03/07/23	0.3	U	NA		NA		NA		0.009	UU	50	UJ	--		43	U	110	UJ	--		160
MW-509	06/07/23	0.3	U	NA		NA		NA		0.009	UU	51	U	--		43	U	110	U	--		161
MW-509	09/12/23	1.0	U	NA		NA		NA		0.009	UU	100	U	100	U	46	J	250	U	250	U	350
MW-509	11/16/23	1.0	U	NA		NA		NA		0.407		100	U	100	U	250	U	260	U	260	U	360
MW-509	03/20/24	0.30	U	NA		NA		NA		0.009	UU	100	U	100	U	250	U	250	U	260	U	350

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11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-510[*DB2]	07/26/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		86		100	U	--		146
MW-511	07/27/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-511	03/21/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-511	06/27/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-511	09/20/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-511	11/29/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-511	03/21/19	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-511	06/18/19	0.5	U	NA		NA		NA		0.008	UU	91	J	--		19	U	100	U	--		191
MW-511	09/19/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-511	12/09/19	0.2	U	NA		NA		NA		0.008	UU	49	U	--		19	U	110	U	--		159
MW-511	03/10/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-511	07/01/20	0.2	U	NA		NA		NA		0.009	UU	52	U	--		19	U	120	U	--		172
MW-511	09/22/20	0.2	U	NA		NA		NA		0.009	UU	45	U	--		19	U	100	U	--		145
MW-511	11/03/20	0.2	U	NA		NA		NA		0.009	UU	51	U	--		19	U	110	U	--		161
MW-511	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		19	U	100	UJ	--		147
MW-511	06/21/21	0.3	U	NA		NA		NA		0.009	UU	50	U	--		19	U	110	U	--		160
MW-511	08/25/21	0.3	U	NA		NA		NA		0.009	UU	50	UJ	--		19	U	110	U	--		160
MW-511	11/03/21	0.3	U	NA		NA		NA		0.009	UU	50	U	--		19	U	110	U	--		160
MW-511	02/28/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-511	06/15/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		22	U	110	U	--		158
MW-511	08/22/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-511	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		43	UJ	--	R	--		--
MW-511	03/08/23	0.3	U	NA		NA		NA		0.010	UU	52	UJ	--		43	U	120	UJ	--		172
MW-511	06/07/23	0.3	U	NA		NA		NA		0.010	UU	51	U	--		43	U	110	U	--		161
MW-511	09/12/23	1.0	U	NA		NA		NA		0.009	UU	100	UJ	100	UJ	59	J	260	UJ	260	UJ	360
MW-511	11/14/23	1.0	U	NA		NA		NA		0.009	UU	100	UJ	100	U	250	U	260	U	260	UJ	360
MW-511	03/19/24	0.30	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	260	U	260	U	370

Table 2-8
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11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-512	07/26/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		120		100	U	--		146
MW-512	03/21/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-512 (Duplicate)	03/21/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-512	06/28/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		50	U	110	U	--		160
MW-512 (Duplicate)	06/28/18	0.5	U	NA		NA		NA		0.008	UU	49	U	--		50	U	110	U	--		159
MW-512	09/20/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-512	11/29/18	0.5	U	NA		NA		NA		0.017	UU	46	U	--		19	U	100	U	--		146
MW-512	03/21/19	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-512	06/18/19	0.5	U	NA		NA		NA		0.008	UU	160		--		19	U	100	U	--		260
MW-512	09/19/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		45	J	100	U	--		146
MW-512	12/09/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		61	J	110	U	--		157
MW-512	03/10/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-512	06/25/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		28	J	100	U	--		147
MW-512	09/22/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		27	J	110	U	--		157
MW-512	11/03/20	0.2	U	NA		NA		NA		0.009	UU	51	U	--		57	J	110	U	--		161
MW-512	03/03/21	0.2	U	NA		NA		NA		0.009	UU	46	UJ	--		27	J	100	UJ	--		146
MW-512	06/24/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		50	J	100	U	--		147
MW-512	08/26/21	0.3	U	NA		NA		NA		0.009	UU	52	UJ	--		66	J	120	U	--		172
MW-512	11/03/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		57	J	110	U	--		157
MW-512	02/28/22	0.3	U	NA		NA		NA		0.009	UU	45	U	--		44	J	100	U	--		145
MW-512	06/16/22	0.3	U	NA		NA		NA		0.016	UJ	49	U	--		47	J	110	U	--		159
MW-512	08/24/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		97	J	100	U	--		146
MW-512	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		130	J	--	R	--		--
MW-512	03/08/23	0.3	U	NA		NA		NA		0.026	J	47	UJ	--		76	J	100	UJ	--		147
MW-512	06/07/23	0.3	U	NA		NA		NA		0.009	UU	46	UJ	--		66	J	100	UJ	--		146
MW-512 (Duplicate)	06/07/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		64	J	100	U	--		146
MW-512	09/13/23	1.0	U	NA		NA		NA		0.009	UU	100	U	190		54	J	260	U	260	U	360
MW-512	11/16/23	1.0	U	NA		NA		NA		0.009	UU	100	U	78	J	47	J	260	U	260	U	360
MW-512	03/20/24	0.30	U	NA		NA		NA		0.010	UU	110	U	670		66	J	280	U	270	U	390

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11720 Unoco Road
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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-513	07/25/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		110		100	U	--		146
MW-513	03/21/18	0.2	U	NA		NA		NA		0.008	UU	240		--		50	U	100	U	--		340
MW-513	06/28/18	0.5	U	NA		NA		NA		0.008	UU	49	U	--		50	U	110	U	--		159
MW-513	09/20/18	0.5	U	NA		NA		NA		0.008	UU	46	HU	--		19	U	100	HU	--		146
MW-513	11/29/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-513	03/21/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-513	06/17/19	0.5	U	NA		NA		NA		0.008	UU	47	U	--		22	J	100	U	--		147
MW-513	09/18/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		50	J	100	U	--		145
MW-513	12/09/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		29	J	100	U	--		146
MW-513	03/10/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-513	06/25/20	0.2	U	NA		NA		NA		0.009	UU	47	U	--		39	J	100	U	--		147
MW-513	09/22/20	0.2	U	NA		NA		NA		0.008	UU	50	U	--		52	J	110	U	--		160
MW-513	11/04/20	0.2	U	NA		NA		NA		0.009	UU	52	U	--		19	UB	110	U	--		162
MW-513	03/03/21	0.2	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-513	06/21/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	110	U	--		157
MW-513	08/25/21	0.3	U	NA		NA		NA		0.009	UU	45	UJ	--		28	J	100	U	--		145
MW-513	11/01/21	0.3	U	NA		NA		NA		0.009	UU	45	U	--		45	J	99	U	--		144
MW-513	03/01/22	0.3	U	NA		NA		NA		0.009	UU	45	U	--		19	U	100	U	--		145
MW-513	06/16/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		22	U	100	U	--		146
MW-513	08/25/22	0.3	U	NA		NA		NA		0.009	UU	71	J	--		57	J	110	U	--		181
MW-513	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		52	J	--	R	--		--
MW-513	03/08/23	0.3	U	NA		NA		NA		0.009	UU	48	UJ	--		43	U	110	UJ	--		158
MW-513	06/08/23	0.3	U	NA		NA		NA		0.009	UU	50	UJ	--		49	J	110	UJ	--		160
MW-513	09/12/23	1.0	U	NA		NA		NA		0.010	UU	120	U	89	J	82	J	290	U	290	U	410
MW-513	11/16/23	1.0	U	NA		NA		NA		0.009	UU	110	U	59	J	59	J	260	U	260	U	370
MW-513	03/20/24	0.30	U	NA		NA		NA		0.009	UU	--		94	J	55	J	260	U	--		--

Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-514	07/27/17	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	110	U	--		157
MW-514	03/21/18	0.2	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-514	06/28/18	0.5	U	NA		NA		NA		0.008	UU	49	U	--		50	U	110	U	--		159
MW-514	09/20/18	0.5	U	NA		NA		NA		0.008	UU	45	HU	--		19	U	100	HU	--		145
MW-514	11/29/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-514	03/21/19	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-514	06/18/19	0.5	U	NA		NA		NA		0.008	UU	140		--		19	U	100	U	--		240
MW-514	09/19/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		37	J	100	U	--		145
MW-514	12/09/19	0.2	U	NA		NA		NA		0.008	UU	49	U	--		38	J	110	U	--		159
MW-514	03/10/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-514	06/25/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		37	J	110	U	--		157
MW-514	09/22/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		60	J	100	U	--		147
MW-514	11/05/20	0.2	U	NA		NA		NA		--	R	--	R	--		34	J	--	R	--		--
MW-514	03/03/21	0.2	U	NA		NA		NA		0.009	UU	48	U	--		29	J	110	U	--		158
MW-514	06/24/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		29	J	100	U	--		146
MW-514	08/25/21	0.3	U	NA		NA		NA		0.009	UU	46	UJ	--		29	J	100	U	--		146
MW-514	11/01/21	0.3	U	NA		NA		NA		0.009	UU	45	U	--		50	J	100	U	--		145
MW-514	02/28/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		24	J	100	U	--		147
MW-514	06/16/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		25	J	100	U	--		146
MW-514	08/25/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		56	J	100	U	--		146
MW-514	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		53	J	--	R	--		--
MW-514	03/08/23	0.3	U	NA		NA		NA		0.064	J	51	UJ	--		43	U	110	UJ	--		161
MW-514	06/08/23	0.3	U	NA		NA		NA		0.025	J	51	U	--		47	J	110	U	--		161
MW-514	09/12/23	1.0	U	NA		NA		NA		0.020	UU	120	U	120	U	71	J	310	U	310	U	430
MW-514 (Duplicate)	09/12/23	1.0	U	NA		NA		NA		0.009	UU	120	UJ	120	UJ	75	J	290	UJ	290	UJ	410
MW-514	11/16/23	1.0	U	NA		NA		NA		0.019	UU	100	U	100	U	73	J	260	U	260	U	360
MW-514 (Duplicate)	11/16/23	1.0	U	NA		NA		NA		1.605	J	110	U	62	J	92	J	270	U	270	U	380
MW-514	03/21/24	0.30	U	NA		NA		NA		0.020	UU	100	U	45	J	250	U	250	U	250	U	350
MW-514 (Duplicate)	03/21/24	0.30	U	NA		NA		NA		0.010	UU	100	U	100	U	250	U	250	U	250	U	350

Table 2-8
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Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-515	07/25/17	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-515	03/21/18	0.2	U	NA		NA		NA		0.008	UU	50	U	--		50	U	110	U	--		160
MW-515	06/28/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	110	U	--		157
MW-515	09/19/18	0.5	U	NA		NA		NA		0.008	UU	120		--		19	U	110	U	--		230
MW-515	11/28/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-515 (Duplicate)	11/28/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		19	U	110	U	--		160
MW-515	03/21/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-515	06/17/19	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-515	09/18/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		37	J	100	U	--		146
MW-515	12/09/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		37	J	100	U	--		147
MW-515	03/09/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-515	06/22/20	Wasp nest in well box. Well neither gauged nor sampled. Nest removed.												--						--		--
MW-515	09/23/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		25	J	110	U	--		158
MW-515	11/05/20	0.2	U	NA		NA		NA		0.010	UU	--	R	--		36	J	--	R	--		--
MW-515	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		37	J	100	UJ	--		147
MW-515	06/24/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		23	J	100	U	--		146
MW-515	08/24/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		32	J	100	U	--		146
MW-515	11/02/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-515	02/28/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		27	J	100	U	--		147
MW-515	06/15/22	0.3	U	NA		NA		NA		0.009	UU	52	U	--		22	U	120	U	--		172
MW-515	08/25/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	J	100	U	--		146
MW-515	11/07/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		43	U	110	U	--		159
MW-515	03/08/23	0.3	U	NA		NA		NA		0.009	UU	50	UJ	--		43	U	110	UJ	--		160
MW-515	06/08/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-515	09/12/23	1.0	U	NA		NA		NA		0.009	UU	100	U	100	U	45	J	250	U	250	U	350
MW-515	11/14/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	260	U	260	U	370
MW-515	03/19/24	0.30	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	280	U	280	U	390

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11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-516	07/25/17	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-516 (Duplicate)	07/25/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-516	03/21/18	0.2	U	NA		NA		NA		0.008	UU	48	U	--		50	U	110	U	--		158
MW-516	06/28/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		50	U	110	U	--		158
MW-516	09/19/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-516	11/29/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-516	03/21/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-516	06/17/19	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-516	09/18/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-516	12/09/19	0.2	U	NA		NA		NA		0.008	UU	51	U	--		19	U	110	U	--		161
MW-516	03/09/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-516	06/25/20	0.2	U	NA		NA		NA		0.010	UU	47	U	--		19	U	100	U	--		147
MW-516	09/23/20	0.2	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-516	11/05/20	0.2	U	NA		NA		NA		0.009	UU	--	R	--		19	U	--	R	--		--
MW-516	03/03/21	0.2	U	NA		NA		NA		0.009	UU	46	UJ	--		19	U	100	UJ	--		146
MW-516	06/24/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-516	08/24/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		21	J	100	U	--		146
MW-516	11/03/21	0.3	U	NA		NA		NA		0.011	UU	46	U	--		19	U	100	U	--		146
MW-516	02/28/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-516	06/15/22	0.3	U	NA		NA		NA		0.009	UU	52	U	--		22	U	110	U	--		162
MW-516	08/25/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-516	11/07/22	0.3	U	NA		NA		NA		0.010	UU	50	U	--		43	U	110	U	--		160
MW-516	03/08/23	0.3	U	NA		NA		NA		0.009	UU	50	UJ	--		43	U	110	UJ	--		160
MW-516	06/08/23	0.3	U	NA		NA		NA		0.009	UU	88	J	--		46	J	100	U	--		188
MW-516	09/12/23	1.0	U	NA		NA		NA		0.009	UU	100	U	140		43	J	260	U	260	U	360
MW-516	11/14/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	UB	250	U	280	U	280	U	390
MW-516	03/20/24	0.30	U	NA		NA		NA		0.009	UU	100	UJ	100	UJ	250	U	250	UJ	250	UJ	350

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Table 2-8
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-517	07/25/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		61		100	U	--		146
MW-517	03/21/18	0.2	U	NA		NA		NA		0.008	UU	49	U	--		50	U	110	U	--		159
MW-517	06/28/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	110	U	--		157
MW-517	09/19/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-517	11/29/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-517	03/21/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-517 (Duplicate)	03/21/19	0.5	U	NA		NA		NA		0.008	UU	62	J	--		19	U	100	U	--		162
MW-517	06/17/19	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-517	09/18/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		31	J	100	U	--		146
MW-517	12/09/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-517	03/09/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-517	06/25/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-517	09/23/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-517	11/06/20	0.2	U	NA		NA		NA		0.009	UU	50	U	--		20	J	110	U	--		160
MW-517	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		27	J	100	UJ	--		147
MW-517	06/24/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-517	08/25/21	0.3	U	NA		NA		NA		0.009	UU	46	UJ	--		19	J	100	U	--		146
MW-517	11/03/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-517	02/28/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-517	06/16/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		22	U	100	U	--		146
MW-517	08/25/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-517	11/07/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	J	100	U	--		147
MW-517	03/08/23	0.3	U	NA		NA		NA		0.010	UU	52	UJ	--		43	U	120	UJ	--		172
MW-517	06/08/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-517	09/12/23	1.0	U	NA		NA		NA		0.009	UU	100	U	79	J	120	J	260	U	260	U	360
MW-517	11/14/23	1.0	U	NA		NA		NA		0.010	UU	110	U	110	UB	51	J	290	U	290	U	400
MW-517	03/20/24	0.30	U	NA		NA		NA		0.010	J	110	U	110	U	250	U	280	U	280	U	390

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Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L) B		T		E		X		Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-518*	07/25/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		190		100	U	--		146
MW-518*	03/21/18	0.2	U	NA		NA		NA		0.008	UU	48	U	--		220		110	U	--		158
MW-518*	06/28/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		690		100	U	--		147
MW-518* (Duplicate)	06/28/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		630		100	U	--		147
MW-518*	09/19/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		370		100	U	--		147
MW-518*	11/28/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		840		110	U	--		157
MW-518*	02/07/19	0.0	U	NA		NA		NA		0.008	UU	46	U	--		340		100	U	--		146
MW-518*	03/20/19	0.0	U	NA		NA		NA		0.008	UU	47	U	--		480		100	U	--		147
MW-518*	06/18/19	0.5	U	NA		NA		NA		0.013	UU	290		--		760		100	U	--		390
MW-518*	09/18/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		520		100	U	--		146
MW-518* (Duplicate)	09/18/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		490		100	U	--		147
MW-518*	12/09/19	0.2	U	NA		NA		NA		0.008	UU	52	U	--		820		120	U	--		172
MW-518* (Duplicate)	12/09/19	0.2	U	NA		NA		NA		0.008	UU	50	U	--		840		110	U	--		160
MW-518*	03/09/20	0.2	U	NA		NA		NA		0.008	UU	45	U	--		430		100	U	--		145
MW-518* (Duplicate)	03/09/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		440		100	U	--		146
MW-518*	06/24/20	0.2	U	NA		NA		NA		0.009	UU	87	J	--		930		110	U	--		197
MW-518* (Duplicate)	06/24/20	0.2	U	NA		NA		NA		0.008	UU	98	J	--		950		110	U	--		208
MW-518*	09/23/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		590		110	U	--		158
MW-518* (Duplicate)	09/23/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		560		100	U	--		147
MW-518*	11/05/20	0.2	U	NA		NA		NA		0.009	UU	--	R	--		720		--	R	--		--
MW-518* (Duplicate)	11/05/20	0.2	U	NA		NA		NA		0.008	UU	56	J	--		760		--	R	--		--
MW-518*	03/01/21	0.2	U	NA		NA		NA		0.009	UU	52	J	--		720		110	U	--		162
MW-518* (Duplicate)	03/01/21	0.2	U	NA		NA		NA		0.009	UU	49	U	--		730		110	U	--		159
MW-518*	06/24/21	0.3	U	NA		NA		NA		0.009	UU	50	U	--		580		110	U	--		160
MW-518* (Duplicate)	06/24/21	0.3	U	NA		NA		NA		0.009	UU	53	J	--		520		120	U	--		173
MW-518*	08/26/21	0.3	U	NA		NA		NA		0.009	UU	68	J	--		870		110	U	--		178
MW-518*	11/03/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		320		100	U	--		147
MW-518* (Duplicate)	11/03/21	0.3	U	NA		NA		NA		0.009	UU	48	U	--		260		110	U	--		158
MW-518*	02/28/22	0.3	U	NA		NA		NA		0.009	UU	59	J	--		1,100		110	U	--		169
MW-518* (Duplicate)	02/28/22	0.3	U	NA		NA		NA		0.009	UU	55	J	--		1,100		100	U	--		155
MW-518*	06/15/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		470		100	U	--		146
MW-518* (Duplicate)	06/15/22	0.3	U	NA		NA		NA		0.009	UU	--		--		430		--		--		--
MW-518*	08/22/22	0.3	U	NA		NA		NA		0.009	UU	55	J	--		750		110	U	--		165
MW-518* (Duplicate)	08/22/22	0.3	U	NA		NA		NA		0.009	UU	57	J	--		740		110	U	--		167
MW-518*	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	54	J	--		750	J	--	R	--		--
MW-518* (Duplicate)	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	61	J	--		730	J	--	R	--		--
MW-518*	03/08/23	0.3	U	NA		NA		NA		0.010	UU	62	J	--		970		110	UJ	--		172
MW-518* (Duplicate)	03/08/23	0.3	U	NA		NA		NA		0.010	UU	78	J	--		1,000		120	UJ	--		198
MW-518*	06/06/23	0.3	U	NA		NA		NA		0.010	UU	150		--		2,400		120	U	--		270
MW-518*	09/13/23	1.0	U	NA		NA		NA		0.009	UU	150		500		1,100		300	U	300	U	450
MW-518* (Duplicate)	09/13/23	1.0	U	NA		NA		NA		0.008	UU	73	J	300	J	1,100		320	UJ	320	UJ	393
MW-518*	11/16/23	1.0	U	NA		NA		NA		0.009	UU	78	J	210		800		260	U	260	U	338
MW-518* (Duplicate)	11/16/23	1.0	U	NA		NA		NA		0.008	UU	81	J	230		800		260	U	260	U	341
MW-518	03/19/24	0.30	U	NA		NA		NA		0.009	UU	110	U	150		85	J	280	U	280	U	390
MW-518 (Duplicate)	03/19/24	0.30	U	NA		NA		NA		0.008	UU	110	U	160		100	J	270	U	270	U	380

Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L) B		T		E		X		Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-519	07/25/17	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-519	03/22/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-519 (Duplicate)	03/22/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-519	06/27/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-519	09/18/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-519	11/29/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-519	03/21/19	0.5	U	NA		NA		NA		0.008	UU	87	J	--		19	U	100	U	--		187
MW-519	06/19/19	0.5	U	NA		NA		NA		0.008	UU	52	U	--		19	U	120	U	--		172
MW-519	09/19/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-519	12/11/19	0.2	U	NA		NA		NA		0.008	UU	120		--		19	U	110	U	--		230
MW-519	03/09/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-519	06/24/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-519	09/23/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-519	11/05/20	0.2	U	NA		NA		NA		0.009	UU	--	R	--		19	U	--	R	--		--
MW-519	03/04/21	0.2	U	NA		NA		NA		0.009	UU	50	UJ	--		19	U	110	UJ	--		160
MW-519	06/23/21	0.3	U	NA		NA		NA		0.011	UJB	46	U	--		19	U	100	U	--		146
MW-519	08/25/21	0.3	U	NA		NA		NA		0.009	UU	52	UJ	--		19	U	120	U	--		172
MW-519	11/01/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-519	02/28/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-519	06/15/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		22	U	100	U	--		147
MW-519	08/22/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		43	U	110	U	--		159
MW-519	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	52	J	--		43	UJ	--	R	--		--
MW-519	03/09/23	0.3	U	NA		NA		NA		0.010	UU	52	UJ	--		43	U	120	UJ	--		172
MW-519	06/08/23	0.3	U	NA		NA		NA		0.009	UU	51	U	--		43	U	110	U	--		161
MW-519	09/11/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	270	U	270	U	380
MW-519	11/16/23	1.0	U	NA		NA		NA		0.010	UU	110	UJ	110	UJ	250	U	280	U	280	U	390
MW-519	03/19/24	0.30	U	NA		NA		NA		0.010	UU	110	U	90	J	73	J	280	U	280	U	390

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11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-520	07/25/17	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-520	03/20/18	0.2	U	NA		NA		NA		0.008	UU	47	U	--		50	U	110	U	--		157
MW-520	06/28/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		50	U	110	U	--		158
MW-520	09/18/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-520	11/29/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-520	03/22/19	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-520	06/19/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-520	09/18/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		22	J	100	U	--		146
MW-520	12/12/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-520	03/09/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-520	06/24/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-520	09/22/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-520	11/05/20	0.2	U	NA		NA		NA		0.009	UU	--	R	--		19	U	--	R	--		--
MW-520	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		19	U	100	UJ	--		147
MW-520	06/23/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		30	J	100	U	--		147
MW-520	08/26/21	0.3	U	NA		NA		NA		0.010	UU	51	UJ	--		19	U	110	U	--		161
MW-520	11/03/21	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-520	02/28/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-520	06/16/22	0.3	U	NA		NA		NA		0.039	UJ	49	U	--		22	U	110	U	--		159
MW-520	08/24/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		43	U	110	U	--		159
MW-520	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		43	UJ	--	R	--		--
MW-520	03/09/23	0.3	U	NA		NA		NA		0.009	UU	51	UJ	--		43	U	110	UJ	--		161
MW-520	06/08/23	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-520	09/11/23	1.0	U	NA		NA		NA		0.010	UU	110	U	--		250	U	280	U	--		390
MW-520	11/16/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	270	U	270	U	380
MW-520	03/19/24	0.30	U	NA		NA		NA		0.010	UU	110	U	61	J	250	U	280	U	280	U	390

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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-521	07/25/17	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-521	03/20/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-521	06/28/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		50	U	110	U	--		158
MW-521	09/18/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-521	11/30/18	0.5	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-521	03/22/19	0.5	U	NA		NA		NA		0.008	UU	75	J	--		19	U	100	U	--		175
MW-521 (Duplicate)	03/22/19	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-521	06/19/19	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-521	09/18/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-521	12/11/19	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-521	03/09/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-521	06/25/20	0.2	U	NA		NA		NA		0.235		46	U	--		19	U	100	U	--		146
MW-521	09/22/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-521 (Duplicate)	09/22/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-521	11/06/20	0.2	U	NA		NA		NA		0.009	UU	47	U	--		19	U	110	U	--		157
MW-521	03/04/21	0.2	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-521	06/23/21	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-521	08/26/21	0.3	U	NA		NA		NA		0.009	UU	47	UJ	--		19	U	110	U	--		157
MW-521	11/03/21	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-521	02/28/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-521	06/16/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		22	U	110	U	--		158
MW-521	08/24/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		43	U	110	U	--		158
MW-521	11/09/22	0.3	U	NA		NA		NA		0.010	UU	53	U	--		43	U	120	U	--		173
MW-521	03/09/23	0.3	U	NA		NA		NA		0.010	UU	51	UJ	--		43	U	110	UJ	--		161
MW-521	06/08/23	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-521	09/11/23	1.0	U	NA		NA		NA		0.010	UU	110	UJ	110	UJ	250	U	270	UJ	270	UJ	380
MW-521	11/16/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	280	U	280	U	390
MW-521	03/19/24	0.30	U	NA		NA		NA		0.010	UU	110	U	110	U	250	U	270	U	270	U	380

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Dissolved Phase COC Concentrations (2017 through 2024)
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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-522*	07/25/17	0.5	U	NA		NA		NA		0.008	UU	80		--		50	U	700		--		780
MW-522*	03/20/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-522*	06/28/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		50	U	110	U	--		160
MW-522*	09/18/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-522*	11/29/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		19	U	110	U	--		160
MW-522*	03/21/19	0.5	U	NA		NA		NA		0.008	UU	190		--		19	U	100	U	--		290
MW-522*	06/18/19	0.5	U	NA		NA		NA		0.008	UU	510		--		19	U	120	U	--		630
MW-522*	09/17/19	0.2	U	NA		NA		NA		0.008	UU	61	U	--		20	J	140	U	--		201
MW-522*	12/12/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	170	J	--		217
MW-522* (Duplicate)	12/12/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-522*	03/09/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-522*	06/30/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		110	J	240	JB	--		286
MW-522*	09/23/20	0.2	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-522*	11/06/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-522*	03/03/21	0.2	U	NA		NA		NA		0.009	UU	47	UJ	--		19	U	110	UJ	--		157
MW-522*	06/24/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		20	J	100	U	--		146
MW-522*	08/25/21	0.3	U	NA		NA		NA		0.009	UU	47	UJ	--		19	U	100	U	--		147
MW-522*	11/01/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-522*	02/28/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-522*	06/16/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		22	U	110	U	--		159
MW-522*	08/24/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		44	J	100	U	--		147
MW-522*	11/10/22	0.3	UJ	NA		NA		NA		0.009	UU	--	R	--		43	UJ	--	R	--		--
MW-522*	03/09/23	0.3	U	NA		NA		NA		0.010	UU	51	UJ	--		43	U	110	UJ	--		161
MW-522*	06/08/23	0.3	U	NA		NA		NA		0.009	UU	46	UJ	--		43	U	100	UJ	--		146
MW-522*	09/11/23	1.0	U	NA		NA		NA		0.009	UU	100	UJ	100	UJ	250	U	260	UJ	260	UJ	360
MW-522*	11/16/23	1.0	U	NA		NA		NA		0.009	UU	100	U	100	U	250	U	260	U	260	U	360
MW-522*	03/19/24	0.30	U	NA		NA		NA		0.029	J	100	U	100	U	250	U	250	U	250	U	350

Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-525	07/26/17	1,200		NA		NA		NA		0.008	UU	130		--		4,700		110	U	--		240
MW-525	03/20/18	14		NA		NA		NA		0.008	UU	49	U	--		920		110	U	--		159
MW-525	06/27/18	6.0		NA		NA		NA		0.008	UU	46	U	--		1,000		100	U	--		146
MW-525	09/17/18	6.6		NA		NA		NA		0.008	UU	47	U	--		570		100	U	--		147
MW-525	11/27/18	0.5	U	NA		NA		NA		0.009	UU	130		--		19	U	100	U	--		230
MW-525	03/19/19	6.0		NA		NA		NA		0.008	UU	47	U	--		320		100	U	--		147
MW-525	06/20/19	4.7		NA		NA		NA		0.008	UU	47	U	--		290		100	U	--		147
MW-525	09/17/19	0.9	J	NA		NA		NA		0.008	UU	46	U	--		120	J	100	U	--		146
MW-525	12/11/19	3.0		NA		NA		NA		0.008	UU	50	U	--		88	J	110	U	--		160
MW-525	03/11/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-525	06/23/20	0.72	J	NA		NA		NA		0.009	UU	48	U	--		41	J	110	U	--		158
MW-525	09/21/20	1.10		NA		NA		NA		0.009	UU	50	U	--		70	J	110	U	--		160
MW-525	11/04/20	0.93	J	NA		NA		NA		0.009	UU	50	U	--		19	UB	110	U	--		160
MW-525	03/02/21	0.2	U	NA		NA		NA		0.009	UU	52	J	--		19	U	160	J	--		212
MW-525	06/22/21	0.3	U	NA		NA		NA		0.009	UU	48	U	--		27	J	110	U	--		158
MW-525	08/23/21	0.3	U	NA		NA		NA		0.010	UU	52	U	--		31	J	120	U	--		172
MW-525	11/02/21	0.3	U	NA		NA		NA		0.009	UU	52	J	--		19	U	100	U	--		152
MW-525	03/02/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-525	06/14/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		40	J	110	U	--		158
MW-525	08/23/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		50	J	100	U	--		146
MW-525	11/09/22	0.3	U	NA		NA		NA		0.009	UU	49	UJ	--		43	U	110	UJ	--		159
MW-525 (Duplicate)	11/09/22	0.3	U	NA		NA		NA		--	R	--	R	--		43	U	--	R	--		--
MW-525	03/06/23	0.3	UJ	NA		NA		NA		0.009	UU	50	UJ	--		43	U	110	UJ	--		160
MW-525	06/06/23	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-525	09/11/23	1.0	U	NA		NA		NA		0.009	UU	100	U	910		250	U	150	J	250	U	250
MW-525	03/18/24	1.50	U	NA		NA		NA		0.009	UU	110	UJ	1900	J	220	U	270	U	800		380

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Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-526	07/26/17	1.5		NA		NA		NA		0.008	UU	120		--		1,600		100	U	--		220
MW-526	03/20/18	1.0		NA		NA		NA		0.008	UU	210		--		1,800		100	U	--		310
MW-526	06/27/18	0.5	U	NA		NA		NA		0.008	UU	53		--		1,000		100	U	--		153
MW-526	09/17/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		710		110	U	--		158
MW-526	11/27/18	0.5	U	NA		NA		NA		0.045	UU	8800		--		84		1400		--		10200
MW-526	02/07/19	0.1	J	NA		NA		NA		0.008	UU	100		--		360		100	U	--		200
MW-526	03/19/19	0.1	J	NA		NA		NA		0.008	UU	64	J	--		530		100	U	--		164
MW-526	06/20/19	0.5	U	NA		NA		NA		0.008	UU	150		--		640		100	U	--		250
MW-526	09/17/19	0.2	U	NA		NA		NA		0.008	UU	48	U	--		410		110	U	--		158
MW-526	12/11/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		150	J	100	U	--		147
MW-526	03/11/20	0.2	U	NA		NA		NA		0.008	UU	45	U	--		220	J	100	U	--		145
MW-526	07/01/20	0.2	U	NA		NA		NA		0.009	UU	85	J	--		440		110	U	--		195
MW-526	09/21/20	0.2	U	NA		NA		NA		0.009	UU	75	J	--		750		120	U	--		195
MW-526	11/04/20	0.2	U	NA		NA		NA		0.008	UU	53	J	--		530		110	U	--		163
MW-526 (Duplicate)	11/04/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		520		110	U	--		158
MW-526	03/02/21	0.2	U	NA		NA		NA		0.009	UU	48	UJ	--		350		110	UJ	--		158
MW-526	06/22/21	0.3	U	NA		NA		NA		0.009	UU	92	J	--		580		110	U	--		202
MW-526	08/24/21	0.3	U	NA		NA		NA		0.009	UU	66	J	--		670		110	U	--		176
MW-526 (Duplicate)	08/24/21	3.0	U	NA		NA		NA		0.009	UU	140		--		640		110	U	--		250
MW-526	11/02/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		370		110	U	--		157
MW-526 (Duplicate)	11/02/21	0.3	U	NA		NA		NA		0.009	UU	48	J	--		450		100	U	--		148
MW-526	03/02/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-526	06/13/22	1.5	U	NA		NA		NA		0.009	UU	61	J	--		490		100	U	--		161
MW-526 (Duplicate)	06/13/22	1.5	U	NA		NA		NA		0.009	UU	69	J	--		510		100	U	--		169
MW-526	08/23/22	1.5	U	NA		NA		NA		0.009	UU	79	J	--		530		100	U	--		179
MW-526 (Duplicate)	08/23/22	0.3	U	NA		NA		NA		0.009	UU	150		--		450		110	U	--		260
MW-526	11/09/22	0.3	U	NA		NA		NA		0.010	UU	--	R	--		52	J	--	R	--		--
MW-526 (Duplicate)	11/09/22	0.3	U	NA		NA		NA		0.009	UU	--	R	--		43	U	--	R	--		--
MW-526	12/16/22	0.3	U	NA		NA		NA		--		54	U	--		43	U	120	U	--		174
MW-526	03/06/23	0.3	U	NA		NA		NA		0.009	UU	51	UJ	--		43	U	110	UJ	--		161
MW-526 (Duplicate)	03/06/23	0.3	U	NA		NA		NA		0.009	UU	50	UJ	--		43	U	110	UJ	--		160
MW-526	06/06/23	0.3	U	NA		NA		NA		0.009	UU	46	UJ	--		250		100	UJ	--		146
MW-526	09/11/23	1.0	U	NA		NA		NA		0.010	UU	83	J	5,600	J	510		230	J	270	UJ	313
MW-525	11/13/23	1.0	U	NA		NA		NA		0.009	UU	110	UJ	1,300		290	J	470		270	UJ	580
MW-526	11/15/23	1.0	U	NA		NA		NA		0.009	UU	100	UJ	1,300		250	U	150	J	260	UJ	250
MW-526	03/18/24	0.30	U	NA		NA		NA		0.009	UU	120	UJ	290	J	250	U	300	U	120	J	420

Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-529*[DB2]	07/27/17	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-530*	07/26/17	0.5	U	NA		NA		NA		0.010	UU	47	U	--		50	U	100	U	--		147
MW-530*	03/20/18	0.2	U	NA		NA		NA		0.0302	UU	45	U	--		50	U	100	U	--		145
MW-530*	06/27/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-530*	09/20/18	0.5	U	NA		NA		NA		0.009	UU	50	HU	--		19	U	110	HU	--		160
MW-530*	11/27/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-530*	03/19/19	0.0	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-530*	06/17/19	Well Damaged - No sampling - Repaired on 06/28/19												--						--		0
MW-530*	09/17/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-530*	12/12/19	0.2	U	NA		NA		NA		0.008	UU	51	U	--		19	U	110	U	--		161
MW-530*	03/11/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-530*	06/23/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-530*	09/21/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-530*	11/03/20	0.2	U	NA		NA		NA		0.009	UU	51	U	--		19	U	110	U	--		161
MW-530*	03/02/21	0.2	U	NA		NA		NA		0.009	UU	45	U	--		19	U	100	U	--		145
MW-530*	06/23/21	0.3	U	NA		NA		NA		0.012	UJB	52	U	--		19	U	120	U	--		172
MW-530*	08/24/21	0.3	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-530*	11/03/21	0.3	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-530*	03/02/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-530*	06/14/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		22	U	110	U	--		159
MW-530*	08/24/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		52	J	100	U	--		147
MW-530*	11/08/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		43	U	110	U	--		158
MW-530*	03/07/23	0.3	U	NA		NA		NA		0.009	UU	49	UJ	--		43	U	110	UJ	--		159
MW-530*	06/06/23	0.3	U	NA		NA		NA		0.009	UU	49	U	--		43	U	110	U	--		159
MW-530*	09/13/23	1.0	U	NA		NA		NA		0.010	UU	110	UJ	110	UJ	250	U	280	UJ	280	UJ	390
MW-530*	11/15/23	1.0	U	NA		NA		NA		0.009	UU	120	U	180		55	J	300	U	300	U	420
MW-530*	03/20/24	0.30	U	NA		NA		NA		0.009	UU	110	U	260		250	U	130	J	280	U	240

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Dissolved Phase COC Concentrations (2017 through 2024)
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11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-531	07/26/17	0.6		NA		NA		NA		0.008	UU	46	U	--		95		100	U	--		146
MW-531	03/20/18	0.2	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-531	06/27/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-531	09/17/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		19	U	110	U	--		160
MW-531	11/27/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-531	03/19/19	4.5		NA		NA		NA		0.008	UU	190		--		19	U	100	U	--		290
MW-531	06/20/19	0.5	U	NA		NA		NA		0.008	UU	51	U	--		19	U	110	U	--		161
MW-531 (Duplicate)	06/20/19	0.5	U	NA		NA		NA		0.008	UU	49	U	--		19	U	110	U	--		159
MW-531	09/17/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		23	J	100	U	--		146
MW-531 (Duplicate)	09/17/19	0.2	U	NA		NA		NA		0.019	UU	46	U	--		24	J	100	U	--		146
MW-531	12/11/19	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-531	03/11/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-531	06/24/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-531	09/21/20	0.2	U	NA		NA		NA		0.008	UU	1300		--		19	U	1300		--		2600
MW-531	11/04/20	0.2	U	NA		NA		NA		0.009	UU	49	U	--		19	UB	110	U	--		159
MW-531 (Duplicate)	11/04/20	0.2	U	NA		NA		NA		0.009	UU	50	U	--		32	J	110	U	--		160
MW-531	03/02/21	0.2	U	NA		NA		NA		0.009	UU	46	UJ	--		19	U	100	UJ	--		146
MW-531	06/22/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		25	J	100	U	--		146
MW-531	08/23/21	0.3	U	NA		NA		NA		0.009	UU	45	U	--		19	U	100	U	--		145
MW-531	11/02/21	0.3	U	NA		NA		NA		0.009	UU	49	U	--		19	U	110	U	--		159
MW-531	03/02/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-531 (Duplicate)	03/02/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-531	06/14/22	0.3	U	NA		NA		NA		0.009	UU	48	U	--		22	U	110	U	--		158
MW-531	08/23/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-531	11/09/22	0.3	U	NA		NA		NA		0.009	UU	--	R	--		43	U	--	R	--		--
MW-531	12/16/22	0.3	U	NA		NA		NA		--		49	U	--		43	U	110	U	--		159
MW-531	03/06/23	0.3	U	NA		NA		NA		0.009	UU	51	UJ	--		43	U	110	UJ	--		161
MW-531	06/06/23	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-531	09/11/23	1.0	U	NA		NA		NA		0.009	UU	100	U	74	J	250	U	260	U	260	U	360
MW-531	11/13/23	1.0	U	NA		NA		NA		0.010	UU	110	UJ	110	U	250	U	280	U	280	UJ	390
MW-531	03/18/24	1.50	U	NA		NA		NA		0.009	UU	110	U	14000		860	[9]U	270	J	1500	U	380

Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-532	07/26/17	0.5	U	NA		NA		NA		0.021	UU	380		--		50	U	110	U	--		490
MW-532	03/20/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-532	06/27/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-532	09/17/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-532	11/27/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-532	03/19/19	0.0	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-532	06/20/19	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-532	09/17/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-532	12/11/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-532	03/11/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-532	07/01/20	0.2	U	NA		NA		NA		0.008	UU	97	J	--		19	U	210	J	--		307
MW-532	09/21/20	0.2	U	NA		NA		NA		0.009	UU	47	U	--		19	U	110	J	--		157
MW-532	11/04/20	0.2	U	NA		NA		NA		0.028	J	57	J	--		19	UB	110	U	--		167
MW-532	03/02/21	0.2	U	NA		NA		NA		0.009	UU	48	UJ	--		19	U	110	UJ	--		158
MW-532	06/23/21	0.3	U	NA		NA		NA		0.010	UU	47	U	--		19	U	100	U	--		147
MW-532	08/24/21	0.3	U	NA		NA		NA		0.009	UU	50	U	--		19	U	110	U	--		160
MW-532	11/02/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-532	03/02/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-532	06/14/22	1.5	U	NA		NA		NA		0.009	UU	47	U	--		22	U	100	U	--		147
MW-532	08/23/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		51	J	110	U	--		159
MW-532	11/09/22	0.3	U	NA		NA		NA		0.010	UU	49	U	--		43	U	130	J	--		179
MW-532	03/06/23	0.3	U	NA		NA		NA		0.009	UU	51	UJ	--		43	U	110	UJ	--		161
MW-532	06/06/23	0.3	U	NA		NA		NA		0.010	UU	75	J	--		43	U	110	UJ	--		185
MW-532	09/11/23	1.0	U	NA		NA		NA		0.009	UU	110	U	110	U	250	U	270	U	270	U	380
MW-532	11/13/23	1.0	U	NA		NA		NA		0.009	UU	110	UJ	190	UB	1,300	U	120	J	280	UJ	230
MW-532	03/18/24	0.30	U	NA		NA		NA		0.009	UU	110	U	170		250	U	270	U	270	U	380

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Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
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Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-8R*	07/25/17	0.5	U	NA		NA		NA		0.007	UU	45	U	--		50	U	100	U	--		145
MW-8R*	03/20/18	0.2	U	NA		NA		NA		0.008	UU	48	U	--		50	U	110	U	--		158
MW-8R*	06/29/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-8R*	09/18/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-8R*	11/29/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-8R*	03/21/19	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-8R*	06/18/19	0.5	U	NA		NA		NA		0.008	UU	140		--		19	U	120	U	--		260
MW-8R*	09/18/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-8R*	12/12/19	0.2	U	NA		NA		NA		0.008	UU	50	U	--		19	U	110	U	--		160
MW-8R*	03/10/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-8R*	06/30/20	0.2	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-8R*	09/23/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-8R*	11/06/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-8R*	03/03/21	0.2	U	NA		NA		NA		0.009	UU	48	UJ	--		19	J	110	UJ	--		158
MW-8R*	06/23/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-8R*	08/25/21	0.3	U	NA		NA		NA		0.009	UU	48	UJ	--		19	U	110	U	--		158
MW-8R*	11/01/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-8R*	03/01/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-8R*	06/16/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		22	U	110	U	--		157
MW-8R*	08/25/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		51	J	110	U	--		159
MW-8R*	11/09/22	0.3	U	NA		NA		NA		0.019	J	46	UJ	--		43	U	100	U	--		146
MW-8R*	03/09/23	0.3	U	NA		NA		NA		0.072	J	47	UJ	--		43	U	110	UJ	--		157
MW-8R*	06/07/23	0.3	U	NA		NA		NA		0.009	UU	47	UJ	--		43	U	100	UJ	--		147
MW-8R*	09/14/23	1.0	U	NA		NA		NA		0.009	UU	100	U	100	U	250	U	260	U	260	U	360
MW-8R*	11/16/23	1.0	U	NA		NA		NA		0.010	UU	110	U	110	U	48	J	280	U	280	U	390
MW-8R	03/19/24	0.30	U	NA		NA		NA		0.009	UU	100	U	71	J	250	U	260	U	260	U	360

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11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-533*	03/20/18	0.2	U	NA		NA		NA		0.008	UU	47	U	--		50	U	100	U	--		147
MW-533*	06/27/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-533*	09/17/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		19	U	110	U	--		160
MW-533* (Duplicate)	09/17/18	0.5	U	NA		NA		NA		0.008	UU	49	U	--		19	U	110	U	--		159
MW-533*	11/27/18	0.5	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-533**	03/19/19	0.0	U	NA		NA		NA		0.008	UU	47	J	--		19	U	100	U	--		147
MW-533*	06/19/19	0.5	U	NA		NA		NA		0.008	UU	50	U	--		19	U	110	U	--		160
MW-533*	09/17/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-533*	12/11/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-533* (Duplicate)	12/11/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-533*	03/11/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-533*	06/24/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-533*	09/21/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-533*	11/04/20	0.2	U	NA		NA		NA		0.008	UU	45	U	--		19	UB	100	U	--		145
MW-533*	03/02/21	0.2	U	NA		NA		NA		0.009	UU	46	UJ	--		19	U	100	UJ	--		146
MW-533*	06/22/21	0.3	U	NA		NA		NA		0.010	UU	50	U	--		19	U	110	U	--		160
MW-533*	08/24/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-533*	11/02/21	0.3	U	NA		NA		NA		0.009	UU	45	U	--		19	U	100	U	--		145
MW-533*	03/02/22	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-533*	06/13/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		22	U	100	U	--		147
MW-533*	08/23/22	0.3	U	NA		NA		NA		0.009	UU	52	U	--		43	U	120	U	--		172
MW-533*	11/08/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-533*	03/07/23	0.3	U	NA		NA		NA		0.010	UU	50	UJ	--		43	U	110	UJ	--		160
MW-533*	06/06/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-533*	09/13/23	1.0	U	NA		NA		NA		0.009	UU	110	UJ	110	UJ	250	U	270	UJ	270	UJ	380
MW-533*	11/15/23	1.0	U	NA		NA		NA		0.009	UU	120	U	120	U	250	U	500		290	U	620
MW-533*	03/18/24	0.30	U	NA		NA		NA		0.009	UU	100	U	100	U	250	U	250	U	250	U	350

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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-534	03/20/18	0.2	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-534	06/27/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-534	09/17/18	0.5	U	NA		NA		NA		0.008	UU	47	U	--		19	U	100	U	--		147
MW-534	11/28/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-534 (Duplicate)	11/28/18	0.5	U	NA		NA		NA		0.008	UU	50	U	--		19	U	110	U	--		160
MW-534	03/19/19	0.03	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-534 (Duplicate)	03/19/19	0.03	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-534	06/20/19	0.5	U	NA		NA		NA		0.008	UU	51	U	--		19	U	110	U	--		161
MW-534	09/17/19	0.2	U	NA		NA		NA		0.008	UU	45	U	--		29	J	100	U	--		145
MW-534	12/12/19	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-534	03/11/20	0.2	U	NA		NA		NA		0.008	UU	48	U	--		19	U	110	U	--		158
MW-534	06/24/20	0.2	U	NA		NA		NA		0.009	UU	46	U	--		20	J	100	U	--		146
MW-534	09/21/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		19	U	110	U	--		157
MW-534	11/04/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		29	J	110	U	--		158
MW-534	03/02/21	0.2	U	NA		NA		NA		0.009	UU	46	UJ	--		19	U	100	UJ	--		146
MW-534	06/22/21	0.3	U	NA		NA		NA		0.010	UU	48	U	--		19	J	110	U	--		158
MW-534	08/24/21	0.3	U	NA		NA		NA		0.010	UU	49	U	--		19	U	110	U	--		159
MW-534	11/02/21	0.3	U	NA		NA		NA		0.009	UU	47	U	--		19	U	100	U	--		147
MW-534	03/03/22	0.3	U	NA		NA		NA		0.009	UU	50	U	--		19	U	110	U	--		160
MW-534	06/13/22	0.3	U	NA		NA		NA		0.010	UU	49	U	--		22	U	110	U	--		159
MW-534	08/23/22	0.3	U	NA		NA		NA		0.010	UU	49	U	--		43	U	110	U	--		159
MW-534	11/09/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-534	03/07/23	0.3	U	NA		NA		NA		0.010	UU	51	UJ	--		43	U	110	UJ	--		161
MW-534	06/07/23	0.3	U	NA		NA		NA		0.009	UU	52	U	--		43	U	120	U	--		172
MW-534	09/13/23	1.0	U	NA		NA		NA		0.009	UU	110	U	56	J	250	U	280	U	280	U	390
MW-534	11/15/23	1.0	U	NA		NA		NA		0.009	UU	100	U	100	U	250	U	260	U	100	J	360
MW-534	03/18/24	0.30	U	NA		NA		NA		0.011	J	100	U	60	J	250	U	260	U	260	U	360

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Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO[3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-535*	03/20/18	0.2	U	NA		NA		NA		0.008	UU	45	U	--		50	U	100	U	--		145
MW-535* (Duplicate)	03/20/18	0.2	U	NA		NA		NA		0.008	UU	46	U	--		50	U	100	U	--		146
MW-535*	06/27/18	0.5	U	NA		NA		NA		0.008	UU	48	U	--		50	U	110	U	--		158
MW-535* (Duplicate)	06/27/18	0.5	U	NA		NA		NA		0.008	UU	49	U	--		50	U	110	U	--		159
MW-535*	09/17/18	0.5	U	NA		NA		NA		0.008	UU	49	U	--		19	U	110	U	--		159
MW-535*	11/27/18	0.5	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-535**	03/19/19	0.03	U	NA		NA		NA		0.008	UU	45	U	--		19	U	100	U	--		145
MW-535*	06/19/19	0.5	U	NA		NA		NA		0.008	UU	52	U	--		19	U	110	U	--		162
MW-535*	09/17/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-535*	12/12/19	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	320		--		366
MW-535*	03/11/20	0.2	U	NA		NA		NA		0.192		48	U	--		19	U	110	U	--		158
MW-535*	06/23/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-535* (Duplicate)	06/23/20	0.2	U	NA		NA		NA		0.008	UU	46	U	--		19	U	100	U	--		146
MW-535*	09/21/20	0.2	U	NA		NA		NA		0.009	UU	48	U	--		19	U	110	U	--		158
MW-535*	11/03/20	0.2	U	NA		NA		NA		0.009	UU	49	U	--		19	U	190	J	--		239
MW-535*	03/02/21	0.2	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-535*	06/23/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-535*	08/24/21	0.3	U	NA		NA		NA		0.009	UU	49	J	--		19	U	100	U	--		149
MW-535*	11/03/21	0.3	U	NA		NA		NA		0.009	UU	46	U	--		19	U	100	U	--		146
MW-535*	03/02/22	0.3	U	NA		NA		NA		0.009	UU	83	J	--		19	U	100	U	--		183
MW-535*	06/14/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		22	U	140	J	--		187
MW-535*	08/24/22	0.3	U	NA		NA		NA		0.009	UU	47	U	--		43	U	100	U	--		147
MW-535*	11/08/22	0.3	U	NA		NA		NA		0.009	UU	49	U	--		43	U	110	U	--		159
MW-535*	03/07/23	0.3	U	NA		NA		NA		0.010	UU	51	UJ	--		43	U	110	UJ	--		161
MW-535*	06/06/23	0.3	U	NA		NA		NA		0.009	UU	46	U	--		43	U	100	U	--		146
MW-535*	09/13/23	1.0	U	NA		NA		NA		0.009	UU	120	UJ	120	UJ	250	U	290	UJ	290	UJ	410
MW-535*	11/15/23	1.0	U	NA		NA		NA		0.009	UU	--		100	U	250	U	250	U	--		--
MW-535*	03/20/24	0.30	U	NA		NA		NA		0.009	UU	110	U	100	U	56	J	260	U	260	U	370

Table 2-8

Dissolved Phase COC Concentrations (2017 through 2024)

Public Review Draft Final Feasibility Study Report Addendum

Former Union Oil Company of California Edmonds Bulk Fuel Terminal

11720 Unoco Road

Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)								Total cPAHs Adjusted for Toxicity[2] (µg/L)		DRO [3] (µg/L) with Silica Gel Cleanup		DRO[3] (µg/L)		GRO[4] (µg/L)		HRO[3] (µg/L) with Silica Gel Cleanup		HRO[3] (µg/L)		DRO+HRO (µg/L)
		B		T		E		X														
		CUL= 1.6		--		--		--		CUL= 0.05		CUL= 500		--		CUL= 1,000		CUL= 500		--		CUL= 500
MW-E	07/26/17	0.5	U	NA		NA		NA		0.018		1500		--		260		100	U	--		1600
MW-E-R	03/20/18	0.2	U	NA		NA		NA		0.008	UU	45	U	--		410		100	U	--		145
MW-E-R	06/27/18	0.5	U	NA		NA		NA		0.008	UU	59		--		510		110	U	--		169
MW-E-R	09/17/18	0.5	U	NA		NA		NA		0.008	UU	280		--		590		100	U	--		380
MW-E-R	11/27/18	0.5	U	NA		NA		NA		0.012		640		--		460		110	U	--		750
MW-E-R	02/07/19	0.2	J	NA		NA		NA		0.008		450		--		350		100	U	--		550
MW-E-R (Duplicate)	02/07/19	0.2	J	NA		NA		NA		0.008		300		--		380		100	U	--		400
MW-E-R	03/19/19	0.1	J	NA		NA		NA		0.010		180		--		400		110	U	--		290
MW-E-R	06/20/19	0.5	U	NA		NA		NA		0.008	UU	100	J	--		460		120	U	--		220
MW-E-R	09/17/19	0.2	U	NA		NA		NA		0.008	UU	140		--		690		100	U	--		240
MW-E-R	12/11/19	2.0	U	NA		NA		NA		0.008	UU	74	J	--		770		100	U	--		174
MW-E-R	03/11/20	2.0	U	NA		NA		NA		0.008	UU	86	J	--		880		100	U	--		186
MW-E-R	06/23/20	2.0	U	NA		NA		NA		0.008	UU	48	U	--		1,000		110	U	--		158
MW-E-R (Duplicate)	06/23/20	2.0	U	NA		NA		NA		0.009	UU	46	U	--		960		100	U	--		146
MW-E-R	09/21/20	0.2	U	NA		NA		NA		0.008	UU	210		--		1,100		270		--		480
MW-E-R (Duplicate)	09/21/20	0.2	U	NA		NA		NA		0.008	UU	47	U	--		980		140	J	--		187
MW-E-R	11/04/20	0.2	J	NA		NA		NA		0.009	UJ	72	J	--		1,300		110	U	--		182
MW-E-R	03/02/21	0.2	U	NA		NA		NA		0.009	UU	72	J	--		580		100	U	--		172
MW-E-R	06/22/21	3.0	U	NA		NA		NA		0.009	UU	97	J	--		580		110	U	--		207
MW-E-R (Duplicate)	06/22/21	0.3	U	NA		NA		NA		0.009	UU	98	J	--		590		110	U	--		208
MW-E-R	08/24/21	3.0	U	NA		NA		NA		0.010	UU	770		--		880		120	U	--		890
MW-E-R (Duplicate)	08/24/21	3.0	U	NA		NA		NA		0.093	UU	1,400		--		880		120	J	--		1520
MW-E-R	11/02/21	3.0	U	NA		NA		NA		0.010	UU	97	J	--		840		120	U	--		217
MW-E-R	03/02/22	0.3	U	NA		NA		NA		0.009	UU	110		--		840		100	U	--		210
MW-E-R (Duplicate)	03/02/22	0.3	U	NA		NA		NA		0.009	UU	100		--		770		100	U	--		200
MW-E-R	06/14/22	1.5	U	NA		NA		NA		0.009	UU	57	J	--		1,100		110	U	--		167
MW-E-R (Duplicate)	06/14/22	1.5	U	NA		NA		NA		0.009	UU	93	J	--		1,100		110	U	--		203
MW-E-R	08/23/22	0.3	U	NA		NA		NA		0.009	UU	95	J	--		890		100	U	--		195
MW-E-R (Duplicate)	08/23/22	0.3	U	NA		NA		NA		0.009	UU	83	J	--		910		110	U	--		193
MW-E-R	11/08/22	0.3	U	NA		NA		NA		0.009	UU	82	J	--		1,100		110	UJ	--		192
MW-E-R	03/07/23	0.3	U	NA		NA		NA		0.017	J	680	J	--		490		110	UJ	--		790
MW-E-R (Duplicate)	03/07/23	0.3	U	NA		NA		NA		0.014		1000	J	--		530		110	UJ	--		1110
MW-E-R	06/06/23	0.3	U	NA		NA		NA		0.009	UU	63	J	--		320		100	UJ	--		163
MW-E-R (Duplicate)	06/06/23	0.3	U	NA		NA		NA		0.009	UU	94	J	--		280		110	U	--		204
MW-E-R	09/13/23	1.0	U	NA		NA		NA		0.010	UU	110	UJ	5,100	J	1,000		280	J	920	UJ	390
MW-E-R	11/15/23	1.0	U	NA		NA		NA		0.010	UU	370		11,000		1,200	J	1500		280	U	1870
MW-ER	03/18/24	1.50	U	NA		NA		NA		0.009	UU	60	J	2900		860	[9]U	260		740	U	320

Table 2-8
Dissolved Phase COC Concentrations (2017 through 2024)
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Monitoring Well	Date Sampled	BTEX[1] (µg/L)				Total cPAHs Adjusted for Toxicity[2] (µg/L)	DRO [3] (µg/L) with Silica Gel Cleanup	DRO[3] (µg/L)	GRO[4] (µg/L)	HRO[3] (µg/L) with Silica Gel Cleanup	HRO[3] (µg/L)		DRO+HRO (µg/L)
		B	T	E	X								
		CUL= 1.6	--	--	--	CUL= 0.05	CUL= 500	--	CUL= 1,000	CUL= 500	--		CUL= 500

Notes:
[1] B = benzene, T = toluene, E = ethylbenzene, X = xylenes. BTEX analyzed by USEPA Method 8021B.
[2] cPAH = Carcinogenic polynuclear aromatic hydrocarbon. Analyzed by USEPA Method 8270C-HVI. cPAHs adjusted for toxicity according to WAC 173-340-708(8) and Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors. Office of Environmental Health Hazard Assessment, California EPA. May 2005. If one or more adjusted cPAH constituents were reported as nondetect, half of the reporting limit was used in calculations.
[3] Diesel-range organics (DRO) and heavy-oil-range organics (HRO; lube) analyzed by Method NWTPH-D extended.
[4] Gasoline-range organics (GRO) analyzed by Method NWTPH-G.

1. Yellow Highlighted cell indicates an exceedance of the site-specific CUL.

Acronyms and Abbreviations:
-- = not applicable
µg/L = microgram per liter
* = perimeter wells
[ ] = duplicate samples
BTEX = benzene, toluene, ethylbenzene, and xylenes
COC = constituent of concern
CUL = cleanup level
[DB2] = wells located within the Detention Basin 2 (DB-2) excavation footprint and decommissioned during the construction work related to DB-2 excavation activities in August 2017
MTCA = Model Toxics Control Act
NA = not analyzed
USEPA = United States Environmental Protection Agency.

Qualifiers:
B = Compound was found in the blank and sample.
F1 = Matrix spike and/or matrix spike duplicate exceeds control limits.
H = The sample was re-extracted outside of holding time and the QC is complaint.
J = Indicates an estimated value.
R = Data rejected during data validation.
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UB = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.Compound was found in the blank and sample.
UBJ = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.Compound was found in the blank and sample Indicates an estimated value..
UJ = The compound was analyzed for but not detected. The associated value is the estimated compound quantitation limit.
UU = The constituents making up the total are all nondetects.

Table 6-1
Updated Disproportionate Cost Analysis
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Determining Whether a Cleanup Action Uses Permanent Solutions to the Maximum Extent Practicable[1]					
Procedure		Alternative 1	Alternative 4	Alternative 6	WAC Reference 173-340-360
Step 1: Determine costs and benefits of each cleanup action alternative					**5(c)**
Relative benefit analysis (qualitative comparisons)					5(c)(i)
Criteria	Weightings				
Protectiveness	30%	3.0	5.0	4.0	5(d)(i)
Permanence	20%	3.0	5.0	4.0	5(d)(ii)
Long-term effectiveness	20%	2.0	5.0	3.0	5(d)(iii)
Management of implementation risks	15%	4.0	1.0	3.0	5(d)(iv)
Technical/administrative implementability	15%	3.0	3.0	4.0	5(d)(v)
Total weighted benefit score		**3.0**	**4.1**	**3.7**	
DCA relative benefit ranking		3rd	1st	2nd	
Cost analysis					
Total construction and post-construction costs using average of lowest and highest cost estimates		$1,807,000	$9,724,000	$877,500	5(d)(vii)(A) and (B)
Step 2: Rank by degree of permanence		**3rd**	**1st**	**2nd**	**5(c)(ii)**
		3	5	4	
Step 3: Identify initial baseline alternative			**BASELINE**		**5(c)(iii)**
			Baseline		

Table 6-1
Updated Disproportionate Cost Analysis
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Determining Whether a Cleanup Action Uses Permanent Solutions to the Maximum Extent Practicable[1]				
Procedure	**Alternative 1**	**Alternative 4**	**Alternative 6**	**WAC Reference 173-340-360**
Step 4: DCA	**FIRST ITERATION**			**5(c)(iv)**
Compare: The cost and benefits of the next most permanent alternative to the costs and benefits of the baseline	Incremental change from Alternative 6 to the baseline			
	cost	degree of benefit		5(c)(iv)(A)
Difference	$8,846,500	0.45		
Proportional change	1008.15%	12.33%		
(proportional change in cost)/(proportional change in benefit)	81.77			
Decision: Is the baseline alternative permanent to the maximum extent practicable?	NO Compared to Alternative 6, the incremental cost of the baseline substantially exceeds its incremental degree of benefits. Therefore the baseline is not practicable.			5(c)(iv)(B)
Continue the analysis: Repeat Step 4.	Alternative 6 becomes the new baseline for comparison with the next most permanent remaining alternative.			5(c)(iv)(B)(III)

Table 6-1
Updated Disproportionate Cost Analysis
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Determining Whether a Cleanup Action Uses Permanent Solutions to the Maximum Extent Practicable[1]				
Procedure	**Alternative 1**	**Alternative 4**	**Alternative 6**	**WAC Reference 173-340-360**
Step 4: DCA	**SECOND ITERATION**			**5(c)(iv)**
Compare: The cost and benefits of the next most permanent alternative to the costs and benefits of the new baseline	Incremental change from Alternative 1 to the new baseline			5(c)(iv)(A)
	Cost	Degree of benefit		
Difference	-$929,500	0.7		
Proportional change	-51.44%	23.73%		
(proportional change in cost)/(proportional change in benefit)	-2.17			
Decision: Is the new baseline alternative permanent to the maximum extent practicable?	YES Compared to Alternative 1, the incremental cost of the new baseline does not exceed its incremental degree of benefits.			5(c)(iv)(B)
Stop the analysis	Alternative 6 is permanent to the maximum extent practicable.			5(c)(iv)(B)(III)

Note:
[1]Source: SCUMII Appendix H - Case Study #2; Ecology Publication No. 1209057).

Acronyms and Abbreviations:
% = percent
DCA = disproportionate cost analysis
WAC = Washington Administrative Code

Table 6-2
Updated Alternative 1 Cost Analysis
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Alternative 1: Monitored Natural Attenuation with Environmental Covenants

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions/Descriptions
Sampling Plan Costs							
Engineering Design	1	Lump Sum	$5,000	$8,000	$5,000	$5,000	
Groundwater Monitored Natural Attenuation	1	Lump Sum	$1,100,000	$1,375,000	$1,100,000	$1,375,000	Annual sampling and reporting for 60 years
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$88,400	$110,400	$88,400	$110,400	
Environmental Covenant							
Environmental Covenant	1	Lump Sum	$30,000	$50,000	$30,000	$50,000	

Complete Remedial Alternative 1 Subtotal Cost	**$1,230,000**	**$1,550,000**
Contingency (30%)	**$369,000**	**$465,000**
Complete Remedial Alternative 1 Cost	**$1,599,000**	**$2,015,000**

Abbreviations:

% = percent

$ = dollar

Table 6-3
Updated Alternative 4 Cost Analysis
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Alternative 4: Excavation

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
Lower Yard Excavation Costs							
Pre-Design Costs							
Surveying (e.g., establish control points, base mapping, as-builts)	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	
Engineering Design		Lump Sum	$10,000	$15,000	$19,000	$28,500	
Remediation Activities							
Mobilization/Demobilization	1	Lump Sum	$50,000	$100,000	$50,000	$100,000	
Excavation Work	7,000 - 8,000	cy	$10	$15	$70,000	$120,000	
10-Foot Excavation Shoring Materials (drive extract, salvage; 29-foot depth)	4340	Square foot	$4	$5	$17,360	$21,700	
Lab (soil)	30	Sample	$572	$572	$17,160	$22,880	
Lab (water)	6	Sample	$950	$950	$5,700	$7,600	
Excavation Water Management	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Material Handling – Impacted Soils	7,000 - 8,000	cy	$10	$15	$70,000	$120,000	
Material Stockpile Area and Management	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Truck Loading Area	1	Lump Sum	$5,000	$7,500	$5,000	$7,500	
Odor/Dust Control System and Material	1	Month	$5,000	$7,500	$5,000	$7,500	
Transportation and Off-Site Disposal							
- Hazardous Soil	0	Tons	$250	$375	$0	$0	
- Nonhazardous Soil	11000	Tons	$60	$90	$660,000	$990,000	
Air Monitoring	1	Lump Sum	$8,000	$12,000	$8,000	$12,000	
Excavation Restoration Activities							
Furnish Backfill	11,500-13,900	Ton	$10	$12	$115,000	$166,800	
Placement and Compaction of Backfill	7,000-8,000	cy	$6	$10	$42,000	$80,000	
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$88,498	$137,398	$88,498	$137,398	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$130,226	$202,318	$130,226	$202,318	
				Lower Yard Excavation Subtotal Cost	**$1,330,000**	**$2,060,000**	

Table 6-3
Updated Alternative 4 Cost Analysis
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

ARCADIS

Alternative 4: Excavation

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
WSDOT Stormwater Line Excavation Costs							
Pre-Design Costs							
Surveying(e.g., establish control points, base mapping, as-builts)	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	
Geotechnical Investigation	1	Lump Sum	$30,000	$45,000	$30,000	$45,000	Assume 3 borings to 50 feet bgs and index property testing.
Sheetpile Design	1	Lump Sum	$30,000	$45,000	$30,000	$45,000	Design 2 sheet sections, provide drawings and specs to team
Remediation Activities							
Stormwater Handling	1	Lump Sum	$35,000	$50,000	$35,000	$50,000	
Excavation Work	7990	cy	$10	$15	$79,900	$119,850	
15-Foot Excavation Shoring Materials (drive extract, salvage; 43-foot depth)	281	Tons	$1,900	$2,200	$533,828	$618,116	From RSMeans
10-Foot Excavation Shoring Materials (drive extract, salvage; 29-foot depth)	168	Tons	$2,300	$2,800	$386,193	$470,148	From RSMeans + extra for light sheets and higher weight to labor cost
Watertight Sealant (sheets sealed to 20 feet bgs)	8600	LF	$5	$8	$43,000	$64,500	
Geotechnical Monitoring	1	Month	$12,000	$21,000	$12,000	$21,000	
Excavation Dewatering – Setup of Water Treatment System	1	Lump Sum	$20,000	$30,000	$20,000	$30,000	Approximate
Excavation Dewatering – Operation of Water Treatment System	1,728,000	Gallons	$0.80	$1	$1,382,400	$2,073,600	Assumes 60 gallons per minute for 20 continuous days.
Material Handling – Impacted Soils	7990	cy	$10	$15	$79,900	$119,850	Material handling – Relocation and temporary stockpile for subsequent loadout. Double handling of soils.
Material Stockpile Area and Management	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Truck Loading Area	1	Lump Sum	$5,000	$7,500	$5,000	$7,500	
Odor/Dust Control System and Material	1	Month	$5,000	$7,500	$5,000	$7,500	Assumes equipment will be kept on standby for dust/odor control due to existing active facility/tenants
Transportation and Off-Site Disposal							
- Hazardous Soil	0	Tons	$250	$375	$0	$0	
- Nonhazardous Soil	11985	Tons	$60	$90	$719,100	$1,078,650	
Air Monitoring	1	Lump Sum	$8,000	$12,000	$8,000	$12,000	Assumes air monitoring will be performed as part of work for health and safety, and active facility/tenants (provided by team)
Excavation Restoration Activities							
Pipe Replacement	570	LF	$650	$750	$370,500	$427,500	Approximate assumes new manholes, setting new pipe at $475 per LF
Furnish Backfill	11,985	Ton	$15	$20	$179,775	$239,700	
Placement and Compaction of Backfill	7,990	cy	$6	$10	$47,940	$79,900	From RSMeans
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$318,363	$442,225	$318,363	$442,225	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$470,104	$652,178	$470,104	$652,178	

WSDOT Stormwater Line Excavation Subtotal Cost $4,770,000 $6,630,000

Table 6-3
Updated Alternative 4 Cost Analysis
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Alternative 4: Excavation

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
Groundwater Monitoring and Sampling							
Groundwater Monitoring and Sampling	1	Lump Sum	$40,000	$50,000	$40,000	$50,000	Annual sampling and reporting for 3 years
Environmental Covenant							
Environmental Covenant	1	Lump Sum	$30,000	$50,000	$30,000	$50,000	

Complete Excavation Cost	**$6,170,000**	**$8,790,000**
Contingency (30%)	**$1,851,000**	**$2,637,000**
Complete Alternative 4 Cost	**$8,021,000**	**$11,427,000**

Acronyms and Abbreviations:
% = percent
$ = dollar
bgs = below ground surface
cy = cubic yard
LF = linear foot
WSDOT = Washington State Department of Transportation

Table 6-4
Updated Alternative 6 Cost Analysis
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Alternative 6: Dual-Phase Extraction Treatment System Operation, Engineered Cover System, Excavation Contingency Plan, and Limited Environmental Covenant

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions/Descriptions
Pre-Design Soil Sampling							
Lab (soil)	60	Sample	$550	$650	$33,000	$39,000	
Soil Sampling Plan	1	Lump sum	$5,000	$8,000	$5,000	$8,000	
Engineered Cover System							
Mobilization/Demobilization	1	Lump sum	$10,000	$15,000	$10,000	$15,000	Mobilization of minimal equipment for materials handling
Site Preparation	1	Lump sum	$5,000	$8,000	$5,000	$8,000	Minimal grading and surface preparation
Cover Area (purchase and place fabric)	31000	Square feet	$5	$8	$155,000	$248,000	
Truck Loading Area	1	Lump sum	$5,000	$7,500	$5,000	$7,500	
Dust Control System and Material	1	Month	$5,000	$7,500	$5,000	$7,500	
Engineered Cover Activities							
Furnish Cover Material	900	Ton	$15	$20	$13,500	$18,000	
Placement and Compaction Cover Stone	560	cy	$6	$10	$3,360	$5,600	
Management							
Project Management (8% of Overall Costs)	1	Lump sum	$18,789	$28,528	$18,789	$28,528	
Construction Oversight and Health and Safety (12% of Construction Costs)	1	Lump sum	$23,623	$37,152	$23,623	$37,152	
				Engineered Cover Subtotal Cost	**$280,000**	**$430,000**	
DPE on WSDOT SD line							
DPE on WSDOT SD line	1	Lump Sum	$200,000	$250,000	$200,000	$250,000	
				DPE on WSDOT SD line Subtotal Cost	**$200,000**	**$250,000**	
Groundwater Monitoring and Sampling							
Groundwater Monitoring and Sampling	1	Lump Sum	$45,000	$60,000	$45,000	$60,000	Annual sampling and reporting for 3 years
Environmental Covenant							
Environmental Covenant	1	Lump Sum	$30,000	$50,000	$30,000	$50,000	
				DB-2 Excavation and DPE on WSDOT SD line Cost	**$560,000**	**$790,000**	
				Contingency (30%)	**$168,000**	**$237,000**	
				Complete Alternative 6 Cost	**$728,000**	**$1,027,000**	

Acronyms and Abbreviations:
% = percent
$ = dollar

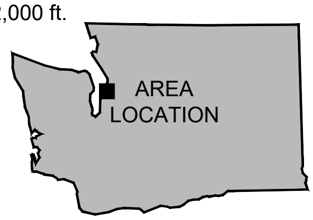
DPE = dual-phase extraction
SD = Stormdrain
WSDOT = Washington State Department of Transportation

Figures

REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., EDMONDS EAST, WASH. AND EDMONDS WEST, WASHINGTON, 2020.

0 2,000' 4,000'

Approximate Scale: 1 in. = 2,000 ft.



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON

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SITE LOCATION MAP

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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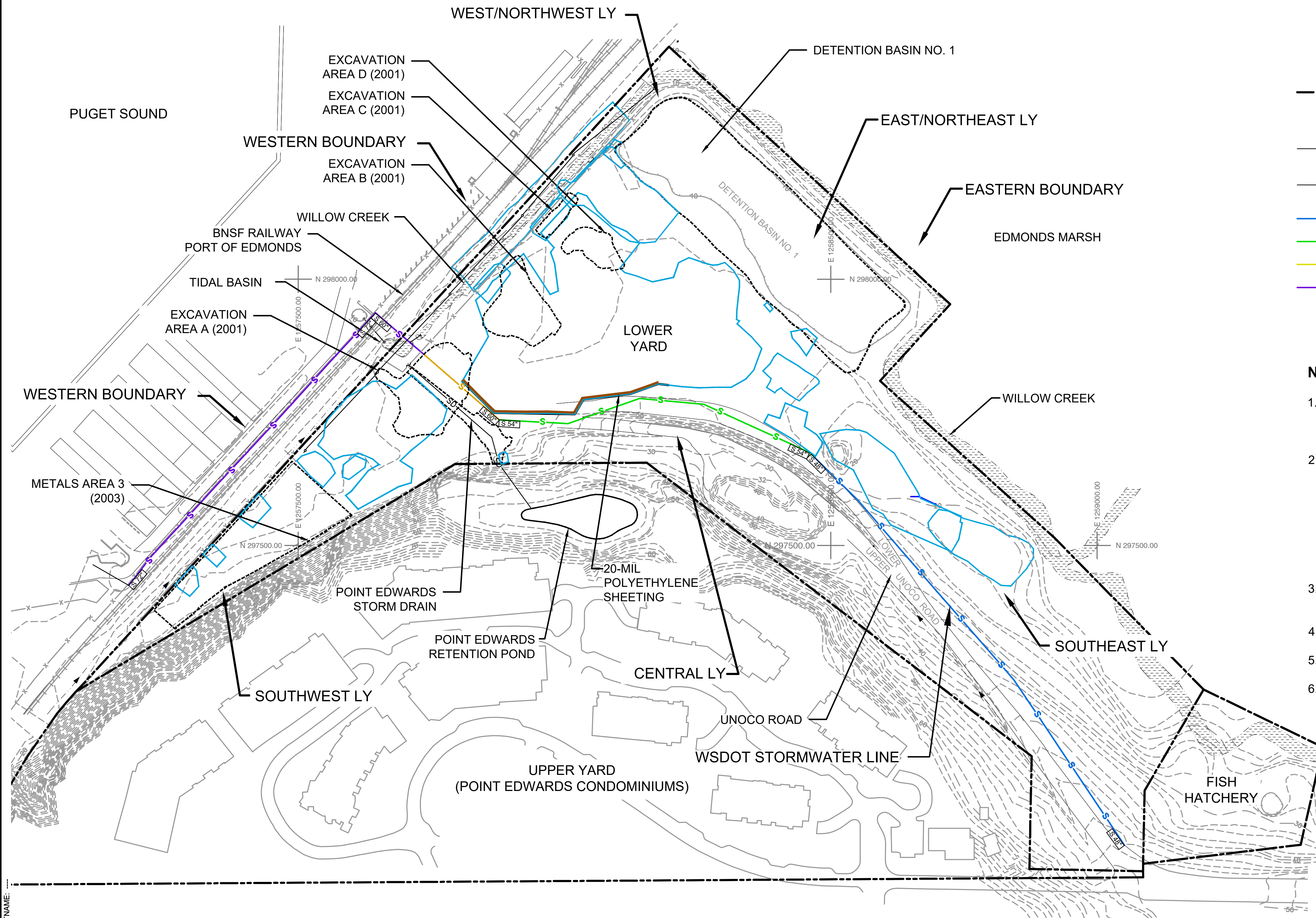

LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008/2017 EXCAVATION BOUNDARIES
- SD — POINT EDWARDS STORM DRAIN LINE
- S — WSDOT STORMWATER LINE (DIAMETER OF STORMWATER LINE INDICATED BY COLOR)
- S — 48-INCH DIAMETER STORMWATER LINE
- S — 54-INCH DIAMETER STORMWATER LINE
- S — 60-INCH DIAMETER STORMWATER LINE
- S — 72-INCH DIAMETER STORMWATER LINE

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET NAVD 88.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
5. LY = LOWER YARD.
6. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

SITE LAYOUT

FIGURE
2

LEGEND:

- FORMER UNOCAL BULK FUEL PROPERTY BOUNDARY
- POINT EDWARDS STORM DRAIN LINE
- WSDOT STORMWATER LINE
- CENTRAL LY
- EAST/NORTHEAST LY
- EASTERN BOUNDARY
- SOUTHEAST LY
- SOUTHWEST LY
- WEST/NORTHWEST LY
- WESTERN BOUNDARY
- SITE BOUNDARY

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET NAVD 88.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. THE SITE NOW COMPRISES THE AREAS OF THE LOWER YARD AND THE UPPER YARD WHERE A HAZARDOUS SUBSTANCE HAS COME TO BE LOCATED. THE FISH HATCHERY IS NO LONGER INCLUDED AS PART OF THE SITE AS A RESULT OF THE REVIEW OF HISTORICAL INFORMATION.
5. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
6. LY = LOWER YARD.
7. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
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SITE AREA OF THE LOWER YARD

FIGURE
3

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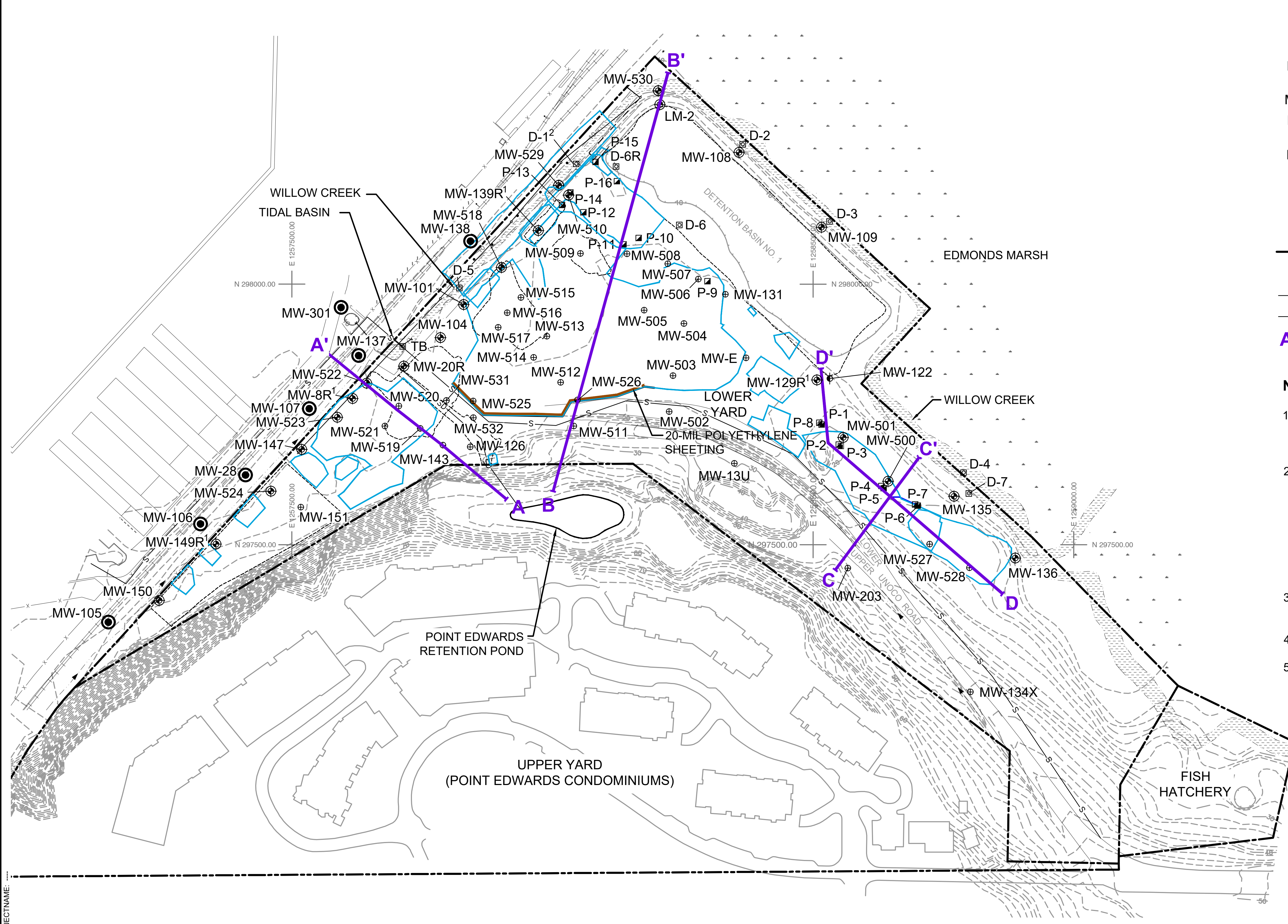

LEGEND:

- MW-203 ⊕ INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-105 BNSF RAILWAY WELLS
- MW-122 DEEP MONITORING WELL LOCATION AND DESIGNATION
- MW-109 PERIMETER MONITORING WELL LOCATION
- P-11 PIEZOMETER
- D-1 STAFF GAUGE
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008/2017 EXCAVATION BOUNDARIES
- S WSDOT STORMWATER LINE
- SD POINT EDWARDS STORM DRAIN LINE
- A—A' CROSS-SECTION LOCATIONS

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET NAVD 88.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
5. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
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CROSS-SECTION LOCATION MAP

FIGURE
4

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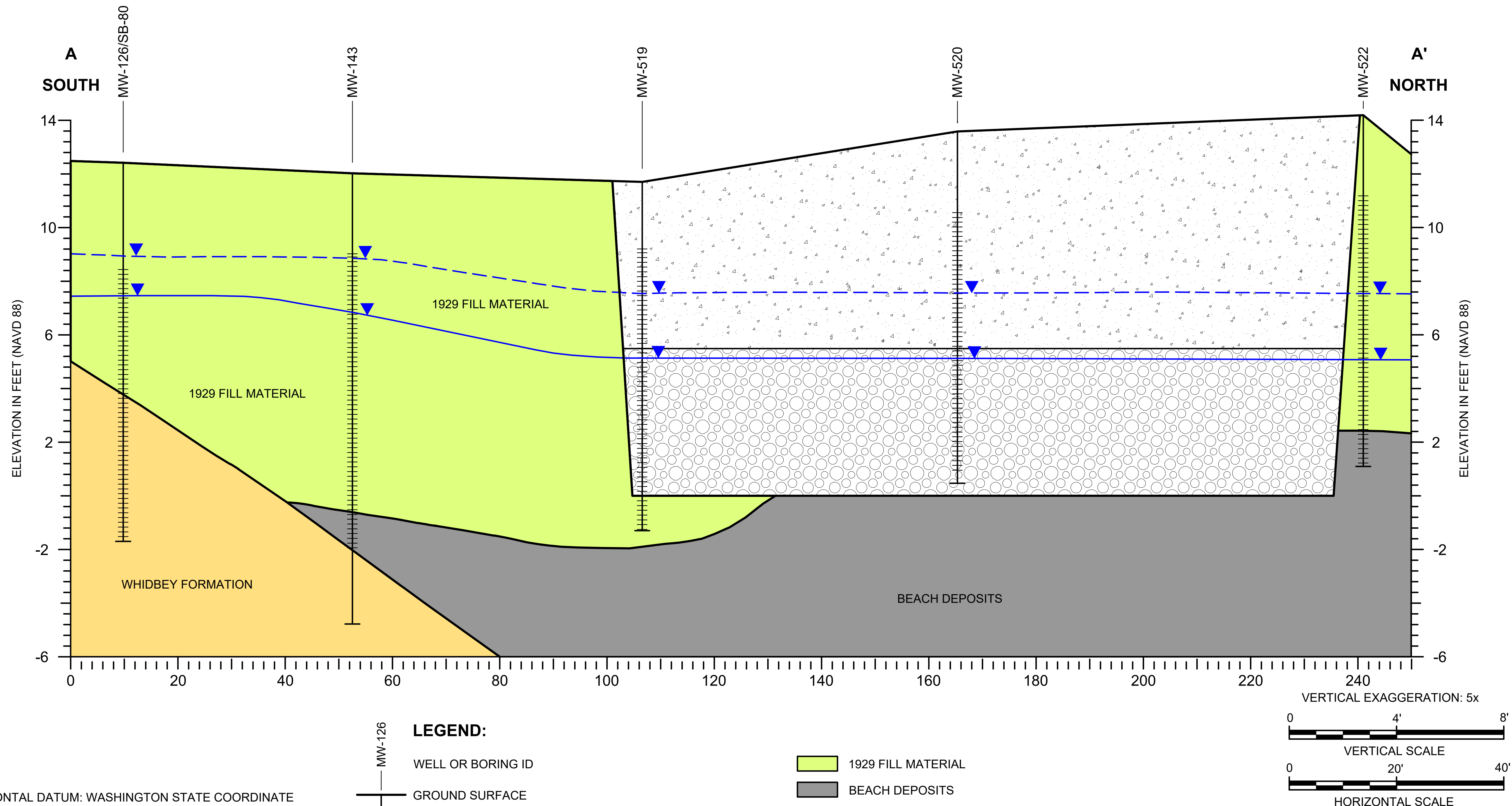

LEGEND:

- MW-126 — WELL OR BORING ID
- GROUND SURFACE
- HISTORICAL HIGH WATER LEVEL
- HISTORICAL LOW WATER LEVEL
- LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
- SCREENED INTERVAL
- BOTTOM OF BORING

- 1929 FILL MATERIAL
- BEACH DEPOSITS
- TRANSITIONAL SILT BED
- WHIDBEY FORMATION
- MARSH DEPOSITS
- 2007/2008 FILL (GRAVEL)
- 2007/2008 FILL (SILT, SAND AND GRAVEL)
- (35' SE)= OFFSET DISTANCE FROM CROSS-SECTION PROFILE

NOTES:

1. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
2. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
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EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
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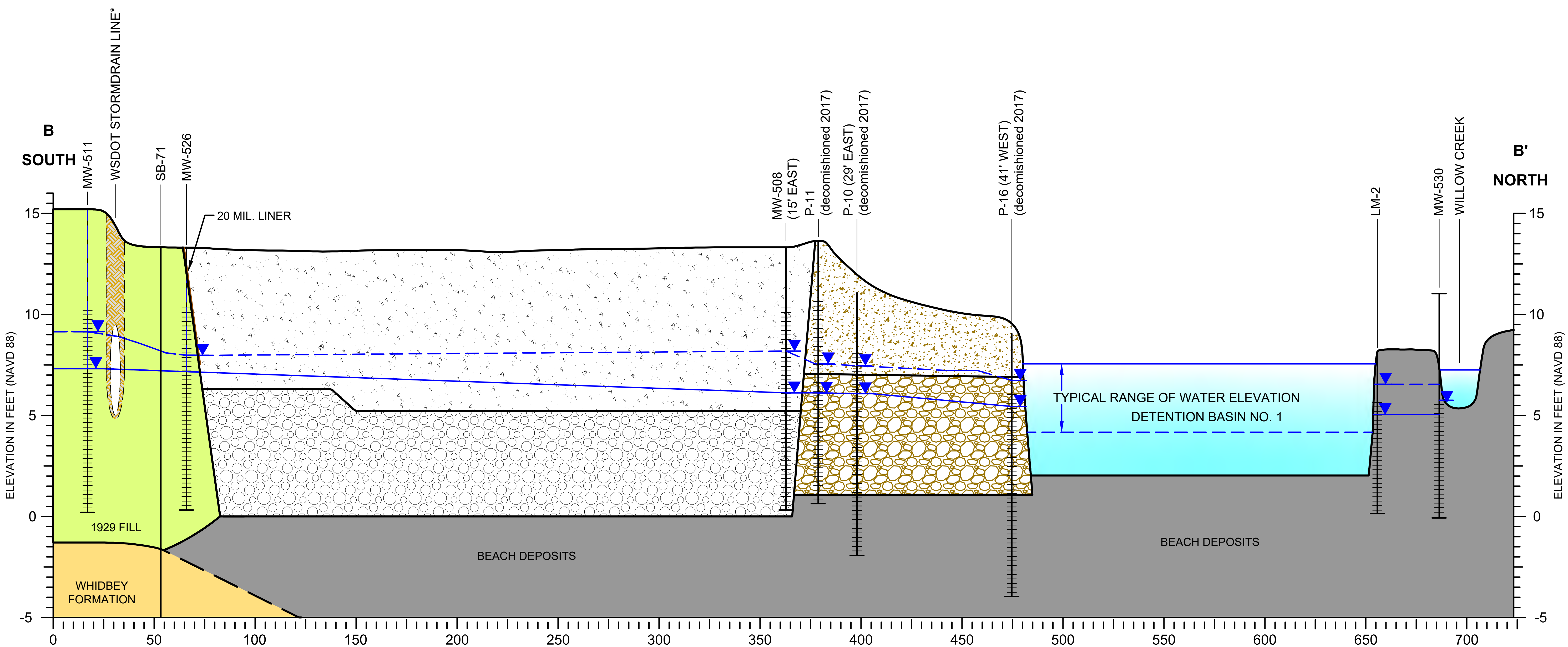
LOWER YARD
GEOLOGIC CROSS-SECTION A-A'

FIGURE
5



NOTES:

1. WSDOT STORMDRAIN LINE LOCATION IS APPROXIMATE AND DRAWN TO A NON EXAGGERATED SCALE FOR CLARITY.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
4. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

LEGEND:

- MW-511 — WELL OR BORING ID
- GROUND SURFACE
- HISTORICAL HIGH WATER LEVEL
- HISTORICAL LOW WATER LEVEL
- LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
- SCREENED INTERVAL
- BOTTOM OF BORING
- (29' E)= OFFSET DISTANCE FROM CROSS-SECTION PROFILE
- DISTURBED TRENCH MATERIAL
- 1929 FILL MATERIAL
- BEACH DEPOSITS
- WHIDBEY FORMATION
- MARSH DEPOSITS
- 2007/2008 FILL (GRAVEL)
- 2007/2008 FILL (SILT, SAND AND GRAVEL)
- 2017 FILL (GRAVEL)
- 2017 FILL (SILT, SAND AND GRAVEL)

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FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
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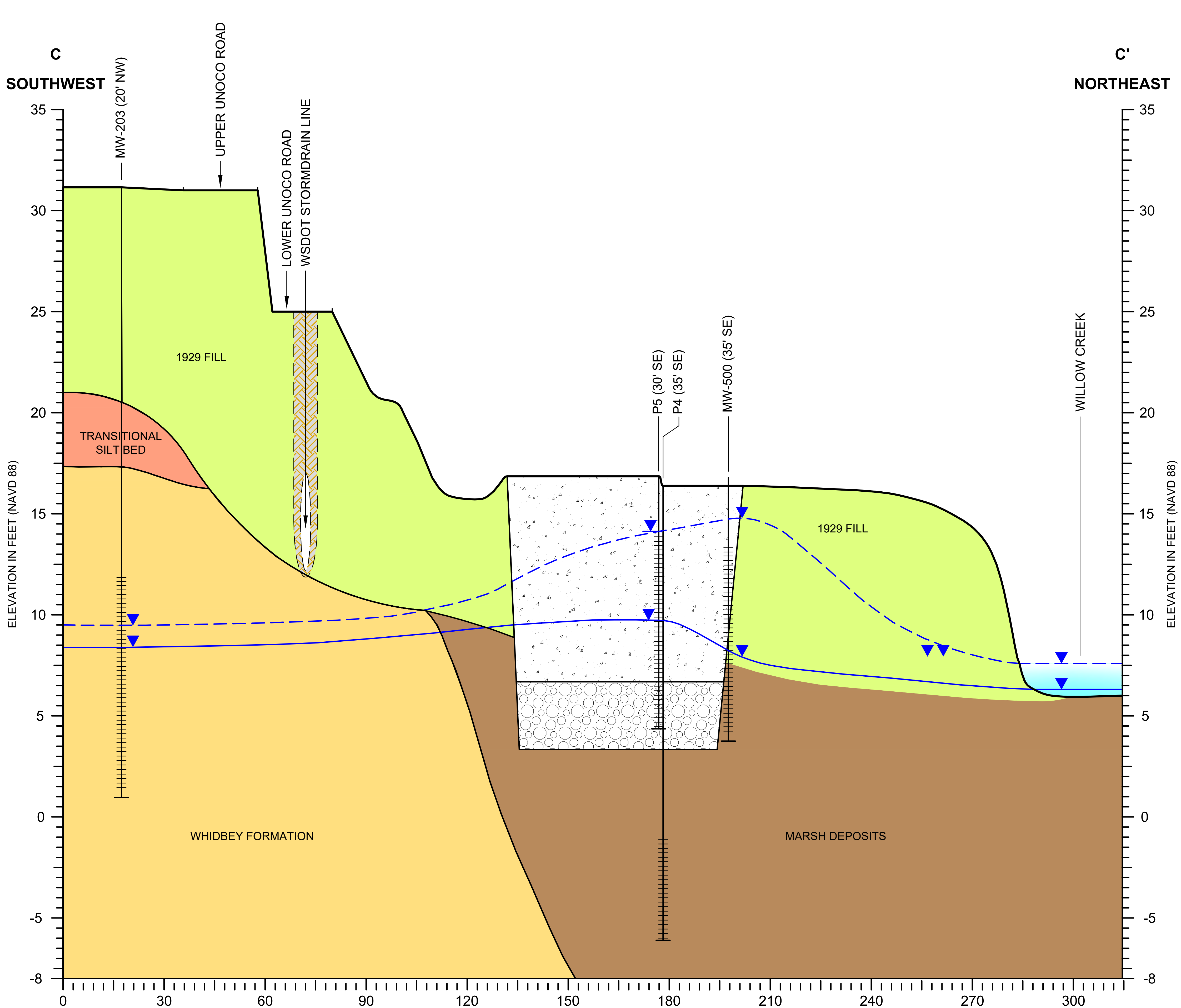
LOWER YARD
GEOLOGIC CROSS-SECTION B-B'

FIGURE
6



LEGEND:

MW-500 — WELL OR BORING ID

GROUND SURFACE

HISTORICAL HIGH WATER LEVEL

HISTORICAL LOW WATER LEVEL

LITHOLOGIC CONTACT (DASHED WHERE INFERRED)

SCREENED INTERVAL

BOTTOM OF BORING

DISTURBED TRENCH MATERIAL

1929 FILL MATERIAL

BEACH DEPOSITS

TRANSITIONAL SILT BED

WHIDBEY FORMATION

MARSH DEPOSITS

2007/2008 FILL (GRAVEL)

2007/2008 FILL (SILT, SAND AND GRAVEL)

(35' SE)= OFFSET DISTANCE FROM CROSS-SECTION PROFILE

NOTES:

1. WSDOT STORMWATER LINE LOCATION IS APPROXIMATE AND DRAWN TO A NON EXAGGERATED SCALE FOR CLARITY.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
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   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
4. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

VERTICAL EXAGGERATION: 6x

0 5' 10'

VERTICAL SCALE

0 30' 60'

HORIZONTAL SCALE

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EDMONDS, WASHINGTON

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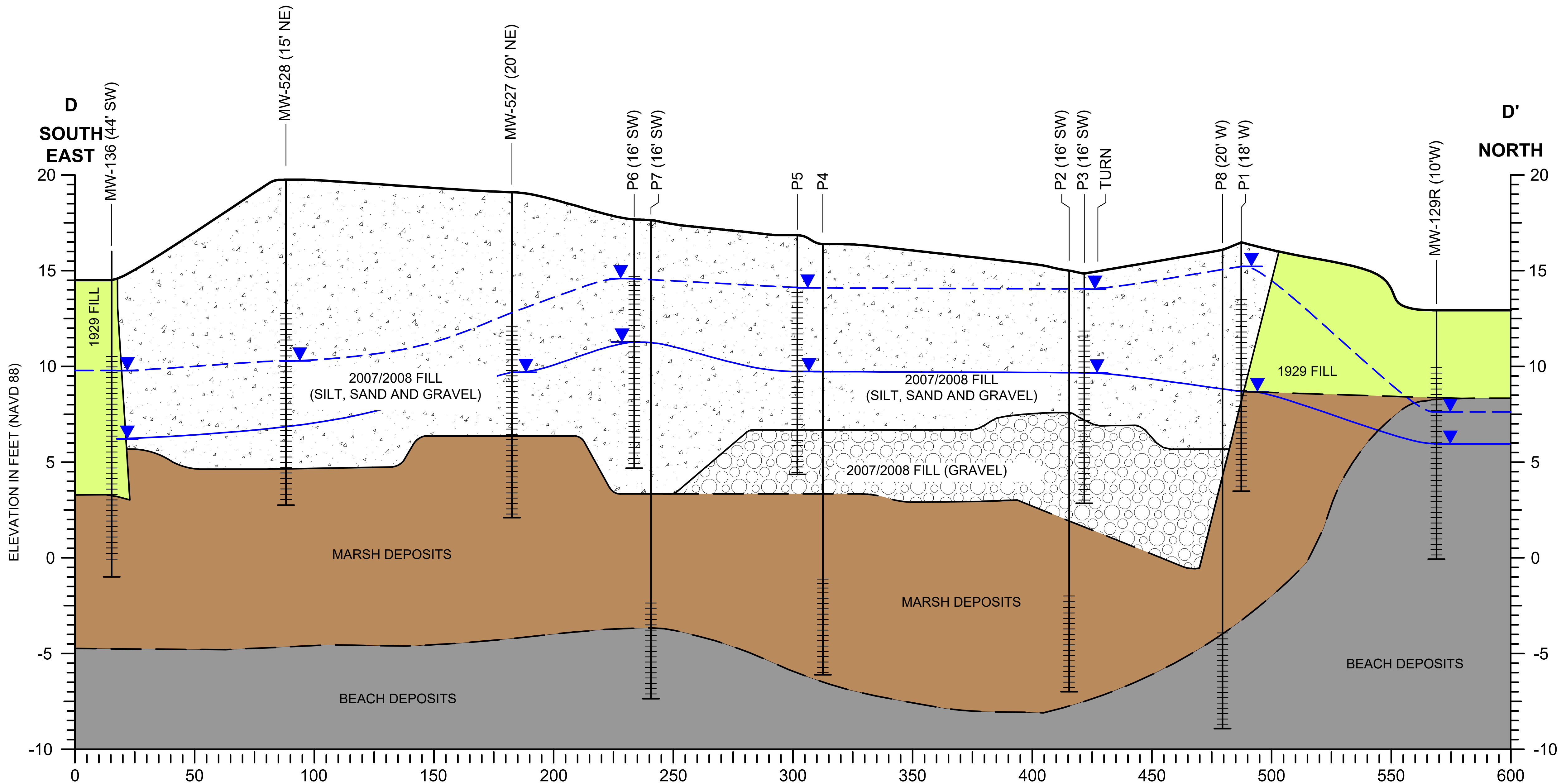
SOUTHEAST LOWER YARD GEOLOGIC CROSS-SECTION C-C'

FIGURE 7



VERTICAL EXAGGERATION: 8x

0 6.25' 12.5'

VERTICAL SCALE

0 50' 100'

HORIZONTAL SCALE

LEGEND:

MW-136 WELL OR BORING ID

GROUND SURFACE

HISTORICAL HIGH WATER LEVEL

HISTORICAL LOW WATER LEVEL

LITHOLOGIC CONTACT (DASHED WHERE INFERRED)

SCREENED INTERVAL

BOTTOM OF BORING

1929 FILL MATERIAL

BEACH DEPOSITS

TRANSITIONAL SILT BED

WHIDBEY FORMATION

MARSH DEPOSITS

2007/2008 FILL (GRAVEL)

2007/2008 FILL (SILT, SAND AND GRAVEL)

(20' W)= OFFSET DISTANCE FROM CROSS-SECTION PROFILE

NOTES:

1. CROSS SECTION DEPICTS SOIL CHARACTERISTICS OF EXCAVATION SIDE WALLS. EXCAVATIONS REACHED TOTAL DEPTHS OF 15 FEET BELOW GROUND SURFACE (LESS THAN 0 FEET ABOVE MEAN SEA LEVEL).
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
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CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
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EDMONDS, WASHINGTON
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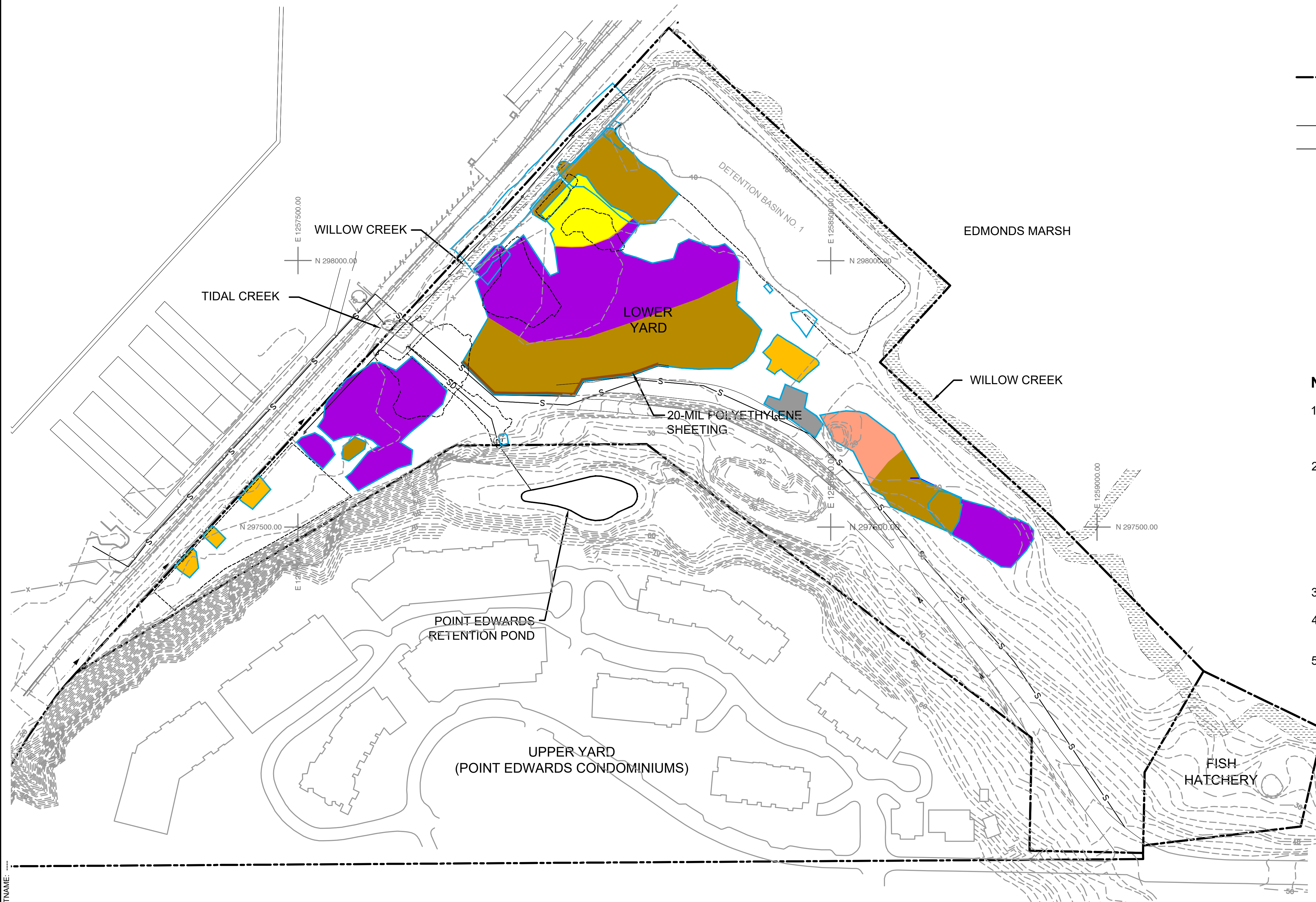
SOUTHEAST LOWER YARD GEOLOGIC CROSS-SECTION D-D'

FIGURE
8



LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008/2017 EXCAVATION BOUNDARIES
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE

TOP OF GRAVEL BACKFILL ELEVATION:

- 2 TO 3 FEET NAVD 88
- 4 TO 5 FEET NAVD 88
- 5 TO 6 FEET NAVD 88
- 6 TO 7 FEET NAVD 88
- 7 TO 8 FEET NAVD 88
- 9 TO 11 FEET NAVD 88

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET NAVD 88.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
VERTICAL DATUM: NAVD 88
UNITS: U.S. SURVEY FEET
HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
4. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
5. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

0 200' 400'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
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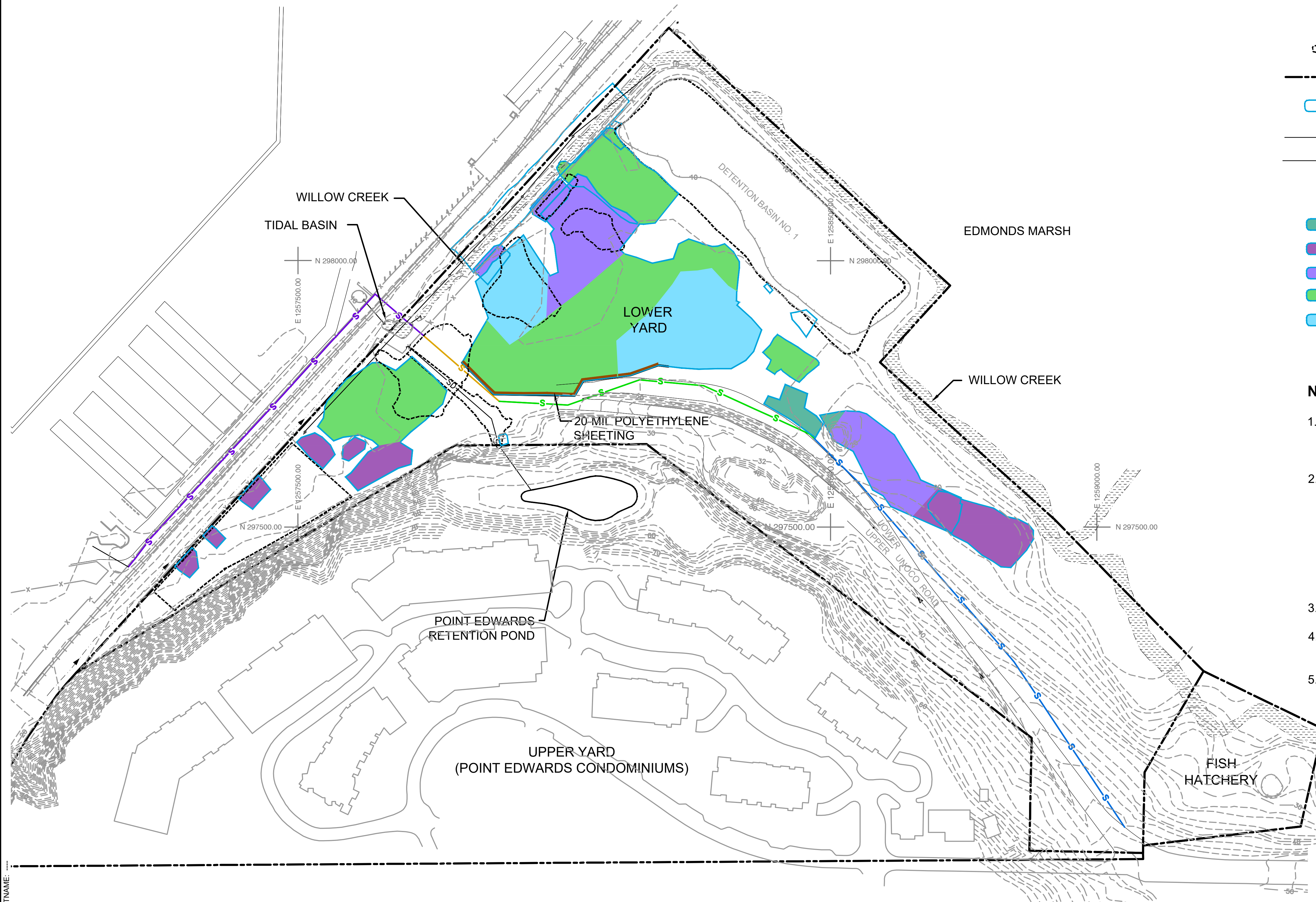
TOP OF 2008 AND 2017 GRAVEL BACKFILL ELEVATIONS

FIGURE
9



LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- LOWER YARD PROPERTY BOUNDARY
- 2007/2008/2017 EXCAVATION BOUNDARIES
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE

BOTTOM OF GRAVEL BACKFILL ELEVATION:

- 8 TO 9 FEET NAVD 88
- 6 TO 4 FEET NAVD 88
- 4 TO 2 FEET NAVD 88
- 2 TO 0 FEET NAVD 88
- 0 TO -2 FEET NAVD 88

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET NAVD 88.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
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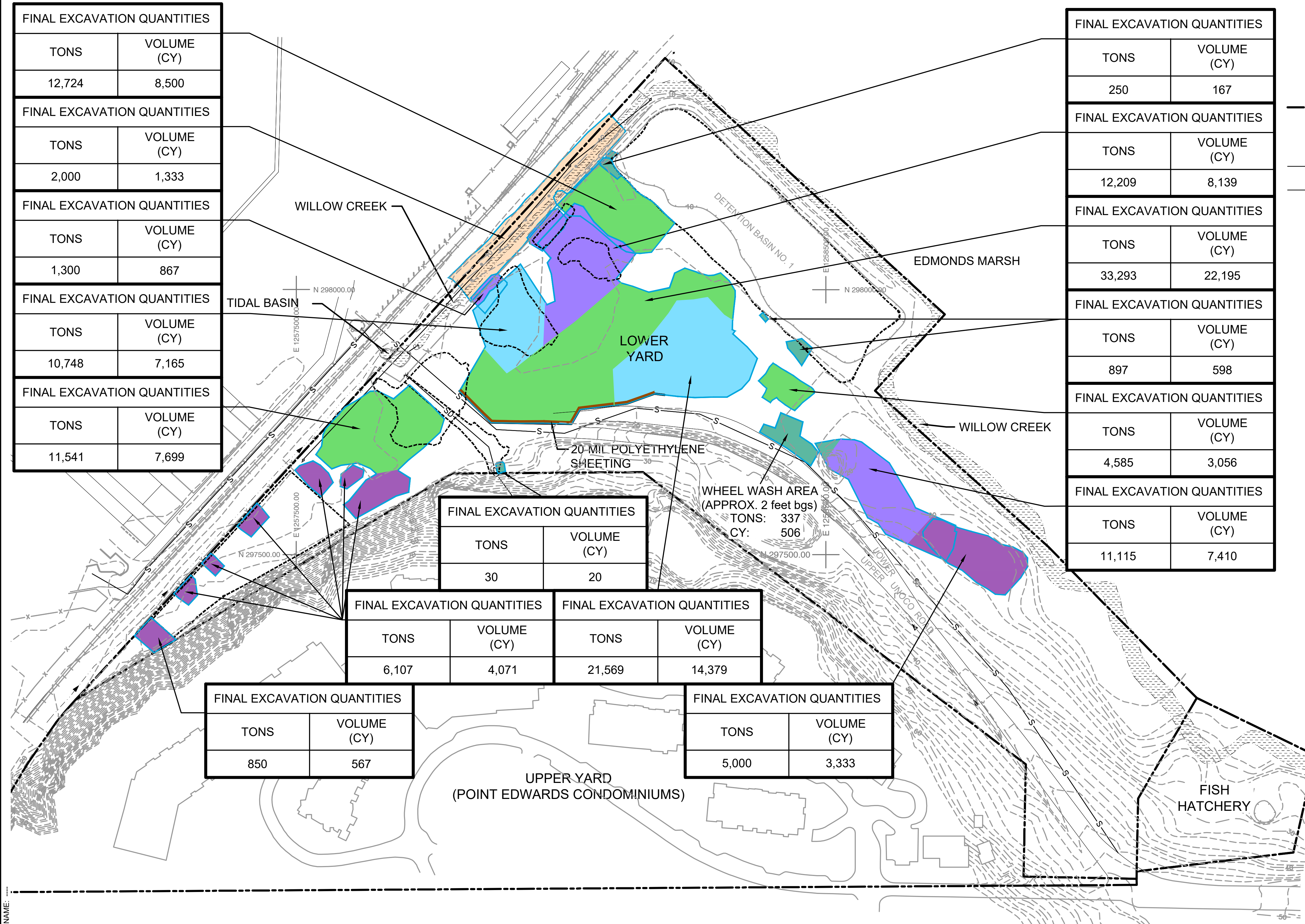
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
4. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
5. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

BOTTOM OF 2008 AND 2017 GRAVEL BACKFILL ELEVATIONS

FIGURE
10



FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
12,724	8,500

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
2,000	1,333

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
1,300	867

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
10,748	7,165

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
11,541	7,699

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
30	20

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
6,107	4,071

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
21,569	14,379

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
850	567

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
5,000	3,333

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
250	167

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
12,209	8,139

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
33,293	22,195

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
897	598

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
4,585	3,056

FINAL EXCAVATION QUANTITIES	
TONS	VOLUME (CY)
11,115	7,410

LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008/2017 EXCAVATION BOUNDARIES
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE

BOTTOM OF GRAVEL BACKFILL ELEVATION:

- 8 TO 9 FEET NAVD 88
- 6 TO 4 FEET NAVD 88
- 4 TO 2 FEET NAVD 88
- 2 TO 0 FEET NAVD 88
- 0 TO -2 FEET NAVD 88
- WILLOW CREEK SEDIMENT REMOVAL AREA (1 FOOT SCRAPE)

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET NAVD 88.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK
3. CY = CUBIC YARD
4. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
5. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
6. bgs = BELOW GROUND SURFACE.
7. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

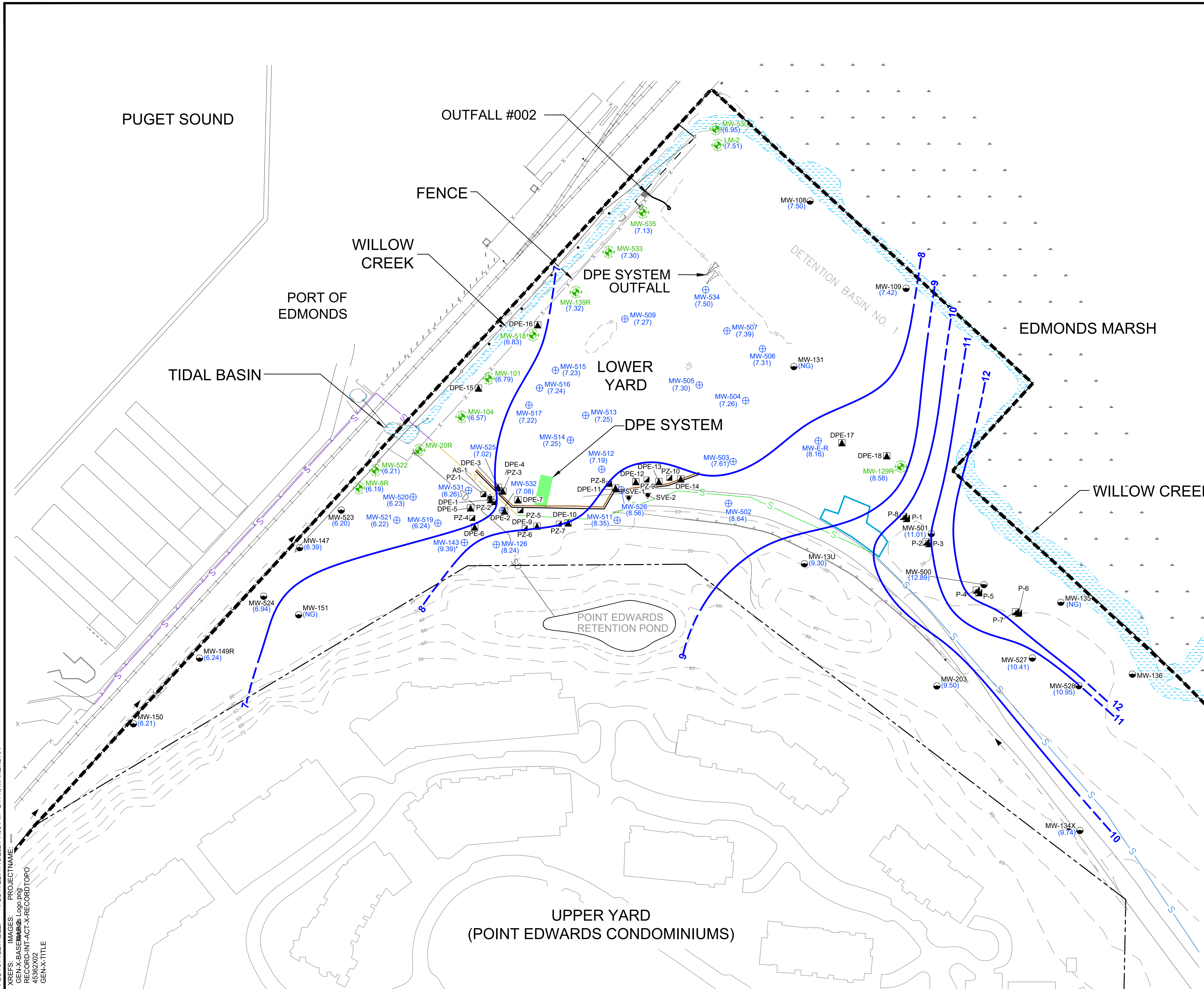
0 200' 400'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

2007/2008 AND 2017 INTERIM ACTION FINAL EXCAVATION LIMITS AND VOLUMES

FIGURE
11



LEGEND:

- FORMER UNOCAL BULK FUEL TERMINAL PROPERTY BOUNDARY
- MW-515 INTERIOR MONITORING WELL LOCATION
- MW-518 PERIMETER MONITORING WELL LOCATION
- MW-13 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- AS-1 AIR SPARGE WELL LOCATION
- DPE-10 DUAL PHASE EXTRACTION (DPE) WELL LOCATION
- SVE-1 SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- 20-MIL POLYETHYLENE SHEETING
- SITE BOUNDARY
- (18.13) GROUNDWATER ELEVATION IN FEET ABOVE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)
- 18 GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- (NG) NOT GAUGED
- · WELLS ARE NOT USED FOR CONTOURING

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998). VERTICAL DATUM: NAVD 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN SURVEYED.
4. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
6. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.
5. MONITORING WELL MW-E WAS RE-INSTALLED IN PLACE ON OCTOBER 20, 2017 AND RENAMED MW-E-R.

0 160' 320'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON

PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

GROUNDWATER ELEVATIONS AND CONTOURS MARCH 19, 2024

ARCADIS

FIGURE
12

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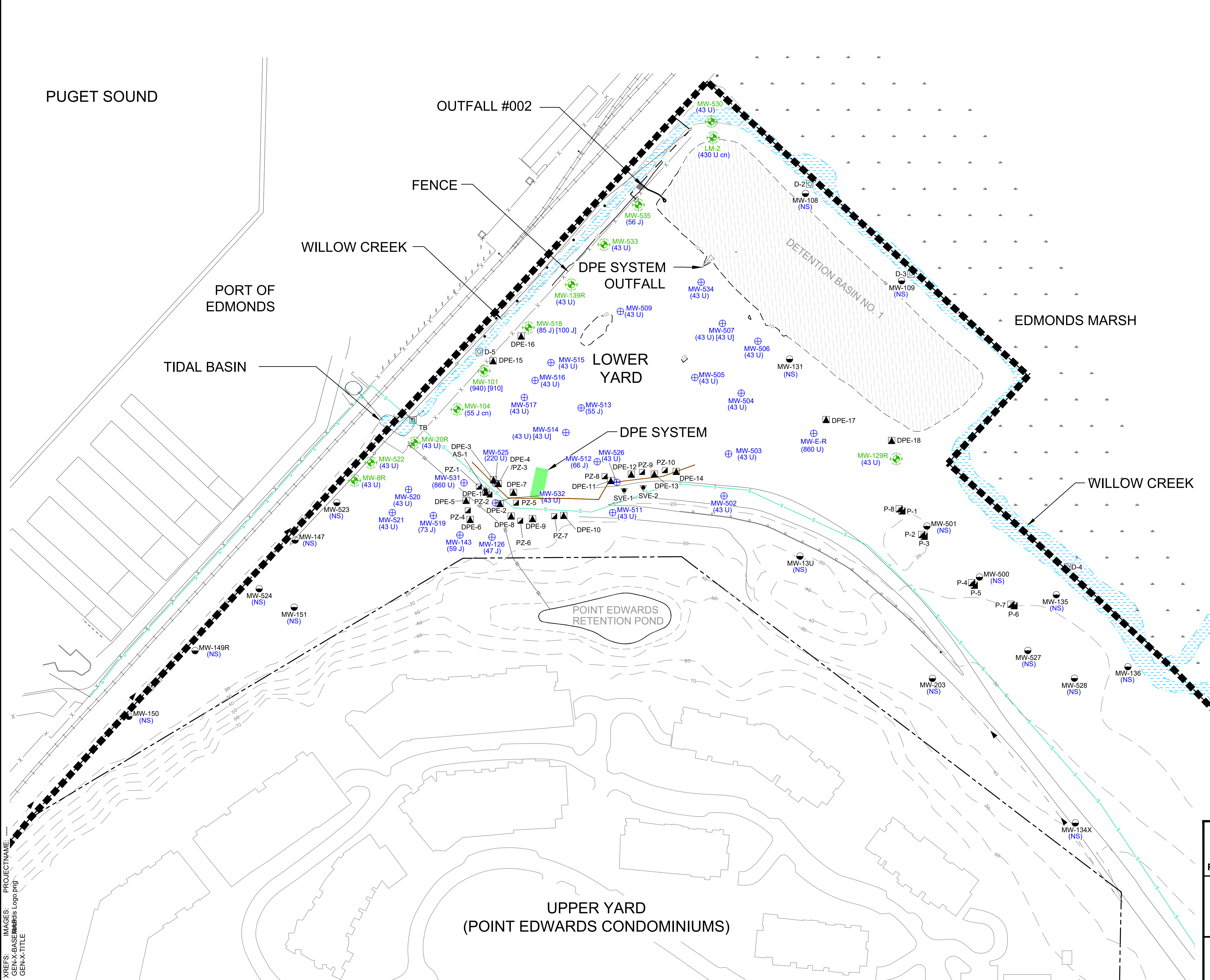


LEGEND:

- FORMER UNOCAL BULK FUEL TERMINAL PROPERTY BOUNDARY
- MW-515 INTERIOR MONITORING WELL LOCATION
- MW-518 PERIMETER MONITORING WELL LOCATION
- MW-13 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- D-2 STAFF GAUGE LOCATION
- AS-1 AIR SPARGE WELL LOCATION
- DPE-10 DUAL-PHASE EXTRACTION (DPE) WELL LOCATION
- SVE-1 SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- 20-MIL POLYETHYLENE SHEETING
- SITE BOUNDARY
- (860 U) GASOLINE RANGE ORGANICS (GRO) CONCENTRATION IN MICROGRAMS PER LITER
- U NON DETECT
- J INDICATES AN ESTIMATED VALUE
- (NS) NOT SAMPLED
- [43 U] DUPLICATE SAMPLE RESULTS

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
VERTICAL DATUM: NAVD 88
UNITS: U.S. SURVEY FEET
HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN SURVEYED.
4. MONITORING WELL MW-E WAS RE-INSTALLED IN PLACE ON OCTOBER 20th, 2017 AND RENAMED MW-E-R.
5. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
6. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

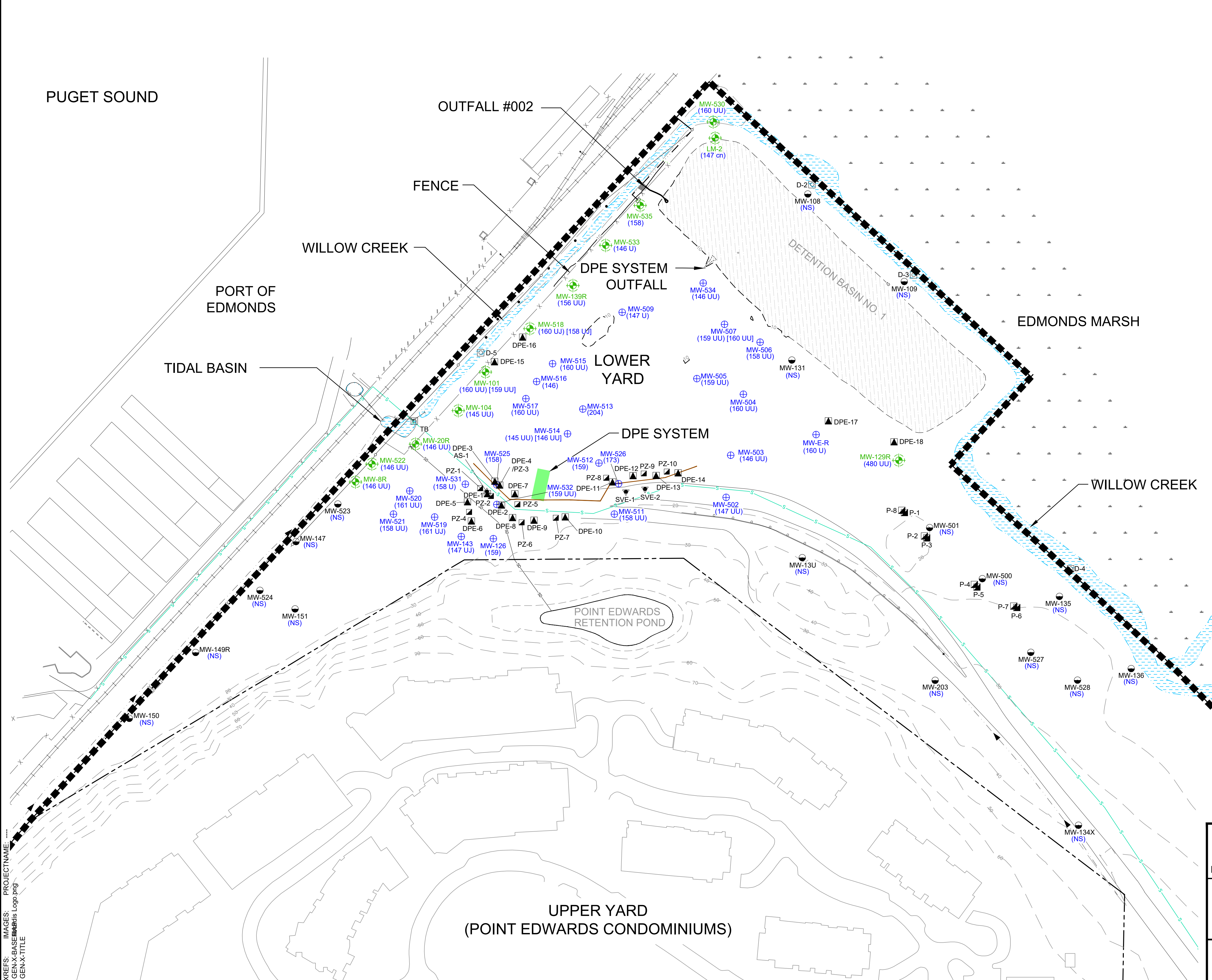
0 160' 320'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

GROUNDWATER GRO CONCENTRATION
MARCH 18 - 21, 2024

FIGURE
13



LEGEND:

- FORMER UNOCAL BULK FUEL TERMINAL PROPERTY BOUNDARY
- MW-515 — INTERIOR MONITORING WELL LOCATION
- MW-518 — PERIMETER MONITORING WELL LOCATION
- MW-13 — MONITORING WELL LOCATION
- PZ-1 — PIEZOMETER LOCATION
- D-2 — STAFF GAUGE LOCATION
- AS-1 — AIR SPARGE WELL LOCATION
- DPE-10 — DUAL-PHASE EXTRACTION (DPE) WELL LOCATION
- SVE-1 — SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- 20-MIL POLYETHYLENE SHEETING
- SITE BOUNDARY
- (204) — TOTAL PETROLEUM HYDROCARBONS IN THE C12-C24 AND C-24 TO C40 RANGE COMBINED WITH SILICA GEL CLEANUP CONCENTRATION IN MICROGRAMS PER LITER
- U — NON DETECT
- UU — THE CONSTITUENTS MAKING UP THE TOTAL ARE ALL NON-DETECTS
- J — INDICATES AN ESTIMATED VALUE
- (NS) — NOT SAMPLED
- [146 UU] — DUPLICATE SAMPLE RESULTS

NOTES:

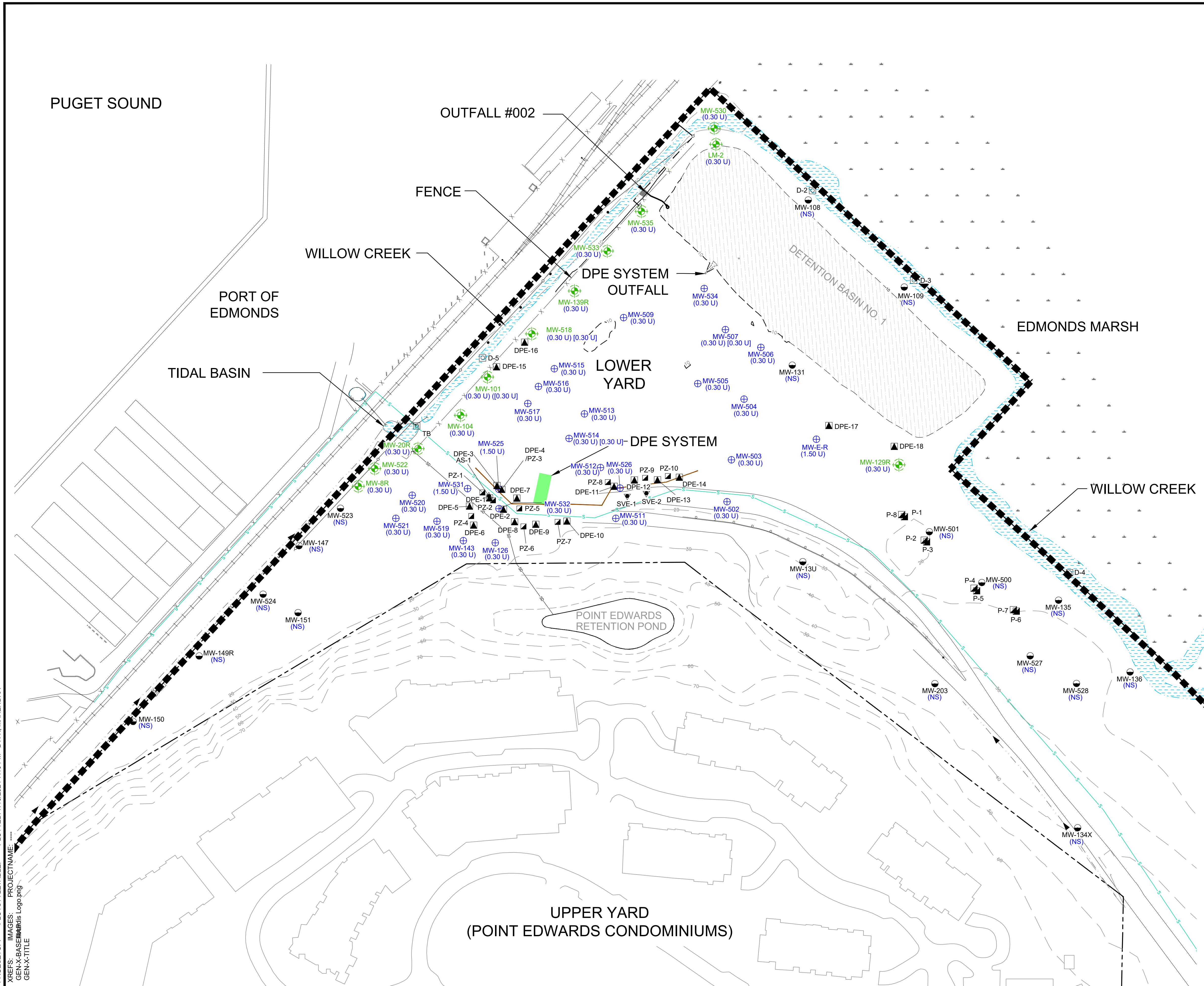
1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
VERTICAL DATUM: NAVD 88
UNITS: U.S. SURVEY FEET
HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN SURVEYED.
4. MONITORING WELL MW-E WAS RE-INSTALLED IN PLACE ON OCTOBER 20th, 2017 AND RENAMED MW-E-R.
5. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
6. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

0 160' 320'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

GROUNDWATER TPH DRO+HRO CONCENTRATIONS MARCH 18 - 21, 2024

FIGURE
14



LEGEND:

- FORMER UNOCAL BULK FUEL TERMINAL PROPERTY BOUNDARY
- MW-515 INTERIOR MONITORING WELL LOCATION
- MW-518 PERIMETER MONITORING WELL LOCATION
- MW-13 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- D-2 STAFF GAUGE LOCATION
- AS-1 AIR SPARGE WELL LOCATION
- DPE-10 DUAL-PHASE EXTRACTION (DPE) WELL LOCATION
- SVE-1 SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- 20-MIL POLYETHYLENE SHEETING
- SITE BOUNDARY
- (1.50) BENZENE CONCENTRATION IN MICROGRAMS PER LITER(µg/L)
- U NON DETECT
- (NS) NOT SAMPLED
- [0.30 U] DUPLICATE SAMPLE RESULTS

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998). VERTICAL DATUM: NAVD 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN SURVEYED.
4. MONITORING WELL MW-E WAS RE-INSTALLED IN PLACE ON OCTOBER 20th, 2017 AND RENAMED MW-E-R.
5. MONITORING WELLS MW-526 AND MW-531 WERE RESAMPLED ON DECEMBER 16, 2022.
6. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
7. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

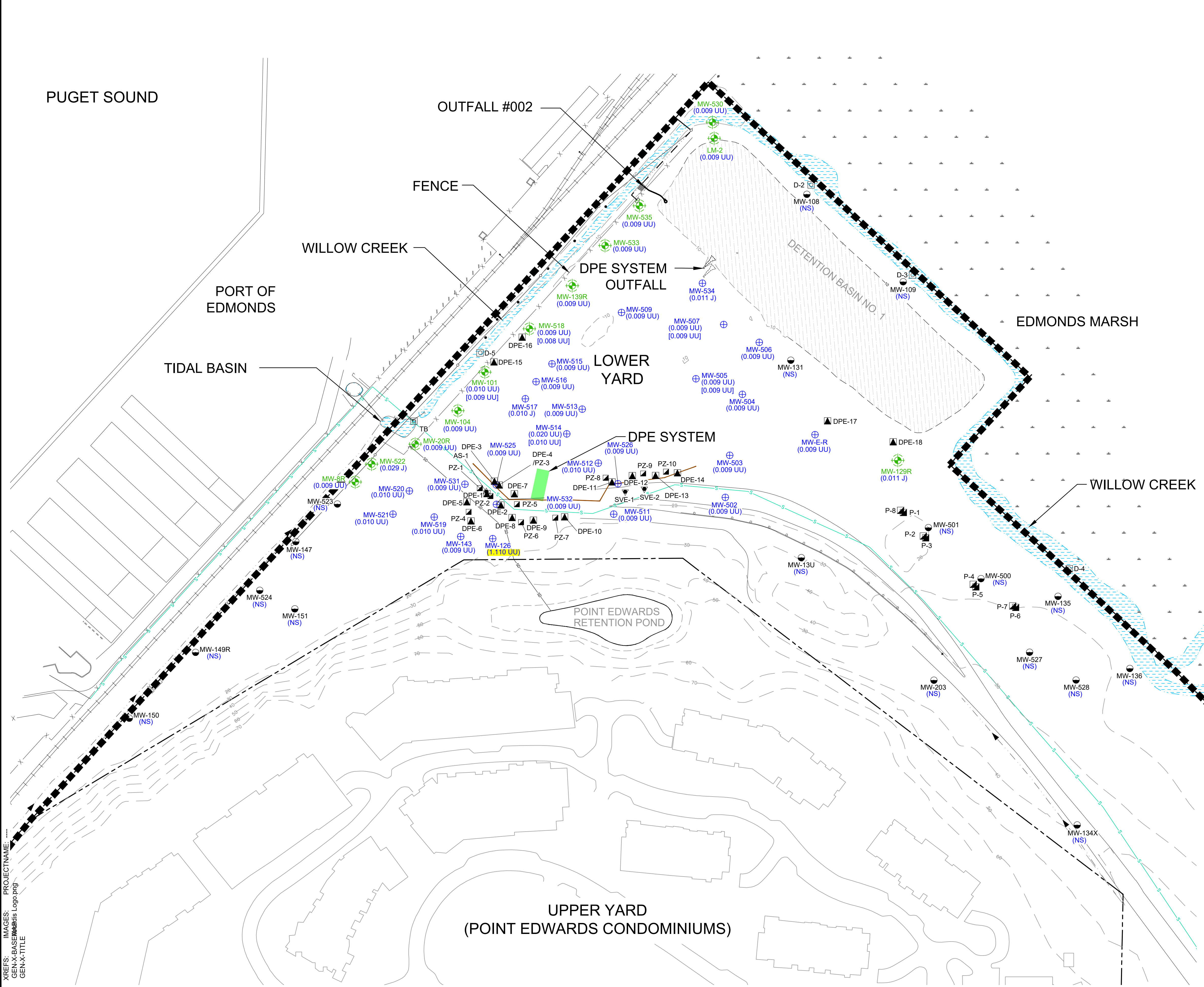
0 160' 320'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

GROUNDWATER BENZENE CONCENTRATION
MARCH 18 - 21, 2024

FIGURE
15



LEGEND:

- FORMER UNOCAL BULK FUEL TERMINAL PROPERTY BOUNDARY
- MW-515 — INTERIOR MONITORING WELL LOCATION
- MW-518 — PERIMETER MONITORING WELL LOCATION
- MW-13 — MONITORING WELL LOCATION
- PZ-1 — PIEZOMETER LOCATION
- D-2 — STAFF GAUGE LOCATION
- AS-1 — AIR SPARGE WELL LOCATION
- DPE-10 — DUAL-PHASE EXTRACTION (DPE) WELL LOCATION
- SVE-1 — SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- 20-MIL POLYETHYLENE SHEETING
- SITE BOUNDARY
- (1.110) — CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS (cPAHs) CONCENTRATION IN MICROGRAMS PER LITER
- UU — THE CONSTITUENTS MAKING UP THE TOTAL ARE ALL NON-DETECTS
- J — INDICATES AN ESTIMATED VALUE
- (NS) — NOT SAMPLED
- [0.009 UU] — DUPLICATE SAMPLE RESULTS
- (1.110 UU) — HIGHLIGHTED CONCENTRATIONS EXCEED SAMPLE SPECIFIC TPH CLEANUP LEVEL

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION (WSDOT) STORMWATER LINE HAS NOT BEEN SURVEYED.
4. MONITORING WELL MW-E WAS RE-INSTALLED IN PLACE ON OCTOBER 20th, 2017 AND RENAMED MW-E-R.
5. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
6. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

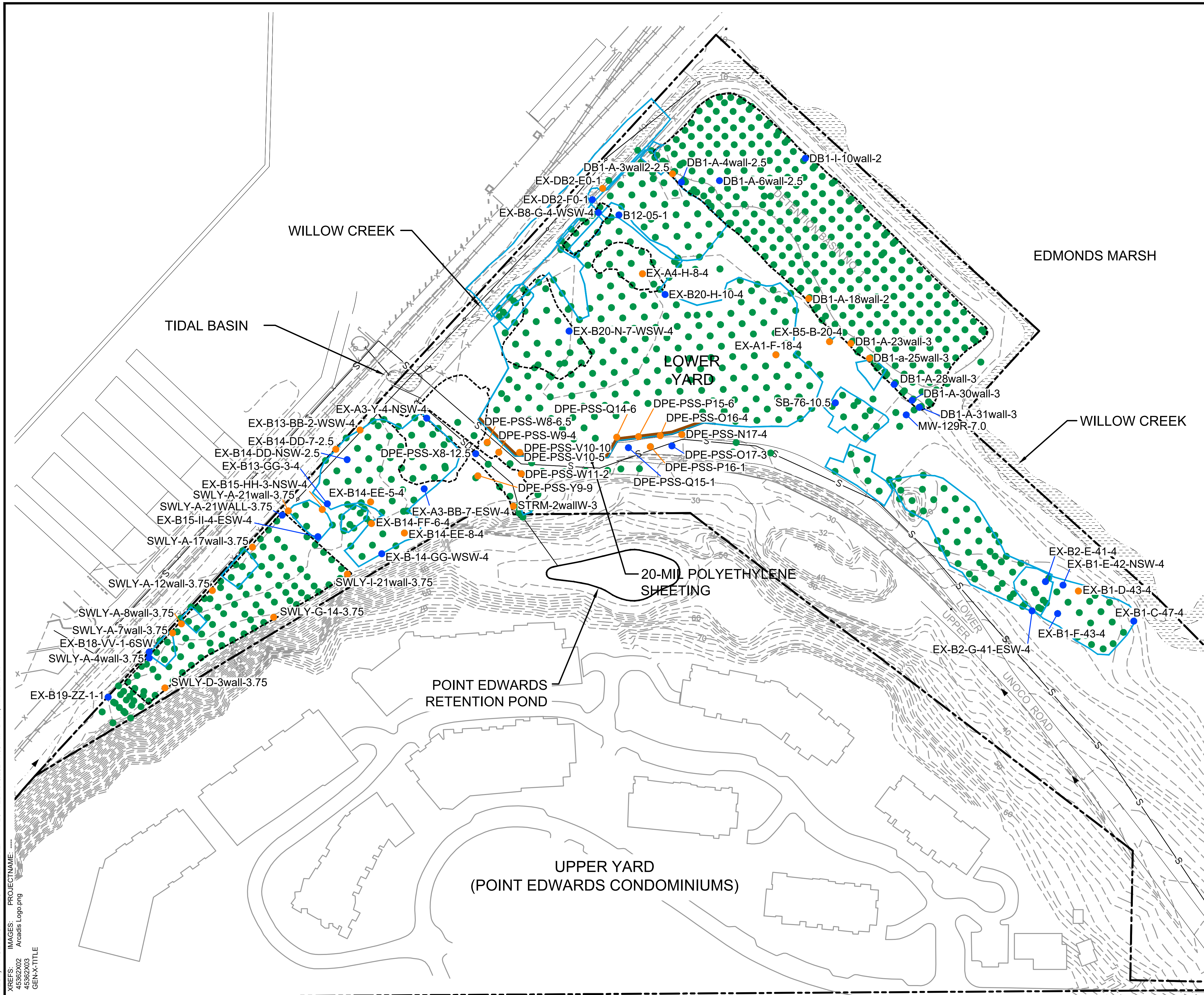
0 160' 320'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

GROUNDWATER cPAH CONCENTRATION
MARCH 18 - 21, 2024

FIGURE
16



LEGEND:

- ● SOIL SAMPLE LOCATION WHERE COC CONCENTRATIONS BELOW RESPECTIVE CLEANUP LEVEL (CUL) OR ECOLOGICALLY PROTECTIVE SOIL VALUE (PSV)
- ● CUL/PSV EXCEEDED
- ● 2X CUL/PSV EXCEEDED
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008/2017 EXCAVATION BOUNDARIES
- —S— WSDOT STORMWATER LINE
- —SD— POINT EDWARDS STORM DRAIN LINE
- PRE 2007 EXCAVATION BOUNDARIES

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET NAVD 88.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
5. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

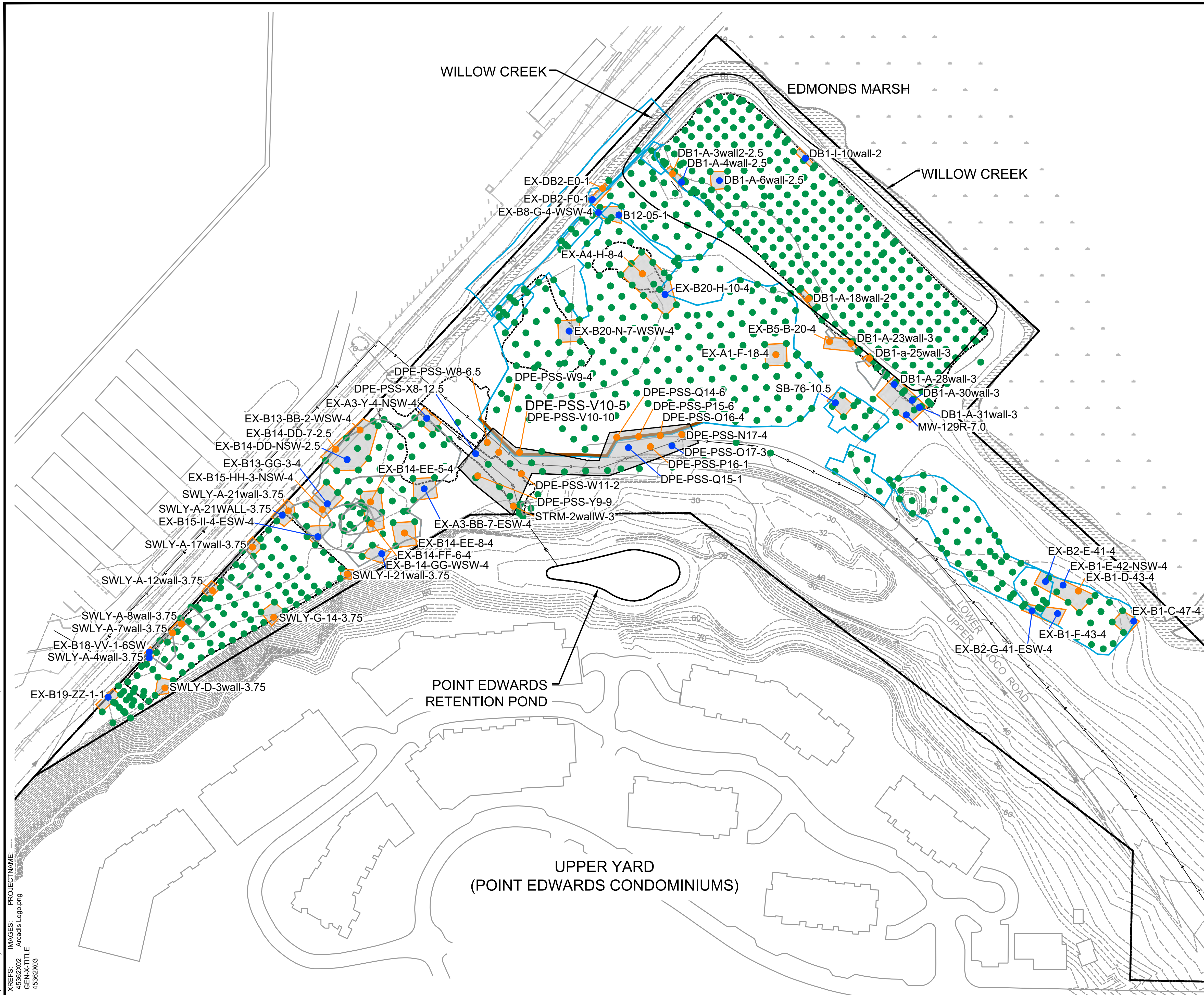
0 160' 320'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

LOWER YARD REMAINING SOIL IMPACTS MAP

FIGURE
17



LEGEND:

- SOIL SAMPLE LOCATION WHERE COC CONCENTRATIONS BELOW RESPECTIVE CLEANUP LEVEL (CUL) OR ECOLOGICALLY PROTECTIVE SOIL VALUE (PSV)
- CUL/PSV EXCEEDED
- 2X CUL/PSV EXCEEDED
- 2007/2008/2017 EXCAVATION BOUNDARIES
- PROPERTY BOUNDARY
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- PROPOSED WSDOT STORMWATER LINE EXCAVATION BOUNDARY
- PROPOSED SPOT EXCAVATION BOUNDARY
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE

NOTES:

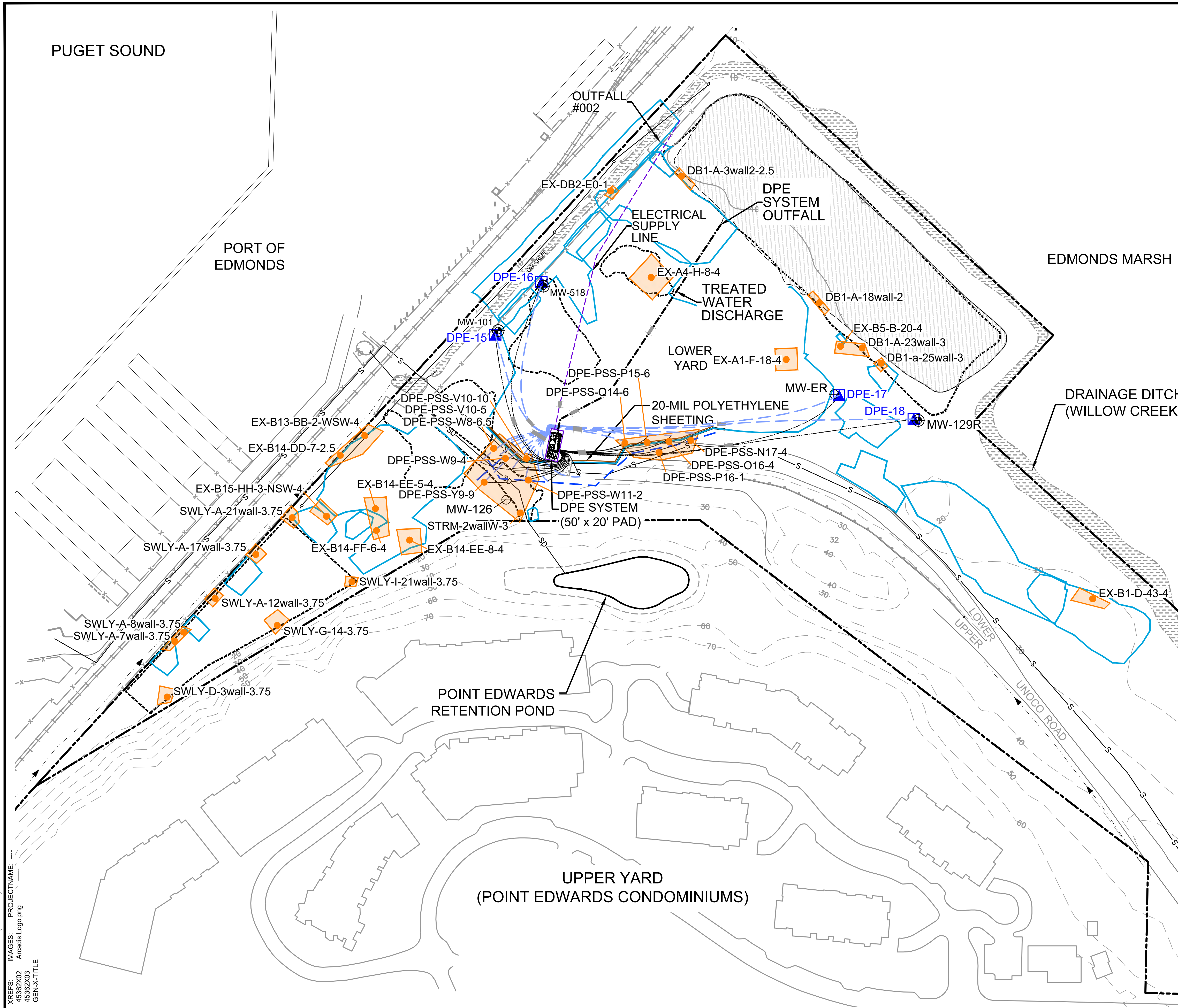
1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET NAVD 88.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
5. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

0 160' 320'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON
PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

ALTERNATIVE 4: EXCAVATION

FIGURE
18



LEGEND:

- PROPERTY BOUNDARY
- 2007/2008/2017 EXCAVATION BOUNDARIES
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- DUAL-PHASE EXTRACTION WELL
- 2X CLEANUP LEVEL EXCEEDED
- GROUNDWATER CONVEYANCE PIPING (APPROXIMATE LOCATION)
- VAPOR CONVEYANCE PIPING (APPROXIMATE LOCATION)
- GRAVEL AREA
- PIPE CROSSOVER
- PROPOSED ENGINEERED COVER
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- HISTORICAL EXCAVATION AREA
- STATEING MONITONRING WELL WITH DISSOLVED PHASE COC CONCENTRATION EXCEEDING CUL DURING THE LAST 4 QUARTERS

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET NAVD 88.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NORTH AMERICAN DATUM OF 1983/NORTH AMERICAN DATUM OF 1998).
   VERTICAL DATUM: NAVD 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GLOBAL POSITIONING SYSTEM VIA VERTICAL REFERENCE STATION NETWORK.
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. LOCATION OF EXISTING POWER SUPPLY PANEL HAS NOT BEEN SURVEYED.
5. NAVD 88 = NORTH AMERICAN VERTICAL DATUM OF 1988.
6. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION.

0 160' 320'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNION OIL COMPANY OF CALIFORNIA
EDMONDS BULK FUEL TERMINAL, 11720 UNOCO ROAD
EDMONDS, WASHINGTON

PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT ADDENDUM

ALTERNATIVE 6: DUAL-PHASE EXTRACTION TREATMENT SYSTEM OPERATION, ENINGEE RED COVER SYSTEM, CONTINGENCY PLAN AND ENVIRONMENTAL COVENANT

FIGURE

19

Appendix A

Public Review Draft Final Feasibility Report

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY

PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT

Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

June 16, 2017

PUBLIC REVIEW DRAFT FINAL FEASIBILITY STUDY REPORT

Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Prepared for:

Chevron Environmental Management Company

Prepared by:

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1100 Olive Way

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Our Ref.:

B0045362.0009

Date:

June 16, 2017

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Ophelie Encelle
Environmental Scientist

Peter Campbell PE
Senior Engineer
WA PE 45051

Scott Zorn
Project Manager

CONTENTS

Acronyms and Abbreviations i

1 Introduction 1-1

1.1 Final Feasibility Study Report Background 1-1

1.2 Previous Submittals and Historical Data 1-2

1.3 Final Feasibility Study Report Organization 1-3

2 Background 2-1

2.1 Former Unocal Property Description 2-1

2.1.1 Upper Yard 2-1

2.1.2 Lower Yard 2-2

2.1.3 Willow Creek Fish Hatchery 2-3

2.1.4 Site Definition 2-4

2.1.5 Land Use and Zoning 2-4

2.2 Site History 2-5

2.2.1 Lower Yard Creation 2-5

2.2.2 Historical Facilities and Operations 2-5

2.2.2.1 Former Upper Yard Facilities 2-6

2.2.2.2 Lower Yard Facilities 2-6

2.2.3 Historical Releases 2-9

2.2.4 Regulatory History and Previous Interim Actions 2-9

2.2.4.1 Agreed Order No. DE 92TC-N328 2-10

2.2.4.2 Agreed Order No. DE 4460 2-10

2.3 Regional Environmental Setting 2-11

2.3.1 Climate 2-11

2.3.2 Regional Geology 2-11

2.3.3 Regional Hydrogeology 2-12

2.4 Site Environmental Setting 2-12

2.4.1 Site Geology 2-12

2.4.2 Site Hydrology 2-13

2.4.2.1 Water Supply Wells 2-13

2.4.2.2 Groundwater Elevations 2-13

2.4.2.3 Groundwater Gradient and Direction 2-14

2.4.2.4 Hydraulic Conductivity 2-15

2.4.2.5 Surface Water – Groundwater Interaction 2-16

2.4.3 Surface Water 2-18

2.4.4 Upland Sediment 2-18

2.4.5 Wetlands 2-18

2.5 Historical Site Investigations 2-19

2.5.1 Onsite investigations 2-19

2.5.2 Offsite investigations 2-20

2.6 Previous Cleanup Actions 2-21

2.6.1 Light Non-Aqueous Phase Liquid Recovery Interim Actions 2-21

2.6.2 Upper Yard Interim Action 2-21

2.6.3 Lower Yard Interim Actions 2-22

2.6.3.1 2001 Excavation 2-22

2.6.3.2 2003 Excavation 2-22

2.6.3.3 2007 and 2008 Excavation 2-23

2.7 Recent Investigations 2-26

2.7.1 2008 Lower Yard Site Investigation 2-26

2.7.2 2011 Lower Yard Site Investigation 2-27

2.7.3 2012 Lower Yard Investigation 2-27

2.7.4 2013 Soil Vapor Investigation 2-28

3 Nature and Extent of Contamination 3-1

3.1 Soil Quality 3-1

3.1.1 Petroleum Hydrocarbons 3-1

3.1.2 Benzene 3-3

3.1.3 Carcinogenic Polycyclic Aromatic Hydrocarbons 3-3

3.1.4 Arsenic 3-4

3.2 Soil Vapor Quality 3-4

3.3 Light Nonaqueous Phase Liquid 3-5

3.4 Groundwater Quality 3-6

3.4.1 Petroleum Hydrocarbons 3-7
3.4.1.1 Total Petroleum Hydrocarbons 3-7
3.4.1.2 Benzene 3-8
3.4.2 Carcinogenic Polycyclic Aromatic Hydrocarbons 3-9
3.5 Surface Water 3-9
3.6 Sediment 3-10
3.6.1 Willow Creek 3-10
3.6.2 Loading Dock and Pier 3-11
4 Conceptual Site Model 4-1
4.1 Source Characterization 4-1
4.2 Remaining Impacts 4-1
4.2.1 Soil 4-1
4.2.1.1 Washington State Department of Transportation Stormwater Line 4-1
4.2.1.2 Detention Basin No. 2 Area 4-2
4.2.1.3 Monitoring Well MW-129R, Southwest Lower Yard, and Southeast Lower Yard 4-3
4.2.1.4 Point Edwards Storm Drain 4-3
4.2.2 Groundwater 4-4
4.2.2.1 Groundwater Concentration Trends 4-5
4.2.2.2 Light Non-Aqueous Phase Liquid 4-6
4.3 Fate and Transport of Contaminants 4-6
4.4 Potential Receptors 4-7
4.4.1 Human Receptors 4-7
4.4.2 Ecological Receptors 4-7
4.5 Potential Exposures 4-7
4.5.1 Exposures to Human Receptors 4-7
4.5.1.1 Current Exposures 4-8
4.5.1.2 Potential Future Exposures 4-9
4.5.2 Exposures to Ecological Receptors 4-10
5 Cleanup Standards 5-1
5.1 Indicator Hazardous Substances 5-1

5.1.1 Sediment 5-1
5.1.2 Surface Water and Groundwater 5-2
5.1.3 Soil 5-3
5.2 Sediment Cleanup Standards 5-4
5.3 Surface-Water Cleanup Standards 5-4
5.3.1 Endpoints for Cleanup Levels 5-4
5.3.2 Cleanup Levels 5-5
5.3.3 Surface-Water Points of Compliance 5-6
5.4 Groundwater Cleanup Standards 5-6
5.4.1 Endpoints for Cleanup Levels 5-6
5.4.2 Cleanup Levels 5-7
5.4.3 Groundwater Point of Compliance 5-7
5.5 Soil Cleanup Standards 5-9
5.5.1 Terrestrial Ecological Evaluation for Soil 5-9
5.5.2 Direct Human Contact Soil Pathway 5-10
5.5.3 Soil Points of Compliance 5-11
5.5.4 Soil Leaching Pathway 5-11
5.5.5 Soil Residual Saturation 5-12
5.5.6 Soil Vapor Pathway 5-12
5.5.7 Soil Dermal Contact Pathway 5-13
5.6 Summary of Soil and Groundwater Cleanup Levels 5-13
6 Development of Remedial Alternatives 6-1
6.1 Description of Possible Remedial Technologies 6-2
6.1.1 Remedial Technology 1: Environmental Covenant 6-2
6.1.2 Remedial Technology 2: Groundwater Monitored Natural Attenuation 6-3
6.1.3 Remedial Technology 3: Excavation 6-4
6.1.4 Remedial Technology 4: In-Situ Solidification 6-4
6.1.5 Remedial Technology 5: Enhanced Anaerobic Bio-Oxidation 6-5
6.1.6 Remedial Technology 6: Surfactant Flushing 6-5
6.1.7 Remedial Technology 7: Groundwater Containment System Using Groundwater Extraction Wells 6-6

6.1.8 Remedial Technology 8: Groundwater Containment System Using Groundwater Extraction Trench 6-6

6.1.9 Remedial Technology 9: Light Nonaqueous Phase Liquid Barrier Trench with Reactive Core Mat 6-7

6.1.10 Remedial Technology 10: Funnel and Gate System with In-Situ Remediation 6-7

6.1.11 Remedial Technology 11: Funnel and Gate System with Groundwater Extraction 6-7

6.1.12 Remedial Technology 12: Soil and Groundwater Treatment using Dual-Phase Extraction 6-8

6.2 Summary of Retained Remedial Alternatives 6-8

6.3 Description of Retained Remedial Alternatives 6-9

6.3.1 Groundwater Flow Model 6-9

6.3.2 Alternative 1: Excavation and Monitored Natural Attenuation with Environmental Covenants 6-10

6.3.3 Alternative 2: Groundwater Containment System Using Groundwater Extraction Wells, and Monitored Natural Attenuation with Environmental Covenants 6-11

6.3.4 Alternative 3: Groundwater Containment System Using Groundwater Extraction Trench, and Monitored Natural Attenuation with Environmental Covenants 6-12

6.3.5 Alternative 4: Excavation and Limited Environmental Covenant 6-14

6.3.5.1 Soil Excavation Near DB-2 6-14

6.3.5.2 Soil Excavation Adjacent to the Washington State Department of Transportation Stormwater Line 6-14

6.3.6 Alternative 5: Excavation, In-Situ Solidification and Monitored Natural Attenuation with Environmental Covenants 6-15

6.3.7 Alternative 6: Excavation, Dual-Phase Extraction Treatment and Limited Environmental Covenant 6-16

6.3.7.1 Soil Excavation Near DB-2 6-16

6.3.7.2 Dual-Phase Extraction System Adjacent to the Washington State Department of Transportation Stormwater Line 6-16

7 Evaluation of Remedial Alternatives 7-1

7.1 Protect Human Health and the Environment and Comply with Cleanup Standards 7-1

7.1.1 Alternative 1: Excavation and Monitored Natural Attenuation with Environmental Covenants 7-2

7.1.2 Alternative 2: Groundwater Containment System Using Groundwater Extraction Wells, and Monitored Natural Attenuation with Environmental Covenants 7-3

7.1.3 Alternative 3: Groundwater Containment System Using Groundwater Extraction Trench, and Monitored Natural Attenuation with Environmental Covenants 7-4

7.1.4 Alternative 4: Excavation and Limited Environmental Covenant 7-4

7.1.5 Alternative 5: Excavation and In-Situ Solidification and Monitored Natural Attenuation with Environmental Covenants 7-5

7.1.6 Alternative 6: Excavation, Dual-Phase Extraction Treatment and Limited Environmental Covenant 7-5

7.2 Comply with Applicable State and Federal Laws 7-6

7.3 Provide for Compliance Monitoring........7-6

7.4 Use Permanent Solutions to the Maximum Extent Practicable 7-7

7.5 Provide for a Reasonable Restoration Timeframe 7-8

7.6 Consider Community Concerns........7-9

7.7 Expectations for Cleanup Action Alternatives........7-9

7.7.1 Waste/Hazardous Substances Treatment 7-9

7.7.2 Minimization of Long-Term Management at Small Sites........7-10

7.7.3 Use of Engineering Controls at Large Sites 7-10

7.7.4 Minimize Stormwater Contamination and Offsite Migration 7-12

7.7.5 Minimize Direct Contact and Migration by Consolidating Hazardous Substances 7-13

7.7.6 Avoid Surface-Water Contamination through Control of Runoff and Control of Groundwater Discharge or Migration 7-13

7.7.7 Use of Natural Attenuation 7-14

7.8 Disproportionate Cost Analysis........7-15

7.8.1 Protectiveness 7-15

7.8.2 Permanence 7-16

7.8.3 Cost 7-17

7.8.4 Long-Term Effectiveness 7-19

7.8.5 Management of Short-Term Risks 7-20

7.8.6 Technical and Administrative Implementability 7-21

7.8.7 Public Concerns 7-23

7.8.8 Disproportionate Cost Analysis Preliminary Summary........7-23

7.9 Final Disproportionate Cost Analysis........7-23

7.9.1 Protectiveness 7-24

7.9.2 Permanence 7-24
7.9.3 Cost 7-25
7.9.4 Long-Term Effectiveness 7-25
7.9.5 Management of Short-Term Risks 7-25
7.9.6 Technical and Administrative Implementability 7-26
7.9.7 Consideration of Public Concerns 7-27
7.9.8 Provide for a Reasonable Restoration Time Frame 7-27
8 Recommended Remedial Alternative 8-1
9 Conclusion 9-1
10 Schedule 10-1
11 References 11-1

TABLES

Table 2-1. Site Investigations and Remedial Actions Chronology

Table 2-4. Remaining Impacts – Soil Sample Locations

Table 2-6. 2013 Soil Vapor Analytical Results

Table 6-1. Remedial Alternatives Screening

Table 7-1. Remedial Alternative Evaluation

Table 7-2. Cost Estimate for Remedial Alternative 1

Table 7-3. Cost Estimate for Remedial Alternative 2

Table 7-4. Cost Estimate for Remedial Alternative 3

Table 7-5. Cost Estimate for Remedial Alternative 4

Table 7-6. Cost Estimate for Remedial Alternative 5

Table 7-7. Cost Estimate for Remedial Alternative 6

Table 7-9. Remedial Alternative 6 Versus Remedial Alternative 4 Pass 1 Evaluation

Table 7-10. Remedial Alternative 6 Versus Remedial Alternative 4 Pass 2 Evaluation

TABLES (IN TEXT)

Table 2-2. Southeast Lower Yard Well Screen Interval Summary....2-15

Table 2-3. Revised Summary of Hydraulic Conductivity Results....2-16

Table 2-5. Soil Vapor Data Screening Levels....2-29

Table 5-1. Surface-Water Cleanup Levels....5-6

Table 5-2. Groundwater Compliance Monitoring Wells....5-8

Table 5-3. Soil Cleanup and Remediation Levels....5-11

Table 7-8. Cost Comparison of Remedial Alternatives....7-18

Table 7-11. Disproportionate Cost Analysis Weighted Sums....7-24

FIGURES

Figure 1-1 Former Unocal Bulk Fuel Terminal Location Map

Figure 1-2 Former Unocal Bulk Fuel Terminal Layout

Figure 1-3 Former Unocal Bulk Fuel Terminal Layout Area of the Lower Yard

Figure 2-1 Historical Facilities Location Map

Figure 2-2 Cross Section Location Map

Figure 2-3 Lower Yard Geologic Cross Section A-A'

Figure 2-4 Lower Yard Geologic Cross Section B-B'

Figure 2-5 Southeast Lower Yard Geologic Cross Section C-C'

Figure 2-6 Southeast Lower Yard Geologic Cross Section D-D'

Figure 2-7 Top of 2008 Gravel Backfill Elevations

Figure 2-8 Bottom of 2008 Gravel Backfill Elevations

Figure 2-9 Second Quarter 2015 Groundwater Elevations and Contours – June 22, 2015

Figure 2-10 Fourth Quarter 2016 Groundwater Elevations and Contours – October 27, 2016

Figure 2-11 2007/2008 Interim Action Final Excavation Limits and Volumes

Figure 2-12 2008 Site Investigation Sample Locations and Analytical Results

Figure 2-13 2011 Site Investigation Soil Sample Locations and Analytical Results

Figure 2-14 2012 Soil Sample Locations and Analytical Results

Figure 2-15 Sediment Sampling Locations and 2012 Analytical Results

Figure 2-16 2013 Soil Vapor Sample Locations and Analytical Results

Figure 3-1 Pre-Remediation Dissolved Total Petroleum Hydrocarbon Concentration and LNAPL Map (2006)

Figure 3-2 Second Quarter 2015 TPH Concentrations

Figure 3-3 Fourth Quarter 2016 TPH Concentrations

Figure 3-4 Sediment Sample Locations

Figure 4-1 Lower Yard Remaining Soil Impacts Map

Figure 4-2 Site Soil and Groundwater Remediation Status – Fourth Quarter 2016

Figure 4-3 Conceptual Site Model - Exposure Pathways

Figure 5-1 Compliance Monitoring Wells

Figure 6-1 Current WSDOT Construction Easement

Figure 6-2 Alternative 1: Excavation and Monitored Natural Attenuation with Environmental Covenants

Figure 6-3 Alternative 2: Groundwater Containment System Using Groundwater Extraction Wells, and Monitored Natural Attenuation with Environmental Covenants

Figure 6-4 Alternative 3: Groundwater Containment System Using Groundwater Extraction Trench, and Monitored Natural Attenuation with Environmental Covenants

Figure 6-5 Alternative 4: Excavation (DB-2 and WSDOT Stormwater Line) and Limited Environmental Covenant

Figure 6-6 Alternative 5: Excavation, In-Situ Solidification and Monitored Natural Attenuation with Environmental Covenants

Figure 6-7 Alternative 6: Excavation, Dual Phase Extraction Treatment and Limited Environmental Covenant

APPENDICES

Appendix A .... Selected Data from Previous Investigations

Appendix B .... Applicable or Relevant and Appropriate Requirements

Appendix C .... MTCATPH11.1 Worksheet and Calculation Summary

Appendix D ....2007 TEE

Appendix E .... Statistical Analysis – Lower Yard Soil Samples

Appendix F .... Groundwater Flow Model

Appendix G ....DPE Pilot Test Summary

ACRONYMS AND ABBREVIATIONS

ABOx	anaerobic bio-oxidation
ABS	acrylonitrile butadiene styrene
amsl	above mean sea level
AO	Agreed Order
APH	air-phase petroleum hydrocarbons
Arcadis	Arcadis U.S., Inc.
AST	aboveground storage tank
bgs	below ground surface
BNSF	BNSF Railway
Chevron	Chevron Environmental Management Company
COC	constituent of concern
Comp. Plan	Edmonds Comprehensive Plan
cPAH	carcinogenic polycyclic aromatic hydrocarbon
Csat	residual saturation concentrations
CSID	Cleanup Site Identification Number
CSL	cleanup screening level
CSM	conceptual site model
CUL	cleanup level
CULs and RELs Report	Cleanup Levels and Remediation Levels Report
cy	cubic yards
DB-1	Detention Basin 1
DB-2	Detention Basin 2
DCA	disproportionate cost analysis
DPE	dual-phase extraction
Draft FS Addendum	Proposed Addendum to the Draft FS Report
Draft FS Report	Draft Feasibility Study Report
Draft Final FS Report	Draft Final Feasibility Study Report
DRO	diesel range organics
EC	Environmental covenant
ECAC	Edmonds Citizens Awareness Committee

ECC	Edmonds City Code
Ecology	Washington State Department of Ecology
Edmonds Crossing EIS	SR 104 Edmonds Crossing, Volume 1 – Preliminary Final Environmental Impact Statement and Preliminary Final Section 4(f) Evaluation
EIMS	Environmental Information Management System
Final CSM	Final Conceptual Site Model
Final Phase II RI Report	Final Phase II Remedial Implementation As-Built Report
Final SICR	Final 2011 Site Investigation Completion Report
fish hatchery	Willow Creek Fish Hatchery
former Unocal property	former Unocal Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington
FSID	Facility Site Identification Number
GAC	granular activated carbon
gpm	gallons per minute
GRO	gasoline range organics
HI	hazard index
HO	heavy oil range organics
2007 IAWP	Interim Action Report -Work Plan for 2007 Lower Yard Interim Action
IAWP	Interim Action Work Plan
IHS	indicator hazardous substance
IRA	interim remedial action
ISS	in-situ solidification
ITRC	Interstate Technology Regulatory Council
kg	kilogram
LAET	lowest apparent effects threshold
LNAPL	light non-aqueous phase liquid
LRL	laboratory reporting limit
MFA	Maul, Foster, and Alongi
mg/day	milligrams per day
mg/kg	milligrams per kilogram
MNA	monitored natural attenuation
MP-1	Master Plan 1
MP-2	Master Plan Hillside Development, District 2

MTCA	Model Toxics Control Act
NPDES	National Pollutant Discharge Elimination System
NRWQC	National Recommended Water Quality Criteria
NTR	National Toxics Rule
OWS	oil/water separator
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
POC	point of compliance
Point Edwards	Point Edwards condominium complex
PVC	polyvinyl chloride
REL	remediation level
RIWP	Remedial Investigation Work Plan
ROI	radius of influence
SIGMR	2008 Additional Site Investigation and Groundwater Monitoring Report
Site	the areas of the Lower Yard and the Upper Yard where a hazardous substance has been located
SLR	SLR International, Corp.
SMP	Shoreline Master Program
SMS	Sediment Management Standards
SQS	Sediment Quality Standards
SRI	supplemental remedial investigation
SVE	soil vapor extraction
TEE	terrestrial ecological evaluation
total cPAH TEQ	total cPAHs adjusted for toxicity
TPH	total petroleum hydrocarbons
Unocal	Union Oil Company of California
USACE	U.S. Army Corps of Engineers
UST	underground storage tank
VOC	volatile organic compound
VPH	volatile petroleum hydrocarbon
WAC	Washington Administrative Code
WDFW	Washington Department of Fish & Wildlife
WQS	Washington State Water Quality Standards
WSDOT	Washington State Department of Transportation

°F	degrees Fahrenheit
$^0/_{00}$	parts per thousand
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µg/m^3	micrograms per cubic meter

1 INTRODUCTION

On behalf of Chevron Environmental Management Company (Chevron), Arcadis U.S., Inc. (Arcadis) prepared this Draft Final Feasibility Study Report (Draft Final FS Report) for the former Union Oil Company of California (Unocal) Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (former Unocal property; Figure 1-1). Agreed Order (AO) No. DE 4460 with Washington State Department of Ecology (Ecology) requires Chevron to conduct a remedial action to remediate soil, groundwater, and sediment; monitor groundwater in the Lower Yard; prepare a feasibility study report; and prepare a draft Cleanup Action Plan. This Draft Final FS Report was prepared as required by AO No. DE4460.

The former Unocal property is formally known as Unocal Edmonds Bulk Fuel Terminal 0178 in Ecology's database. Identifiers are

- Facility Site Identification Number (FSID): 2720
- Cleanup Site Identification Number (CSID): 5180

Ecology's website for the former Unocal property is available at https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=5180 and documents available electronically can be accessed by clicking View Electronic Documents in the sidebar (or clicking on the preceding hyperlink). Documents are also available at the public repository at Edmonds Public Library. The full file can be reviewed at Ecology's Northwest Regional Office in Bellevue (phone 425-649-7000).

Data collected during investigations of the former Unocal property are available in Ecology's Environmental Information Management System (EIMS) database. (See Study IDs UNOCAL01 and UNOCAL 02).

Chevron's website for the former Unocal property is at http://www.unocaledmonds.info/.

1.1 Final Feasibility Study Report Background

As defined in AO No. DE 4460, the former Unocal property consists of three areas: Upper Yard ("Parcel B and Parcel III" in AO), Lower Yard ("Parcel A" in AO), and Willow Creek Fish Hatchery (described as "Lot 1" in AO) (fish hatchery). The Upper Yard and Lower Yard were areas of operation for the former terminal. Although the fish hatchery was included in AO No. DE 4460, it was not used for operations or storage by Unocal and remained undeveloped until 1985 when the fish hatchery was constructed. The recent remediation history at former Unocal property is described below. The former Unocal property layout and areas of the Lower Yard are shown on Figure 1-2.

Remediation of the Upper Yard began in 2001. In 2003, upon the completion of remedial actions, Ecology issued a letter (Ecology 2003) indicating that the Upper Yard Interim Action had met direct contact for soil cleanup criteria as specified in the Interim Action Report, Unocal Edmonds Terminal (Maul, Foster, and Alongi [MFA], 2001a). Unocal sold the Upper Yard to Point Edwards, LLC in October 2003.

The southeast portion of the former Unocal property, near the entrance to the Lower Yard, was leased by Unocal to the Edmonds Chapter of Trout Unlimited in 1984. In 1985, an easement was issued by Unocal for development of the property as a fish hatchery. This property is now owned by the City of Edmonds.

The Lower Yard is currently owned by Unocal. The Lower Yard is a 22-acre vacant property, with no permanent aboveground structures. Unocal and the Washington State Department of Transportation (WSDOT) have entered into a purchase and sale agreement in 2005 that provides for a future transfer of the Lower Yard to the WSDOT. In June 2007, Unocal entered into AO No. DE 4460 with Ecology to conduct interim remedial actions (IRAs) at the Lower Yard. IRAs were conducted at the Lower Yard in two phases in 2007 and 2008. After completion of the IRAs, localized areas of known impacted soil with concentrations exceeding cleanup levels (CULs) remain along the WSDOT stormwater line and near Detention Basin 2 (DB-2). These areas are shown on Figure 1-2.

This Draft Final FS Report discusses the cleanup alternatives of the WSDOT stormwater line and DB-2 impacted soil and associated groundwater impacts.

To address those localized areas of known impacted soil, Chevron submitted a Draft Feasibility Study Report (Draft FS Report; Arcadis 2014a) to Ecology on January 30, 2014. Ecology reviewed the Draft FS Report (Arcadis 2014a) and provided comments on May 21, 2014 (Ecology 2014a). Chevron submitted a Proposed Addendum to the Draft FS Report (Draft FS Addendum; Arcadis 2014b) on August 11, 2014 proposing Remedial Alternative 6 (combination of excavation and dual-phase extraction [DPE] treatment) as a preferred remedy for the remaining impacts at the former Unocal property. Ecology reviewed the Draft FS Addendum (Arcadis 2014b) and provided comments in a letter dated September 23, 2014 (Ecology 2014b). Ecology also asked Chevron to implement Remedial Alternative 6 as a continuation of the interim actions required by AO No. DE 4460 in the letter dated September 23, 2014. Chevron submitted for public comment a public review draft Interim Action Work Plan (IAWP) including Ecology revisions on July 6, 2015 (Arcadis 2015a); a final IAWP was submitted to Ecology on July 19, 2016 (Arcadis 2016).

This Draft Final FS Report incorporates revisions to the Draft FS Report and Draft FS Addendum in response to Ecology's comments, as well as applicable changes relative to public comments and Ecology revision of IAWP (Arcadis 2014a, 2014b, 2016; Ecology 2014a, 2014b). This Draft Final FS Report evaluates the feasibility and effectiveness of cleanup action alternatives for remediation of hazardous substances in the Lower Yard of the former Unocal property. Ecology will review the alternatives presented in this Draft Final FS Report and select a final cleanup remedy based upon the minimum requirements and procedures specified in Washington Administrative Code (WAC) 173-340-360, Selection of Cleanup Actions, in consideration of Ecology's Expectations for Cleanup Action Alternatives specified in WAC 173-340-370, and all other parts of the Model Toxics Control Act (MTCA) Cleanup Regulation, Ch. 173-340 WAC pertinent to cleanup of the former Unocal property.

1.2 Previous Submittals and Historical Data

The specific data and documents referred to in this Draft Final FS Report are listed below in reverse chronological order:

- *Draft FS Addendum (Arcadis 2014b)*. Evaluates Remedial Alternative 6, excavation to address impacts near DB-2 and soil and groundwater treatment using DPE to address impacts near the WSDOT stormwater line.
- *Final Conceptual Site Model (Final CSM; Arcadis 2013a)*. Evaluates remaining impacts, potential fate and transport of the remaining impacts, and potential receptors and exposure pathways.

- *Cleanup Levels and Remediation Levels Report (CULs and RELs Report; Arcadis 2013b)*. Evaluates and confirms the CULs and remediation levels (RELs) for soil, groundwater, and surface water.
- *Final Feasibility Study Work Plan (Arcadis 2012b)*. Summarizes investigation activities implemented in August 2012, which included additional groundwater monitoring well installation, additional groundwater sampling, and sediment sampling.
- *Final 2011 Site Investigation Completion Report (Final SICR; Arcadis 2012a)*. Incorporates a tidal study, pumping tests, and investigation of soil conditions near DB-2.
- *Final Phase II Remedial Implementation As-Built Report (Final Phase II RI Report; Arcadis 2010a)*. Documents the final compliance soil samples collected in 2008 during remedial excavation activities.
- *Phase I Remedial Implementation As-Built Report (Arcadis 2009a)*. Documents the final compliance soil samples collected in 2007/2008 during remedial excavation activities.
- *2008 Additional Site Investigation and Groundwater Monitoring Report (SIGMR; Arcadis 2010b).* Discusses site investigation and groundwater monitoring activities that were conducted near the WSDOT stormwater line and the former asphalt warehouse.

Documents related to remedial actions and investigation conducted under prior AO No. DE 4460 are not included in the list above; however, the references are provided in Section 10.

1.3 Final Feasibility Study Report Organization

The remaining sections of this Draft Final FS Report are summarized below:

- Section 2 – *Background*. Describes the three areas of the former Unocal property (Upper Yard, Lower Yard, and fish hatchery), historical facilities, operations, and releases. Summarizes historical property ownership and regulatory actions including AO No. DE 4460.
- Section 3 – *Nature and Extent of Contamination*. Describes constituents of concern (COCs) and remaining soil and groundwater impacts at the former Unocal property.
- Section 4 – *Conceptual Site Model*. Evaluates fate and transport, potential receptors, and potential exposure pathways.
- Section 5 – *Cleanup Standards*. Describes cleanup standards and development of CULs and RELS for sediment, soil, groundwater, and surface water.
- Section 6 – *Development of Remedial Alternatives*. Identifies and describes the potentially applicable remediation technology types considered for the WSDOT stormwater line and DB-2 impacted soil and associated groundwater impacts.
- Section 7 – *Evaluation of Remedial Alternatives*. Evaluates the proposed remedial alternatives based on applicable regulations, cost analysis, expectations, and implementation.
- Section 8 – *Recommended Remedial Alternative*. Presents the recommended remedial alternative for the WSDOT stormwater line and DB-2 impacted soil and associated groundwater impacts.
- Section 9 – *Conclusion*. Presents the conclusion of this Draft Final FS Report.

- Section 10 – *Schedule*. Discusses the activities that will be conducted following Ecology's approval of this Drat Final FS Report.
- Section 11 – *References*. Lists the references cited throughout this Draft Final FS Report.

2 BACKGROUND

This section describes the three areas of the former Unocal property and summarizes historical activities conducted at the property.

2.1 Former Unocal Property Description

As defined in AO No. DE 4460, the former Unocal property consists of three areas: Upper Yard ("Parcel B and Parcel III"), Lower Yard ("Parcel A"), and the fish hatchery ("Lot 1"). Sections 2.1.1, 2.1.2, and 2.1.3 present background information for the Upper Yard, Lower Yard, and fish hatchery. Table 2-1 presents a chronologic summary of investigation activities at the former Unocal property.

2.1.1 Upper Yard

The approximately 25-acre Upper Yard is located to the south of the Lower Yard. East of the Upper Yard is the fish hatchery and State Route 104. Beyond State Route 104 are residential and commercial areas in Edmonds, Washington. South of the Upper Yard is the residential area of Woodway, Washington. To the west of the Upper Yard are the BNSF Railway (BNSF) right-of way and, west of the right-of-way, the Port of Edmonds Marina, a public park, and Puget Sound. The Upper Yard is shown on Figure 1-2.

The surface elevation of the Upper Yard ranges from approximately 20 to 100 feet above mean sea level (amsl) based on North American Vertical Datum of 1988. The majority of the Upper Yard is approximately 90 to 100 feet amsl. The northern boundary of the Upper Yard is approximately 75 to 80 feet higher than the majority of the Lower Yard. The land declines steeply from the northern boundary of the Upper Yard to the Lower Yard.

Remediation of the Upper Yard began in 2001. In 2003, upon the completion of remedial actions described in Section 2.6.2, Ecology issued a letter (Ecology 2003) confirming that Unocal successfully completed the cleanup actions identified for the Edmonds Upper Yard and as a result of these activities, the Upper Yard is suitable for residential use with regard to the soil direct contact pathway.

Unocal sold the Upper Yard to Point Edwards, LLC in October 2003. Currently, this area is occupied by the Point Edwards condominium complex (Point Edwards). According to the City of Edmonds zoning plan dated April 2015, this area is zoned Master Plan 1 (MP-1), which allows for residential and commercial uses. Point Edwards is fully developed, including underground and overhead utilities, a stormwater system, several high-occupancy residential buildings, administrative buildings, parking areas, landscaping areas, and an outdoor walking path. The slope from the Point Edwards to the Lower Yard is covered by vegetation planted by Point Edwards, LLC, during the construction of Point Edwards.

Point Edwards is served by a stormwater system owned by Point Edwards, LLC that conveys stormwater to a sedimentation/detention pond located in the northern part of the former Upper Yard. This system connects the Point Edwards stormwater retention pond and the tidal basin leading to Puget Sound via a 36-inch-diameter underground drainpipe that runs beneath the Lower Yard and discharges into the tidal basin. The Point Edwards storm drain line is made of corrugated acrylonitrile butadiene styrene (ABS) plastic, is located approximately 3 to 5 feet below ground surface (bgs), and runs parallel to the WSDOT stormwater line that runs across the Lower Yard.

2.1.2 Lower Yard

The approximately 22-acre Lower Yard surrounds the Upper Yard to the north, east, and west, and is currently owned by Unocal. Unocal and WSDOT have entered into a purchase and sale agreement that provides for WSDOT to assume ownership of the Lower Yard after Capital Remediation Work has been completed. The Lower Yard and its subdivisions are shown on Figure 1-2 and Figure 1-3. The Lower Yard is approximately 160 feet from Puget Sound at its closest point.

The surface elevation of the majority of the Lower Yard ranges from approximately 10 to 19 feet amsl and is relatively flat. However, the southeastern-most portion of the Lower Yard, on Unoco Road near the Lower Yard entrance, is approximately 35 feet amsl. Upper Unoco Road continues along the southern property boundary, drops in elevation, and turns into lower Unoco Road at the south-central portion of the Lower Yard. From upper Unoco Road near the Lower Yard entrance, the ground surface drops in elevation to the north from approximately 35 to 16 feet amsl in the south-central portion of the Lower Yard. On the south side of upper Unoco Road is a paved area along the property boundary.

Willow Creek runs along the northern portion of the western boundary and the entire eastern boundary of the Lower Yard. Willow Creek is approximately 10 feet wide and is underlain by silt and sand material. The creek banks on the property boundary are steeply sloped and vegetated with native and non-native vegetation. Willow Creek is tidally influenced. At high tide, water flows from Puget Sound upstream into Edmonds Marsh; at low tide, water drains from Edmonds Marsh into Puget Sound. Water depths in Willow Creek vary from 0 to 4 feet deep, depending on season and tidal cycles (Arcadis 2012a). Additional surface-water information for the Lower Yard is provided in Section 2.4.2.5.

The Lower Yard is currently a vacant property, with no permanent aboveground structures. A temporary storage shed, a concrete pad and a system enclosure are located along lower Unoco Road in the central portion of the Lower Yard. The ground surface is compact dirt, gravel, and natural vegetative cover. The Lower Yard use is described is Section 2.1.5.

Twelve storm drains collect surface-water runoff. The collected water is conveyed via gravity flow to DB-2. Stormwater also collects in Detention Basin 1 (DB-1) from direct precipitation and overland flow. DB-1 and DB-2 form depressions approximately 6 and 4 feet deep, respectively, and are described below:

- DB-1 is located in the east/northeast Lower Yard and west/northwest Lower Yard. DB-1 is bounded to the northwest, northeast, and southeast by a manmade berm. The berm runs along the eastern property boundary, adjacent to Willow Creek. DB-1 acts as a retention pond for overflow from DB-2 during storm events. DB-1 is an unlined pond with one aboveground pump and a piping system to the DB-2 outfall on the bank of Willow Creek. To maintain storage capacity, water levels are monitored in DB1 and water is periodically pumped from DB1 into DB2 and discharged from DB-2.
- DB-2 is located between the west/northwest Lower Yard and central Lower Yard, south of DB-1. DB-2 serves as a stormwater collection area from which Lower Yard stormwater is discharged into Willow Creek. DB-2 has an impermeable liner, two submersible pumps, and a piping system to the DB-2 outfall.

A WSDOT stormwater line crosses beneath the Lower Yard and discharges stormwater collected from State Route 104 to Puget Sound. According to a 1971 drainage plan (Washington State Highway Commission 1971), the WSDOT stormwater line is composed of sections of increasing diameter from 48 inches at the eastern part of the Lower Yard to 72 inches at the western part of the Lower Yard. The WSDOT stormwater line is made of asphalt-coated corrugated metal and crosses the Lower Yard at depths of 9 to 12 feet bgs to the top of the pipe. The WSDOT stormwater line generally runs along the northern edge of lower Unoco Road and trends west across the Lower Yard to the tidal basin leading to Puget Sound. The WSDOT stormwater line was installed between 1972 and 1975 and is a major stormwater drainage structure for State Route 104; WSDOT evaluated the stormwater line in 2011 and found its integrity to be sound, with no visible signs of deterioration.

In addition, a separate stormwater line connects the Point Edwards stormwater retention pond and the tidal basin leading to Puget Sound. For the purposes of this document, to distinguish the Point Edwards stormwater line from the WSDOT stormwater line, it is referred to as a “storm drain line” at the approximate location shown on Figure 1-2. The Point Edwards storm drain line runs parallel to the WSDOT stormwater line where the Point Edwards storm drain line crosses beneath the Lower Yard. The Point Edwards storm drain line is made of corrugated ABS plastic and crosses the Lower Yard at depths of approximately 3 to 5 feet bgs.

The only paved areas of the Lower Yard are Unoco Road and the paved area to the south of upper Unoco Road. The majority of the Lower Yard is covered with 3-inch quarry spall stones, silty sand, and gravel backfill material. Vegetation such as grasses, alder saplings, and native blackberries have begun to reclaim the Lower Yard around its perimeter and throughout most of the southeast Lower Yard. Occasionally, gorse (*Ulex Europeus*) growth is encountered in the Lower Yard. Gorse is a weed that displaces native plants. Gorse removal activities were conducted in the Lower Yard in December 2014 as directed by the Snohomish County Noxious Weed Control Board in a letter dated April 1, 2014.

The berm surrounding DB-1 is covered by native vegetation.

Upon completion of 2008 interim action activities, the banks of Willow Creek were restored pursuant to the Hydraulic Project Approval 112524-1 issued on April 24, 2008 by the Washington Department of Fish & Wildlife (WDFW). Native estuarine wetlands species were planted in the floodplain areas of the creek, comprising areas not in the creek channel but below the high water mark. In addition to the floodplain species, several trees, shrubs, and grasses (meant to stabilize and protect the bank from erosion and invasive species) were planted on the Lower Yard side of the creek, above the high water line. The plantings were installed through cuts made in BioNet, a woven biodegradable straw mat material used as an erosion control measure, at a density and pattern designated by a wetland biologist.

2.1.3 Willow Creek Fish Hatchery

The southeast portion of the former Unocal property, near the entrance to the Lower Yard, is currently the Willow Creek Fish Hatchery and is owned by the City of Edmonds. The fish hatchery, formerly known as the Deer Creek Fish Hatchery, is shown on Figure 1-2.

The fish hatchery currently comprises an approximately 50-foot-long by 20-foot-wide building, an approximately 40-foot-diameter circular fish rearing pond, and a small pump house. The remainder of the developed property is composed of a compact gravel driveway and grass and landscaped areas. Surface-water runoff from the property drains directly into Willow Creek.

Although the fish hatchery property was included in AO No. DE 4460, it was not used for operations or storage by Unocal and remained undeveloped until 1985 when the fish hatchery was constructed. Unocal leased this part of the former Unocal property to the Edmonds Chapter of Trout Unlimited in 1984. In 1985, Unocal issued an easement for development of this part of the property as a fish hatchery. The fish hatchery became the property of the City of Edmonds in 2005.

2.1.4 Site Definition

The Site, as defined by MTCA, means: “any building, structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly owned treatment works), well, pit, pond, lagoon, impoundment, ditch, landfill, storage container, motor vehicle, rolling stock, vessel, or aircraft; or any site or area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located.” Historical information was reviewed prior to development of the Remedial Investigation Work Plan (RIWP; EMCON 1995), which indicated that field investigations of the fish hatchery property were not warranted. Therefore, in coordination with Ecology, the fish hatchery property was not further evaluated.

Therefore, at the former Unocal property, the Site (See Figure 1-3) is now comprised of the areas of the Lower Yard and the Upper Yard where a hazardous substance has come to be located. The fish hatchery will no longer be included as part of the Site in future Orders and Decrees as a result of the review of historical information (See Background History Report, EMCON 1994) and a determination that the area was not used for operations or storage by Unocal.

2.1.5 Land Use and Zoning

City of Edmonds land use policies and regulations affecting the Lower Yard are set out in the Edmonds Comprehensive Plan, December, 2016 (Comp. Plan), the Edmonds City Code (ECC) and, for portions of the Lower Yard within the jurisdiction of the State Shorelines Act, the Edmonds Shoreline Master Program (SMP). The Comp. Plan assigns the land use plan designation “Master Planned Development” to the Lower Yard and identifies the Lower Yard as the future location of Edmonds Crossing, a multimodal transportation center. The ECC zones the Lower Yard "Master Plan Hillside Development, District 2” (MP-2) as shown on the Edmonds Zoning Map, April 2015. A multi-modal transportation facility is a permitted use in the MP-2 zone as are mixed residential and commercial uses. Residential use is prohibited on the ground floor of any building constructed on the Lower Yard.

The extreme southeastern part of the Lower Yard near the fish hatchery and the fish hatchery were regulated by the SMP that was in effect until May 10, 2017. The SMP designated these areas “Natural Environment”. On April 26, 2017, Ecology granted final approval of amendments to the SMP. The updated SMP took effect May 10, 2017 (Updated SMP), subject to a 60-day appeal period. The Updated SMP adds the land within 200 feet upland from the ordinary high water mark of tidally influenced portions of the Edmonds Marsh (generally, the west half of the Marsh) to the portions of the Lower Yard subject to the Updated SMP. These added shoreline areas are designated Urban Mixed Use IV. Residential uses are not permitted within areas designated Mixed Use IV.

The Upper Yard is zoned MP-1, which allows for residential and commercial uses. Properties surrounding the Lower Yard consist of various commercial, recreational, and residential sites. The property immediately north-northeast of the former Unocal property (Edmonds Marsh) is designated open space. Farther north, Harbor Square (a commercial development) is zoned commercial general. Land use in the town of Woodway, located immediately south of the Site, is primarily single-family residential. The properties east of the Lower Yard, to the east of State Route 104, are zoned under public use, multifamily, and single-family residential designations. The BNSF right of way, Port of Edmonds Marina, Marina Beach Park, and Puget Sound shoreline to the west-northwest of the Site are zoned commercial waterfront.

2.2 Site History

Unocal operated the terminal from 1923 to 1991. Petroleum products were brought to the terminal on ships, pumped to storage tanks in the Upper Yard, and loaded from the storage tanks into rail cars and trucks for delivery to customers. In addition, an asphalt plant operated at the terminal from 1953 to the late 1970s. From 1991 to 2003, the Lower Yard was only used by Unocal for office purposes. After termination of the terminal activities, Unocal entered into AO No. DE92TC-N328 with Ecology in 1993 and then AO No. DE 4460 in 2007 (superseded AO No. DE92TC-N328). Remedial actions were conducted under those AOs in 2001, 2003, 2007, and 2008.

2.2.1 Lower Yard Creation

Prior to 1923, when the main facility structures of the terminal were constructed, the area of the Lower Yard was tidal marshland. To provide usable working and building surfaces, backfill material was placed over the marsh, presumably beginning in the early 1920s. As seen in aerial photos of the Site (EMCON 1994), in 1947 only the southwest Lower Yard area was developed and contained structures and facilities.[1] The central, eastern, northeastern, and southeastern portions of the Lower Yard were undeveloped marshland at this time. By 1955, backfilled areas, structures, and facilities had expanded to the central area of the Lower Yard. The northeastern and southeastern portions of the Lower Yard were still undeveloped marshland. By 1965, the Lower Yard was filled and developed in all areas except in the southeast, and remained so throughout facility operations.

2.2.2 Historical Facilities and Operations

Historical operations at the Site conducted by Unocal included the storage and distribution of petroleum products, and the production, storage, and distribution of asphalt products. Historical facility operations areas and structures discussed in this section are presented on Figure 2-1.

Facilities at the Site included a loading/unloading dock in Puget Sound, railcar unloading areas, an aboveground tank farm, piping systems, an air-blown asphalt plant, asphalt warehouse, laboratory, truck loading racks, oil/water separators (OWSs), underground storage tanks (USTs), and stormwater and sewer systems (EMCON 1994). A series of aboveground and underground pipelines, valves, and

[1] Historical aerial photographs are available through Ecology's Unocal Edmonds website under View Electronic Documents. See Group: Technical Reports, 01/26/2012.

manifolds were used at the Site to move product between areas of receipt, storage, blending, packaging, and distribution in the Upper Yard and Lower Yard. The product pipes and valves were made of steel and ranged in diameter from 1.5 to 12 inches. Product was received at the terminal and distributed via barge, ship, tanker, railcar, truck, drums, and cartons.

The southeastern Lower Yard was briefly used as a waste soil stockpile area for material removed from two local Unocal service stations (EMCON 1994).

Detailed operations and historical activities are presented in the Background History Report (EMCON 1994).

2.2.2.1 Former Upper Yard Facilities

Construction of the Upper Yard began in 1923, along with the main terminal structures and loading dock. The Upper Yard consisted of 23 aboveground storage tanks (ASTs), one UST, abovegrade piping, a garage, and a warehouse. Abovegrade piping carried petroleum materials up the hill from the loading dock in the Lower Yard to the ASTs in the Upper Yard. The ASTs ranged in capacity from 9,726 to 3,491,754 gallons. The ASTs in the Upper Yard were primarily used to store and blend products.

The Upper Yard ASTs were contained within soil berms coated with emulsified asphalt. Except for the bermed areas and paved roads, the Upper Yard had a gravel surface. Precipitation infiltrated the gravel, and stormwater was collected in catch basins that drained to an OWS in the Lower Yard (EMCON 1994).

The UST located in the Upper Yard was removed in 1984; its installation date and intended use are unknown.

2.2.2.2 Lower Yard Facilities

The Lower Yard facilities are presented on Figure 2-1 and listed below.

- DB-1 and DB-2
- Former loading dock and pier
- Former railcar unloading areas
- Former air-blown asphalt plant
- Former asphalt warehouse
- Former truck loading racks
- Former OWSs
- Former USTs.

Of those, only DB-1 and DB-2 are still present. Each of the facilities are described in the following sections.

Detention Basins No.1 and No.2

DB-1 is located in the East/Northeast Lower Yard and is approximately 200 by 600 feet in size. DB-1 was constructed in 1952; the original layout was an L-shape with a leg extending south along the northwestern property boundary. DB-1 was constructed by dredging sediment from the northeastern and northwestern site perimeters to create the bermed detention basin, and create a drainage channel (Willow Creek) to carry the flow from small creeks draining surface water from upland areas in the city of Edmonds.

In the late 1960s, DB-1 was modified by partitioning off the southern leg and creating an impoundment area to contain refinery and asphalt sludges and runoff (EMCON 1994). The impoundment area became known as the "slops pond." In 1974, the slops pond was backfilled and DB-2 was constructed on top of the slops pond. DB-2 is fully lined with polyvinyl chloride (PVC) liner material and contains outfall pumps that discharge to Willow Creek (EMCON 1994).

Former Loading Dock and Pier

Unocal owned and operated an 860-foot long pier extending westward into Puget Sound from the southwest corner of the Lower Yard and terminating in a 275-foot long loading dock (See Figure 1-1). The loading dock received daily deliveries of gasoline, fuel oils, and crude oils from tanker ships in Puget Sound (EMCON 1994), and transferred the deliveries to the Upper Yard ASTs via a piping system. The piping from the dock and pier passed over the BNSF tracks via a trestle at the end of the pier. The dock, pier, and trestle were constructed in 1923. The dock facilities included a system of pipes and valves, including ten 2- to 12-inch-diameter steel pipes. Pipelines from the dock ran aboveground to the shoreline manifold area, in the southwest corner of the Lower Yard. The piping then ran southeast up the hillside to the southwest portion of the Upper Yard, as well as northeast along the toe of the hillside to the north-central portion of the Upper Yard, to the Upper Yard ASTs.

As described in Section 3.6, a sediment investigation was conducted at the former loading dock and pier location. The chemical analytical results showed compliance with Ecology's Sediment Quality Standards (SQS), presented in the Sediment Management Standards (SMS) at WAC 173-204-320; therefore, the marine sediment is uncontaminated and this area is not considered part of the Site.

Former Railcar Unloading Areas

Two railcar loading/unloading areas were located in the southwest Lower Yard. The southern railcar loading/unloading area was constructed in the early 1930s. The time of construction of the northern railcar unloading area is unknown. Railcar service to the Lower Yard was discontinued in the 1960s and the unloading areas were dismantled in 1974 (EMCON 1994).

The southern loading/unloading area was approximately 40 feet wide by 310 feet long, and was located along the property boundary in the southwest Lower Yard. This loading/unloading area consisted of two railroad spurs parallel to the BNSF tracks, with loading/unloading racks parallel to the railroad spurs. The northern loading/unloading area was located immediately south of the tidal basin leading to Puget Sound, and was approximately 10 feet wide by 70 feet long (EMCON 1994). Railcar tankers were loaded and unloaded in these areas on a regular basis for approximately 30 years.

Former Air-Blown Asphalt Plant

The air-blown asphalt plant was constructed in approximately 1953 and covered a large portion of the west/northwest Lower Yard, adjacent to DB-1 and the former slops pond area. Various grades of air-blown asphalt were produced in this facility, including crack-pouring compound, sub-sealing compound, and canal-lining asphalt. The air-blown asphalt plant was designed to produce up to 100 tons per day and the asphalt products were packaged into 100-pound cartons or steel drums. Materials used to manufacture air-blown asphalt included tank bottom material from the facilities' existing crude distillation column and flux oil shipped to the Site by tanker or rail.

Former Asphalt Warehouse

The steel-framed asphalt warehouse building was constructed in 1953, along with the asphalt plant. The 80- by 280-foot warehouse was located in the central Lower Yard, parallel to the southern edge of DB-1. Operations in the asphalt warehouse consisted of packaging asphalt from the air-blown asphalt plant. Asphalt was pumped from cooling tanks into a 6-inch-diameter pipe that ran in a trench down the centerline of the building. The asphalt was then pumped into containers using a loading arm. These containers were loaded into and distributed via truck and trailer.

Former Truck Loading Racks

Two truck loading racks were located in the Lower Yard. A two-lane gasoline and diesel loading rack was located in the central Lower Yard and a single-lane loading rack was located in the southwest Lower Yard along the toe of the slope leading to the Upper Yard. It is unclear when the loading racks were constructed, but in approximately 1977 they were modified from top-loading racks to bottom-loading racks. This reportedly minimized the potential for accidental releases and product loss during truck loading. Spill containment controls at each rack consisted of a concrete pad, concrete curbs, and strip drains that led to a 10,000-gallon UST separator tank (EMCON 1994).

Former Oil/Water Separators

Two OWSs were located in the Lower Yard, approximately 150 feet south of DB-2. The OWSs were used to remove oil from the site wastewater prior to its discharge into Willow Creek.

The main OWS was built in approximately 1950 and was a concrete vault measuring approximately 45 feet long, 18 feet wide, and 11 feet deep. The main OWS had an open top at ground surface, with baffles and skimmers to remove oil product as wastewater passed through the vault. Product removed from the main OWS was pumped into one of the ASTs in the Lower Yard. Stormwater drains in the Upper Yard and Lower Yard carried stormwater flow to the main OWS since its construction in 1950 until removal of the OWS in 2007. Prior to 1950, wastewater treatment and disposal practices at the Site were not documented.

The secondary OWS was located immediately northwest of the main OWS. The secondary separator was made of steel, consisted of a series of four cells, and contained a full-length float skimmer. This unit was installed in approximately 1974 when DB-2 was constructed and used for additional treatment of wastewater to meet National Pollutant Discharge Elimination System (NPDES) discharge standards (EMCON 1994).

Former Underground Storage Tanks

Eleven USTs operated at the former Unocal property until 1985. UST capacity varied from 200 to 10,000 gallons and the USTs were installed at various times from the pre-1950s to 1985. The USTs were made of welded steel, except for the delivery truck slops tank installed in 1985, which was made of fiberglass.

Ten of the USTs were located throughout the Lower Yard and one was located in the Upper Yard, as summarized below:

- Three were located near the facilities garage and were used to fuel site trucks and equipment.
- One contained diesel fuel and was used to fuel the onsite boiler.
- One contained fuel additive that was mixed during truck loading at the two truck loading racks.
- One was a delivery truck petroleum slops tank, where delivery lines from ingoing and outgoing trucks were drained.
- Two collected truck loading rack overflow, spills, and rainwater from the strip drains at each of the truck loading racks.
- Two served as vapor recovery tanks that collected condensed vapor from the vapor recovery system.

2.2.3 Historical Releases

Facility operations began in the early 1920s with construction of the Unocal pier and main facilities of the Upper Yard and Lower Yard. Although no spills were documented during this time, data collected during the 2007/2008 interim action excavations indicated that soil impacts were present at depths deeper than site groundwater fluctuations (Arcadis 2009a, 2010a, 2010b). Specifically, impacts were found in layers of beach and marsh deposits below the 1929 fill unit, suggesting that releases potentially occurred in either the undeveloped marshland areas of the Lower Yard prior to backfill placement, from the early 1920s to the 1950s, or were transported vertically through the saturated zone by a fluctuating groundwater table through time.

From 1954 to 1990, several documented spills occurred at the terminal, totaling approximately 155,000 gallons. Spilled quantities ranged from a few gallons to 80,000 gallons and involved fuel oils, heavy oils, gasoline, off-specification asphalt, and diesel products. Periodic product releases (approximately 0.2 gallon to 2 gallons) reportedly occurred from valves, flanges, and pumps in the Upper Yard and Lower Yard throughout the terminal history. Records and documentation of these smaller releases are not available. Several remedial actions have been performed to address releases listed above and are summarized in Section 2.6.

2.2.4 Regulatory History and Previous Interim Actions

Unocal operated the terminal from 1923 to 1991. After termination of the terminal activities, Unocal entered into AO No. DE92TC-N328 and then AO No. DE 4460 with Ecology (AO No. DE 4460 superseded AO No. DE92TC-N328). Under these AOs, a number of interim actions were completed and are summarized below.

2.2.4.1 Agreed Order No. DE 92TC-N328

In 1993, Unocal entered into AO No. DE92TC-N328 with Ecology. Under the AO, remedial investigations were conducted during the 1990s. Interim actions were conducted under AO No. DE92TC-N328 in the Upper Yard and Lower Yard during 2001 and 2003.

In 2001, Unocal conducted an interim action in the Lower Yard, removing light non-aqueous phase liquid (LNAPL) and petroleum-impacted soil and groundwater from four areas of the Lower Yard. Results of the 2001 interim action are summarized in the Lower Yard Interim Action As-Built Report (MFA 2002). Additional interim actions conducted in 2003 included soil excavations in the southwest Lower Yard and DB-1. Results of the 2003 interim action are summarized in the 2003 Lower Yard Interim Action As-Built Report (MFA 2004a). The 2001 and 2003 excavations are shown on Figures 1-2 and 2-1, and are discussed in Sections 2.6.2 and 2.6.3.

2.2.4.2 Agreed Order No. DE 4460

In June 2007, Unocal entered into AO No. DE 4460 with Ecology to conduct an IRA at the Lower Yard. AO No. DE 4460, which superseded AO No. DE92TC-N328, required Unocal to conduct an IRA to remediate soil, groundwater, and sediment; and to monitor groundwater in the Lower Yard. The purpose of the IRA was to reduce potential threats to human health and the environment, and to gather information to design additional cleanup actions, if necessary. Specific objectives of the IRA included:

- Remediate the petroleum hydrocarbon-impacted soil in the Lower Yard with petroleum hydrocarbon concentrations greater than the soil RELs or CULs based on direct contact.
- Remove LNAPL from four areas of the Lower Yard.
- Extract groundwater that is in contact with LNAPL.
- Remove soil from the southwest Lower Yard with arsenic concentrations in excess of the soil CUL based on natural background concentrations.
- Remove sediment from Willow Creek at locations near the Site’s two stormwater outfalls that failed toxicity tests in 2003.
- Obtain the data necessary to evaluate if the remaining soil concentrations are sources of LNAPL on the groundwater table.
- Obtain the data necessary to evaluate if the remaining soil concentrations will cause an exceedance of the groundwater CULs at the groundwater points of compliance (POCs).
- Obtain the data necessary to evaluate if petroleum hydrocarbon concentrations in groundwater beneath the Lower Yard will naturally attenuate to below the CULs at the groundwater POCs.

The soil RELs were calculated to identify a concentration that is protective of direct contact. Groundwater monitoring was conducted to provide empirical evidence that RELs are protective of groundwater. Soil

CULs and RELs are identified in the Interim Action Report -Work Plan for 2007 Lower Yard Interim Action (2007 IAWP) (SLR International, Corp. [SLR] 2007). The IRAs were conducted in two phases in 2007 and 2008. The 2007 and 2008 excavations are shown on Figure 1-2, and are discussed in Sections 2.6.2 and 2.6.3.

2.3 Regional Environmental Setting

2.3.1 Climate

The Site is located on the eastern shore of Puget Sound, less than 100 miles inland from the Pacific Ocean. Puget Sound lies in a basin between the Olympic Mountains on the west, which form a significant barrier to onshore wind flow from the Pacific, and the Cascade Mountains to the east, which shields the area against westerly flow of colder and drier continental air masses. As a result, the climate of Puget Sound is temperate, with mild to moderate precipitation and temperatures year-round in the Edmonds, Washington area. Occasionally, winter storms will bring heavy rainfall, strong winds, or snowfall. Average temperatures are typically in the 30s and 40s degrees Fahrenheit (°F) during winter, and range from the 50s to 70s °F during spring, summer, and fall. The annual precipitation is approximately 36-inches and consists mostly of rain that falls between October and March.

2.3.2 Regional Geology

The Edmonds, Washington area is located in the Puget Sound Lowland, bound by the North Cascade Mountains and South Cascade Mountains to the east and the Olympic Mountains and Willapa Hills to the west. Continental glaciers advanced into the region several times during the Pleistocene Epoch (between 2 million and 10,000 years ago). This part of the Cordilleran ice sheet is known as the Puget Lobe. The most recent period of glaciation, the Vashon Stade, began approximately 15,000 years ago. As the climate cooled during the Vashon Stade, the continental ice sheet in Canada expanded and the Puget Lobe slowly advanced southward into western Snohomish County and beyond. The ice of this Vashon Glacier blanketed the entire Puget Sound Basin before halting and retreating (Thomas 1997).

As the Vashon Glacier advanced southward, streams and melting ice in front of the glacier deposited sediment throughout the Puget Sound Lowland. As the glacier continued its advance, it overrode these advance outwash deposits and covered them with glacial till. This till, also known as hardpan, consists of reworked older deposits and rocks scoured by the bottom and sides of the advancing glacier. Because of the pressure of thousands of feet of overlying ice, the till is compact and cemented in some areas, with a texture much like concrete. However, local deposits of fine- and coarse-grained sediment resulted in areas where the till was subjected to the influence of subglacial water during deposition. Approximately 13,500 years ago, the climate began to warm and the Vashon Glacier started to retreat. During this retreat, recessional outwash sediment was deposited, filling in discontinuous depressions and channels in front of the glacier. Subsequent to the deposition of glacial sediment, alluvial sediment of Holocene age (10,000 years ago to the present) was deposited. These are predominantly fluvial deposits of sand and gravel in stream and river valleys. During the same time, bog, marsh, and peat deposits were formed in small low-lying and poorly drained areas (Thomas 1997).

The thickness of the entire assemblage of unconsolidated deposits varies considerably over the region, but averages approximately 500 feet thick, with a maximum thickness of more than 1,200 feet. The deposits are thickest in western Snohomish County and are thinner to the east where the Tertiary bedrock is at or near land surface (Thomas 1997).

Beneath the Pleistocene and Holocene deposits are consolidated Tertiary marine sediment and volcanic rocks.

The Site lies within this regional setting, and is underlain by both glacial and nonglacial unconsolidated sediment. The Upper Yard is located on top of a bluff and the Lower Yard is situated at the foot of the bluff, along its northern edge. The Upper Yard bluff consists of three main types of deposits: interglacial deposits (Whidbey Formation), alluvial/lacustrine pre-glacial deposits (Transitional Beds and Advance Outwash), and glacial deposits (till) (Minard 1983). The Lower Yard bounding the bluff is composed of marsh deposits to the northeast and “modified land” that has been dredged and filled to the north and northwest (MFA 2004c).

2.3.3 Regional Hydrogeology

Groundwater flow in the Puget Sound region can generally be divided into large- and small-scale flow systems. Large-scale flow systems exist in unconsolidated, glacially derived units, and in the marine sediment and volcanic rocks underlying them. These systems are recharged by precipitation in upland areas, east of the Puget Sound, where the units are exposed. Large-scale, regional system discharge is into Puget Sound. Small-scale, local flow systems occur in the uppermost deposits of alluvial and lacustrine pre-glacial sediment, glacial sediment, and post-glacial alluvium, as well as in construction-related backfill. Precipitation and deeper flow systems are the chief methods of recharge for these local flow systems. Discharge of local systems is to adjacent surface-water bodies.

The Site lies within this regional setting. Large-scale, Site system discharge is into Puget Sound. Small-scale, local flow systems occur in the uppermost deposits.

2.4 Site Environmental Setting

2.4.1 Site Geology

Five hydrostratigraphic units have been identified in the Lower Yard:

- *2008 fill*. The 2007 and 2008 interim action excavations were backfilled to 6 to 12 inches above the observed groundwater table in the open excavations with poorly graded coarse gravels (⅜ to 1 inch) and little to no fines. Backfill material above the coarse gravel to ground surface was a mixture of very fine to medium sand, trace silt, and fine to medium gravel materials.
- *1929 fill*. This unit consists of silty sands with gravel and sandy silts with gravel. During the 2007 and 2008 interim action excavations, subsurface materials encountered from ground surface to a depth of 8 to 15 feet bgs were mostly fill material placed circa 1929 or later, during creation of the Lower Yard facility.

- *Marsh deposits*. In many areas of the Lower Yard, beneath the 1929 fill unit, a 1- to 15-foot-thick layer is present and is composed of silt and sandy silt with large amounts of organic matter such as peat and wood debris. This layer is encountered at depths ranging from 8 to 14 feet bgs, directly below the 1929 fill unit, and is interpreted to be representative of the former marsh horizon beneath the Lower Yard. This layer is typically demarcated by a 6- to 12-inch-thick layer of decomposing vegetation.
- *Beach deposits*. Below the 1929 fill unit and marsh deposits, a poorly graded sand formation of very fine to medium sand with fine gravel is present, containing organic material such as driftwood and seashells. This layer is interpreted to be representative of the former beach environment in the area prior to creation of the Lower Yard.
- *Whidbey Formation*. This material is a poorly graded sand layer consisting of very fine to medium sand with fine gravel. It is present beneath the overlying deposits to the maximum depth explored by Unocal (41.8 feet bgs). This unit contains interbedded sand with silt and interbedded silt and sandy silt. The interbeds range in thickness from less than 1 inch to several feet and appear to be laterally discontinuous. This unit is interpreted to be alluvium and is likely part of the Whidbey Formation.

The current uppermost stratigraphic unit of the Lower Yard consists primarily of 2008 fill. The 2007 and 2008 interim action excavations were extended to reach beach deposits, marsh deposits, or Whidbey Formation materials. Remaining unexcavated areas are likely 1929 fill material, underlain by the hydrostratigraphic units described above. Cross sections of the Lower Yard are presented on Figures 2-2 through 2-6. Elevations of the 2008 gravel backfill material in the 2007 and 2008 excavation areas are shown on Figures 2-7 and 2-8.

2.4.2 Site Hydrology

2.4.2.1 Water Supply Wells

According to a review of Ecology and Snohomish Health District files, no potable water supply wells exist within ¼ mile of the Site. One abandoned test well is located approximately ⅓ mile northeast of the site boundary and was used for dewatering during construction of the Edmonds wastewater treatment plant. The nearest domestic supply well, installed in 1995, is located approximately ¼ mile south of the site boundary. This well is upgradient from the Site; therefore, groundwater from the Site cannot affect this well.

2.4.2.2 Groundwater Elevations

Groundwater elevations throughout the Lower Yard have remained consistent from October 2008 to October 2016, with average groundwater elevations ranging between 5 and 9 feet amsl. This does not include groundwater elevation data collected in the southeast Lower Yard, which indicate the presence of an area of localized groundwater mounding. During the period of record, average groundwater elevations in the southeast Lower Yard were between 9 and 11 feet amsl. Historical groundwater elevations throughout the Site (excluding the southeast Lower Yard) varied from 2.24 feet amsl at well MW-147 in September 2011 to 11.20 feet amsl at well MW-109 in December 2011. The highest average historical groundwater elevations (8.71 and 8.89 feet amsl) are observed in monitoring wells MW-203 and MW-134X (in the upper Unoco Road portion of the southeast Lower Yard). The lowest average historical groundwater elevations (5.21 and 5.49 feet amsl) are observed in monitoring wells MW-301 and MW-149R in the southwest Lower Yard.

Historical groundwater elevations in the southeast Lower Yard ranged from 6.21 feet in well MW-136 in August 2009 to 15.21 feet amsl in piezometer P-1 in January 2010. The historical average groundwater elevation in the southeast Lower Yard is 9.82 feet amsl.

Groundwater elevation data from June 2015 and October 2016 were contoured and are presented on Figures 2-9 and 2-10. In general, the seasonal variation includes the difference between the highest groundwater elevations observed during January and the lowest groundwater elevations observed between June and September.

2.4.2.3 Groundwater Gradient and Direction

As described in Section 2.7.2, the 2011 investigation activities indicate that tidal variations in water levels in Puget Sound influence groundwater elevations at the site perimeter. Horizontal gradients in the surficial materials of the Lower Yard measured during tidal study activities ranged in magnitude from 0.0053 to 0.0058 foot per foot, with an overall direction to the west-northwest toward Puget Sound (Arcadis 2012a).

Quarterly water-level data from October 2008 to June 2012 were evaluated to assess the long-term hydraulic gradient and overall gradient direction in the Lower Yard. Groundwater elevations during this time period ranged from approximately 2 to 15 feet amsl and generally decreased from south to north-northwest, primarily toward Puget Sound and Edmonds Marsh (east). Depth to water values ranged from approximately 0.6 foot to 27 feet below top of casing. In general, the greatest depth to water values occur near the entrance to the Lower Yard (on upper Unoco Road) and near the central portion of the Site, decreasing with proximity to Puget Sound (to the north) and Edmonds Marsh (southeastern portion of the Lower Yard). Using the quarterly data to calculate a site-wide gradient (Devlin 2003), the analysis indicates that the overall average gradient is 0.002 foot per foot toward the west-northwest.

Groundwater elevations in monitoring wells MW-500 and MW-501, installed in June 2012 in both 2008 fill and in the underlying 1929 fill material, are generally several feet higher (5 to 7 feet) than elevations at surrounding wells. Groundwater gradient in the southeast portion of the Lower Yard is also influenced by the 2007 and 2008 interim action excavations and subsequent 2008 fill. In July 2009, in an effort to understand the higher groundwater elevations, eight piezometers were installed in the southeast Lower Yard near monitoring wells MW-500 and MW-501. The piezometers were installed in pairs, with each piezometer approximately 1 to 2 feet from each other. One piezometer of each pair was installed as a deep well (ranging from 25 to 22 feet bgs) and one piezometer was installed as a shallow well (ranging from 12 to 13 feet bgs). The deep piezometers were constructed with 5 feet of well screen and the shallow piezometers were constructed with 10 feet of well screen. The piezometers and wells MW-500 and 501 screen interval summary is presented in Table 2-2.

Table 2-2. Southeast Lower Yard Well Screen Interval Summary

Well ID	Classification	Well Screen Interval (geologic material)
P-1	Shallow	2008 fill/1929 fill
P-2	Deep	1929 fill
P-3	Shallow	2008 fill
P-4	Deep	1929 fill
P-5	Shallow	2008 fill
P-6	Shallow	2008 fill/1929 fill
P-7	Deep	1929 fill/Whidbey Formation
P-8	Deep	1929 fill/Whidbey Formation
MW-500	Shallow (monitoring well)	2008 fill/1929 fill
MW-501	Shallow (monitoring well)	2008 fill/1929 fill

All shallow piezometers, which are installed in either the 2008 fill or both the 2008 fill and the 1929 fill, have groundwater elevations consistent with those observed in monitoring wells MW-500 and MW-501. The groundwater elevations in the shallow piezometers are also several feet higher than the corresponding deeper piezometers, which are installed in the 1929 fill or both the 1929 fill and the Whidbey Formation.

The 2008 fill material is a higher permeability material than the 1929 fill that underlies and surrounds the 2007 and 2008 interim action excavation areas in the southeast Lower Yard. The 2008 fill appears to have created a distinct zone in which shallow groundwater responds more rapidly to recharge than the surrounding and underlying 1929 fill. Movement of groundwater from the 2007 and 2008 interim action excavation area (both laterally and vertically) is restricted due to the presence of the lower permeability 1929 fill. Additionally, surface-water runoff from the bluff along the Upper Yard may be contributing some recharge to this portion of the Site. As a result, water levels near the 2007 and 2008 interim action excavation area indicate a limited area of groundwater mounding due to the differential permeabilities.

Cross sections of the southeast Lower Yard, with historical groundwater elevation data, are shown on Figures 2-5 and 2-6. Groundwater elevation contours and data from the June 22, 2015 and October 27, 2016 gauging events are presented on Figures 2-9 and 2-10.

2.4.2.4 Hydraulic Conductivity

Results of the hydraulic conductivity testing conducted during the 2011 site investigation, including step drawdown tests, short-duration hydraulic conductivity tests, long-duration hydraulic conductivity tests, and slug tests, indicate that hydraulic conductivity (ranging from 0.06 to 345 feet per day) varies throughout the Lower Yard and corresponds to the heterogeneity of the subsurface materials. The 1929 fill is of lower permeability than the 2008 fill material. Wells completed in the 2008 fill have relatively higher hydraulic conductivity values (ranging from 2.5 to 345 feet per day) than those completed in the 1929 fill (ranging from 0.2 foot to 15 feet per day). Hydraulic conductivity results are presented in Table 2-3, along with the screened interval lithology.

Table 2-3. Revised Summary of Hydraulic Conductivity Results

Tested Well	Minimum Estimated Hydraulic Conductivity (feet/day)	Maximum Estimated Hydraulic Conductivity (feet/day)	Arithmetic Mean Hydraulic Conductivity (feet/day)	Well Screen Interval (geologic material)
LM-2	0.3	0.4	0.3	1929 fill
MW-104	4.7	15	10	1929 fill
MW-129R	0.2	0.5	0.3	1929 fill
MW-149R	2.5	2.5	2.5	2008 fill
MW-500	0.06	0.2	0.1	2008 fill/1929 fill
MW-518	5.8	10	8	2008 fill
MW-8R	186	345	259	2008 fill

Source: Final SICR (Arcadis 2012a).

Note:
The value estimated at LM-2 was from slug testing only because a valid result could not be obtained from the step test data analysis.

2.4.2.5 Surface Water – Groundwater Interaction

The 2011 site investigation included a study to evaluate the potential interaction between Puget Sound, groundwater at the Lower Yard, and surface water in Willow Creek. Results are presented in the Final SICR and its revision (Arcadis 2012a, 2014c) and summarized below.

Tidal Influence on Groundwater

Based on the tidal study, the Lower Yard perimeter wells (located within approximately 62 feet of the site boundary) are tidally influenced. Shallow monitoring wells with observable response to tidal influence indicated a range in amplitude from 0.07 foot to 1.15 feet. Deeper monitoring well MW-122, completed in the Whidbey Formation, indicated a range in amplitude from 0.02 to 0.33 foot. Wells monitored during the tidal study indicate higher tidal efficiency factors (or the ratio of the change in water level in a groundwater well compared to the change in water level in a tidally affected water body) along the northwest boundary wells adjacent to Puget Sound, compared to interior wells and southeast boundary wells adjacent to the marsh. Results indicate that the average tidal efficiency varied between approximately 0.003 (LM-2 and MW-515) and 0.09 (MW-149R). The average tidal efficiency of all wells studied was 0.03. The values are relatively low, likely due to the low permeability and heterogeneity of material at the Site. The relatively low tidal efficiency values observed at monitoring wells indicate that groundwater levels at the Site are not significantly influenced by tidal changes in Puget Sound.

A comparison of groundwater elevations to Puget Sound water elevations measured during the 2011 tidal study indicates that the short-term groundwater gradient direction near the tidal boundaries varies with the tidal stage. At most of the observed perimeter locations during high tide, the Puget Sound water elevation is higher than groundwater elevations in the Lower Yard, indicating an inward flow direction near the boundary. However, at that same time, groundwater gradients between perimeter and interior wells remained almost unchanged, indicating outward flow. Thus, the region experiencing gradient reversal is limited to a narrow band at the site margin near the tidal surface waters. At low tide the opposite is true, and groundwater gradient is toward Puget Sound both within the Site and at the margins. Exceptions to this occur at MW-122, MW-500, and MW-501. At these locations, during the tidal study, elevations were higher than Puget Sound except at the "high" high tide stage, when the groundwater elevations of these wells were lower than Puget Sound; groundwater gradient is therefore reversed and groundwater does not discharge toward Puget Sound during the "high" high tide stage.

Tidal Influence on Surface Water

Data collected during the 2011 tidal study from transducers installed at staff gauges in Willow Creek indicate that Willow Creek is tidally influenced. At locations where Willow Creek was monitored with transducers, the Puget Sound elevation is greater at high tide than surface-water elevations in Willow Creek, and Willow Creek elevations are greater at low tide than those in Puget Sound. Salinity was also measured in Willow Creek during the tidal study. Salinity variations were observed to correlate to the tidal stage at staff gauges with observable tidal influence. During high tide in Puget Sound, the flow is directed toward Willow Creek and salinity concentrations in Willow Creek increase. During low tide in Puget Sound, the flow direction reverses and flow is from Willow Creek toward Puget Sound while salinity concentrations decrease in the creek. During periods of high tide, flow in Willow Creek will be toward Edmonds Marsh, and Edmonds Marsh partially fills with water. During low tide, Edmonds Marsh will partially drain into Puget Sound.

During some tidal cycles in the 2011 tidal study monitoring period, surface-water elevations in Willow Creek were greater than those in Puget Sound during low and low high tides. Staff gauge D-6R (located in DB-1) did not identify any observable tidal influence. Staff gauges with observable tidal responses to tidal influence indicated a range in amplitude from 0.02 foot to 3.73 feet. Fluctuations in surface-water elevations in Willow Creek ranged from 3.06 to 8.76 feet amsl.

Surface Water – Groundwater Interaction

Based on the water-level data and salinity collected during the 2011 tidal study, not only does the flow direction vary with tide, but water from Puget Sound is mixing with water in Willow Creek and (to a lesser extent) with groundwater. This is indicated by the water-level response to tidal fluctuations and the varying salinity concentrations observed at the staff gauge locations. This is also occurring at the tidally influenced monitoring wells; however, the magnitude of responses to tidal fluctuations and salinity concentrations is less at the wells than observed in Willow Creek.

Willow Creek is directly hydraulically connected to Puget Sound through a culvert running under the Port of Edmonds, which also likely contributes to the greater tidal response and higher salinity concentrations. Therefore, based on groundwater elevations, surface-water elevations, and salinity changes, data from the tidal study indicate that groundwater flow is directed to surface water over the long term. However, local, transient flow direction also changes as a result of tidal stage fluctuations in Puget Sound where surface water from Willow Creek is directed to groundwater. This unique hydraulic and hydrogeological setting creates a mixing zone along the western boundary where groundwater, freshwater, and saltwater interact, at times stagnating and ultimately reversing groundwater gradient at the western boundary of the Site.

2.4.3 Surface Water

At its nearest point (the southwest corner of the Lower Yard), the Site is approximately 160 feet from the Puget Sound shoreline. The Site is bounded by Willow Creek, which runs along the northern portion of the western boundary and the entire eastern boundary of the Lower Yard. To the north and northeast of the Lower Yard is Edmonds Marsh, which is a 23-acre freshwater and brackish-water marsh. This tidally influenced marsh is fed by Shellabarger Creek on the southeast side of the marsh and drains a portion of the City of Edmonds and WSDOT stormwater system. Willow Creek connects Edmonds Marsh to Puget Sound and carries surface water into a tidal basin, where the water is conveyed beneath the Port of Edmonds through a culvert to Puget Sound. Willow Creek and Edmonds Marsh are directly connected to Puget Sound and are tidally influenced.

2.4.4 Upland Sediment

Upland sediment on the banks of Willow Creek, the tidal basin, and the berm surrounding DB-1 are partially to fully inundated during high tides. During low tides, these areas are fully exposed. Observations during field activities conducted since 2007 indicated that sediment at the bottom of the main channel of Willow Creek is constantly submerged. The water covering the upland sediment is generally brackish (1 to 30 parts per thousand [$^{0}/_{00}$] salinity) as a result of the mixing of surface water runoff with saltwater from tidal incursion. In June 1995, upland sediment pore water salinities measured between 11 and 21 $^{0}/_{00}$ at depths up to 10 centimeters (MFA 2001b).

In 1995, upland sediment was investigated and sampled for characterization. The results of this investigation are presented in the Draft Remedial Investigation Report (MFA 2001b) and are summarized below.

Upland sediment observed along the northeast boundary of the Site is highly organic, very soft to firm, olive brown to black sandy silt (MFA 2001b). Upland sediment located at an elevation high enough to support perennial vegetation retained a peat-like composition. Sediment located in the bottom of Willow Creek and along the northwest boundary of the Site is generally loose, olive gray to gray, silty sand. Tidal basin sediment is loose, gray to brown, gravelly sand. Reducing sediment indicative of anoxic conditions was observed along the northeast boundary of the Site. Amphipods were observed in the upland sediment (MFA 2001b).

Sediment samples in Willow Creek were collected for indicator hazardous substance (IHS) analysis in 1996, 2003, and 2012, as discussed in Section 3.6.

2.4.5 Wetlands

In 2001, CH2M HILL prepared the SR 104 Edmonds Crossing, Volume 1 – Preliminary Final Environmental Impact Statement and Preliminary Final Section 4(f) Evaluation (Edmonds Crossing EIS;

CH2M HILL 2001) for the U.S. Department of Transportation Federal Highway Administration and the WSDOT in preparation for future construction of the Edmonds Crossing multimodal transportation center on the Lower Yard. The Edmonds Crossing EIS (CH2M HILL 2001) included a wetland delineation of the Lower Yard, and Edmonds Marsh and its surrounding areas. During development of the Edmonds Crossing EIS (CH2M HILL 2001), three wetland areas were identified at or adjacent to the former Unocal property:

- Edmonds Marsh.
- A freshwater marsh on the east side of Highway 104 that was part of Edmonds Marsh before construction of the highway (now known as Edmonds City Park).
- DB-1 area of the Lower Yard.

Two riparian corridors were also identified: one associated with Shellabarger Creek at the north end of Edmonds City Park and the Willow Creek riparian corridor that runs through the fish hatchery.

Edmonds Marsh was classified as a Category II wetland (wetlands that are difficult, though not impossible, to replace, and provide high levels of some functions) by Ecology during the SMP Update implemented by the City of Edmonds (Ecology 2016). The primary functions of the approximately 23-acre Edmonds Marsh are flood storage and desynchronization, sediment trapping, nutrient removal, water quality improvement, wildlife habitat, fish habitat, and passive recreation. Edmonds Marsh is tidally influenced, receiving saltwater during high tides from Willow Creek and freshwater from Shellabarger Creek.

The 3.7-acre freshwater marsh on the east side of Highway 104 is rated as a Category II wetland. Its primary functions are flood storage and desynchronization, sediment trapping, nutrient removal, water quality improvement, and limited biological support. This wetland receives freshwater from Shellabarger Creek and from upland areas to the south and southeast.

The 2.3-acre DB-1 wetland area is located within the Lower Yard. The DB-1 area would likely be classified as a Category III wetland due to its small size, lack of vegetative diversity, disturbed condition, and lack of hydraulic connectivity to Edmonds Marsh. The only source of freshwater to DB-1 is precipitation, surface runoff during heavy precipitation events, and overflow from DB-2.

2.5 Historical Site Investigations

2.5.1 Onsite investigations

Site investigations have been ongoing at the Site since 1986. Historical investigations indicated that in general, the areas of petroleum hydrocarbon-impacted soil coincided with historical operations. Impacts in the Upper Yard were found near AST basins, stormwater drain lines, product piping lines, and facility operations areas. In the Lower Yard, impacts were generally found near the asphalt plant, railcar loading racks, truck loading racks, and fuel storage and distribution areas. Areas of the Lower Yard containing soil impacted with metals (specifically arsenic) were identified in locations where tanks and pipes were sandblasted with arsenic-containing sandblast grit. During 2007 and 2008 interim action excavation activities, it was observed that the southeast Lower Yard was used as a disposal area for petroleum-impacted soil, construction debris, and other waste material, with associated soil impacts. These historical site investigations are summarized in Table 2-1 and in the various reports referenced in Section 1.2. Pertinent data tables from historical site investigations are included in Appendix A.

Historical information reviewed for development of the RIWP (EMCON 1995) indicated that field investigations of the fish hatchery area were not warranted. Indeed, although the fish hatchery property was included in AO No. DE 4460, it was not used for operations or storage by Unocal and remained undeveloped until 1985 when the fish hatchery was constructed.

2.5.2 Offsite investigations

Historical investigations were conducted offsite on Admiral Way (soil borings SB-1 to SB-7 in 2001), along the BNSF tracks (monitoring wells MW-27 to MW-29 in 1991 and MW-105 to MW-107, MW-137 and MW-138 in 1995) and on the Port of Edmonds property (soil borings P-1 to P-9 in 1997 and LAI-DP-6 to LAI-DP-16 in 2004) (GeoEngineers 1993; MFA 2003b; EMCON 1998; Landau Associates, Inc. 1998, 2004).

Offsite investigations conducted by the Port of Edmonds on their property, identified local areas of soil impacted with total petroleum hydrocarbons (TPH) or carcinogenic polycyclic aromatic hydrocarbons (cPAHs), which are believed to be the result of releases at the Port of Edmonds and are not related to the Site nor are expected to cause impacts to the Site. These conclusions are based on the review of chromatograms from soil impacts detected at the Site that did not resemble the petroleum hydrocarbons found in the soil samples collected on the Port of Edmonds property. Furthermore, soil and groundwater samples collected along the BNSF tracks, located between the Site and the observed impacts, did not exceed site REL or CULs. Details of the investigations by Unocal conducted on Admiral Way and along the BNSF tracks are provided below.

As part of the remedial investigation activities conducted by EMCON in 1995, five monitoring wells (MW-105, MW-106, MW-107, MW-137, and MW-138) were installed in the BNSF right of way, between the southwest Lower Yard property boundary and the BNSF tracks. TPH concentrations in the soil samples collected during well installation were generally less than the laboratory reporting limits (LRLs). The maximum TPH concentration in soil was 230 milligrams per kilogram (mg/kg) in MW-105, collected at 1 foot bgs (EMCON 1998). No soil concentrations in these samples were greater than site-specific CULs for the Lower Yard.

Soil samples collected northwest of the Site, in Admiral Way, contained concentrations of TPH less than 500 mg/kg, except samples from two borings (SB-1 and SB-4). Samples from SB-1 and SB-4 contained TPH concentrations of up to 2,694 and 3,203 mg/kg, respectively (MFA 2003b). Based on the localized distribution of impacted soil beneath Admiral Way and the low to non-detect petroleum hydrocarbon concentrations in soil and/or groundwater samples from the borings/wells (MW-28, MW-106, and MW-107) located between the Lower Yard and Admiral Way, impacted soil beneath Admiral Way appears to be unrelated to the Site (MFA 2003b).

In coordination with Ecology, offsite locations on Admiral Way, along the BNSF tracks and on the Port of Edmonds property were not further evaluated.

Data tables and figures from historical offsite investigations are included in Appendix A.

2.6 Previous Cleanup Actions

Cleanup actions have been ongoing at the Site since 1986. In 1993, Unocal entered into AO No. DE-92TC-N328, which was superseded by AO No. DE 4460 in 2007. In accordance with the AOs, Unocal conducted interim action cleanup activities at the Upper Yard and Lower Yard, as described below.

2.6.1 Light Non-Aqueous Phase Liquid Recovery Interim Actions

From 1987 to 1991, GeoEngineers conducted LNAPL recovery operations in the Lower Yard. During this time, approximately 7,500 gallons of LNAPL were recovered from areas adjacent to the tidal basin and DB-1 (EMCON 1994). EMCON (from 1992 to 1998) and MFA (in 1999 and 2000) also conducted LNAPL recovery operations in the Lower Yard. During these periods, approximately 1,970 gallons of LNAPL were recovered from recovery wells in the Lower Yard (EMCON 1999; MFA 2000). Additionally, in 1996 during remedial investigation activities, EMCON recovered approximately 8,600 gallons of LNAPL (EMCON 1998). Recovery operations primarily consisted of skimming, bailing, and pumping the product out of monitoring wells, as well as installing and operating a recovery well system along the northwest border of the Site (MFA 2001a). LNAPL recovery operations are summarized in Table 2-1.

2.6.2 Upper Yard Interim Action

The Upper Yard interim action was conducted between July 2002 and May 2003, in accordance with AO No. DE92TC-N328, and consisted of the excavation of petroleum-impacted soil, metals-impacted surface soil, and asphalt/polyurethane coating material. Approximately 113,034 tons of petroleum-impacted soil, 7,320 tons of metals-impacted soil, and 4,021 tons of asphalt/polyurethane coated material were excavated and removed from the Upper Yard. In October 2003, Ecology confirmed that Unocal had completed cleanup activities in the Upper Yard and that the Upper Yard was suitable for residential use with regard to the soil direct contact pathway. Information regarding the Upper Yard interim action is presented in the Upper Yard Interim Action As-Built Report (MFA 2003a) and summarized below.

MTCA Method B CULs of 200 mg/kg for gasoline range organics (GRO), 460 mg/kg for diesel range organics (DRO), and a combined 2,959 mg/kg for TPH in all ranges (GRO, DRO, and heavy oil range organics [HO]) were used for petroleum-impacted soil in the Upper Yard. A total of 842 confirmation samples were collected along the floors and sidewalls of the excavation areas. Confirmation samples containing concentrations exceeding the Method B CULs triggered additional excavation. At the final extent of each excavation area, no confirmation samples exceeded the Method B CULs for TPH.

A MTCA Method B CUL of 20 mg/kg for arsenic was used in metals-impacted surface soil excavation areas of the Upper Yard. A total of 500 metals confirmation samples were collected, which met the Method B CUL for arsenic. One confirmation sample in the Upper Yard ramp area exceeded the Method B CUL for arsenic, with a concentration of 48.1 mg/kg. Twenty-one additional soil samples were subsequently collected to a maximum depth of 4 feet bgs in the Upper Yard ramp area. Those samples confirmed that arsenic is naturally present in the Upper Yard ramp area; therefore, the concentration exceeding the Method B CUL was associated with naturally occurring arsenic in the native soil. Additionally, in the Appendix B of the June 2007 AO No. DE 4460, a memorandum provided by Integral

Consulting, Inc showed that arsenic concentrations observed onsite were likely caused by geochemical conditions associated with naturally occurring organic carbon sources (SLR 2007).

2.6.3 Lower Yard Interim Actions

2.6.3.1 2001 Excavation

In 2001 Unocal conducted an interim action under AO No. DE92TC-N328 to remove LNAPL and petroleum-saturated soil and groundwater from four areas of -the Lower Yard. These areas were located near the former railcar loading rack (Excavation A), former asphalt plant (Excavation B), and north-central area near the former slops pond (Excavations C and D) (Figure 2-1). The 2001 interim action resulted in the excavation and removal of 10,764 tons of LNAPL-saturated soil and 76,237 gallons of LNAPL and groundwater from these four areas of the Lower Yard. Results of the 2001 interim action are presented in the Lower Yard Interim Action As-Built Report (MFA 2002) and summarized below.

Each excavation (A to D) extended laterally until LNAPL-saturated soil was no longer observed on the excavation sidewalls, or until structural concerns would not allow further excavation. The excavation areas were left open for approximately 1 month to allow LNAPL to enter the excavations and be recovered. Final excavation depths ranged between 6.5 and 10.5 feet bgs.

Soil samples were collected from the sidewalls of each excavation although there was no requirement to meet CULs or minimum concentration criteria because the purpose of the 2001 interim action was to remove LNAPL and visually petroleum-saturated soil. Excavation confirmation soil samples collected during the 2001 interim actions contained TPH concentrations ranging from 724 to 3,203 mg/kg. Excavated material from above the top of the smear zone was stockpiled and sampled for laboratory analysis. Stockpiles with soil concentrations of TPH less than 5,000 mg/kg were used as backfill material above the top of the smear zone.

Excavations B, C, and D and the south part of the Excavation A were over-excavated during the 2007 and 2008 interim action. In the area of Excavation A, soil samples containing concentrations greater than CULs and RELs (EX-A-6 and EX-A-7A containing TPH concentrations of 6,680 and 3,320 mg/kg, respectively) were over-excavated as a part of the 2007/2008 excavation activities.

2.6.3.2 2003 Excavation

Additional interim actions were conducted in 2003 under AO No. DE92TC-N328, including soil excavations in the southwest Lower Yard, DB-1, Metals Area 3 (located adjacent to the southwest Lower Yard excavation area), and the Point Edwards storm drain line area. The interim action excavations conducted in the southwest Lower Yard, DB-1, and Metals Area 3 were implemented to reduce potential threats to human health and the environment, and to provide additional information for the feasibility study and design of the final cleanup action. The Point Edwards storm drain line area excavation was conducted to remove contaminated soil along the alignment of a new storm drain for Point Edwards prior to its installation (Figure 2-1). During the 2003 interim action excavations, 39,130 tons of soil were excavated from DB-1, the southwest Lower Yard, Metals Area 3, and the storm drain line area; and approximately 1,861,520 gallons of groundwater were extracted from the DB-1 and southwest Lower

Yard and treated onsite. Results of the 2003 interim actions are presented in the 2003 Lower Yard Interim Action As-Built Report (MFA 2004a) and summarized below.

Depths of each excavation area were approximately 6 feet bgs in DB-1, 7.5 feet bgs (up to 1.5 feet below the groundwater table) in the southwest Lower Yard, 1 foot bgs in Metals Area 3, and 8.5 feet bgs in the Point Edwards storm drain line area (MFA 2004a).

The lateral extents of the excavations were identified by a REL for TPH (GRO, DRO, and HO) of 3,000 mg/kg and an arsenic CUL of 20 mg/kg. Soil samples were collected along the sidewalls and floors of each excavation area, except those areas that extended below the groundwater table, where floor samples had not previously been collected (the southwest Lower Yard excavation area). Laboratory analysis of soil samples at the extents of the excavations indicated that soil containing concentrations greater than CULs was left in place in two locations in DB-1, five locations in the southwest Lower Yard, and two locations in the Point Edwards storm drain line area. The location containing soil concentrations greater than CULs after the 2003 excavation was addressed during remedial excavations in 2007 and 2008. However, soil sample SWLY-D-3 Wall-3.75, located in the southwest Lower Yard, contained a TPH concentration of 2,923 mg/kg (less than the 2003 site REL for TPH of 3,000 mg/kg, but greater than the current site REL for TPH of 2,775 mg/kg, which was established lower in 2013 (Arcadis 2013b)). Details for the soil sample location SWLY-D-3 Wall-3.75 are provided in Table 2-4.

The Point Edwards storm drain line excavation was conducted to facilitate installation of a new stormwater outfall for Point Edwards, and was not specifically intended as a remedial action. Three sample locations from the Point Edwards storm drain line excavation contained COC concentrations exceeding applicable RELs and CULs:

- TPH: 17,439, 15,388, and 4,913 mg/kg in STRM-6FLOOR-7, STRM-4WALLE(2)-3, and STRM-2WALLE-3, respectively
- Benzene: 54.9 mg/kg in STRM-6FLOOR-7
- Total cPAHs adjusted for toxicity (total cPAHs TEQ): 0.56 mg/kg in STRM-4WALLE(2)-3.

Soil from the STRM-2WALLE-3 location was over-excavated during remedial excavations in 2007 and 2008. Soil sample locations STRM-6FLOOR-7 and STRM-4WALLE(2)-3 are described in Table 2-4.

2.6.3.3 2007 and 2008 Excavation

The 2007 and 2008 interim action excavation activities were conducted in two phases from July 2007 to April 2008 (Phase I), and July to October 2008 (Phase II), in accordance with AO No. DE 4460. Results of the 2007 and 2008 Phase I interim actions are summarized in the Phase I RI Report (Arcadis 2009a). Results of the 2007 and 2008 Phase II interim actions are summarized in the Final Phase II RI Report (Arcadis 2010a). Limits of excavation for all areas of the Phase I and II excavations, as well as quantities of soil removed, are presented on Figure 2-11.

Phase I

Phase I interim actions consisted of removing 108,000 tons of petroleum-impacted soil for offsite disposal and approximately 9,700 gallons of LNAPL from the groundwater surface in open excavations.

During Phase I excavation activities, 438 confirmation soil samples were collected from the floors and sidewalls of the excavation areas for TPH analysis. Soil samples were collected according to a systematic 25-foot grid pattern over the entire excavated areas at the center of each excavated grid cell and from any sidewalls that occur within each excavated grid cell. The site REL for TPH was 2,975 mg/kg and the site total cPAHs TEQ CUL was 0.14 mg/kg. CULs and RELs were met in 430 of 438 confirmation samples. Eight of the confirmation samples contained concentrations of COCs exceeding applicable CULs and RELs. Two areas where samples contained concentrations of COCs exceeding applicable CULs and RELs were over-excavated during Phase II activities. The other six areas were not over-excavated to preserve the integrity of Site structures or due to logistical constraints. Four samples contained COC concentrations exceeding the applicable REL for TPH: EX-A2-Q-14-6 (3,060 mg/kg), EX-B18-VV-1-6SW (4,980 mg/kg), EX-A2-O-15-SSW-6 (7,540 mg/kg) and EX-A2-N-16-SSW-6 (7,550 mg/kg). One sample contained a COC concentration exceeding the applicable CUL for total cPAHs TEQ: EX-B11-U-10-SSW-5 (0.159 mg/kg). One sample, EX-B20-M-17-SSW-6, contained COC concentrations exceeding the applicable CUL for total cPAHs TEQ (0.166 mg/kg) and the REL for TPH (15,700 mg/kg). These six confirmation samples are described in Table 2-4.

As part of Phase I activities, arsenic-impacted soil was excavated and removed from the southwest Lower Yard, beneath the former Unocal railroad trestle. This area contained arsenic-impacted soil associated with sandblasting of the pipelines prior to their removal and was the only remaining metals-impacted area at the Site. This area was excavated to 2.5 feet bgs, where confirmation samples showed concentrations of arsenic less than the arsenic CUL of 20 mg/kg.

At the completion of Phase I excavation activities, the excavation sidewall along the WSDOT stormwater line was demarcated with 20 thousandths of an inch thick plastic sheeting prior to backfilling. This sheeting extends from the ground surface (13.5 feet amsl) to approximately 7.5 feet amsl. Groundwater elevations near the sheeting, as measured at MW-511 and MW-512, have ranged from 5.51 to 9.14 feet amsl during the current groundwater monitoring program.

During Phase I construction activities, approximately 9,700 gallons of LNAPL were recovered and removed from the Site and approximately 2 million gallons of groundwater were extracted, treated onsite, and discharged to Willow Creek under a NPDES permit.

Phase II

In April 2008, 65 confirmation soil borings were completed in the southwest Lower Yard to confirm that soil on the floor of the 2003 excavation met the CULs and RELs. The boring locations were spaced on the same 25-foot grid pattern established for excavation sampling. Sixty-three of the 65 borings did not contain COC concentrations exceeding the CULs and RELs. The two borings with exceedances of the CULs and RELs were completed in a previously unexcavated area of the southwest Lower Yard, in the former location of the pipeline trestle. These two borings (SB-63 and SB-64) were over-excavated during Phase II excavation activities. Subsequent over-excavation confirmation soil samples contained concentrations of site COCs less than applicable site CULs and RELs.

Phase II interim action work was performed between July and October 2008 and consisted of removing 14,825 tons of petroleum-impacted soil for offsite disposal, removing 131 gallons of LNAPL, removing and treating approximately 520,000 gallons of groundwater, and removing 2,000 tons of sediment from Willow Creek.

The excavation areas for Phase II were based on areas of the Lower Yard that could not be excavated during Phase I and areas where impacts were discovered during 2008 investigation activities (see Section 2.7.1). These areas included the northwest perimeter of the site adjacent to Willow Creek where soil samples containing COC concentrations greater than site CULs and RELs were left in place during Phase I activities, the southeast Lower Yard, and impacted soil in the former asphalt warehouse area. Excavation depths ranged from 4 to 15 feet bgs. Limits of excavation extended until LNAPL-saturated soil was removed and TPH concentrations in confirmation soil samples collected at the extent of the excavation were less than the former site REL of 2,975 mg/kg. TPH concentrations in soil samples collected during the 2007 and 2008 interim action excavations ranged from less than LRLs to 17,100 mg/kg.

During Phase II, 71 confirmation soil samples were collected from the floors and sidewalls of the excavation areas. The boring locations were spaced on the same 25-foot grid pattern established for excavation sampling during Phase I. Seventy confirmation soil samples met the site CULs and RELs and one confirmation sample (EX-B1-F-44-4) contained concentrations of total cPAHs TEQ (0.212 mg/kg) exceeding the site CUL (0.14 mg/kg). Soil in the area of this sample was not over-excavated during Phase II due to a calculation error in the field. This sample was collected from the southeast Lower Yard. Approximately 850 tons of concrete and metal debris were excavated from the southeast Lower Yard, including pilings, footings, large concrete blocks, scrap metal, steel I-beams, sheet metal, metal wiring, and lumber debris. In addition, approximately 18 steel drums and drum remnants were encountered in this area, some of which were filled or coated with tar-like substances. Much of this excavation area contained large quantities of tar-like substances intermixed with soil and debris. This material was sent to a permitted solid waste landfill.

Phase II construction activities also included the removal of 2,000 tons of impacted sediment and subsequent restoration of approximately 420 feet of Willow Creek. The sediment removal in Willow Creek was conducted based on 2003 toxicity testing, during which three sampling locations in Willow Creek failed toxicity tests (US-05, US-07 and US-15). Two of these sampling locations (US-05 and US-07), near the Lower Yard's stormwater outfalls #001 and #002, were excavated during the sediment removal portion of the Phase II 2007 and 2008 excavation activities. The third sampling location (US-15) was collected in 2003 as a background sample and suggested there may be contribution causing toxicity in this sample from urban source(s) such as stormwater runoff from highways and roads. This sampling location was later confirmed in compliance during the 2012 investigations (see Section 3-6).

Phase I/Phase II Summary Results

During Phases I and II of the 2007 and 2008 excavation activities, 512 confirmation soil samples were collected from sample locations at the final extent of the excavation areas. Results for the confirmation soil samples are summarized below:

- Concentrations of TPH constituents (GRO, DRO, and HO) were less than LRLs in 261 of the 512 confirmation soil samples.

- Detected TPH concentrations were less than one-half of the former site REL for TPH of 2,975 mg/kg in 227 of the 512 confirmation soil samples, and between one-half of the REL and the REL in 17 of the 512 confirmation soil samples.
- Seven of the 512 confirmation samples contained COC concentrations exceeding applicable CULs and RELs, as described in Table 2-4:
  - TPH concentrations exceeded the former REL in five samples (EX-A2-Q-14-6 [3,060 mg/kg], EX-B18-VV-1-6SW [4,980 mg/kg], EX-A2-O-15-SSW-6 [7,540 mg/kg], EX-A2-N-16-SSW-6 [7,550 mg/kg], and EX-B20-M-17-SSW-6 [15,700 mg/kg]).
  - One sample with concentrations of TPH that exceeded the former REL also exceeded the CUL for total cPAHs TEQ (EX-B20-M-17-SSW-6 [0.166 mg/kg]). Two additional samples exceeded the CUL for total cPAHs TEQ (EX-B11-U-10-SSW-5 [0.159 mg/kg] and EX-B1-F-44-4 [0.212 mg/kg]).
- Grid sampling on a 25-foot spacing of the floors and sidewalls confirmed that the lateral and vertical extents of soil impacts were addressed in all but two distinct areas of the Lower Yard (DB-2 and the WSDOT stormwater line area).
- The 2007 and 2008 interim action excavation areas included areas from the 2003 excavations that exceeded the TPH CUL and were not over-excavated in 2003.

2.7 Recent Investigations

2.7.1 2008 Lower Yard Site Investigation

In 2008, 24 soil borings were advanced to collect data and evaluate the nature and extent of limited remaining petroleum impacts in discrete areas of the Lower Yard, including areas to the south and southwest of the WSDOT stormwater line and the former asphalt warehouse area, near monitoring well MW-129R. Results of the 2008 investigation activities are presented in the SIGMR (Arcadis 2010b) and summarized below. Soil sample locations and analytical results from 2008 soil investigation activities are presented on Figure 2-12.

Fourteen soil borings were advanced to the south and southwest of the WSDOT stormwater line, five (SB-65, SB-66, SB-68, SB-69, and SB-80) of which contained soil with concentrations of TPH and/or total cPAHs TEQ exceeding site CULs/RELs (with TPH concentrations ranging from 3,720 to 16,900 mg/kg and total cPAHs TEQ ranging from 0.165 to 0.693 mg/kg). One location (SB-65-6.5) also exceeded the benzene CUL with a benzene concentration of 35.8 mg/kg). The five samples containing concentrations of TPH and/or total cPAHs TEQ exceeding site CULs and RELs are listed in Table 2-4. Three of these boring locations were located between the WSDOT stormwater line and the Point Edwards storm drain line, in the south-central portion of the Lower Yard. One boring was located to the southwest of the Point Edwards storm drain line and one boring was located south of the WSDOT stormwater line where upper and lower Unoco Road meet.

Samples collected from three soil borings in the former asphalt warehouse area, which is located in the east-central portion of the Lower Yard, contained soil with concentrations of TPH and/or total cPAHs TEQ exceeding site CULs and RELs. Soil in the area of the soil borings located near the former asphalt warehouse area was excavated during Phase II excavation activities.

From October 8 to 14, 2008, Arcadis supervised the installation of 29 onsite monitoring wells. One soil sample collected during these activities (MW-129R-7.0) exceeded the site REL for TPH (with a TPH concentration of 3,007 mg/kg). This sample is listed in Table 2-4.

2.7.2 2011 Lower Yard Site Investigation

In 2011, site investigation activities conducted in the Lower Yard included a tidal study, hydraulic conductivity testing, and soil boring advancement in the limited area of impact near DB-2. Details of the 2011 site investigation activities are summarized in the Final SICR (Arcadis 2012a). Soil sample locations and analytical results from the 2011 soil investigation activities are presented on Figure 2-13.

Tidal study data were collected from 17 locations in onsite monitoring wells and staff gauges in Willow Creek to evaluate the potential influence of Puget Sound and Willow Creek on surface water and groundwater gradients at the Site, and groundwater chemistry.

Hydraulic conductivity pumping tests, including step tests, short-duration tests, and one long-term test, were conducted in 10 onsite monitoring wells.

Soil investigation activities included the advancement of 17 soil borings (B-1 to B-17) and installation of nine piezometers (P-9 to P-16) near DB-2, monitoring well MW-510, and Willow Creek. These areas were investigated to assess the recurring but minimal amount of LNAPL present in monitoring well MW-510. LNAPL was not encountered in nine of the 17 borings. Eight of the 17 soil borings presented either residual or free-phase LNAPL at the time of installation. Free-phase LNAPL subsequently appeared in two of the piezometers (P-12 and P-13) in 2011 and in a third piezometer in 2013 (P-15). Soil containing concentrations of COCs exceeding their respective CULs and/or RELs was encountered in 11 of the soil borings (B-4 to B-11, B-13, B-16, and B-17), with TPH concentrations ranging from 4,413 to 220,400 mg/kg and total cPAHs TEQ ranging from 0.1 to 116 mg/kg. The 11 samples containing concentrations of TPH and/or total cPAHs TEQ exceeding site CULs and RELs are listed in Table 2-4.

2.7.3 2012 Lower Yard Investigation

In 2012, site investigation activities conducted in the Lower Yard included the installation of eight monitoring wells and collection of three sediment samples. Results of the 2012 investigation activities are summarized in the Final CSM (Arcadis 2013a).

Eight monitoring wells were installed in the Lower Yard to assess groundwater conditions in areas of known and potential remaining soil impacts.

- Four wells (MW-525, MW-526, MW-531, and MW-532) were installed to the north and south of the WSDOT stormwater line to monitor for the possible presence of LNAPL and dissolved-phase TPH concentrations in groundwater in the unexcavated soil in this area. Specifically, wells MW-525, MW-526, and MW-532 were installed in previously impacted soil that was not removed during previous remedial interim actions.

- Monitoring wells MW-527 and MW-528 were installed in the southeast Lower Yard, near the one confirmation soil sample that contained cPAH concentrations exceeding the CUL.
- Monitoring wells MW-529 and MW-530 were installed on the southeast bank of Willow Creek, directly downgradient of monitoring wells MW-510 and LM-2, respectively. These wells were installed to monitor the potential for contaminant migration in groundwater offsite into Willow Creek.

Soil samples collected during monitoring well installation contained concentrations of benzene, total cPAHs TEQ, and/or TPH exceeding site CULs and RELs in MW-525 and MW-532 only (with respective TPH concentrations of 17,850 and 10,540 mg/kg and total cPAHs TEQ of 0.29 mg/kg in MW-525 only). Monitoring well locations and soil sample analytical data from 2012 site investigation activities are presented on Figure 2-14. The two samples containing concentrations of TPH and/or total cPAHs TEQ exceeding site CULs and RELs are listed in Table 2-4.

In July 2012, three sediment samples were collected from Willow Creek to assess sediment toxicity conditions near the 2003 sediment sampling location US-15. Based on the evaluation of these data, Ecology confirmed that further cleanup of Willow Creek was not needed (Ecology 2003). Sediment sampling locations and analytical results are presented on Figure 2-15.

2.7.4 2013 Soil Vapor Investigation

Soil vapor sampling was conducted in October and November 2013 in selected locations to evaluate worst-case scenario vapor intrusion in discrete areas which have not been excavated or remediated and to support remedial strategy decisions at the Lower Yard. The soil vapor locations tested had one or more chemical concentrations exceeding the soil vapor available screening level. Soil vapor analytical results are presented in Table 2-6. Soil vapor probe locations and analytical results are presented on Figure 2-16.

The sampling locations, soil vapor probes VP-1, VP-2, and VP-3, were selected near areas of maximum TPH detection and/or areas of remaining impacts to represent worst-case scenarios for volatile organic compounds (VOCs) and GRO. These locations represent undisturbed soil in areas where remediation was not conducted. Therefore, the data collected from these locations are not considered indicative of site-wide conditions. Sampling locations VP-1, VP-2, and VP-3 are described below:

- Soil vapor probe VP-1 is located near MW-525 (TPH [17,850 mg/kg], GRO [1,400 mg/kg]) to evaluate potential soil vapor adjacent to the WSDOT stormwater line.
- Soil vapor probe VP-2 is located near B-7 (TPH [111,400 mg/kg], GRO [1,400 mg/kg]) to evaluate potential soil vapor adjacent to DB-2 and groundwater monitoring well MW-510 (LNAPL observed).
- Soil vapor probe VP-3 is located adjacent to monitoring well MW-129R (TPH [3,007 mg/kg], GRO [nondetect]) to evaluate potential soil vapor in the adjacent area.

Soil vapor data were collected at a depth of 5 feet bgs in October; however, data from this sampling event were not considered for the soil vapor quality evaluation due to VOC concentrations detected in quality control samples. Soil vapor samples were collected at a depth of 5 feet bgs in November 2013; these data were used to evaluate soil vapor quality in the remaining impact areas by comparing to available health-based screening criteria (Ecology Method B soil gas screening levels for samples collected at depths of less than 15 feet bgs are presented in Table 2-5and available at http://www.ecy.wa.gov/programs/tcp/policies/VaporIntrusion/vig.html). These screening criteria define levels that Ecology have deemed safe for human exposure under a vapor intrusion scenario for residential use and are not site-specific.

Table 2-5. Soil Vapor Data Screening Levels

COCs	Laboratory Reported Compounds	Method B Shallow Soil Gas Screening Levels (μg/m^3)
Benzene	Benzene	3.2
Naphthalene	Naphthalene	14
Air-phase petroleum hydrocarbons (APH) aliphatic (C5-C8)	Volatile petroleum hydrocarbons (VPH) aliphatic (C5-C6 + >C6-C8)	27,000
APH aliphatic (C9-C12)	VPH aliphatic (>C8-C10 + >C10-C12)	1,400
APH aromatic (C9-C10)	VPH aromatic (>C8-C10)	1,800

Note:
μg/m^3 = micrograms per cubic meter

Concentrations of aliphatic carbon ranges C5-C6 + >C6-C8 were detected greater than available screening criteria in the samples collected from VP-1 (35,000,000 μg/m^3), VP-2 (33,700 μg/m^3), and VP-3 (529,000 μg/m^3). Concentrations of aliphatic carbon ranges >C8-C10 + >C10-C12 were detected greater than available screening criteria in the sample collected from VP-1 (6,600,000 μg/m^3), VP-2 (36,000 μg/m^3), and VP-3 (305,000 μg/m^3). The concentration of aromatic carbon range >C8-C10 was detected greater than available screening criteria in the sample collected from VP-1 (34,000 μg/m^3). Concentrations of benzene were detected greater than available screening criteria in the samples collected from VP-1 (710,000 μg/m^3), VP-2 (340 μg/m^3), and VP-3 (46 μg/m^3). The concentration of aromatic carbon range >C8-C10 was detected greater than available screening criteria in the sample collected from VP-1 (34,000 μg/m^3). Due to sample dilution, the LRLs for the analysis of naphthalene in all samples were greater than the respective available screening criteria.

3 NATURE AND EXTENT OF CONTAMINATION

This section describes the type of contaminants at the Site (nature) and the distribution of these contaminants vertically and horizontally across the Site (extent). The nature and extent of contamination were identified based on data collected during the remedial investigation (MFA 2001c), the supplemental remedial investigation (SRI [MFA 2003b]), 2008 site investigations (Arcadis 2010b), 2011 site investigations (Arcadis 2012a), 2012 site investigations (Arcadis 2013a), and 2013 vapor sampling.

This section describes the nature and extent of contamination, primarily the COCs that were screened for the Lower Yard during development of the 2004 Draft Feasibility Study Report (MFA 2004c). These contaminants are: TPH (combined GRO, DRO, and HO); benzene, arsenic, and cPAHs for soil and TPH (combined GRO, DRO, and HO); and benzene and cPAHs for groundwater and protection of surface water.

3.1 Soil Quality

Soil sampling activities were completed in locations throughout the Lower Yard and in offsite locations (to the west and northwest of the Site). The soil samples were collected as part of several site investigations, including the 2008 additional site investigation (Arcadis 2010b), 2011 site investigation (Arcadis 2012a), remedial investigation (MFA 2001b), SRI (MFA 2003b), 2003 assessment (MFA 2004b), and investigations that were conducted prior to the remedial investigation and are described in the Background History Report (EMCON 1994). Soil samples were also collected as part of the 2001 and 2003 interim actions (MFA 2002, 2004a).

The vertical and lateral distributions of petroleum hydrocarbons, benzene, cPAHs, and arsenic in soil are presented in the 2004 Draft FS Report (MFA 2004c). All COCs except petroleum hydrocarbons were profiled at depths from ground surface to greater than 6 feet bgs. The distribution of petroleum hydrocarbons was profiled in three depth intervals: 0 to 3, 3 to 6, and greater than 6 feet bgs (MFA 2004c).

3.1.1 Petroleum Hydrocarbons

Historically, gasoline, diesel, and heavy oil were stored and used at the terminal. The TPH concentrations observed in soil are a mixture of GRO, DRO, and/or HO in varying proportions; therefore, this section discusses TPH (combined GRO, DRO, and HO concentrations) and not the individual product ranges.

Generally, the areas of TPH-impacted soil at the Site coincided with historical terminal operations conducted in the former asphalt plant, and fuel storage and distribution areas, except the southeastern Lower Yard. The southeastern Lower Yard was used as a waste soil stockpile area for material removed from two local Unocal service stations (EMCON 1994) as well as storage area for other waste and debris.

The 2001 interim actions removed impacted soil from four areas of the Lower Yard: near the former railcar loading rack (Excavation A), near the former asphalt plant (Excavation B), and in the north-central area near the former slops pond (Excavations C and D) (Figure 2-1). Excavation confirmation soil samples collected during the 2001 interim actions contained TPH concentrations ranging from 724 to

3,203 mg/kg. Stockpiles with soil concentrations of TPH less than 5,000 mg/kg were used as backfill material above the top of the smear zone. The 2001 interim actions are detailed in Section 2.6.3.

The 2003 interim actions removed impacted soil from DB-1, the Point Edwards storm drain line, Metals Area 3 (located adjacent to the southwest Lower Yard Excavation Area), and the southwest Lower Yard. Concentrations of TPH ranged from less than LRLs to 17,439 mg/kg in these samples. The 2003 interim actions are detailed in Section 2.6.3.

After the 2001 and 2003 interim action activities, TPH was still present in the shallow soil above the groundwater table throughout most of the Lower Yard (MFA 2004c). Soil containing TPH greater than 5,000 mg/kg at depths from ground surface to greater than 6 feet bgs were also found throughout the majority of the Lower Yard. Areas of remaining impacted soil included the central and south-central Lower Yard (location of the northern truck loading rack area), northwestern property boundary adjacent to Willow Creek (former asphalt plant area), southwest property boundary adjacent to the BNSF right of way (former railcar loading areas and southern truck loading rack), and southeast Lower Yard. Areas with elevated concentrations of TPH in the Lower Yard also included 2001 interim action Excavations B, C, and D, and under the stormwater excavation, adjacent to Excavation A (Figure 2-1). Maximum concentrations of TPH were found at depths from 0 foot to 3 feet bgs in the north-central Lower Yard (31,600 mg/kg), from 3 to 6 feet bgs in the south-central Lower Yard (147,230 mg/kg), and at depths greater than 6 feet bgs in the southeast Lower Yard (18,852 mg/kg). TPH impacts were most laterally extensive at depths from 3 to 6 feet bgs throughout the Lower Yard (SLR 2007).

The 2007 and 2008 excavation activities covered the majority of the Lower Yard, including the western boundary of the southwest Lower Yard, the majority of the central and west-northwestern Lower Yard, and the southeastern Lower Yard. Excavation areas from the 2003 interim actions were re-excavated, except the Point Edwards storm drain line area and DB-1. TPH concentrations in soil samples collected during the 2007 and 2008 interim action excavations ranged from less than LRLs to 17,100 mg/kg. Areas excavated during the 2007 and 2008 interim actions are shown on Figure 2-11.

After the remedial action conducted from 2001 to 2008, the majority of remaining hydrocarbon impacts in soil occur in two localized areas of the Lower Yard (close to the WSDOT and Point Edwards stormwater lines and DB-2) as summarized below:

- Concentrations of TPH remaining in the WSDOT stormwater line range from 3,060 to 16,900 mg/kg, at depths between 4 and 8 feet bgs. This includes soil sample location SB-80 from 2008 along the Point Edwards storm drain line (4,660 mg/kg TPH) at 7.5 feet bgs.
- Soil samples collected in the DB-2 area contain residual LNAPL in some areas and concentrations of TPH ranging from 4,413 to 220,400 mg/kg in some areas. Impacts are found between 4 to 14 feet bgs in the DB-2 area.

Remaining TPH impacts are also present in two sample locations in the southwest Lower Yard (2,923 and 4,980 mg/kg TPH) at 3.75 and 6 feet bgs, respectively; and in monitoring well MW-129R (3,007 mg/kg TPH) at 7 feet bgs. The samples containing TPH concentrations exceeding the site REL are listed in Table 2-4.

Offsite investigations identified local areas of soil impacted with TPH or cPAHs, which are believed to be the result of offsite releases and are not expected to cause impacts to the Site. These conclusions are based on the review of chromatograms from soil impacts detected onsite that did not resemble the petroleum hydrocarbons found in the soil sample collected from the Port of Edmonds property soil explorations. Furthermore, soil and groundwater collected along the BNSF tracks, located between the Site and the observed impacts, did not exceed site REL or CULs. Details of the investigations are provided in Section 2.5.2.

3.1.2 Benzene

Prior to the 2007 and 2008 interim action excavations, benzene in soil was present in localized areas of the Lower Yard. Benzene concentrations exceeding 1 mg/kg were present in localized areas in the southeastern, central, and west-northwestern parts of the Lower Yard. Areas of the Lower Yard where benzene concentrations existed typically also contained elevated TPH concentrations. The maximum detected concentration of benzene in soil in the Lower Yard was 78 mg/kg. Soil sample location STRM-6FLOOR-7, from the Point Edwards storm drain line excavation and containing a benzene concentration of 54.9 mg/kg, was not over-excavated due to the presence of the storm drain line.

During the 2007 and 2008 interim action excavations, benzene concentrations detected in confirmation soil samples ranged from less than LRLs to 14.90 mg/kg, below the site-specific benzene CUL of 18 mg/kg.

During the additional soil investigation activities in 2008, one of the 24 soil samples (SB-65, located south of the WSDOT stormwater line) contained a benzene concentration of 35.8 mg/kg, exceeding the site-specific benzene CUL of 18 mg/kg. SB-65 soil sample location was not over-excavated to avoid damage to the WSDOT stormwater line. SB-65 soil sample presents the highest benzene concentration in soil observed in the Lower Yard during or after the 2007 and 2008 interim action excavations.

In 2012, monitoring wells MW-525, MW-526, and MW-532 were installed along the WSDOT stormwater line in soil that was not disturbed during prior excavation activities. One soil sample collected from the boring for well MW-525 at a depth of 6 feet bgs contained a benzene concentration of 34 mg/kg.

Sample locations MW-525, SB-65, and STRM-6FLOOR-7 are the only soil samples remaining onsite that exceed the site-specific benzene CUL and are listed in Table 2-4.

Benzene in soil was not detected at concentrations greater than LRLs in samples collected during the offsite soil investigation, to the northwest of the Site.

3.1.3 Carcinogenic Polycyclic Aromatic Hydrocarbons

Prior to the 2007 and 2008 interim action excavations, cPAHs were found in subsurface soil in large areas beneath the central and eastern-southeastern parts of the Lower Yard, and in more localized areas beneath the northern and western-southwestern parts of the Lower Yard (MFA 2004c). Areas of cPAHs concentrations typically contained elevated concentrations of TPH.

After the 2007 and 2008 interim actions, 18 soil samples with concentrations of total cPAHs TEQ exceeding the site CUL of 0.14 mg/kg remained onsite. Those samples were collected from depths ranging from 0.5 foot to 10.5 feet bgs at the locations described below and listed in Table 2-4:

- *Near the WSDOT stormwater line.*

  - One soil sample collected during the 2003 Point Edwards storm drain line excavation.
  - Two soil samples collected during the 2007 Phase I excavation activities.
  - Five soil sample locations close to the WSDOT stormwater line during the 2008 site investigation.
  - One soil sample collected from the boring for well MW-525.
- *Southeast Lower Yard.* One soil sample collected during the 2008 Phase II excavation activities.
- *Near DB-2.* Soil samples collected from eight borings in 2011.

3.1.4 Arsenic

Arsenic was identified as the only metal IHS in soil in the Lower Yard. The majority of arsenic-impacted soil in the Lower Yard was removed during the 2003 interim action. Upon completion of the 2003 interim action, arsenic was present only at concentrations greater than 20 mg/kg in the southwestern corner of the southwestern Lower Yard. The maximum arsenic concentration in this area was 1,900 mg/kg.

During the 2007 and 2008 interim action excavations, the arsenic-impacted area of the southwestern Lower Yard was excavated and confirmation samples were collected. Confirmation samples in one sample location exceeded the CUL of 20 mg/kg, with concentrations of 25, 30.7, and 30.9 mg/kg. These samples were over-excavated and one confirmation sample with a concentration of arsenic less than LRL was collected. As discussed in Section 5.5.2, the CUL of 20 mg/kg for arsenic is based on natural background concentrations in the state of Washington [WAC 173-340-740(5)(c)].

Areas where arsenic was identified in soil exceeding CULs in the Lower Yard were removed by prior IRAs.

3.2 Soil Vapor Quality

As discussed in Section 2.7.4, Arcadis conducted a limited soil vapor assessment to represent worst-case scenarios for VOCs in discrete areas, which have not been excavated or remediated. Three vapor probes (VP-1, VP-2, and VP-3) were installed at a depth of 5 feet bgs near areas of maximum TPH detection and/or areas of remaining impacts at the Site.

The soil vapor concentrations at all three locations exceeded available screening levels for one or more chemicals:

- *Near the WSDOT stormwater line.* Soil vapor concentrations analyzed in samples collected from VP-1 exceeded available screening levels for benzene, naphthalene, analyzed vapor-phase hydrocarbon aliphatic carbon ranges, and >C8-C10 vapor-phase hydrocarbon aromatic carbon ranges.
- *Near DB-2*. Soil vapor concentrations analyzed in samples collected from VP-2 exceeded available screening levels for benzene, naphthalene, and analyzed vapor-phase hydrocarbon aliphatic carbon ranges.

- *MW-129 R*. Soil vapor concentrations analyzed in samples collected from VP-3 exceeded available screening levels for benzene, naphthalene, and analyzed vapor-phase hydrocarbon aliphatic carbon ranges.

Based on the limited soil vapor assessment conducted at the Site, the three locations tested indicate that the potential exists for soil vapor to cause exceedances of available screening levels. These screening criteria define levels that Ecology have deemed safe for human exposure under a vapor intrusion scenario for residential use and are not site-specific. These discrete areas have not been excavated or remediated. Additional soil vapor assessment is necessary to define the soil vapor quality at the Site if the land use changes from its current approved use.

3.3 Light Nonaqueous Phase Liquid

LNAPL has been encountered in the Lower Yard since1986 and several LNAPL recovery operations were conducted onsite, recovering 7,500 gallons from 1987 to 1991, 2,500 gallons in 2001, 9,700 gallons in 2007, and 131 gallons in 2008.

Prior to the 2001 interim action, seven main areas of LNAPL were identified beneath the Lower Yard. These areas were the four areas included in the 2001 excavations (Excavations A through D), plus the southwest Lower Yard property boundary and the former asphalt plant area, south of the detention basins, and in the central Lower Yard (MFA 2004c).

Prior to the 2007 and 2008 excavation, SLR conducted a groundwater sampling event at the Lower Yard (SLR 2006) and identified four distinct areas of LNAPL. These areas were in Excavation A (adjacent to the tidal basin), southeast of Excavation B (in the central Lower Yard), Excavation D in the west-northwestern area (south of DB-2), and the central portion of the Lower Yard between DB-1 and lower Unoco Road (SLR 2007).

Since the 2007 and 2008 interim action excavation activities, measurable thickness of 0.01 foot of LNAPL on groundwater has been monitored as requested per the AO No. DE4460 and has been present in the following monitoring wells and piezometers located in the central Lower Yard:

- Monitoring well MW-129R had a measurable thickness of 0.01 foot of LNAPL in February 2009.
- Monitoring well MW-525 had a measurable thickness of 0.01 foot of LNAPL in June 2015.
- Monitoring well MW-510 had measurable thicknesses of LNAPL during nine sampling events from October 2009 to September 2012, with thicknesses ranging from 0.01 to 0.13 foot.
- Piezometer P-12 had measurable thicknesses of LNAPL during 10 sampling events from August 2011 to October 2016, with thicknesses ranging from 0.01 to 0.47 foot. LNAPL was measured at a thickness of 0.47 foot during the last event in October 2016.
- Piezometer P-13 had measurable thicknesses of LNAPL during 19 sampling events from August 2011 to October 2016, with thicknesses ranging from 0.01 foot to 1.96 feet. LNAPL was detected at a thickness of 0.13 foot during the last event in October 2016.
- Piezometer P-15 had measurable thicknesses of LNAPL during six sampling events from August 2011 to September 2014, with thicknesses ranging from 0.06 to 0.14 foot.

- Non-measurable thickness of LNAPL (less than of 0.01 foot) was observed in monitoring wells MW-129R (August 2009 and September 2011), MW-E (October 2016), MW-525 (June and September 2014), MW-510 (occasionally from December 2012 to September 2014) and P-15 (October 2016).

LNAPL has never been observed in the tidal basin or Willow Creek, nor was it detected in the offsite monitoring wells located along the BNSF right of way, adjacent to the southwest Lower Yard.

3.4 Groundwater Quality

Groundwater quality has been assessed at the Site since the late 1980s; only recent groundwater quality is discussed in this section.

The conceptual site model (CSM) presented in the 2007 IAWP (SLR 2007) concluded that groundwater beneath the Site discharges to surface water and sediment in Willow Creek. As a result, the 2007 IAWP (SLR 2007) establishes groundwater CULs based on the protection of surface water. According to AO No. DE 4460, groundwater CULs are required to be met at the perimeter monitoring wells for the interim action, which are located along the downgradient perimeter of the Site where groundwater discharges to surface water. Data collected from the interior monitoring well locations were not used to assess compliance during the interim action; rather, the dissolved concentration data collected at interior monitoring well locations have historically been used to evaluate groundwater concentration trends and overall plume stability.

In accordance with AO No. DE 4460, groundwater monitoring was initiated and has been ongoing since completion of the 2007 and 2008 interim action activities. Groundwater flow paths were established within the interior of the Lower Yard, and each groundwater flow path consisted of seven monitoring wells (one upgradient well, three source area wells, and three downgradient wells). Perimeter wells were established at the point where groundwater discharges to surface water within the monitoring well network, located along the downgradient perimeter of the Site. Seventeen perimeter wells were originally established in the 2007 IAWP (SLR 2007); currently, 23 perimeter wells are present onsite.

The locations of the wells inside the three groundwater flow paths were selected based on the presence of LNAPL on groundwater prior to remedial activities. Prior to the 2007 and 2008 interim action remedial excavations, the groundwater flow paths fit the established model of upgradient, source area, and downgradient wells. However, as a result of the 2007 and 2008 interim action, remedial excavations extended beyond the mapped flow path areas, and the resulting monitoring well arrangement was no longer suitable for use with Ecology's Natural Attenuation Analysis Tool Package A, as originally intended.

Because of the extensive source removal, the flow paths previously defined did not contain monitoring wells that could provide upgradient and downgradient water quality data in relation to specific source areas and were no longer applicable for a spatial evaluation of natural attenuation away from the source, as required for use with Ecology's Natural Attenuation Analysis Tool Package A. This change in the CSM rendered the previous sampling schedule and monitoring program obsolete with respect to the planned data evaluation, and necessitated revisions to the monitoring program that were reviewed and approved by Ecology. However, the current monitoring well network is sufficient to monitor and evaluate the status of the overall dissolved-phase plume. The stability of the site plume is being evaluated on a well-by-well basis, and the monitoring program needed to support this analysis was revised accordingly. Per Ecology's letter dated May 21, 2014 (Ecology 2014a), a conditional POC at the property boundary cannot be used at the Site. Therefore, groundwater compliance must be met throughout the Site.

Until June 2015, groundwater sampling events were conducted quarterly, with perimeter wells sampled during first and third quarter events and all site wells (perimeter and interior wells) sampled during second and fourth quarter events. Due to stable groundwater conditions at the Site and the locations of remaining groundwater impacts limited to areas of future remedial action, Arcadis (2015) proposed to temporarily cease groundwater sampling. This proposed action was approved by Ecology in a letter dated September 1, 2015 (Ecology 2015). With Ecology's concurrence, a reduced monitoring event was conducted in October 2016 to assess if groundwater conditions onsite were stable. The following sections describe the current groundwater conditions in the Lower Yard.

3.4.1 Petroleum Hydrocarbons

3.4.1.1 Total Petroleum Hydrocarbons

A site-wide groundwater sampling event was completed in June 2001, prior to the 2001 interim action. TPH was present in shallow groundwater throughout most of the western, northwestern, and central parts of the Lower Yard, and in localized areas beneath the southwestern, northern, eastern, and southeastern parts of the Lower Yard. In general, the areas of impacted groundwater beneath the Lower Yard coincided with historical facility operations (e.g., former asphalt plant, fuel storage and distribution areas).

Site-wide groundwater sampling events were conducted in February and August 2004 (i.e., after the 2003 interim action). The area of TPH-impacted groundwater in 2004 is similar to the impacted area in June 2001. Based on the results of the 2001 and 2003 interim actions, the TPH concentrations in August 2004 in wells located near Excavation B, the southwest Lower Yard, and DB-1 excavations were typically less than the concentrations in June 2001. Due to the presence of LNAPL in Excavations A and D, elevated TPH concentrations in groundwater remained near Excavations A, C, and D. TPH concentrations in the five offsite wells in the BNSF right of way adjacent to the southwest Lower Yard were less than LRLs (SLR 2004a).

In September 2006, prior to the 2007 and 2008 excavation, SLR conducted a groundwater sampling event at the Lower Yard. Dissolved concentrations of TPH greater than site-specific CULs were detected in six wells outside of the LNAPL areas during the 2006 groundwater sampling event. Dissolved-phase impacts were not found in the southwest or southeast Lower Yard, or north of DB-1 (SLR 2007). TPH concentrations in the five offsite wells in the BNSF right of way adjacent to the southwest Lower Yard were less than LRLs (SLR 2006). Approximate concentration contours of TPH from this time are shown on Figure 3-1.

Compared to groundwater conditions prior to interim action activities in the Lower Yard (2006) (Figure 3-1), there has been a marked decrease in areas of LNAPL and in dissolved-phase TPH across the Site (Figure 3-2 and Figure 3-3). Geochemical parameters monitored across the Site indicate that an environment that is conducive to anaerobic biodegradation of petroleum hydrocarbons is present and that biodegradation is likely ongoing at the Site. June 2015 groundwater sampling analytical results are presented on Figure 3-2. October 2016 groundwater sampling analytical results are presented on Figure 3-3.

As of October 2016, 47 of 52 monitoring wells have consistently been below groundwater CULs for 13 to 30 consecutive quarters. Since September 2013, only five wells (MW-510, MW-518, MW-525, MW-526 and MW-532) contained concentrations of dissolved-phase hydrocarbons exceeding sample-specific CULs. Monitoring wells MW-510 and MW-518 are perimeter wells downgradient of the Lower Yard. However, monitoring well MW-529, located approximately 20 feet further downgradient of MW-510, has not contained dissolved concentrations of TPH greater than LRLs since its installation in June 2012. This supports the conclusion that site groundwater is not creating offsite impacts, nor site groundwater impacting surface water at this location (MW-510). Wells MW-525, MW-526 and MW-532 are interior monitoring wells installed along the WSDOT stormwater line in soil that was not disturbed during prior excavation activities. However, monitoring wells downgradient of MW-525 (MW-104 and MW-20R) and MW-526 (MW-101 and MW-512 through MW-517) have not exceeded the TPH CULs since December 2013, indicating that the noted groundwater impacts at wells MW-525 and MW-526 are localized. These wells are located approximately 47 to 300 feet downgradient of MW-525 and MW-526.

3.4.1.2 Benzene

In June 2001 (before the 2001 interim action), dissolved-phase benzene concentrations were detected in shallow groundwater in localized areas in the western, southwestern, northwestern, central, and eastern parts of the Lower Yard (MFA 2004c). Benzene was not detected in the northern and southeastern parts of the Lower Yard. Outside of the LNAPL areas, benzene concentrations greater than 20 micrograms per liter (µg/L) were present in the western part of the Lower Yard (near the northeastern former truck loading rack) and in the southwestern part of the Lower Yard (MFA 2004c).

Following the 2003 interim action excavation activities, the August 2004 groundwater sampling results indicated that benzene concentrations decreased near Excavations B and C and in the southwest Lower Yard. Due to the continued presence of LNAPL after excavation was completed, elevated benzene concentrations remained in groundwater near Excavations A and D. In August 2004, areas outside of the LNAPL areas contained dissolved benzene concentrations greater than 20 µg/L in four monitoring wells near Excavation A and in a localized area of the southwestern Lower Yard (SLR 2004a).

After completion of the 2007 and 2008 interim action excavation activities, and since the implementation of the current groundwater monitoring program in October 2008, dissolved-phase benzene concentrations have exceeded the recently revised site CUL of 16 µg/L in three monitoring wells. Perimeter monitoring well MW-20R located near the Point Edwards storm drain and interior monitoring well MW-525 located in the central Lower Yard, have contained maximum benzene concentrations of 55 and 6,200 µg/L, respectively. Perimeter monitoring well MW-510 located in the DB-2 area, exceeded the CUL once in June 2009, with a concentration of 18 µg/L, but has not contained benzene greater than reporting limits since August 2009.

3.4.2 Carcinogenic Polycyclic Aromatic Hydrocarbons

Prior to the 2001 interim action excavations, dissolved-phase cPAHs were detected in one groundwater sample collected from one well (MW-8) in the Lower Yard. The sample from well MW-8 contained an estimated cPAH concentration of 0.933 µg/L (MFA 2004c).

Groundwater sampling results from August 2004 showed that dissolved-phase cPAHs were detected in one groundwater sample collected from well MW-13U in the Lower Yard. The sample from well MW-13U, which is located near the former garage, contained a chrysene concentration of 0.0135 µg/L (MFA 2004c).

Since the implementation of the current groundwater monitoring program in October 2008, two samples have exceeded the site-specific total cPAHs TEQ CUL of 0.05 µg/L and six samples presented LRLs exceeding the CUL due to raised detection limits. The two samples exceeding the site-specific total cPAHs TEQ CUL include one sample collected from well MW-510 in December 2012 and one sample collected from well MW-526 in December 2013, with total cPAH TEQ concentrations of 0.078 and 0.090 µg/L, respectively. No other detections in these wells or others wells were observed.

3.5 Surface Water

Surface-water samples (SW-1 through SW-4 and SW-1A through SW-4) were collected from four locations in Willow Creek and the tidal basin in April 1996; September 2001; October 2003; and May, July, and August 2004 (MFA 2004c).

The April 1996 samples were collected during a storm event. The samples from Willow Creek and the tidal basin did not contain GRO, DRO, or HO concentrations greater than LRLs. The samples (SW-3 and SW-4) collected downstream from the Lower Yard stormwater outfalls contained toluene, ethylbenzene, and total xylenes at concentrations up to an estimated 1 µg/L (EMCON 1998). SW-3 also contained pyrene at a concentration of 0.011 µg/L. The upstream (background) surface-water sample (SW-1) collected near the fish hatchery contained detectable concentrations of polycyclic aromatic hydrocarbon (PAH) compounds ranging from 0.017 µg/L for anthracene to 1.1 µg/L for fluoranthene. Arsenic, chromium, copper, lead, and zinc were detected in almost all of the samples, although the detections were estimated values due to the low concentrations (EMCON 1998).

During the 2001 and 2003 sampling events, GRO, DRO, HO, and BTEX constituents were not detected in the surface-water samples collected from Willow Creek or the tidal basin (MFA 2003b). PAHs and metals were not analyzed in the 2001 samples. In 2003, samples SW-1, SW-3, and SW-4 contained detectable concentrations of PAH compounds (including cPAHs) that ranged from 0.030 to 0.066 µg/L (MFA 2004b). Samples SW-3 and SW-4 contained total copper and total lead concentrations ranging from 12 to 19 µg/L; however, the dissolved copper and dissolved lead concentrations ranged up to only 1 µg/L (MFA 2004b).

One additional surface-water sampling event was conducted in 2004 to evaluate the source of the arsenic concentrations detected in 1996 at downstream sample locations SW-3 and SW-4. Using an analysis procedure to reduce interference from the brackish water in the sample, analytical results showed dissolved arsenic concentrations ranging from 1.4 to 2.1 µg/L and that the arsenic concentrations reflected upstream concentrations that flow into the area of the Site (SLR 2004b).

According to the Ecology environment education guide, Protecting Washington's waters from stormwater pollution (http://www.ecy.wa.gov/biblio/0710058.html), "most stormwater runoff carries pollution and more pollution comes from highly urbanized areas". According to Ecology report, Stormwater Quality Programs in the Puget Sound Basin (https://fortress.wa.gov/ecy/publications/publications/wqr93010.pdf), "testing of stormwater has found it to contain high concentrations of heavy metals, fecal coliform bacteria, silt, petroleum products, and nutrients". While no concentration range was mentioned in those Ecology documents, it is likely that the low PAHs, copper and lead concentrations detected in the water of Willow Creek and the tidal basin are either comparable or lower than stormwater runoff associated with urbanized areas.

3.6 Sediment

3.6.1 Willow Creek

In order to assess any potential contamination related to the operation of the former Unocal terminal and specifically the historical releases noted in Section 2.2.3, several sediment investigations as well as remedial actions were conducted at the Site and in Willow Creek, and are summarized below.

In 1996, 15 sediment samples (US-01 through US-15) were collected from Willow Creek and the tidal basin, and two sediment samples were collected from offsite control locations. Of those samples, six sediment samples (US-10 through US-15) were collected from Willow Creek adjacent to Edmonds Marsh and are considered the best indicators of possible contaminant migration from the Site to the Edmonds Marsh. The samples were submitted for conventional analyses (e.g., grain size and total organic carbon) and bioassay testing. The bioassay testing results identified effects on amphipod (*Eohaustarius estuaris*) survival, bivalve (*Mytilus edulis*) larvae survival and development, and juvenile polychaete (*Neanthes arenaceodentata*) development in sediment sample US-15, which was located where stormwater enters Edmonds Marsh from the highway (MFA 2004c).

In 2003, 16 sediment samples were again collected from locations US-1 through US-15 and one additional sample location (US-16), located between locations US-14 and US-15. These samples were analyzed using a suite of chemical analyses and bulk chemistry analyses. Results are summarized below:

- GRO and DRO concentrations were greater than LRLs in 10 samples and HO concentrations were greater than LRLs in 13 samples. The greatest GRO concentration (59.1 mg/kg) was detected near the terminal's stormwater outfall #002 (sample US-07). The highest DRO and HO concentrations (1,470 and 5,480 mg/kg, respectively) were detected in the sample collected downgradient (northwest) of the former asphalt plant (sample US-04).
- PAH compounds (including cPAHs) were detected in six samples.
- VOCs and chlorinated hydrocarbons were not detected in any of the samples (MFA 2004b).
- Polychlorinated biphenyls (PCBs) were detected at a total concentration of 0.484 mg/kg (without normalization to organic carbon content) in sample US-07, collected near stormwater outfall #002 (MFA 2004b).

- Metals (arsenic, copper, zinc, lead, chromium, mercury, and silver) were detected in all 16 samples, with the highest concentration observed in upstream sample location US-16.

Based on the analytical results in the sediment samples, bioassay toxicity testing was conducted on sediment samples from six locations (US-03 to US-05, US-07, US-12, and US-15), two of which were located in Willow Creek adjacent to Edmonds Marsh. The results of the sediment toxicity testing showed that the toxicity at two sample stations located near the Lower Yard outfalls into Willow Creek, adjacent to the OWS and DB-2 (US-05 and US-07), exceeded cleanup screening levels (CSLs). Other than the background sample (US-15), none of the sediment samples collected from Willow Creek adjacent to Edmonds Marsh exceeded CSLs. Results of the bioassay toxicity testing of the background sediment sample (US-15) again suggested there may be contribution causing toxicity in the marsh from urban source(s) such as stormwater runoff from highways and roads.

The 2007 and 2008 interim action included the removal of sediment that failed bioassay tests due to discharges at outfall locations made during facility operations (at sample locations US-05 and US-07).

In July 2012, three sediment samples were collected from Willow Creek to assess sediment toxicity conditions near 2003 sediment sampling location US-15, as described in the Final CSM (Arcadis 2013a). Chemical analytical results for the sediment samples were evaluated to identify if bioassays should be performed on the samples. This determination was made by comparing the results to the SQS (WAC 173-204-320) and CSLs. Based on an evaluation of the data, which showed that all results for the 2012 sediment samples were below the SQS (WAC 173-204-320) and CSL or lowest apparent effects threshold (LAET), Arcadis suggested that bioassay testing was not necessary.

On August 9, 2012, Ecology concurred that bioassay testing was not needed and that no further cleanup of Willow Creek is required unless Willow Creek subsequently becomes contaminated by remaining impacts at the Site (Arcadis 2013a).

Additionally, based on the information provided above, there is no evidence of impacts to Edmonds Marsh from the former operations at the Site. The data collected during two decades of environmental investigation has concluded that hazardous substances from operations of the Site have not come to rest in Edmonds Marsh and further investigation is not recommended. Sediment sample locations are presented on Figure 3-4.

3.6.2 Loading Dock and Pier

In 2000, the City of Edmonds requested technical assistance to CH2M HILL with acquisition of the former loading dock and pier owned by Unocal and described on Section 2.2.2.2. CH2M HILL conducted an environmental assessment and collected sediments at 15 stations in the vicinity of the Unocal pier. Figures showing the sediment sampling locations from the City of Edmonds Sediment Investigation – Final Report (CH2M HILL 2000) are provided in Appendix A. Sediment samples were collected from 15 stations offshore of Marina Beach Park between the shoreline and the outer harbor line and in the Department of Natural Resources lease areas. Sample stations included five near the Willow Creek drain and Edmonds Way drain located south of the Port of Edmonds breakwater and ten near the Unocal pier. The samples were analyzed for metals, SVOCs, PAHS, PCBs, and conventional parameters (ammonia, total solids, sulfides, total organic carbon and particle size). The chemical analytical results indicate that metals, PAHs, SVOCs, and PCBs were below regulatory the SQS (WAC 173-204-320), Most of the results were below the LRLs. As for metals, only chromium (up to 27.2 mg/kg), copper (up to 11.3 mg/kg), lead (up to 10 mg/kg), nickel (up to 35 mg/kg), and zinc (up to 39.5 mg/kg) were detected at concentrations greater than the LRLs. As for PAHs, only benz[a]anthracene (up to 20 micrograms per kilogram [µg/kg]), phenanthrene (up to 24 µg/kg), pyrene (up to 39 µg/kg), chrysene (up to 21 µg/kg), and fluoranthene (up to 55 µg/kg) were detected at concentrations greater than the LRLs. PCBs were not detected at concentrations greater than the LRLs. Several phthalates (dibutyl phthalate, di-N-octyl phthalate and di(2-ethylhexyl) phthalate) as well as other organic compounds (hexachlorobutadiene, hexachlorobenzene, benzoic acid, and phenol) were also detected at concentrations greater than the LRLs. Following review of the data and consultation with Ecology, CH2M HILL recommended that no further investigation or cleanup pursuant to the SMS was required.

4 CONCEPTUAL SITE MODEL

This section synthesizes the data collected during previous investigations and interim actions into a CSM of contaminant occurrence, movement, and potential exposures. The CSM is a tool used to develop CULs and remedial alternatives. The text presented in this section is also provided in the Final CSM (Arcadis 2013a).

4.1 Source Characterization

As discussed in Section 2.2, the Lower Yard was only used by Unocal for office purposes from 1991 to 2003. As discussed in Section 2.6.2, the Upper Yard was redeveloped in 2003. Therefore, there are no continuing sources of hazardous substance releases at the Site. The historical primary sources of contamination in the Lower Yard were the former asphalt plant and the former fuel storage and distribution operations (aboveground tanks and piping, truck loading racks, and railroad loading rack).

Petroleum hydrocarbons (GRO, DRO, and HO) were likely released from the former asphalt plant and fuel storage and distribution activities. Petroleum-impacted materials from offsite sources were also stockpiled and stored in the southeastern Lower Yard. Arsenic impacts were traced to the use of sandblast grit containing arsenic, used during maintenance of aboveground tanks and piping. Off-specification asphalt from the asphalt plant was likely disposed of in DB-1 (EMCON 1994).

4.2 Remaining Impacts

Extensive investigation and remediation have been conducted at the Site, as described in Sections 2.5, 2.6, and 2.7. As the result of interim action excavation activities and confirmation sampling, multiple site investigations, and groundwater monitoring activities, each area of the Lower Yard containing soil, groundwater, or sediment with COC concentrations greater than applicable CULs is fully delineated. Each area containing soil or groundwater impacts is discussed below. Locations of the Lower Yard with remaining impacts are shown on Figure 4-1 for soil and Figures 3-2 and 3-3 for groundwater and LNAPL. Figure 4-2 shows the site soil and groundwater remediation status as of second quarter 2015.

4.2.1 Soil

The soil samples containing COC concentrations exceeding site CULs and RELs are listed in Table 2-4 and shown on Figures 4-1 and 4-2.

4.2.1.1 Washington State Department of Transportation Stormwater Line

The WSDOT stormwater line runs across the Lower Yard, along lower Unoco Road, and out to Puget Sound.

During the 2007 and 2008 interim action excavation activities, impacted soil was encountered adjacent to the WSDOT stormwater line. Five soil samples collected on the excavation sidewalls adjacent to (and directly north of) the WSDOT stormwater line in the south-central portion of the site contained concentrations exceeding site CULs and/or RELs (Arcadis 2009a). These soil samples were collected at depths between 4 and 6 feet bgs, with concentrations of TPH ranging from 3,060 to 15,700 mg/kg. One of these samples also exceeded the CUL for total cPAHs TEQ, with a concentration of 0.166 mg/kg. One additional sample exceeded the CUL for total cPAHs TEQ, with a concentration of 0.159 mg/kg. Soil along the WSDOT stormwater line, including soil with CUL and REL exceedances, was unable to be excavated due to concerns about compromising the integrity of the line. Polyethylene sheeting was left in place to demarcate the excavation limits adjacent to the WSDOT stormwater line. The sheeting extends from ground surface to approximately 6 feet bgs (7.5 feet amsl) and is located along lower Unoco Road as shown on Figure 1-2 (Arcadis 2009a).

In 2008, 14 soil borings were installed along the south and southwest sides of the WSDOT stormwater line. Soil samples from five of these borings adjacent to the WSDOT stormwater line contained COC concentrations that exceeded site RELs and/or CULs. The locations of these borings are to the south and southwest of the WSDOT stormwater line, at the end of upper and lower Unoco Road, and in the area between the WSDOT stormwater line and monitoring well MW-143. Samples were collected between 4 and 8 feet bgs in this area, with TPH concentrations ranging from 3,720 to 16,900 mg/kg and total cPAH TEQ concentrations ranging from 0.165 to 1.01 mg/kg. One of these samples also exceeded the CUL for benzene, with a concentration of 35.8 mg/kg (Arcadis 2010b).

In 2012, four monitoring wells were installed adjacent to the WSDOT stormwater line. Soil samples collected during the installation of two of the monitoring wells exceeded site CULs and/or RELs at depths of 6 and 7 feet bgs, with concentrations of TPH ranging from 10,540 to 17,850 mg/kg. Soil samples collected from these wells at greater depths did not contain concentrations exceeding site CULs and/or RELs. Both of these monitoring wells were installed in an area of known remaining soil impacts that were left in place during 2007 and 2008 excavation activities and verified during 2008 site investigation activities.

Twelve sample locations in two distinct areas adjacent to the WSDOT stormwater line (to the north and south/southwest) contain soil with COC concentrations greater than site CULs and/or RELs. The depths of these remaining impacts occur between 4 and 8 feet bgs. The impacted soil is adjacent to the WSDOT stormwater line and covers an area of approximately 0.31 acre, of the 22 total acres of the Lower Yard.

4.2.1.2 Detention Basin No. 2 Area

In 2011, soil investigation activities were conducted in the unexcavated areas surrounding DB-2, including the installation of 17 soil borings and eight piezometers.

LNAPL was encountered in eight of the soil borings, located south of DB-2, along the northern-most 2007 and 2008 interim action excavation area, surrounding monitoring well MW-510, and in one location north of DB-2 and adjacent to the southwest corner of DB-1. LNAPL was encountered in these borings at depths from 7 to 12 feet bgs (Arcadis 2012a).

Soil samples containing COC concentrations exceeding site CULs and/or RELs were found in 11 of the 17 soil borings in the same areas as the LNAPL previously mentioned, on the berm separating DB-1 and DB-2, and in one location on the bank of Willow Creek at a depth of 0.5 to 1 foot bgs. The depths of these remaining impacts occur between 0.5 foot and 14 feet bgs. TPH concentrations ranged from 4,413 to

220,400 mg/kg and total cPAH TEQ concentrations ranged from 0.145 to 116 mg/kg (with a laboratory flag indicating the internal standard peak areas outside of the quality control limits).

The area surrounding DB-2, where impacted soil was encountered, covers approximately 0.43 acre of the 22 total acres of the Lower Yard. Boring locations from the DB-2 investigation area are shown on Figure 2-13.

4.2.1.3 Monitoring Well MW-129R, Southwest Lower Yard, and Southeast Lower Yard

Isolated soil samples collected from four locations exceeded site CULs and/or RELs for TPH and/or total cPAHs TEQ; these samples are summarized below and shown on Figure 4-1:

- During 2003 interim action activities, one soil sample collected from the southwest Lower Yard (sample SWLY-D-3 Wall-3.75) at a depth of 3.75 feet bgs had a TPH concentration of 2,923 mg/kg. This sample lies at the base of the slope between the Upper Yard and Lower Yard. This is an isolated exceedance surrounded by soil with no impacts observed (Figures 4-1 and 4-2). Based on the available data, this data point is statistically insignificant for further remediation based on the direct contact and soil to groundwater pathways.
- During Phase I of the 2007 and 2008 interim action, one soil sample collected from the southwest Lower Yard (sample EX-B18-VV-1-6SW) at a depth of 6 feet bgs had a TPH concentration of 4,980 mg/kg. This sample location lies on the property boundary with BNSF. This is an isolated exceedance surrounded by soil and groundwater with no impacts observed (Figures 4-1 and 4-2). Based on the available data, this data point is statistically insignificant for further remediation based on the direct contact and soil to groundwater pathways.
- During Phase II of the 2007 and 2008 interim action, one soil sample collected from the southeast Lower Yard (sample EX-B1-F-44-4) at a depth of 4 feet bgs had a total cPAH TEQ concentration of 0.212 mg/kg. This is an isolated exceedance surrounded by soil and groundwater with no impacts observed (Figures 4-1 and 4-2). Based on the available data, this data point is statistically insignificant for further remediation based on the direct contact and soil to groundwater pathways.
- During the installation of monitoring well MW-129R in 2008, one soil sample collected at a depth of 7 feet bgs contained a concentration of TPH of 3,007 mg/kg. This is an isolated exceedance surrounded by soil and groundwater with no impacts observed (Figures 4-1 and 4-2). The soil concentration observed at this location exceeds the site TPH REL by a minimal amount (235 mg/kg) and the groundwater sampled from monitoring well MW-129R has been in compliance for 13 consecutive quarters, indicating that the soil impacts observed at this location are protective of soil leaching pathway. Soil vapor sampling location VP-3 was located near MW-129R. Vapor results exceeded soil gas screening levels for benzene, naphthalene, aliphatics, and aromatics (see Table 2-6).

4.2.1.4 Point Edwards Storm Drain

During the Point Edwards storm drain line excavation in 2003, two samples (STRM-6FLOOR-7 and STRM-4WALLE(2)-3) contained concentrations of COCs greater than applicable RELs and CULs, with

TPH concentrations of 17,439 and 15,388 mg/kg, respectively; a benzene concentration of 54.9 mg/kg for STRM-6FLOOR-7, and a total cPAH TEQ concentration of 0.56 mg/kg for STRM-4WALLE(2)-3. These sample locations were not over-excavated in the 2007 and 2008 excavation due to the presence of the storm drain. These samples were collected at a depth of 7 feet bgs for the floor sample and 3 feet bgs for the wall sample. Sample locations are shown on Figure 4-1. Based on the close proximity to the WSDOT stormwater line, these samples are considered to be included within the WSDOT stormwater line area.

4.2.2 Groundwater

The 2007 IAWP concluded that drinking water is not an appropriate exposure endpoint for groundwater beneath the Lower Yard (SLR 2007, p. 5-12). Groundwater beneath the Lower Yard discharges to the surface water in Willow Creek. As a result, the 2007 IAWP established groundwater CULs based on the protection of surface water. Data collected from the interior and perimeter (property boundary) monitoring well locations are used to assess compliance.

In accordance with AO No. DE 4460, groundwater monitoring was to be conducted after the 2007 and 2008 remedial excavation activities to:

- Determine if the remaining soil concentrations will be a source of LNAPL.
- Evaluate if the remaining soil concentrations will cause an exceedance of groundwater CULs at the POCs.
- Determine if the remaining petroleum hydrocarbon concentrations in groundwater will naturally attenuate to less than the CULs at the POCs.
- Calculate the restoration timeframes to meet the groundwater CULs at the POCs.

In accordance with AO No. DE 4460 and a letter from Arcadis dated December 1, 2009 (Arcadis 2009b) requesting to modify the groundwater sampling program, groundwater sampling events were conducted at 52 compliance monitoring wells including 23 perimeters wells monitored quarterly and 29 interior wells monitored semiannually (Arcadis 2009b). Two perimeter wells (MW-529 and MW-530) and 10 interior monitoring wells (MW-126, MW-13U, MW-134X, MW-203, MW-525 through MW-528, MW-531, and MW-532) have only been sampled since June 2012.

Due to stable groundwater conditions at the Site and the locations of remaining groundwater impacts within areas of future remedial action, Arcadis (2015) proposed to temporarily cease groundwater sampling; the request was approved by Ecology (2015). Arcadis conducted a reduced monitoring event in October 2016 that included sampling 11 perimeter and 24 interior wells; the 17 wells not sampled were considered to comply with the site CULs.

Groundwater samples are collected and analyzed for TPH, benzene, and cPAHs. TPH is calculated by summing the concentrations of GRO, DRO, and HO; if concentrations do not exceed method reporting limits, one-half of the reporting limit is used to calculate TPH. The CUL for TPH in groundwater is calculated based on the relative proportions of GRO, DRO, and HO, and thus differs at each monitoring location and with each monitoring event, as described in Section 5.3.2. The site-specific CULs in groundwater are 16 μg/L for benzene and 0.05 μg/L for total cPAHs TEQ.

Most wells have met groundwater CULs for at least 13 and up to 30 consecutive quarters. Perimeter compliance monitoring wells in the southwest Lower Yard, MW-147, MW-149-R, MW-150, MW-523, and MW-524, have met groundwater CULs for at least 16 and up to 30 consecutive quarters and therefore were not sampled in 2016 in accordance with Ecology's approval. Perimeter compliance monitoring wells in the southeast Lower Yard, MW-108, MW-109, MW-129R, MW-135, MW-136, MW-500, and MW-501 have met groundwater CULs for at least 13 and up to 29 consecutive quarters and therefore were not sampled in 2016 with Ecology's approval. Interior compliance monitoring wells in the southeast Lower Yard, MW-13U, MW-134X, MW-203, MW-527, and MW-528, have met groundwater CULs for seven consecutive semiannual events and therefore were not sampled in 2016 in accordance with Ecology's approval.

4.2.2.1 Groundwater Concentration Trends

The June 2015 sampling event constituted the last and most recent groundwater monitoring event that included all 23 perimeter and 29 interior wells (Arcadis 2015b; Ecology 2015). Because the 2016 results did not include all of these wells, groundwater concentration trends are evaluated until 2015. June 2015 groundwater sampling analytical results are presented on Figure 3-2.

Dissolved concentrations of COCs in groundwater at the perimeter monitoring wells as of June 2015 are summarized below:

- Eight perimeter monitoring wells (MW-8R, MW-101, MW-108, MW-109, MW-523, MW-524, MW-529, and MW-530) have not contained concentrations of TPH greater than sample-specific CULs since monitoring began in October 2008 or their installation in June 2012. Throughout 2015, 50 of the 52 wells were in compliance with the TPH CULs. Monitoring wells MW-525 and MW-526 were the only wells that contained concentrations that exceeded CULs in June 2015, with TPH concentrations of 2,963 and 923 µg/L, respectively. Of the 13 remaining perimeter monitoring wells, 11 have met groundwater CULs for at least 13 consecutive quarters. MW-518 contained a TPH concentration of 974 µg/L in December 2013 and MW-510 contained a TPH concentration of 5,825 µg/L in September 2014; TPH was not detected at a concentration greater than the TPH CUL in MW-510 from September 2014 through June 2015.
- Benzene has not been detected at concentrations greater than the site-specific CUL in samples collected from any perimeter wells since 2009, when concentrations of 55 and 18 µg/L were detected in MW-20R and MW-510.
- cPAHs have not been detected at concentrations greater than the site-specific CUL in samples collected from any perimeter wells since December 2012 when a concentration of 0.078 µg/L was detected in MW-510. cPAH analysis conducted on samples collected from MW-104 and MW-135 exceeded the site-specific CUL because the laboratory detection limit was greater than the CUL for the 2011 and 2009 sampling events, respectively.

Dissolved COC concentrations in groundwater at the 29 interior monitoring wells as of June 2015 are summarized below:

- Fifteen of the 29 interior monitoring wells (MW-126, MW-134X, MW-13U, MW-203, MW-503, MW-505, MW-506, MW-509, MW-511, MW-519, MW-521, MW-527, MW-528, MW-531, and MW-532) have not exceeded the sample-specific TPH CUL since the beginning of the monitoring period in October 2008.

Concentrations of TPH have not exceeded the sample-specific CUL in any interior monitoring wells (except MW-525 and MW-526) for at least seven consecutive semiannual events. Monitoring well MW-525 has contained TPH concentrations exceeding the sample-specific CUL in all sampling events since its installation in June 2012, with a maximum concentration of 28,753 µg/L in December 2014. Monitoring well MW-526 has contained TPH concentrations exceeding the sample-specific CUL for five out of seven sampling events since its installation and initial sampling in June 2012 to June 2015, with a maximum concentration of 1,216 µg/L in June 2013.

- Since the beginning of the monitoring period in October 2008, benzene has been detected in only one interior monitoring well (MW-525), with a maximum concentration of 6,200 µg/L in December 2014.
- cPAHs have been detected at concentrations greater than the site-specific CUL in samples collected in only three interior monitoring wells (MW-502, MW-519, and MW-526) since the beginning of the monitoring period in October 2008. cPAH analysis conducted on samples collected from MW-502 and MW-519 exceeded the site-specific CUL because the laboratory detection limit was greater than the CUL in the samples collected during April and August 2009, respectively. Monitoring well MW-526 has contained cPAH concentrations exceeding the site-specific CUL in one of three sampling events between December 2012 and December 2014.

4.2.2.2 Light Non-Aqueous Phase Liquid

LNAPL has been effectively delineated and is present in the central Lower Yard near DB-2, near the WSDOT line and locally in the eastern portion of the central Lower Yard (see Figure 1-3 and Section 3.3). During the last events of 2015 and 2016 LNAPL was measured at:

- Monitoring well MW-525 at a thickness of 0.01 foot in June 2015. LNAPL has not been observed in MW-525 during the last event in October 2016.
- Piezometer P-12 at a thickness of 0.47 foot during the last event in October 2016.
- Piezometer P-13 at a thickness of 0.13 foot during the last event in October 2016.

Monitoring well MW-E and piezometer P-15 presented a non-measurable thickness (<0.01 foot) of LNAPL during the October 2016 monitoring event.

4.3 Fate and Transport of Contaminants

Petroleum hydrocarbons within the unsaturated vadose zone and smear zone soils can exist in four phases: residual phase (LNAPL is sorbed to soil or trapped within soil pore space), dissolved or aqueous phase (LNAPL is dissolved in water within soil pore space), vapor phase (LNAPL is volatilized into soil pore space), and free phase (recoverable LNAPL). Following a release, the petroleum hydrocarbons are driven by gravity toward the water table and, depending on the quantity released, soil type, and depth to groundwater, may reach the groundwater table. As the hydrocarbons migrate toward the water table, some residual LNAPL is left behind in each of the phases.

When residual phase, dissolved phase, or free phase LNAPL comes into contact with groundwater, dissolution of the hydrocarbons to the groundwater will occur. If a release of petroleum hydrocarbons is large enough, LNAPL will overcome the capillary forces at the capillary fringe within smear zone soil and pool on top of the groundwater.

When rainwater infiltrates subsurface soil in the area of a release, the water will flow downward through the soil and may preferentially follow high conductivity soil lenses horizontally before reaching groundwater.

LNAPL may then dissolve into groundwater, sorbs to saturated soil, or remains above the displaced capillary fringe as LNAPL. LNAPL can then migrate along the groundwater flow path above the capillary fringe, while the dissolved-phase hydrocarbons follow the groundwater flow path. General gradient direction for onsite groundwater are defined as this: groundwater beneath the southeastern, eastern, and northwestern portions of the Lower Yard flows toward Willow Creek; groundwater beneath the southwestern Lower Yard flows toward Puget Sound; and groundwater beneath the central and north-central areas flows toward DB-1. However, as explained in section 2.4.2.5., the perimeter wells are tidally influenced. At most of the observed perimeter locations during high tide, an inward flow direction near the boundary is observed. However, at that same time, groundwater gradients between perimeter and interior wells remained almost unchanged, indicating outward flow. At low tide, groundwater gradient is toward Puget Sound both within the Site and at the margins.

4.4 Potential Receptors

Potential human and ecological receptors are described below.

4.4.1 Human Receptors

The Lower Yard is currently vacant; therefore, current human receptors are limited to environmental professionals and trespassers. Potential future receptors include construction workers exposed during redevelopment activities, as well as potential residents, commercial workers, and the general public if the Site is redeveloped as a multi-modal transportation facility.

4.4.2 Ecological Receptors

The Lower Yard was a former industrial site that has been recently subject to intensive remedial activity, including excavation, backfilling, and grading. Following these activities, limited vegetation was present onsite, but in recent years native and invasive vegetation has grown on the Lower Yard. Because petroleum hydrocarbons are not expected to enter the aquatic food chain, ingestion of fish or other aquatic biota (e.g., crayfish) is not considered a complete exposure pathway.

4.5 Potential Exposures

Potential exposures are possible for human and ecological receptors.

4.5.1 Exposures to Human Receptors

Current and future exposure scenarios for human receptors are described below.

4.5.1.1 Current Exposures

Current human receptors at the Lower Yard are limited to trespassers and onsite environmental consultants, and their occasional escorted visitors. These visitors have included subcontractors, WSDOT representatives, Chevron personnel, and Ecology staff. Current human receptors may be exposed to soil via incidental ingestion, dermal contact, and inhalation of windblown dust. They may be exposed to surface water via direct contact or from eating contaminated seafood. There is no potential exposure to groundwater and exposure to soil vapor is minimal based on the current use of the Site.

The site-specific CULs and RELs established in the 2007 IAWP (SLR 2007) are based on standard Method B CULs for direct contact. The Method B CULs for direct contact are designed to protect children and assume a 16-kilogram (kg) average body weight and ingestion of an average of 200 milligrams per day (mg/day) of soil for six years. Because children are more highly exposed on a body weight basis than adults, the soil CULs and RELs are adequately protective of adult onsite environmental consultants and subcontractors. Inhalation of windblown dust is not explicitly addressed by the Method B CULs; however, the CULs are sufficiently protective of the inhalation pathway because soil exceedances are below ground and surface soil has been covered with clean backfill material. Therefore, windblown dust is considered a limited exposure pathway for the COCs.

Currently, public access to Willow Creek is not allowed and exposure to the public is limited to trespassers. Exposure to the public would be very unlikely due to the restricted access to Willow Creek; even in contact with surface water in Willow Creek, potential exposure is expected to be insignificant because COC concentrations in the creek do not exceed surface water standards. The Method B surface-water CULs established for the Site are designed to protect human receptors from eating contaminated seafood, which is considered a more significant exposure route than incidental contact. cPAHs are not considered for this scenario because they have not been detected at concentrations greater than the site-specific CUL in any perimeter wells since December 2013. Because petroleum hydrocarbons are not expected to enter the aquatic food chain, ingestion of fish or other aquatic biota (e.g., crayfish) is not considered a complete exposure pathway.

Environmental consultants and subcontractors currently working at the Site are further protected from exposures by personal protective equipment and limited exposure duration. Groundwater beneath the Lower Yard is non-potable (Arcadis 2013a; SLR 2007). Therefore, ingestion is not a potential exposure route. Similarly, direct exposure to groundwater represents an incomplete exposure pathway, unless the groundwater directly discharges to surface water. Site groundwater may discharge to the surface water of Willow Creek; however, depending on the net flow in this mixing zone, groundwater seeping into Willow Creek will be quickly mixed with other water in the creek, reducing the concentration in the discharging groundwater and further decreasing the exposure. Also, the tidal nature of Willow Creek and stormwater inputs to the creek will result in significant exchange (i.e., mixing) between discharging groundwater, tidal water, and stormwater.

Exposure to soil vapor by inhalation represents an incomplete exposure pathway due to the dilution in outdoor air.

4.5.1.2 Potential Future Exposures

If the Lower Yard is redeveloped, future human receptors at the Lower Yard could include construction workers, public, commercial workers, and residents. Future human receptors may be exposed to soil via incidental ingestion, dermal contact, and inhalation of windblown dust; to surface water via direct contact or from eating contaminated seafood; and to soil vapor by inhalation in an indoor environment or while excavating or trenching. Exposure to groundwater is an incomplete pathway unless the groundwater directly discharges to surface water. Potential future exposures are discussed below.

If the Lower Yard is redeveloped in the future, construction workers may be exposed to soil via incidental ingestion, dermal contact, and inhalation of dust for short periods while excavating, trenching, or conducting other construction activities near DB-2 and the WSDOT stormwater line. Future commercial workers and residents may be exposed to soil via incidental ingestion, dermal contact, and inhalation of dust while working in buildings onsite. However, as stated above, the site-specific CULs and RELs established in the 2007 IAWP (SLR 2007) are based on standard Method B CULs for direct contact. The Method B CULs for direct contact are designed to protect children and assume a 16 kg average body weight and ingestion of an average of 200 mg/day of soil for six years. Because children are more highly exposed on a body weight basis than adults, the soil CULs and RELs are adequately protective of adult construction workers. Also, if the Site is redeveloped, commercial workers and residents are not expected to be exposed to surface and subsurface soil because the surface will be covered by buildings and pavement. Inhalation of windblown dust is not explicitly addressed by the Method B CULs; however, the CULs are sufficiently protective of that pathway because windblown dust is considered a limited exposure pathway for the COCs.

If human receptors use Willow Creek recreationally in the future, they could come into direct contact with surface water, and they could eat fish or shellfish. As stated above, Method B surface-water CULs are designed to protect people from eating fish or shellfish. Even in contact with surface water in Willow Creek, potential exposure is expected to be insignificant because COC concentrations in the creek do not exceed surface water standards.

Direct exposure to groundwater represents an incomplete exposure pathway, unless the groundwater directly discharges to surface water. Site groundwater may discharge to the surface water of Willow Creek; but depending on the net flow in this mixing zone, groundwater seeping into Willow Creek will quickly mix with other water in the creek, reducing the concentration in the discharging groundwater and further decreasing the exposure. Measured COC concentrations in the creek do not exceed surface water standards. Also, the tidal nature of Willow Creek and stormwater inputs to the creek will result in significant exchange (i.e., mixing) between discharging groundwater, tidal water, and stormwater. Due to the Lower Yard’s proximity to Puget Sound, groundwater at the site contains salinity levels that make it unsuitable for ingestion or for use as a potable water source. Therefore, groundwater ingestion is not a potential exposure route.

If the Lower Yard is redeveloped in the future, future construction workers may be exposed to soil vapor by inhalation while excavating, trenching, or conducting other construction activities near DB-2 and the WSDOT stormwater line. Future commercial workers and residents may be exposed to soil vapor by inhalation in construction above DB-2 and the WSDOT stormwater line. Exposure to soil vapor by inhalation while outdoors represents an incomplete exposure pathway due to the dilution in outdoor air.

An exposure pathways diagram is provided on Figure 4-3. Soil RELs and CULs that have been used to date are believed to be protective for current and future exposure scenarios (Arcadis 2013b).

4.5.2 Exposures to Ecological Receptors

Ecological receptors at the Site and in the surrounding environment can be directly or indirectly exposed to remaining impacts if a complete exposure pathway exists. They may be exposed to soil, groundwater, surface water, and sediment.

Important features that must be considered when evaluating exposure pathway completeness include:

- Chemical concentrations in different media and their respective locations.
- Physical and chemical properties of the COCs.
- Locations of habitats and other environmentally sensitive areas.

As noted above, the remaining impacts at the Site are limited to subsurface soil in two discrete areas, with elevated concentrations present at greater depths. The standard POC for a terrestrial ecological evaluation (TEE) is 15 feet; however, according to WAC 173-340-7490 (4)(a), a conditional POC may be set at the biologically active soil zone. This zone is assumed to extend to a depth of six feet. Due to the shallow level of the groundwater at the Site, this alternative depth is more appropriate for the Site. Because a limited number of soil exceedances exist at the Site at depths shallower than 6 feet bgs, this pathway will be further evaluated.

At the Site, direct exposure to groundwater represents an incomplete exposure pathway, unless the groundwater directly discharges to surface water. Site groundwater may discharge to the surface water of Willow Creek; however, depending on the net flow in this mixing zone, groundwater seeping into Willow Creek will quickly mix with other water in the creek, reducing the concentration in the discharging groundwater and further decreasing the exposure. Though COC concentrations in the creek do not exceed surface water standards, this pathway will be further evaluated via the surface-water pathway.

Aquatic receptors such as fish and water column invertebrates may be directly exposed to surface water via ingestion and direct contact/uptake. Method B surface-water CULs are protective of aquatic receptors living in Willow Creek and direct contact with surface water by upper-trophic-level wildlife through ingestion is not likely to occur given the brackish nature of the stream. Also, the tidal nature of Willow Creek and stormwater inputs to the creek will result in significant exchange (i.e., mixing) between discharging groundwater, tidal water, and stormwater.

As discussed in Section 3.6, sediment analytical results from Willow Creek indicate that sediment in Willow Creek does not contain contaminants in excess of the SQS (WAC 173-204-320), and most perimeter wells directly adjacent to Willow Creek currently comply with surface-water CULs.

Exposure to surface water and soil are considered the only potentially complete pathways for ecological receptors.

An exposure pathways diagram is provided on Figure 4-3. Soil RELs and CULs that have been used to date are believed to be protective for current and future exposure scenarios (Arcadis 2013b).

5 CLEANUP STANDARDS

A cleanup standard consists of the following three elements [WAC 173-340-700(3)]:

- Cleanup Level (CUL), the concentration that must be met to protect human health and the environment.
- Point of Compliance (POC), the location where the CUL must be achieved.
- Other regulatory requirements commonly referred to as applicable or relevant and appropriate requirements that apply to a site because of the type of action or the location of the Site (Appendix B).

The cleanup standards developed for and used during former interim action work are documented in the 2007 IAWP (SLR 2007), which is provided as Exhibit B to AO No. DE 4460. The cleanup standards were re-evaluated in 2013 and are documented in the CULs and RELs Report (Arcadis 2013b). The National Recommended Water Quality Criteria (NRWQC) for marine organisms and humans ingesting organisms were updated in 2015; therefore, CULs developed in the CULs and RELs Report (Arcadis 2013b) were re-evaluated accordingly. The cleanup standards were developed using a MTCA Method B approach and include the use of RELs as part of the interim action soil removal. This section discusses IHSs, and sediment, surface water, groundwater, and soil cleanup standards.

5.1 Indicator Hazardous Substances

IHSs are the chemicals that are expected to account for most of the risks at a site, and cleanup standards must be developed for each IHS in each medium. Cleanup of IHSs is expected to result in cleanup of chemicals that pose the balance of the risks. The IHSs for sediment, surface water, groundwater, and soil were developed in accordance with WAC 173-340-703, as documented in the IAWP – Lower Yard (SLR 2007).

The 2007 IAWP (SLR 2007) identifies four IHSs in the Lower Yard based on the history and previous investigations conducted at the Site. The following IHSs for soil were developed based on direct contact and leaching pathways: TPH (sum of GRO, DRO, and HO); benzene; cPAHs; and arsenic (direct contact only).

Groundwater IHSs were developed to protect surface water and sediment in Willow Creek. Arsenic was eliminated as a groundwater/surface-water IHS because arsenic concentrations in groundwater were determined to be caused by geochemical conditions associated with naturally occurring organic carbon sources in the soil beneath the Lower Yard, and arsenic concentrations in surface-water samples collected in Willow Creek reflect background concentrations (SLR 2007).

5.1.1 Sediment

Willow Creek sediment chemistry data were compared with SQS (WAC 173-204-320) to identify IHSs for sediment. Prior to the 2007 and 2008 interim action, only total PCBs were known to be present at a concentration greater than the SQS. This exceedance was detected at one sample location (US-07), which was located near the terminal's stormwater outfall #002. Because of the possibility of a sediment to surface-water pathway, several additional chemicals or compound groups were designated as tentative IHSs (TPH, PAHs, and metals) (SLR 2007).

According to the SQS (WAC 173-204-320), sites with sediment that exceed numeric chemical criteria may go through confirmatory biological testing. In 1996 and 2003, biological testing of sediment samples was conducted at the Site to identify areas of sediment toxicity and to help delineate the extent of sediment removal. Sediment samples were collected from 15 locations (US-01 through US-15) in 1996 and 16 locations (US-01 through US-16) in 2003 in all areas of Willow Creek, including locations adjacent to Edmonds Marsh (See Figure 3-4). These samples were submitted for conventional analyses, using a suite of chemical and bulk chemistry analyses, and bioassay toxicity testing.

In 1996, the bioassay testing results identified effects on amphipod (*Eohaustarius estuaris*) survival, bivalve (*Mytilus edulis*) larvae survival and development, and juvenile polychaete (*Neanthes arenaceodentata*) development in sediment sample US-15, which was collected where stormwater enters Edmonds Marsh from the highway (MFA 2004c). In 2003, based on the analytical results in the sediment samples, bioassay toxicity testing was conducted on sediment samples from six locations (US-03 to US-05, US-07, US-12, and US-15), with two locations in Willow Creek adjacent to Edmonds Marsh. Results showed that the toxicity at two sample stations located near the Lower Yard outfalls into Willow Creek adjacent to the OWS and DB-2 (US-05 and US-07) exceeded CSLs. The sediment toxicity at the upstream (background) station adjacent to the southeast Lower Yard (US-15) prevented use of this station as a reference station for two of the three bioassay test species. Other than sample US-15, which was not impacted by inputs from the Site, none of the sediment samples collected from Willow Creek adjacent to Edmonds Marsh exceeded CSLs. Based on 2003 sediment sample data, IHSs were not identified for sediment and sediment CULs were not established for Willow Creek (SLR 2007). The 2007 and 2008 interim action included the removal of sediment that failed bioassay tests due to discharges during historical facility operations at the Lower Yard outfalls (US-05 and US-07).

Three sediment samples (US-100, US-101, and US-102) were collected from Willow Creek on July 30, 2012 to assess sediment toxicity conditions near the 1996 and 2003 sediment sampling location US-15, as described in the Final CSM (Arcadis 2013a). Chemical analytical results for the sediment samples were evaluated to identify if bioassays should be performed on the samples. This determination was made by comparing the results to the SQS (WAC 173-204-320) and CSLs. Based on an evaluation of the data, which showed that all results for the 2012 sediment samples were less than the SQS (WAC 173-204-320) and the CSL or LAET, Arcadis suggested that bioassay testing was not necessary. On August 9, 2012, Ecology concurred that bioassay testing was not needed and that no further cleanup of Willow Creek is required unless Willow Creek becomes contaminated by impacts remaining onsite (Arcadis 2013a).

5.1.2 Surface Water and Groundwater

Groundwater beneath the Site is considered non-potable. AO No. DE 4460, Exhibit B, and Section 5.4.1 discuss this determination. The endpoint for groundwater is protection of Willow Creek (a tidally influenced stream) and Puget Sound.

The endpoint for groundwater CULs is protection of surface water; therefore, a combined list of groundwater and surface-water IHSs was developed (see AO No. DE 4460, Exhibit B, §5.1). TPH, benzene, chrysene, lead, zinc, arsenic, and copper were screened as potential IHSs.

Concentrations of arsenic, copper, lead, and zinc observed in the surface water of Willow Creek were compared to screening levels and background concentrations to identify if the metals should be retained as surface-water IHSs. The samples collected in April 1996 and October 2003 did not contain dissolved copper, lead, and/or zinc concentrations greater than their screening levels. However, the arsenic concentrations in all of the October 2003 samples were greater than the screening level. Therefore, these results support the elimination of copper, lead, and zinc as surface-water IHSs and arsenic was retained for further analysis. Additional evaluation of the sampling results indicated that arsenic concentrations in the samples reflect the upstream concentrations that flow into the Site (background conditions), and that groundwater beneath the Lower Yard is not increasing arsenic concentrations in Willow Creek. On this basis, arsenic was eliminated as an IHS for surface water.

The final surface-water and groundwater IHSs are:

- TPH (sum of GRO, DRO, and HO concentrations)
- Benzene
- Total cPAHs TEQ [sum of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene concentrations that are adjusted using toxicity equivalency factors to represent a total benzo(a)pyrene concentration; the toxicity equivalency factors published in WAC 173-340-900, Table 708-2 are used to make the adjustments].

5.1.3 Soil

The 2007 IAWP (SLR 2007) identifies IHSs for the following four endpoints considered for soil: TEE, direct human contact (incidental ingestion), leaching to groundwater, and residual saturation.

For the TEE and residual saturation concentrations (Csat), GRO, DRO, HO, benzene, cPAHs, and arsenic were considered potential IHSs. Because residual saturation is relevant only to organic chemicals that are in liquid form at ambient soil temperatures, arsenic was eliminated as an IHS for residual saturation. In addition, cPAHs, which exist as needles and platelets at ambient soil temperatures, were also eliminated as IHSs for residual saturation.

The final soil IHSs for the TEE and residual saturation are:

- TPH constituents (GRO, DRO, and HO)
- Benzene
- Total cPAHs TEQ (TEE only)
- Arsenic (TEE only).

For RELs and CULs based on direct human contact and to evaluate the leaching pathway, GRO, DRO, HO, benzene (constituent with a carbon range accounted in the GRO), and cPAHs (constituent with a carbon range accounted in the DRO and HO) were considered in combination to develop one site REL for TPH. A separate soil CUL for benzene and a separate soil CUL for total cPAHs TEQ were also developed to comply with the MTCA Method B risk target for individual carcinogens (1×10^{-6}) [WAC 173-340-705(2)(c)(ii)]. Arsenic was evaluated for direct contact, but not for leaching to groundwater because arsenic is not an IHS for groundwater or surface water.

The final soil IHSs for direct contact and the leaching pathway are:

- TPH (sum of GRO, DRO, and HO concentrations)
- Benzene
- Total cPAHs TEQ
- Arsenic (direct contact only).

5.2 Sediment Cleanup Standards

Sediment cleanup was based on bioassay data, as discussed in Section 3.6. Following the 2007 and 2008 interim action, Ecology concurred that cleanup of Willow Creek is complete (Arcadis 2013a), as discussed in Section 3.5.

5.3 Surface-Water Cleanup Standards

5.3.1 Endpoints for Cleanup Levels

Method B surface-water CULs are endpoints for surface water and groundwater at the Lower Yard [WAC 173-340-730(3)(b)], as presented below:

- Washington State Water Quality Standards (WQS; WAC 173-201A) for marine water.
- NRWQC for marine organisms and humans ingesting organisms. The NRWQC for marine organisms and humans ingesting organisms were updated in 2015; therefore, CULs developed in the CULs and RELs Report (Arcadis 2013b) were re-evaluated accordingly.
- National Toxics Rule (NTR) related to human health [40 Code of Federal Regulations 131.36(c)(14)].
- For hazardous substances for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal standards, MTCA Method B equation values are used for surface water.

Willow Creek is tidally influenced and is not a source of drinking water. The CULs applicable to the Site include the WQS and NRWQC based on use for aquatic organisms and human exposure based on ingestion of aquatic organisms (SLR 2007; Arcadis 2013a), the NTR, and MTCA Method B levels for TPH.

5.3.2 Cleanup Levels

Two pathways are considered in setting groundwater CULs to protect marine surface water:

1. Protection of fish and other aquatic life
2. Protection of human health for consumption of organisms.

MTCA provides that whole effluent toxicity testing may be used to assess CULs protective of fish and aquatic life. CULs for protection of human health are set by considering fish consumption rates. For TPH mixtures, protection of human health is achieved by setting the CUL to those for groundwater whose beneficial use is drinking water [WAC 173-340-730(3)]. The TPH CUL for groundwater used as drinking water was the lowest and was set as the CUL protective of surface water, protecting both marine life and human fish consumption.

The surface-water CULs are presented in Table 5-1 and are based on the WQS (WAC 173-201A-240), NRWQC, and NTR (40 Code of Federal Regulations 131.36) and consider protection of fish and other aquatic life as well as protection of human health for consumption of organisms. The CUL has been adjusted, because it may not be set at levels below the practical quantitation limit or natural background concentration, whichever is higher [WAC 173-340-730(5)(c)].

The CULs for benzene and total cPAHs TEQ (16 to 58 µg/L and 0.00013 µg/L, respectively), are the NRWQC for human health, considering human ingestion of marine organisms. The NRWQC for marine organisms and humans ingesting organisms were updated in 2015; therefore, CULs developed in the CULs and RELs Report (Arcadis 2013b) were re-evaluated accordingly. The NRWQC for human health (organisms only) for benzene is associated with a cancer risk of 2×10^{-6}, and the NRWQC for total cPAHs TEQ is associated with a cancer risk of 6×10^{-7}. Under MTCA, standards are considered sufficiently protective if the cancer risk for those standards is less than 1×10^{-5}. The NRWQC for total cPAHs TEQ is the most stringent CUL; however, the practical quantitation limit for benzo(a)pyrene is 0.05 µg/L. Therefore, an adjustment to the CUL for benzo(a)pyrene (e.g., total cPAHs TEQ) to the practical quantitation limit is required.

The WQS and NRWQC are not established for TPH mixtures. MTCA allows the use of Method A groundwater CULs, whose beneficial use is drinking water (WAC 173-340-900, Table 720-1) to calculate surface-water CULs for TPH mixtures [WAC 173-340-730(3)(b)(iii)(C)]. This protects both marine life and human ingestion of marine organisms.

MTCA Method A CULs for TPH were derived by setting a hazard index (HI) of 1 for all three TPH constituents (DRO, GRO, and HO) and adjusting the compositions of each TPH constituent for each sample, on an individual basis. The CUL ranges from 500 to 800 µg/L, depending on the fraction composition of the sample. The CUL calculation is as follows:

Equation 1: TPH CUL = 1/(%GRO/800+%DRO/500+%HO/500)

Where:

TPH CUL = Overall CUL adjusted for HI = 1

%GRO = Sample-specific percentage of GRO in groundwater, expressed as a decimal

800 = Method A groundwater CUL for GRO (µg/L)

%DRO = Sample-specific percentage of DRO in groundwater, expressed as a decimal

500 = Method A groundwater CUL for DRO and HO (µg/L)

%HO = Sample-specific percentage of HO in groundwater, expressed as a decimal

The surface water CULs are presented in Table 5-1.

Table 5-1. Surface-Water Cleanup Levels

IHS	Surface Water Cleanup Level (µg/L)
TPH	–[1]
Benzene[2]	16
Total cPAHs TEQ[2,3]	0.05

Notes:

[1] Method A (WAC 173-340-900, Table 720-1); TPH calculated on a sample-specific basis. The CUL will fall between 500 and 800 µg/L, depending on the sample's composition.

[2] NRWQC for human-health (organisms only) (United States Environmental Protection Agency 2015). NRWQC. https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table Accessed on June 6, 2016.

[3] Total cPAHs TEQ adjusted for practical quantitation limit based on WAC 173-340-730(5)(c).

5.3.3 Surface-Water Points of Compliance

The POCs for surface water CULs are the point or points where hazardous substances are released to surface water [WAC 173-340-730(6)]. At the Site, hazardous substances are released to surface water from groundwater; thus, the POCs for surface water CULs are where groundwater discharges to surface water.

5.4 Groundwater Cleanup Standards

5.4.1 Endpoints for Cleanup Levels

Groundwater beneath the Lower Yard is considered non-potable (Arcadis 2013a; SLR 2007). As such, the endpoint for CULs is based on the groundwater to surface-water pathway. Groundwater beneath the Lower Yard is hydraulically connected to Willow Creek and Puget Sound. MTCA allows groundwater that is hydraulically connected to surface water to be classified as non-potable if the following five criteria can be met [WAC 173-340-720(2)(d)]:

1. Groundwater does not serve as a current source of drinking water.
2. Ecology concurs that it is unlikely that the hazardous substances will be transported from the contaminated groundwater to groundwater that is or could be a source of drinking water.
3. There are known or projected points of entry of the groundwater into the surface water.
4. Surface water is not classified as a suitable domestic water supply source under WAC 173-201A.

5. Groundwater is sufficiently hydraulically connected to the surface water so that it is not practicable to use the groundwater as a drinking water source.

There are no drinking water supply wells located at the Lower Yard or between the Lower Yard and Puget Sound (SLR 2007). As presented in the 2007 IAWP (SLR 2007), it is unlikely that the hazardous substances at the Lower Yard will be transported to an aquifer that could be used for drinking water (SLR 2007). Groundwater monitoring results demonstrate that the general direction of groundwater flow beneath the eastern part of the Lower Yard is toward Willow Creek, which discharges into Puget Sound, and the general direction of groundwater flow beneath the western part of the Lower Yard is toward Willow Creek and Puget Sound (Arcadis 2013a). Tidal response studies and salinity concentrations in groundwater have shown a hydraulic connection between groundwater beneath the Lower Yard and surface water in Willow Creek (directly connected to Puget Sound) (Arcadis 2013a). Therefore, groundwater beneath the Lower Yard is hydraulically connected to Willow Creek and Puget Sound, neither of which is suitable for domestic water supply.

Based upon the above, the groundwater beneath the Lower Yard is non-potable under WAC 173-340-720(2). The endpoint for groundwater is protection of surface water in Willow Creek and Puget Sound.

5.4.2 Cleanup Levels

The endpoint for groundwater is protection of surface water; therefore, the surface-water CULs presented in Section 5.3.2 establish the groundwater CULs for the Lower Yard.

5.4.3 Groundwater Point of Compliance

Current POCs are defined under to AO No. DE 4460 for interim action; the final POC will be set in a Consent Decree with Cleanup Action Plan. Based on Ecology’s letter dated May 21, 2014 (Ecology 2014a), the POC for groundwater is throughout the Lower Yard. Previously the interim POC for groundwater was established at the site perimeter, where groundwater discharges to surface water, represented by 23 groundwater monitoring wells. Previous interim actions, consisting of excavation of impacted soil in various areas of the Site, have demonstrated that groundwater CULs can be met in a reasonable restoration timeframe in all areas, and groundwater monitoring wells throughout the Site should be used for compliance monitoring (Ecology 2014a). The POC for groundwater was monitored by 52 compliance monitoring wells until 2016: 23 monitoring wells located along the downgradient (western, northwestern, northeastern, and eastern) perimeter of the Lower Yard and 29 interior monitoring wells. MW-E was added to this list early 2017 as an interior monitoring well. The Lower Yard compliance monitoring wells are listed in Table 5-2 and shown on Figure 5-1.

Table 5-2. Groundwater Compliance Monitoring Wells

Perimeter Wells	Interior Wells
LM-2	MW-13U
MW-8R	MW-126
MW-20R	MW-134X
MW-101	MW-143
MW-104	MW-203
MW-108	MW-502
MW-109	MW-503
MW-129R	MW-504
MW-135	MW-505
MW-136	MW-506
MW-139R	MW-507
MW-147	MW-508
MW-149R	MW-509
MW-150	MW-511
MW-500	MW-512
MW-501	MW-513
MW-510	MW-514
MW-518	MW-515
MW-522	MW-516
MW-523	MW-517
MW-524	MW-519
MW-529	MW-520
MW-530	MW-521
	MW-525
	MW-526
	MW-527
	MW-528
	MW-531
	MW-532
	MW-E

The POCs for groundwater are the point or points where hazardous substances are released to surface water [WAC 173-340-730(6)]. At the Site, hazardous substances may be released to surface water from groundwater; therefore, the POCs for groundwater are developed to confirm protection of surface water.

Based on Ecology's letter dated May 21, 2014 (Ecology 2014a), the POCs for groundwater are throughout the Lower Yard and are monitored by compliance monitoring wells including perimeter monitoring wells located along the downgradient (western, northwestern, northeastern, and eastern) perimeter of the Lower Yard and interior monitoring wells. The Lower Yard compliance monitoring wells are further discussed in Section 7.2.3.

5.5 Soil Cleanup Standards

Method B soil CULs are endpoints for the Lower Yard [WAC 173-340-740(3)(b)]. Six possible endpoints must be considered for soil:

1. TEE
2. Direct human contact (incidental ingestion)
3. Leaching to groundwater
4. Residual saturation
5. Inhalation of soil vapors
6. Dermal contact with soil

The soil-to-groundwater-to-surface water pathway is being assessed by empirical demonstration; therefore, the direct contact pathway becomes the most stringent pathway. Soil CULs were establish to be protective of groundwater and are therefore protective of surface water in Willow Creek. CULs protective of the direct contact/dermal contact and leaching to groundwater pathways were calculated using the revised Workbook (MTCATPH11.1 [Appendix C]) and are presented in Section 5.5.2. The remaining endpoints are discussed below. The final soil CULs and RELs, and POCs for soil are summarized in Sections 5.5.2 and 5.5.3, respectively.

5.5.1 Terrestrial Ecological Evaluation for Soil

In 2007, SLR conducted a TEE in accordance with MTCA (WAC 173-304-7490 to 173-304-7493) for the Lower Yard (SLR 2007). The 2007 TEE is included as Appendix D.

The TEE calculated ecological indicator concentrations of 5,000 mg/kg for GRO, 6,000 mg/kg for DRO, 12 mg/kg for total cPAHs TEQ [benzo(a)pyrene used as surrogate], and 132 mg/kg for arsenic in unsaturated soil [WAC 173-340-7493(2)(a)(i)]. No table values exist for HO or benzene. These ecological-based concentrations are greater than or equal to the soil CULs based on direct human contact with soil.

According to the 2007 TEE (Appendix D), institutional controls in the form of deed restrictions will be used to document that any soils exceeding the ecological indicator soil concentrations are capped, that the caps are maintained, and that if the covering are disturbed, contaminated soils are handled appropriately [WAC 173-340-7493(2)(a)(ii)]. The combination of remedial actions, planned development, and institutional controls will minimize wildlife exposure to site-related contaminants.

The 2007 TEE (Appendix D) was reviewed to identify if the information used in the evaluation required updating. This review consisted of comparing site-specific data to the TEE evaluation procedures in WAC 173-340-7490 and the TEE exclusion criteria in WAC 173-340-4791. For industrial and commercial properties, WAC 173-340-7490(3)(b) directs that potential exposure to soil contamination be evaluated in terms of terrestrial wildlife protection. An expanded scope of analysis that includes plants and soil biota is required when soil contamination is located on an area of the evaluated property where vegetation must be maintained to comply with local government land use regulations. No current or proposed local land use regulations require that a vegetated area be maintained on the Site and therefore the expanded scope of analysis is not required at this time.

The 2007 TEE was also compared to the exclusion criteria in WAC 173-340-4791(1) and (2) and considered along with information obtained from the following sources:

- Edmonds Crossing EIS (CH2M HILL 2001).
- WDFW Priority Habitat and Species database.
- Washington State Department of Natural Resources' Natural Heritage Information System.

The information obtained from the sources listed above and the rationale used to establish the ecological indicator concentrations in the 2007 TEE (Appendix D) were also re-evaluated. The ecological indicator concentrations of 5,000 mg/kg for GRO, 6,000 mg/kg for DRO, 12 mg/kg for total cPAHs TEQ [benzo(a)pyrene used as surrogate] are still relevant to the Site. However, an arsenic value of 132 mg/kg is used for Arsenic V. The CUL used for Arsenic III is 7 mg/kg. This will default to 20 mg/kg, the background value.

According to the Comp. Plan (see Section 2.1.5) dated December 2016, the master plan provides for the development of Edmonds Crossing, a multimodal transportation center, at the location of the Lower Yard. The Lower Yard qualifies for exclusion from a TEE if the future land use will cover the Lower Yard with physical barriers to prevent plants and wildlife from being exposed to contamination. An environmental covenant (EC) to maintain the conditions for exclusion from TEE as listed in the 2007 TEE would be required. The planned future use shall include a completion date that is acceptable to Ecology [WAC 173-340-7491(1)(b)].

5.5.2 Direct Human Contact Soil Pathway

Soil CULs for direct human contact were developed in accordance with MTCA Method B, WAC 173-340-740(3)(b)(iii), Equations 740-2 and 740-3, and Ecology's MTCASGL10 spreadsheet (for benzene, total cPAHs TEQ [benzo(a)pyrene equivalents], and arsenic) (SLR 2007) and Ecology's MTCATPH11.1 spreadsheet for petroleum mixtures (Appendix C). No changes were made to the default exposure assumptions in any of the equations. The option for inclusion of dermal contact was not considered for benzene, total cPAHs TEQ, or arsenic, as presented in Section 5.5.7. TPH CUL development did include consideration of dermal contact.

Based on the results of these calculations, the Lower Yard TPH CUL is 2,775 mg/kg. This CUL was calculated based on the median of the 14 fractionated samples collected during the 2003 assessment and interim action (SLR 2007). CULs for the direct contact pathway for benzene and total cPAHs TEQ are based on the MTCA Method B direct contact Equation 740-1 [WAC 173-340-740(3)(b)(iii)(B)]. The arsenic CUL is based on its natural background concentration [WAC 173-340-740-(5)(c) and Table 740-1, footnote b]. These CULs are 18 mg/kg for benzene, 0.14 mg/kg for total cPAHs TEQ, and 20 mg/kg for arsenic. The direct soil contact values are presented in Table 5-3.

Table 5-3. Soil Cleanup and Remediation Levels

IHS	Soil Cleanup Level (mg/kg)
TPH[1]	2,775
Benzene[1]	18
Total cPAHs TEQ[1,2]	0.14
Arsenic[3]	20

Notes:

[1] Proposed soil CUL based on soil direct contact pathway and proposed soil REL based on soil leaching pathway (See 5.5.4).
[2]Total cPAHs TEQ adjusted for toxicity based on WAC 173-340-708(8).
[3] Based on natural background concentrations [WAC 173-340-740(5)(c)].

5.5.3 Soil Points of Compliance

Soil IHS concentrations protective of direct contact and TEE for soil in the Lower Yard will be met within the standard soil POC, which is within 15 feet of the ground surface. Soil CULs are protective of the residual saturation pathway throughout the saturated and unsaturated zones.

5.5.4 Soil Leaching Pathway

To evaluate the leaching to groundwater pathway for TPH, the revised Workbook (MTCATPH11.1 [Appendix C]) uses the three- and four-phase partitioning models described in WAC 173-340-747 to calculate a CUL protective of potable groundwater. However, because groundwater beneath the Site is considered nonpotable, a soil CUL protective of surface-water quality is applicable. The revised Workbook (MTCATPH11.1 [Appendix C]) includes a feature that will calculate a soil CUL that is protective of surface-water quality by entering a target TPH groundwater concentration.

Using the results of the 14 fractionated samples discussed in Section 5.5.2 and a target TPH groundwater concentration of 561.3 µg/L (the average surface-water CUL at the Site calculated with Equation 1 shown in Section 5.3.2 for each TPH concentration of groundwater sampled from October 2008 to June 2014), the revised Workbook (MTCATPH11.1 [Appendix C]) calculated a median value of 100 percent LNAPL. This indicates that the TPH soil CUL exceeds the theoretical maximum TPH that would be reached if all available air space in the porous medium is filled with petroleum product. When 100 percent LNAPL is calculated as the leaching pathway CUL, the revised Workbook (MTCATPH11.1 [Appendix C]) states that “soil-to-groundwater is not a critical pathway.”

Therefore, to establish compliance with WAC 173-340-740(3)(b)(iii)(A), an empirical demonstration will be used to show that soil concentrations will not cause an exceedance of groundwater CULs. As defined under WAC 173-340-747(9), the following conditions are required for the empirical demonstration:

- The measured groundwater concentration is less than or equal to the applicable groundwater CUL established under WAC 173-340-720.
- The measured soil concentration will not cause an exceedance of the applicable groundwater CUL established under WAC 173-340-720 at any time in the future. Specifically, it must be demonstrated that a sufficient amount of time has elapsed for migration of hazardous substances from soil into groundwater to occur and that the characteristics of the Site (e.g., depth to groundwater and infiltration)

are representative of future site conditions. This demonstration may also include a measurement or calculation of the attenuating capacity of soil between the source of the hazardous substance and the groundwater table using site-specific data.

Compliance monitoring will assess whether the empirical demonstration has been successful.

5.5.5 Soil Residual Saturation

When LNAPL such as petroleum hydrocarbons is released to soil, some of the liquid will dissolve in the soil pore water, some will adsorb to the soil particles, some will vaporize in the soil pore air, and some will be held by capillary force in liquid form LNAPL in the soil pore spaces. The threshold concentration at which LNAPL becomes continuous in the soil pore space is called the Csat. At concentrations less than Csat, LNAPL exists in small, isolated blebs. The concentration at which the isolated LNAPL blebs become connected to form streamers is called residual saturation. At concentrations less than residual saturation, the isolated blebs are relatively immobile. At concentrations greater than residual saturation, the LNAPL streamers can migrate downward under the force of gravity and the LNAPL can reach groundwater if a sufficient volume is present.

The 2007 IAWP (SLR 2007) evaluates soil residual saturation, considering default residual Csat values of 1,000 mg/kg for GRO and 2,000 mg/kg for DRO from MTCA Table 747-5. Data for additional soil types indicate that residual Csat values for silt to fine sand (the predominant soil type in the unsaturated zone) can range as high as 9,643 mg/kg for GRO and 22,857 mg/kg for DRO. Residual Csat values for fine to medium sand (the predominant soil type in the saturated zone) can range as high as 5,625 mg/kg for GRO and 13,333 mg/kg for DRO. The 2007 IAWP (SLR 2007) does not use residual saturation to establish soil RELs and CULs.

An empirical demonstration may be used to show that LNAPL in soil is not impacting groundwater, if the following three criteria can be met [WAC 173-340-747(10)(c)]:

1. LNAPL is not accumulating on or in groundwater.
2. Soil contamination has been present sufficiently long for LNAPL to reach groundwater.
3. Site conditions will not change in the future to promote LNAPL migration.

LNAPL is no longer present at the Site, except in three areas located in the central Lower Yard; near DB-2, near the WSDOT line and locally in the eastern portion of the central Lower Yard (see Section 4.2.2). Because LNAPL is not present where the soil RELs were met, the soil RELs are considered protective of groundwater for the residual saturation pathway. Ongoing groundwater monitoring will continue to assess the presence or absence of LNAPL in the monitoring wells and piezometers. The direct contact TPH concentration is assumed to be less than Csat.

5.5.6 Soil Vapor Pathway

WAC 173-340-740(3)(b)(iii)(C) identifies conditions that determine if an evaluation of the soil to vapor pathway is required. These conditions include:

- For GRO, whenever the TPH concentration is significantly higher than a concentration derived for protection of groundwater for drinking water beneficial use under WAC 173-340-747(6) using the default assumptions.
- For DRO, whenever the TPH concentration is greater than 10,000 mg/kg.
- For other VOCs, including petroleum components, whenever the concentration is significantly higher than a concentration derived for protection of groundwater for drinking water beneficial use under WAC 173-340-747(4).

DRO concentrations in site soil have been detected greater than 10,000 mg/kg. Additionally, GRO and VOCs have been detected in site soil at concentrations greater than the concentrations derived for protection of groundwater for drinking water beneficial use, which (under MTCA) requires further evaluation of the soil to vapor pathway.

WAC 173-340-740(3)(c)(iv)(B) lists the methods available under MTCA to evaluate if soil CULs are protective of the indoor or ambient air. These methods include:

- Measuring site-specific soil vapor concentrations and demonstrating that they do not exceed air CULs established in WAC 173-340-750.
- Measuring ambient air concentrations and/or indoor air vapor concentrations throughout buildings, using methods approved by Ecology, demonstrating that air does not exceed CULs established under WAC 173-340-750.
- Use of modeling methods approved by Ecology to demonstrate that the air cleanup standards established under WAC 173-340-750 will not be exceeded.
- Other methods approved by Ecology demonstrating that the air cleanup standards established under WAC 173-340-750 will not be exceeded.

As discussed in Section 3.2, soil vapor sampling was conducted in 2013 to evaluate worst-case scenario vapor intrusion and to support remedial strategy decisions at the Lower Yard. Based on the results of the 2013 soil vapor sampling, it was identified that the further evaluation of the soil vapor pathway is necessary if the land use changes from its current approved use.

5.5.7 Soil Dermal Contact Pathway

Dermal contact with the IHSs must be evaluated if changes have been made to MTCA Method B direct contact equations, WAC 173-340-740, Tables 740-1 and 740-2 [WAC 173-340-740(3)(c)(iii)]. No changes were made to the equation for calculating CULs for benzene, total cPAHs TEQ, or arsenic (Equation 740-2). The dermal contact pathway is included in the equation for calculation of TPH direct contact CULs, Equation 740-3.

5.6 Summary of Soil and Groundwater Cleanup Levels

Water and soil CULs are summarized in Tables 5-1 and 5-2. The soil CULs of 2,775 mg/kg for TPH, 18 mg/kg for benzene, and 0.14 mg/kg for total cPAHs TEQ are based on direct contact. The soil CUL of 20 mg/kg for arsenic is based on the natural background concentration.

The groundwater CULs are based on protection of surface water, using a weighted average of the Method A groundwater CULs for GRO, DRO, and HO, and considering the composition of TPH in groundwater beneath the Lower Yard using Equation 1. The groundwater CULs (16 µg/L for benzene and 0.05 µg/L for total cPAHs TEQ) are based on the protection of surface water and consider the human consumption of aquatic animals. Arsenic is not an IHS for groundwater.

6 DEVELOPMENT OF REMEDIAL ALTERNATIVES

Interim actions have achieved soil and groundwater remediation levels and cleanup levels over much of the Site. Statistical analyses of soil compliance monitoring samples collected during the interim actions conducted to date are presented in Appendix E. These analyses show that the interim actions have achieved remediation levels and cleanup levels for TPH, benzene, and cPAH in the areas where the interim action have been conducted. There are only four isolated soil samples that exceed a remediation level or a cleanup level, and these are not statistically significant. The four isolated samples are described below.

- Monitoring well MW-129R with a concentration of TPH of 3,007 mg/kg less than twice than the current site REL for TPH of 2,775 mg/kg
- Excavation soil samples EX-B18-VV-1-6SW and SWLY-D-3 Wall-3.75 with TPH concentrations of 4,980 and 2,923 mg/kg, respectively less than twice than the current site REL for TPH of 2,775 mg/kg
- Excavation soil sample EX-B1-F-44-4 with a total cPAH TEQ concentration of 0.212 mg/kg less than twice than the site total cPAHs TEQ CUL of 0.14 mg/kg.

MTCA compliance assessment, WAC-173-340-740(7), requires the 95 percent upper confidence limit on the mean be less than the CUL, with less than 10 percent of the samples exceeding the CUL and no single sample exceeding twice the CUL. These four soil exceedances are isolated and less than twice than the site REL and CUL. More than 1,000 samples were collected on a 25-foot grid pattern thorough the Lower Yard (See Figure 4-2). This systematic sampling design is an unbiased approach that results in COC concentrations representative of average exposure conditions across the entire Lower Yard. Only the four exceedances described above, corresponding to less than 0.5 percent of the samples, are recorded thorough the Lower Yard out of the areas that will be further remediated (DB-2 and the area surrounding the WSDOT line). Per WAC-173-340-740(7), these four soil samples are not statistically significant (See Appendix E) and further remediation activities are not required by MTCA. In addition, the monitoring wells in the immediate vicinity of these locations show no groundwater impacts indicating that these isolated soil exceedances are protective of the soil leaching pathway.

Groundwater monitoring data are presented in progress reports submitted monthly, and groundwater monitoring will continue during the dual-phase extraction system operation.

Potential treatment technologies were developed to define the actions that may be taken, either individually or in combination, to achieve CULs where soil and groundwater contamination still exists on-site exceeding cleanup levels. As described in Section 4.2, the remaining impacts to soil and groundwater to consider for remedial treatment are limited to the following areas (Figures 4-1, 4-2, and 4-3; Table 2-4):

- *WSDOT stormwater line and Point Edwards storm drain*: Twelve sample locations in soil along the WSDOT stormwater line and two sample locations in soil along the Point Edwards storm drain contain soil with COC concentrations greater than site CULs and/or RELs. Most of these sample locations are under the construction easement placed by the WSDOT to restrict the current and/or future activities within 25 feet on each side of the WSDOT stormwater line (Figure 6-1).
- *DB-2 area*: Free-phase and/or residual LNAPL was encountered in the DB-2 area. Additionally, 11 sample locations contain soil with COC concentrations greater than site CULs and/or RELs.

The potentially applicable technologies to address remaining impacts near the WSDOT stormwater line and DB-2 area are discussed below. These technologies are consistent with WAC 173-340-350(8)(b) Screening of Alternatives and were derived from the Federal Remediation Technologies Roundtable's Remediation Technologies Screening Matrix (U.S. Army Corps of Engineers [USACE] 2002; www.frtr.gov) and the project team's professional experience. Per Ecology's request, potential remedial technologies for the Site include:

- Environmental covenant (EC)
- Groundwater MNA
- Excavation
- In-situ solidification (ISS)
- Enhanced anaerobic bio-oxidation (ABOx)
- Surfactant flushing
- Groundwater containment system using groundwater extraction wells
- Groundwater containment system using groundwater extraction trench
- LNAPL barrier trench with reactive core mat
- Funnel and gate system with in-situ remediation
- Funnel and gate system with groundwater extraction
- Soil and groundwater treatment using DPE.

Arcadis performed an initial screening of the technical implementability of each technology type to eliminate less viable technologies before performing a more rigorous screening and evaluation process. Technical implementability refers to the ability of a remedial action or process to meet a cleanup goal or level. The initial screening also eliminates those technologies or process options that are not applicable based on the site COCs and site-specific characteristics. As a result, remedial technologies that cannot be effectively implemented were eliminated from further consideration.

The potential remedial technologies and preliminary screening are described in Table 6-1.

6.1 Description of Possible Remedial Technologies

This section summarizes the remedial technologies presented in Table 6-1 that were developed and evaluated for the Lower Yard.

6.1.1 Remedial Technology 1: Environmental Covenant

An administrative control, such as an EC, may be an effective means of managing exposure to site contaminants. EC alone would not meet the minimum requirements of WAC 173-340-360, but may be used to supplement other technologies.

An EC is a type of restrictive covenant, and per WAC 173-340-440 (9) would (where required):

- Prohibit activities at the Site that may interfere with a cleanup action, operation and maintenance, monitoring, or other measures necessary to assure the integrity of the cleanup action and continued protection of human health and the environment.
- Prohibit activities that may result in the release of a hazardous substance that was contained as part of the cleanup action.
- Require notice to Ecology of the owner's intent to convey any interest in the Site. No conveyance of title, easement, lease, or other interest in the Site would be consummated by the owner without adequate and complete provision for the continued operation, maintenance, and monitoring of the cleanup action, and for continued compliance with this requirement.
- Require the owner to restrict leases to uses and activities consistent with the restrictive covenant and notify all lessees of the restrictions on the use of the Site.
- Require the owner to include in any instrument conveying any interest in any portion of the Site, notice of the restrictive covenant.
- Require notice and approval by Ecology of any proposal to use the Site in a manner that is inconsistent with the restrictive covenant. If Ecology, after public notice and comment approves the proposed change, the restrictive covenant would be amended to reflect the change.
- Grant Ecology and its designated representatives the right to enter the Site at reasonable times to evaluate compliance with the cleanup action plan and other required plans, including the right to take samples, inspect any remedial actions taken at the Site, and inspect records.

This technology does not involve the implementation of active remedial activities to remove, treat, or contain COCs at the Site and is not a stand-alone technology. Minimal long-term maintenance would be required. This remedial technology can be used to supplement the technology selected as a preferred alternative.

6.1.2 Remedial Technology 2: Groundwater Monitored Natural Attenuation

Monitored natural attenuation (MNA) is defined as the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remediation objectives within a timeframe that is reasonable compared to that offered by other, more active methods. The natural attenuation processes include a variety of physical, chemical, or biological processes that, under favorable conditions, act to reduce the mass, toxicity, mobility, volume, or concentration of COCs in groundwater. These in-situ processes include diffusion, dilution, sorption, biodegradation, volatilization, and chemical biological stabilization, transformation, or destruction of COCs. According to the technical guidance published by the Interstate Technology Regulatory Council (ITRC, 2009) and published rates of LNAPL source zone depletion measured at other sites (Sale and Zimbron, 2013), natural attenuation of LNAPL can take up to 60 years. To be conservative, a period of 60 years will therefore be considered for any natural attenuation of LNAPL source zone depletion for the Site.

The natural attenuation processes are typically occurring at all sites, but to varying degrees of effectiveness depending on the types and concentrations of contaminants present, and the physical, chemical, and biological characteristics of the soil and groundwater. Analytical and biogeochemical data indicate that natural attenuation is occurring at the Site.

This technology does not involve the implementation of active remedial activities to remove, treat, or contain COCs at the Site; natural attenuation processes would reduce chemical concentrations through time. Compliance monitoring would be performed to assess whether the natural attenuation processes are occurring at a sufficient rate to achieve compliance within an acceptable restoration timeframe

This technology is not acceptable as a stand-alone alternative because treatment would not be addressed within a reasonable timeframe. However, this technology is retained for detailed analysis for use in conjunction with other technologies in establishing remedial alternatives.

6.1.3 Remedial Technology 3: Excavation

Excavation is an effective way to meet CULs because contaminants would be physically removed from the Site. This technology has been used extensively at the Site and has been both implementable and effective at removing impacted soil and reducing dissolved-phase petroleum hydrocarbon concentrations in groundwater to below CULs.

Water ingress into the excavation must be evaluated and managed when excavation occurs beneath the groundwater table. If excavating beneath the water table with freestanding water is not feasible due to project conditions (when workers are required to enter the excavation), dewatering would be used. Dewatering is the removal of freestanding water from excavations using submersible "dewatering" pumps, centrifugal ("trash") pumps, or application of vacuum to adjacent well points. Dewatering and shoring would likely be required for excavation at the Site. Excavation can be implemented with minimal exposure of workers to soil and airborne contaminants through the use of personal protective equipment and proper health and safety planning such as the use of dust suppression measures.

This technology could be used to address free-phase and/or residual LNAPL as well as the remaining soil impact in the DB-2 area. Excavation could also be used to physically remove soil surrounding the WSDOT stormwater line; however, most of the soil-impacted locations are under the construction easement placed by the WSDOT to restrict the present /future activities within 25 feet on each side of the WSDOT stormwater line. In addition, the risk of compromising the structural integrity of the line should be evaluated when assessing this remedial technology. This technology is retained for further consideration.

6.1.4 Remedial Technology 4: In-Situ Solidification

ISS provides long-term protection of human health and the environment through physical contaminant sequestering. This technology involves mixing binding agents (typically Portland cement) into the soil. The resulting mixture of soil and binding agent encapsulates the wastes and forms a low-permeability solid. In addition to the encapsulating effect of ISS, the addition of binding agents can improve the engineering strength properties of the soil. Once the treated soil has cured, it acts as a physical barrier between the ground surface and the untreated soil beneath the treated soil. For remediation mixing depths less than 20 feet bgs, conventional backhoes and excavators are the simplest and most common method used to mix the binding agents into the soil.

This technology could be used to address remaining soil impact in DB-2 area or surrounding the WSDOT stormwater line; however, most of the soil-impacted locations in the WSDOT area are under the construction easement placed by the WSDOT to restrict the current or future activities within 25 feet on each side of the WSDOT stormwater line. In addition, the risk of compromising the structural integrity of the line should be evaluated when assessing this remedial technology. This technology is retained for further consideration.

6.1.5 Remedial Technology 5: Enhanced Anaerobic Bio-Oxidation

Engineered ABOx applications entail delivery of soluble electron acceptors other than oxygen to petroleum hydrocarbon release sites to stimulate biodegradation. A review of biogeochemical data from multiple petroleum hydrocarbon release sites demonstrates that groundwater conditions are predominantly anaerobic based on the availability of petroleum hydrocarbon impacts and background electron acceptors (e.g., nitrate, ferric iron, sulfate). In many instances, the abundance of background sulfate and favorable reaction yield (i.e., mass of petroleum hydrocarbons degraded per mass of sulfate used) allows ABOx via sulfate reduction to serve as the dominant terminal electron accepting process and can account for a majority of the natural biodegradation capacity (Wiedemeier et al. 1999).

This technology would include installation of approximately 15 injection wells with approximately 40-foot centers within the unexcavated footprint surrounding DB-2. Magnesium sulfate and sodium nitrate would be injected into the subsurface semiannually for approximately 5 years to enhance ABOx. Groundwater monitoring would be performed to evaluate changes in biogeochemical data and VOC concentrations in groundwater.

ABOx is an approach that is typically reserved for sites where dissolved-phase concentrations remain in groundwater where petroleum hydrocarbon source material has been depleted or remediated. ABOx injections would not address residual LNAPL in vadose zone soil. Additionally, injection rates may be slow based on site-specific groundwater flux calculations.

Remedial Technology 5: Enhanced ABOx was eliminated from further consideration because it does not remove or treat LNAPL and would have to be coupled with excavation to meet terms of the AO.

6.1.6 Remedial Technology 6: Surfactant Flushing

Surfactant injection and subsequent extraction has been successfully used as an alternative soil and groundwater remediation solution at LNAPL-impacted sites in recent years. Surfactant reduces surface tension between LNAPL and groundwater, creating micelles to more readily remove LNAPL with vacuum extraction. Other advantages of surfactant injection include increased biodegradation following LNAPL removal (Paria 2008). Several studies indicate a temporary increase in the solubility of LNAPL and an increased dissolution of molecules in the aqueous phase, which increases the bioavailability to microorganisms.

This technology consists of the addition of surfactants into the subsurface to enhance LNAPL recoverability and its removal. A 4 percent biosurfactant solution would be gravity fed into injection locations selected near DB-2 area. A mobile vacuum event would remove a minimum of three times the injected volume at each injection location and injected wells would be monitored to determine the frequency and extent of recurring measurable LNAPL. Two piezometers would be installed: one downgradient and one crossgradient from the estimated LNAPL boundary to monitor and address potential LNAPL migration during treatment.

Surfactant flushing was eliminated from further consideration because the technology would be difficult to implement. Injection rates would be slow based on site-specific groundwater flux calculations, causing a slow remediation timeframe. Downgradient monitoring would be difficult to implement because Willow Creek is located adjacent and downgradient (<25 feet) from the remaining LNAPL impacts. This technology would not address remaining impacts in soil and would have to be coupled with excavation to meet direct contact CULs and terms of AO No. DE 4460; therefore, this technology was eliminated from further consideration.

6.1.7 Remedial Technology 7: Groundwater Containment System Using Groundwater Extraction Wells

This technology consists of extracting contaminated groundwater through extraction wells and treating extracted groundwater at the surface using a variety of methods (e.g., OWSs, air strippers, filters, and granular activated carbon [GAC]) prior to discharge.

The groundwater extraction wells would be installed at the downgradient site boundary to contain COCs and control plume migration offsite. The system would be designed to allow for expansion. Based on preliminary flux data and groundwater modeling, approximately six wells would be installed downgradient from MW-510. Wells would be advanced to a depth of approximately 15 to 20 feet bgs (maximum historical excavation depth) at a combined average pumping rate of approximately 3 to 5 gallons per minute (gpm).

This technology is effective in controlling offsite migration of COCs and LNAPL to the adjacent surface water body. LNAPL and groundwater would be extracted and treated prior to discharge. This strategy would be coupled with MNA and ECs to meet direct contact CULs and the terms of AO No. DE 4460, and to address remaining petroleum hydrocarbon-related impacts left in place near the WSDOT stormwater line. Remedial Technology 7 is retained for further consideration.

6.1.8 Remedial Technology 8: Groundwater Containment System Using Groundwater Extraction Trench

This remedial technology is similar to Remedial Technology 7. However, for this remedial technology, a series of groundwater extraction sumps within a groundwater extraction trench with high-permeability backfill would be installed. The trench would be excavated along the northeast and northwest boundaries of DB-2 to approximately 15 feet bgs.

This technology would be effective in controlling offsite migration of COCs and LNAPL to the adjacent surface-water body. LNAPL and groundwater would be extracted and treated prior to discharge. MNA and ECs would be required to meet direct contact CULs and the terms of AO No. DE 4460, and to address remaining petroleum-related hydrocarbons in soil left in place near the WSDOT stormwater line. Remedial Technology 8 is retained for further consideration.

6.1.9 Remedial Technology 9: Light Nonaqueous Phase Liquid Barrier Trench with Reactive Core Mat

This technology includes construction of a barrier trench constructed downgradient from DB-2 to stop offsite migration of LNAPL. The LNAPL barrier trench would be constructed with a reactive core mat to essentially lock LNAPL in place and ensure that no offsite migration occurs. When LNAPL comes into contact with the reactive core mat, it eventually becomes an impenetrable barrier. The reactive core mat would allow groundwater to flow through the barrier in areas where LNAPL is not present. However, where LNAPL is present, the barrier would essentially become an impermeable wall. Several LNAPL collection sumps would be installed within the trench to passively remove LNAPL through manual bailing or pumping.

The barrier would prevent horizontal LNAPL discharge to the adjacent surface water; however, because this technology does not include source removal, LNAPL would remain in place through time. Remedial Technology 9 was eliminated from further consideration because it is does not meet compliance requirements and terms of the AO.

6.1.10 Remedial Technology 10: Funnel and Gate System with In-Situ Remediation

This technology consists of low hydraulic conductivity cutoff walls that may be constructed of sheet piling or organoclay mats with gaps that contain in-situ remediation zones where air sparge wells target the plume. The cutoff walls (the funnel) would modify flow patterns so that groundwater would flow primarily toward the higher permeability gates, where a series of sparge wells would treat the groundwater plume through volatilization and aerobic degradation. The remediated groundwater would then flow through the downgradient side of the gate. The funnel and gate system would isolate LNAPL and the dissolved-phase plume in groundwater and effectively funnel the plumes through an in-situ remediation zone.

Site-specific conditions would not allow for an adequately sized in-situ reactive zone within and downgradient from the gate. The highly weathered nature of the LNAPL onsite is not amenable to a volatilization remediation strategy leading to potential offsite migration of the LNAPL. Additionally, this technology is not adaptable to changing conditions and does not treat LNAPL within a reasonable restoration timeframe. Therefore, Remedial Technology 10 was eliminated from further consideration.

6.1.11 Remedial Technology 11: Funnel and Gate System with Groundwater Extraction

This technology would consist of permeable sorptive walls constructed with an organoclay mat. The organoclay in the permeable sorptive walls (the funnel) would adsorb LNAPL until it reaches adsorption capacity. The remediated groundwater would then flow through the downgradient side of the gate where any remaining dissolved-phase hydrocarbons or LNAPL would be extracted and treated ex-situ. The funnel and gate system would isolate LNAPL and dissolved-phase plumes in groundwater and effectively funnel the plumes toward the extraction zone.

Based on pumping test data, this technology would not likely be effective due to the limited groundwater flux across the site boundary caused by dampening tidal effects and recharge from Willow Creek. The funnel and gate with permeable sorptive walls technology was eliminated from further consideration because it would not be effective and would not remove LNAPL observed in soil near DB-2 within reasonable restoration timeframe.

6.1.12 Remedial Technology 12: Soil and Groundwater Treatment using Dual-Phase Extraction

DPE is a remedial technology that relies on mass transfer and subsequent extraction to reduce mass of residual LNAPL within vadose zone and smear zone soils in the subsurface and reduce soil concentration of petroleum. Residual LNAPL is defined as LNAPL that is occluded by the aqueous phase, occurring as immobile ganglia surrounded by aqueous phase in the pore space or as immobile, non-water-entrapped LNAPL that does not drain from the pore spaces (White 2004). Historical soil and groundwater concentrations and historical occurrence of measureable LNAPL observed prior to Lower Yard excavation activities are indicative of residual LNAPL. Mass transfer of residual LNAPL occurs to both the dissolved phase and vapor phase. However, mass transfer is highly preferential to the vapor phase due to the volatile nature of its components. Dissolved phase mass transfer is limited by the component's solubility in water. Successful DPE application relies on the ability to improve mass transfer to the vapor phase through three mechanisms:

1. Lowering the water table to expose the residual LNAPL to surrounding vapor.
2. Drawing vapor through the impacted area.
3. Removing the vapor phase from the subsurface and treating both soil vapor and groundwater ex situ.

DPE systems typically use a network of remediation wells adequately spaced to dewater the target zone through the operation of pneumatic or electric pumps. The groundwater is pumped to a remediation compound housing a groundwater treatment train that may include a settling tanks, bag filters, and GAC vessels prior to discharge. Soil vapor is collected using a regenerative or positive displacement blower sized to induce vacuum from the remediation well on surrounding soil. The vapor stream passes through a condensation knockout tank before treatment by either a catalytic oxidizer or GAC and vented to ambient air.

Implementation of this strategy would involve pilot testing, installation, and operation of a DPE system within the targeted area. A DPE system would be appropriate to remediate remaining soil impacts surrounding the WSDOT stormwater line, and would act as a groundwater intercept system ensuring that offsite migration of dissolved-phase COCs does not occur. This technology would have to be coupled with excavation in the DB-2 area to meet direct contact CULs and the terms of AO No. DE 4460. Remedial Technology 12 is retained for further consideration.

6.2 Summary of Retained Remedial Alternatives

Remedial technologies that passed initial screening were selected as remedial alternatives for further analysis under MTCA requirements. The selected six remedial alternatives include:

- Alternative 1: Excavation and MNA with ECs

- Alternative 2: Groundwater Containment System Using Groundwater Extraction Wells, and MNA with ECs
- Alternative 3: Groundwater Containment System Using Groundwater Extraction Trench, and MNA with ECs
- Alternative 4: Excavation and limited ECs
- Alternative 5: Excavation, ISS and MNA with ECs
- Alternative 6: Excavation, DPE treatment and limited ECs

These remedial alternatives are further described in Section 6.3 and are evaluated in Section 7.

6.3 Description of Retained Remedial Alternatives

The groundwater flow model used to design the six potential remedial alternatives is described in Section 6.3.1; the six potential remedial alternatives are described in Sections 6.3.2 through 6.3.7.

6.3.1 Groundwater Flow Model

Together with current and available construction and scientific accepted practices, a calibrated groundwater flow model for the Site (Appendix F) was used to design the selected six potential remediation scenarios. However, site heterogeneity required that several parameters be estimated during calculations. Therefore, to best manage the uncertainty in predicted quantities, a pilot study will be performed in a portion of the target cleanup zone to collect field data needed to complete the final design of the preferred remedy.

Internal boundary conditions such as extraction wells, high hydraulic conductivity zones, or vertical flow barriers were added to the site groundwater flow model as necessary to simulate each alternative. After the internal boundary conditions were added, the site groundwater flow model was run at steady-state conditions to estimate average flow rates and predict resulting changes in groundwater flow patterns. External boundary conditions were also modified during evaluation of the potential remedial alternatives to predict potential groundwater flow rates and patterns that may occur under high tide conditions and extreme rainfall events. High tides were simulated by raising the assigned constant head elevation by 5 feet. The extreme rainfall event incorporated both a high tide condition and a doubling of assigned recharge rates.

For hydraulic containment alternatives (i.e., Alternatives 2 and 3), the site groundwater flow model was used to estimate the extent of the capture zone resulting from hypothetical groundwater extraction. A “capture zone” is defined as the spatial area that contributes groundwater to the pumping system; in other words, a capture zone is an area of hydraulic containment. The objective of these simulations was to adjust the locations of the simulated extraction wells or interceptor trenches, and to adjust the simulated groundwater extraction rates until the shape of the predicted capture zone fully encompassed the target remediation area.

For the soil excavation area alternatives (i.e., Alternatives 1, 4, and 5), the site groundwater flow model (Appendix F) was used to estimate the construction dewatering rates that would be required during remediation.

For the DPE alternative (i.e., Alternative 6), two DPE pilot tests were performed during first quarter 2015 and the DPE Pilot Test Summary is provided in Appendix G.

6.3.2 Alternative 1: Excavation and Monitored Natural Attenuation with Environmental Covenants

Remedial Alternative 1 involves excavating remaining impacts below the water table near DB-2 from the approximate area shown on Figure 6-2 using conventional soil excavation and construction dewatering equipment. Impacted soil and LNAPL in the area of DB-2 would be excavated, removed from the Site, and transported to an appropriate waste disposal facility. Excavation in the DB-2 area was successfully implemented during previous soil excavations performed onsite; therefore, this alternative is considered practicable.

It is theoretically possible to excavate the remaining impacts near DB-1 and DB-2 using a construction dewatering strategy that would require an average pumping rate of approximately 10 gpm. High tide or short-duration rainfall events may result in the need for excavation dewatering at an average rate of 23 gpm. Extensive shoring and sheet pile installation are not required for this remedial strategy. However, it is anticipated that a Joint Aquatic Resources Permit Application and accompanying Hydraulic Project Approval through the USACE and the WDFW would be required. During excavation of soil near DB-2, Willow Creek would be coffer dammed to prevent unplanned discharges to the creek and Puget Sound. Based on the groundwater model, standard best practices for dewatering using suction pumps or submersible pumps could be used.

A MNA sampling program would be initiated following DB-2 excavation to address soil and groundwater impacts along the WSDOT stormwater line. MNA sampling would include annual sampling of dissolved phase COC data and biogeochemical data along a transect of wells. This program would be implemented until dissolved phase COC concentrations are reduced below CULs.

ECs would be used to protect human health and the environment at the Site and will:

- Cover the entire Site including the area already covered by the construction easement signed in October 1971 by the Washington State's Attorney General's Office and Unocal and shown on Figure 6-1.
- Protect against direct contact with impacted soil or groundwater remaining at the Site by including a soil management plan.
- Protect against vapor pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and require a new soil vapor assessment if the land use changed from its current approved use.
- Maintain the Site under an industrial or commercial use compatible with the purchase and sale agreement with the WSDOT.
- Specifically, address subsurface use in the impacted area adjacent to the stormwater line and help guide potential future aboveground construction activities (e.g., installation of vapor barriers, building a structure over the storm drain).
- Maintain the conditions for exclusion from TEE as listed in the 2007 TEE.

- Restrict groundwater use.
- Require long-term maintenance and/or monitoring.

This scenario is based on the following assumptions and limitations:

- The total depth of the construction dewatering system would need to be approximately 15 to 20 feet bgs.
- The intake portion of the construction dewatering system would need to extend to an elevation of approximately 0.25 foot amsl or lower (i.e., drain elevation).
- Faster dewatering rates during the initial phase of excavation may be required.
- The potential exists for pumping-induced saltwater intrusion to further degrade groundwater quality.
- The land use is the current approved use.
- MNA is based on published rates of LNAPL source zone depletion.

6.3.3 Alternative 2: Groundwater Containment System Using Groundwater Extraction Wells, and Monitored Natural Attenuation with Environmental Covenants

Remedial Alternative 2 involves hydraulic containment of remaining impacts near DB-2, as shown on Figure 6-3, using a series of six groundwater extraction wells along the downgradient property boundary northwest of DB-2 to recover and treat groundwater that contains hydrocarbon concentrations greater than the CULs. A conceptual layout of the six groundwater extraction wells and the resulting predicted capture zone are shown on Figure 6-3.

It is theoretically possible to hydraulically contain the remaining impacts near DB-1 and DB-2 using groundwater extraction wells pumping at a long-term average combined rate of approximately 3 to 5 gpm, which would include both high-tide conditions and short-duration rainfall events. The layout of the wells and the pumping footprint minimize well interference and ensure an adequate capture zone. Based on groundwater modeling, extraction wells containing pumps would be installed on approximately 40-foot centers. The theoretical groundwater pumping rate would be verified through additional pilot testing. The 3 to 5 gpm total would require a groundwater treatment system that would include an OWS, air stripper, and series of GAC vessels. These system components would be designed to handle more than 5 gpm and would operate for 24 hours per day. System controls and automatic shutoff alarms would ensure that untreated groundwater will not discharge into Willow Creek. Based on the overall pumping rates and system components, a smaller overall system treatment capacity would be required for Alternative 2 compared to Alternative 3.

Since the containment system does not directly remediate source zone LNAPL, an MNA sampling program would be initiated in conjunction with the system. MNA would address the remaining soil and groundwater impacts across the Site. MNA sampling would include annual sampling of dissolved phase COC data and biogeochemical data along a transect of wells. This program would be implemented until dissolved phase COC concentrations are reduced below CULs.

ECs would be used to protect human health and the environment at the Site and will:

- Cover the entire Site including the area already covered by the construction easement signed in October 1971 by the Washington State's Attorney General's Office and Unocal and shown on Figure 6-1.
- Protect against direct contact with impacted soil or groundwater remaining at the Site by including a soil management plan.
- Protect against vapor pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and require a new soil vapor assessment if the land use changed from its current approved use.
- Maintain the Site under an industrial or commercial use compatible with the purchase and sale agreement with the WSDOT.
- Specifically, address subsurface use in the impacted area adjacent to the stormwater line and help guide potential future aboveground construction activities (e.g., installation of vapor barriers, building a structure over the storm drain).
- Maintain the conditions for exclusion from TEE as listed in the 2007 TEE.
- Restrict groundwater use.
- Require long-term maintenance and/or monitoring.

This scenario is based on the following assumptions and limitations:

- Extraction wells would need to be installed to total depths of approximately 15 to 20 feet bgs.
- The intake portion of the extraction wells would need to extend to an elevation of approximately 0.25 foot msl or lower (i.e., drain elevation).
- Extraction wells are 100% efficient.
- The potential exists for pumping-induced saltwater intrusion to further degrade groundwater quality.
- The land use is the current approved use.
- MNA is based on published rates of LNAPL source zone depletion.

6.3.4 Alternative 3: Groundwater Containment System Using Groundwater Extraction Trench, and Monitored Natural Attenuation with Environmental Covenants

Remedial Alternative 3 involves hydraulic containment of remaining impacts near DB-2 as shown on Figure 6-4 using a groundwater interceptor trench. A conceptual layout of the groundwater interceptor trench and the resulting predicted capture zone is also shown on Figure 6-4. Alternative 3 present the same elements that Alternative 2. However, under Alternative 3; in lieu of a series of groundwater extraction wells, a groundwater interceptor trench with high-permeability backfill would be installed.

It is theoretically possible to hydraulically contain the remaining impacts near DB-1 and DB-2 using a groundwater interceptor trench pumping at a long-term average rate of approximately 4 to 7 gpm, which would include both high-tide conditions and short-duration rainfall events. The location and layout of the trench requires a higher overall extraction rate compared to the groundwater extraction system using extraction wells under Alternative 2. The layout of the trench, running along the northeast and northwest boundaries of DB-2, will minimize the likelihood of saltwater intrusion. The theoretical groundwater pumping rate would be verified through additional pilot testing using a smaller section of interceptor trench. The 4 to 7 gpm total would require a groundwater treatment system that would include an OWS, air stripper, and series of GAC vessels. These system components would be designed to handle more than 7 gpm and would operate for 24 hours per day. System controls and automatic shutoff alarms would ensure that untreated groundwater will not discharge into Willow Creek. Based on the greater volume of water to be treated from Alternative 3, system components would need to be sized to handle a larger total volume of water than for Alternative 2.

As with Alternative 2, Alternative 3 also does not directly remediate source zone LNAPL, an MNA sampling program would be initiated in conjunction with the system. MNA would address the remaining soil and groundwater impacts across the site. MNA sampling would include annual sampling of dissolved phase COC data and biogeochemical data along a transect of wells. This program would be implemented until dissolved phase COC concentrations are reduced below CULs.

ECs would be used to protect human health and the environment at the Site and will:

- Cover the entire Site including the area already covered by the construction easement signed in October 1971 by the Washington State's Attorney General's Office and Unocal and shown on Figure 6-1.
- Protect against direct contact with impacted soil or groundwater remaining at the Site by including a soil management plan.
- Protect against vapor pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and require a new soil vapor assessment if the land use changed from its current approved use.
- Maintain the Site under an industrial or commercial use compatible with the purchase and sale agreement with the WSDOT.
- Specifically, address subsurface use in the impacted area adjacent to the stormwater line and help guide potential future aboveground construction activities (e.g., installation of vapor barriers, building a structure over the storm drain).
- Maintain the conditions for exclusion from TEE as listed in the 2007 TEE.
- Restrict groundwater use.
- Require long-term maintenance and/or monitoring.

This scenario is based on the following assumptions and limitations:

- The interceptor trench would be installed to a total depth of approximately 15 to 20 feet bgs.
- The intake portion of the interceptor trench would need to extend to an elevation of approximately 0.25 foot msl or lower (i.e., drain elevation).

- The backfill of the interceptor trench would need to have a hydraulic conductivity of 1,000 feet per day.
- The potential exists for pumping-induced saltwater intrusion to further degrade groundwater quality.
- The land use is the current approved use.
- MNA is based on published rates of LNAPL source zone depletion.

6.3.5 Alternative 4: Excavation and Limited Environmental Covenant

Remedial Alternative 4 involves soil excavation in both the DB-2 and WSDOT stormwater line areas, as shown on Figure 6-5. Impacted soil in the area of DB-2 and adjacent to the WSDOT stormwater line would be excavated and disposed of at an appropriate waste disposal facility. Excavation in each of these areas is described below.

Impacted soils would be removed in the targeted areas under this alternative; therefore, it is expected that limited ECs would be implemented:

- Cover the entire Site including the area already covered by the construction easement signed in October 1971 by the Washington State's Attorney General's Office and Unocal and shown on Figure 6-1
- Protect against direct contact with impacted soil remaining at the four isolated locations described in Section 4.2.1.3 by including a soil management plan
- Protect against vapor pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and require a new soil vapor assessment if the land use changed from its current approved use
- Maintain the Site an industrial or commercial use compatible with the purchase and sale agreement with the WSDOT
- Maintain the conditions for exclusion from TEE as listed in the 2007 TEE
- Require long-term maintenance and/or monitoring.

6.3.5.1 Soil Excavation Near DB-2

Remedial Alternative 4 involves excavating remaining impacts below the water table near DB-2 from the approximate area. Implementation would be the same as Alternative 1.

6.3.5.2 Soil Excavation Adjacent to the Washington State Department of Transportation Stormwater Line

In addition to the dewatering required for excavation of DB-2, Alternative 4 would involve excavating the remaining impacts below the water table adjacent to the WSDOT stormwater line from the approximate area. To protect against the geotechnical concerns of slope stability of the land area between the Site and Point Edwards, extensive sheet piling would be used, as well as conventional soil excavation equipment, and robust construction dewatering equipment. The amount of dewatering water and the geotechnical stability could also be mitigated by performing the excavation in phases and having only shorter sections open at a time; however, this would impact the overall implementation of the excavation.

It is theoretically possible to excavate the remaining impacts adjacent to the WSDOT stormwater line using sheet pile walls and a construction dewatering strategy that would require an average pumping rate of approximately 60 gpm. High-tide or short-duration rainfall events may result in the need for excavation dewatering at an average rate of 75 gpm. During initial startup, dewatering rates may be as high as 120 to 240 gpm until a steady state is achieved. The excavation dewatering treatment system would require system components to handle a large volume of water (80,000 to 300,000 gallons per day) through a series of flocculation tanks, settling tanks, and filtration prior to discharge to either DB-1 or Willow Creek. Considering typical flocculation and settling tanks hold approximately 21,000 gallons of water, it may take up to 15 tanks to store dewatering water daily. The large volumes of water and the discharge rate of more than 75 gpm would increase the technical difficulty of excavation implementation compared to the other alternatives.

This scenario is based on the following assumptions and limitations:

- The total depth of the construction dewatering system would need to be approximately 30 feet bgs.
- The intake portion of the construction dewatering system would need to extend to an elevation of approximately -15 feet msl or lower (i.e., drain elevation).
- The excavation may encounter fill materials, beach deposits, and marsh deposits, and would terminate at the top of the Whidbey Formation.
- The hydraulic conductivity of the sheet pile walls is 0.003 foot per day.
- Faster dewatering rates during the initial phase of excavation may be required.
- The potential exists for pumping-induced saltwater intrusion to further degrade groundwater quality.
- Sheet piling of the excavation area would be required to effectively dewater the excavation area.
- The land use is the current approved use.

6.3.6 Alternative 5: Excavation, In-Situ Solidification and Monitored Natural Attenuation with Environmental Covenants

Remedial Alternative 5 would involve excavating the remaining impacts below the water table near DB-2 from the approximate area shown on Figure 6-6 using conventional soil excavation and construction dewatering equipment. Impacted soil in DB-2 would be excavated, removed from the Site, and transported to an appropriate waste disposal facility, and impacted soil near the WSDOT stormwater line would be treated using ISS.

Alternative 5 would include the same elements as Alternative 1. However, under Alternative 5, remedial action would be implemented in the WSDOT stormwater line area and would include excavation and ISS. Implementation of excavation in DB-2 area would be the same as Alternative 1. Construction of the ISS would not require extensive dewatering surrounding the WSDOT stormwater line.

With Alternative 5, some soil impacts would be left in place below the ISS treated area, an MNA sampling program would be initiated in conjunction excavation and ISS. MNA sampling would include annual sampling of dissolved phase COC data and biogeochemical data along a transect of wells. This program would be implemented until dissolved phase COC concentrations are reduced below CULs.

6.3.7 Alternative 6: Excavation, Dual-Phase Extraction Treatment and Limited Environmental Covenant

Remedial Alternative 6 would involve excavating the remaining impacts below the water table near DB-2 from the approximate area shown on Figure 6-7 using conventional soil excavation and construction dewatering equipment. Impacted soil and groundwater in the area of the WSDOT stormwater line would be remediated through implementation of a DPE system.

Impacted soils would be removed or treated in the targeted areas under this alternative; therefore, it is expected that limited ECs would be implemented:

- Cover the entire Site including the area already covered by the construction easement signed in October 1971 by the Washington State's Attorney General's Office and Unocal and shown on Figure 6-1
- Protect against direct contact with impacted soil remaining at the four isolated locations described in Section 4.2.1.3 by including a soil management plan
- Protect against vapor pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and require a new soil vapor assessment if the land use changed from its current approved use
- Maintain the Site under an industrial or commercial use compatible with the purchase and sale agreement with the WSDOT
- Maintain the conditions for exclusion from TEE as listed in the 2007 TEE
- Require long-term maintenance and/or monitoring.

6.3.7.1 Soil Excavation Near DB-2

Remedial Alternative 6 would involve excavating remaining impacts below the water table near DB-2 from the approximate area. Implementation would be the same as Alternative 1.

6.3.7.2 Dual-Phase Extraction System Adjacent to the Washington State Department of Transportation Stormwater Line

In addition to the dewatering required for excavation of DB-2, Alternative 6 would involve the use of a DPE system to remediate the remaining impacts below the water table adjacent to the WSDOT stormwater line from the approximate area.

This alternative is based on the following assumptions and limitations:

- DPE technology would lower the water table up to approximately 11 feet bgs (6 feet potentiometric drawdown) in the target treatment zone, thereby capturing and dewatering the residual LNAPL throughout a broad interval in the subsurface (i.e., smear zone).

- DPE technology would introduce atmospheric air into soil pores in the residual LNAPL zone.
- DPE technology would remove residual LNAPL through a combination of soil vapor extraction (SVE) and aerobic biodegradation.

Two DPE pilot tests were performed during first quarter 2015 near the WSDOT stormwater line. The first mobilization was completed from February 17 through 21, 2015. Based on the result of the first mobilization, a second pumping test was conducted from March 30 through April 1 to determine more specifically the appropriate extraction well depth and screen interval, as well as improve overall pumping rate estimates and account for observed subsurface heterogeneity.

Pilot test results indicate that groundwater drawdown to below the impacted soil target is feasible. Pilot test data indicate that wells installed within the 1929 fill can create a drawdown of greater than 2.2 feet at a distance of 30 feet horizontally from the pumping wells after approximately 34 hours of pumping.

Average vapor mass VOC removal rates using photo ionization detector readings and system air flow ranged from 3.1 pounds per day during DPE-3 pilot testing to 13.8 pounds per day during DPE-1 pilot testing, indicating that mass can be removed through DPE implementation.

Based on pilot test data, extraction wells would be installed on a maximum of 50-foot centers targeting a design radius of influence (ROI) of 30 feet. Wells would be spaced closer in areas of highest soil impacts. Remediation wells would be installed to approximately 19 feet bgs, with 15 feet of screen allowing for pump intakes to be adjusted to target shallow soil impacts. The treatment system would be designed to operate at a pumping rate of 3 gpm on all remediation wells, with a target pumping rate of up to 13 gpm on wells with vacuum-enhanced dewatering. Due to the high air flow rates observed (36 to 128 standard cubic feet per minute), vacuum-enhanced dewatering would be applied to a subset of four to six wells. Focusing vacuum-enhanced dewatering on a subset of wells would increase the overall operational efficiency of the proposed remediation system and improve maintenance and optimization downtime.

7 EVALUATION OF REMEDIAL ALTERNATIVES

This section evaluates the proposed remedial alternatives in the context of the requirements of MTCA defined based on WAC 173-340-360, WAC 173-340-370, and WAC 173-340-440. The six potential remedial alternatives are ranked highest (being the worst) to lowest (being the best) and scores are presented in Table 7-1.

Cleanup actions are subject to the threshold requirements set forth in WAC 173-340-360 (2)(a) and other requirements set in WAC 173-340-360 (2)(b):

- (a)(i) Protect human health and the environment and (a)(ii) Comply with cleanup standards (see Section 7.1)
- (a)(iii) Comply with applicable state and federal laws (see Section 7.2)
- (a)(iv) Provide for compliance monitoring (see Section 7.3)
- (b)(i) Use permanent solutions to the maximum extent practicable (see Section 7.4)
- (b)(ii) Provide for a reasonable restoration timeframe (see Section 7.5)
- (b)(iii) Consider public concerns (see Section 7.6)

In addition of requirement WAC 173-340-360 (2) (b)(i), WAC 173-340-440(6) states, “Requirement for primary reliance. In addition to meeting each of the minimum requirements specified in WAC 173-340-360, cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site.”

Ecology’s expectations for the development of alternatives and the selection of cleanup actions as defined in WAC 173-340-370 are also taking in consideration when evaluating the remedial alternatives (see Section 7.7).

A disproportionate cost analysis (DCA) is also made to evaluate the proposed remedial alternatives (see Section 7.8). As outlined in WAC 173-340-360(3)(e), costs are determined to be disproportionate to benefits if the incremental cost of a more expensive alternative compared to a lower cost alternative exceeds the incremental degree of benefits achieved by the more expensive alternative.

7.1 Protect Human Health and the Environment and Comply with Cleanup Standards

The alternatives are evaluated in order to protect human health and the environment through compliance with either the agreed-upon cleanup standards, or implementation of institutional controls through ECs. All six alternatives would be protective of human health and the environment; however, Alternatives 1, 2, 3, and 5 would leave remaining impacts onsite. ECs coupled with MNA would be used to protect human health and the environment at the Site, however Alternatives 4 and 6 would only have limited ECs if the land use changed from its current approved use.

7.1.1 Alternative 1: Excavation and Monitored Natural Attenuation with Environmental Covenants

In Alternative 1, impacted soil and LNAPL in the area of DB-2 would be excavated, removed from the Site, and transported to an appropriate waste disposal facility. ECs would be used to protect human health and the environment in the WSDOT stormwater line area, and long-term groundwater monitoring would be implemented as part of an MNA program.

The proposed area of excavation is shown on Figure 6-2 and includes soil around and near DB-2. It is anticipated that removal of the impacted soil would meet applicable CULs, and that removal of impacted soil and MNA would eventually remediate COC concentrations in groundwater to less than CULs. Currently MW-529, which is installed downgradient of the proposed excavation area, has demonstrated compliance with its respective groundwater CULs since its installation. Previous excavation work at the Site has demonstrated that removal of impacted soil has resulted in a decrease in dissolved-phase concentrations in the area.

ECs would be used to protect human health and the environment at the Site and will:

- Cover the entire Site including the area already covered by the construction easement signed in October 1971 by the Washington State's Attorney General's Office and Unocal and shown on Figure 6-1.
- Protect against direct contact with impacted soil or groundwater remaining at the Site by including a soil management plan.
- Protect against vapor pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and require a new soil vapor assessment if the land use changed from its current approved use.
- Maintain the Site under an industrial or commercial use compatible with the purchase and sale agreement with the WSDOT.
- Specifically, address subsurface use in the impacted area adjacent to the stormwater line and help guide potential future aboveground construction activities (e.g., installation of vapor barriers, building a structure over the storm drain).
- Maintain the conditions for exclusion from TEE as listed in the 2007 TEE.
- Restrict groundwater use.
- Require long-term maintenance and/or monitoring. The long term monitoring program will rely on natural attenuation based on published rates of LNAPL source zone depletion and include up to 60 years of MNA sampling.

The combined elements of Alternative 1 would be protective of human health and the environment; however, impacts would remain onsite.

7.1.2 Alternative 2: Groundwater Containment System Using Groundwater Extraction Wells, and Monitored Natural Attenuation with Environmental Covenants

In Alternative 2, a groundwater containment system using groundwater extraction wells would be installed along the downgradient site boundary northwest of DB-2 to recover and treat groundwater that contains hydrocarbon concentrations greater than the CULs. ECs would be used to protect human health and the environment in the DB-2 area and the WSDOT stormwater line area, and MNA would be used to comply with cleanup standards and address remaining petroleum hydrocarbon concentrations. The layout and capture zone ROI based on groundwater modeling are shown on Figure 6-3.

It is expected than groundwater would comply with the cleanup standard in the DB-2 area; however, soil impacts may remain in place above groundwater level and ECs would be necessary.

The ECs proposed in this alternative would:

- Cover the entire Site including the area already covered by the construction easement signed in October 1971 by the Washington State's Attorney General's Office and Unocal and shown on Figure 6-1.
- Protect against direct contact with impacted soil or groundwater remaining at the Site by including a soil management plan.
- Protect against vapor pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and require a new soil vapor assessment if the land use changed from its current approved use.
- Maintain the Site under an industrial or commercial use compatible with the purchase and sale agreement with the WSDOT.
- Specifically, address subsurface use in the impacted area adjacent to the stormwater line and help guide potential future aboveground construction activities (e.g., installation of vapor barriers, building a structure over the storm drain).
- Maintain the conditions for exclusion from TEE as listed in the 2007 TEE.
- Restrict groundwater use.
- Require long-term maintenance and/or monitoring. The long term monitoring program will rely on natural attenuation based on published rates of LNAPL source zone depletion and include up to 60 years of MNA sampling.

The combined elements of Alternative 2 would be protective of human health and the environment; however, impacts would remain onsite.

7.1.3 Alternative 3: Groundwater Containment System Using Groundwater Extraction Trench, and Monitored Natural Attenuation with Environmental Covenants

In Alternative 3, a groundwater containment system using a groundwater extraction trench would be installed downgradient of DB-2 and southwest of DB-1. ECs would be used to protect human health and the environment in the WSDOT stormwater line area, and MNA would be used to comply with cleanup standards and to address remaining petroleum hydrocarbon-related impacts near the WSDOT stormwater line.

Alternative 3 would include the same elements as Alternative 2. However, under Alternative 3, in lieu of a series of groundwater extraction wells a groundwater extraction trench with high-permeability backfill would be installed. The trench would be excavated downgradient from DB-2 to approximately 15 to 20 feet bgs. A series of groundwater collection sumps would be placed within the trench to extract groundwater and contain the groundwater plume onsite. Based on groundwater modeling, the trench would be installed along the northeast and northwest boundaries of DB-2 to provide an adequate capture zone encompassing DB-2. The layout and capture zone ROI based on groundwater modeling are shown on Figure 6-4.

The combined elements of Alternative 3 would be protective of human health and the environment; however, impacts would remain onsite.

7.1.4 Alternative 4: Excavation and Limited Environmental Covenant

In Alternative 4, impacted soil in the area of DB-2 and adjacent to the WSDOT stormwater line would be excavated and disposed of at an appropriate waste disposal facility.

The proposed area of excavation is shown on Figure 6-5 and includes soil around and near DB-2 and the WSDOT stormwater line. The removal of impacted soil is expected to meet applicable CULs. It is expected that the removal of impacted soil and natural attenuation would remediate COC concentrations in groundwater to less than CULs. Previous excavation work at the Site has shown that removal of impacted soil has resulted in a decrease in dissolved-phase hydrocarbon concentrations in the area. Compliance monitoring would be needed to assess if residual groundwater concentrations are less than or reduce to less than the groundwater CUL following excavation.

Impacted soils would be removed in the targeted areas under this alternative; therefore, it is expected that limited ECs would be implemented:

- Cover the entire Site including the area already covered by the construction easement signed in October 1971 by the Washington State's Attorney General's Office and Unocal and shown on Figure 6-1
- Protect against direct contact with impacted soil remaining at the four isolated locations described in Section 4.2.1.3 by including a soil management plan
- Protect against vapor pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and require a new soil vapor assessment if the land use changed from its current approved use.

- Maintain the Site under an industrial or commercial use compatible with the purchase and sale agreement with the WSDOT.
- Maintain the conditions for exclusion from TEE as listed in the 2007 TEE.
- Require long-term maintenance and/or monitoring.

Alternative 4 would be protective of human health and the environment and comply with the cleanup standard.

7.1.5 Alternative 5: Excavation and In-Situ Solidification and Monitored Natural Attenuation with Environmental Covenants

In Alternative 5, impacted soil in DB-2 would be excavated, removed from the Site, and transported to an appropriate waste disposal facility; and impacted soil near the WSDOT stormwater line would be treated using ISS.

Alternative 5 would include the same elements as Alternative 1. However, under Alternative 5, remedial action would be implemented in the WSDOT stormwater line area and would include excavation and ISS. The top 1 foot of soil above and adjacent to the stormwater line would be excavated and disposed of at an appropriate waste disposal facility. Soil from 1 foot to 5 feet bgs would be mixed with a binding agent and left in place, which would bulk approximately to the ground surface. The mixture would produce a hardened surface to prevent surface-water infiltration, close the soil leaching to groundwater pathway, and limit the soil vapor pathway in the area of the WSDOT stormwater line. Soil deeper than 5 feet bgs in this area would remain in place. Impacted soil near the WSDOT stormwater line would remain in place under an EC. MNA would be used to comply with cleanup standards and to address remaining petroleum hydrocarbon-related impacts left in place. The long term monitoring program will rely on natural attenuation based on published rates of LNAPL source zone depletion and include up to 60 years of MNA sampling.

The proposed area of excavation and layout of ISS are shown on Figure 6-6.

The combined elements of Alternative 5 would be protective of human health and the environment; however, impacts would remain onsite.

7.1.6 Alternative 6: Excavation, Dual-Phase Extraction Treatment and Limited Environmental Covenant

In Alternative 6, impacted soil and LNAPL in the area of DB-2 would be excavated, removed from the Site, and transported to an appropriate waste disposal facility. Soil and groundwater remediation through implementation of a DPE system in the area of the WSDOT stormwater line would be protective of human health and the environment through compliance with AO No. DE 4460.

The proposed area of excavation and layout of the DPE system are shown on Figure 6-7.

The DPE system installed near the WSDOT stormwater line would dewater soil, exposing residual LNAPL to induced vapor flow. The DPE system would remediate COC concentrations in soil to less than CULs and ensure that offsite migration of dissolved-phase COCs and LNAPL does not occur. Soil vapor extraction within the WSDOT stormwater line area would mitigate the soil vapor pathway.

Impacted soils would be removed in the targeted areas under this alternative; therefore, it is expected that limited ECs would be implemented:

- Cover the entire Site including the area already covered by the construction easement signed in October 1971 by the Washington State's Attorney General's Office and Unocal and shown on Figure 6-1.
- Protect against direct contact with impacted soil remaining at the four isolated locations described in Section 4.2.1.3 by including a soil management plan.
- Protect against vapor pathway by providing guidance for potential future ground construction activities (e.g., installation of vapor barriers) and require a new soil vapor assessment if the land use changed from its current approved use.
- Maintain the Site under an industrial or commercial use compatible with the purchase and sale agreement with the WSDOT.
- Maintain the conditions for exclusion from TEE as listed in the 2007 TEE.
- Require long-term maintenance and/or monitoring.

The combined elements of Alternative 6 would be protective of human health and the environment and comply with the cleanup standard.

7.2 Comply with Applicable State and Federal Laws

As discussed in Section 5, the selected RELs and CULs are consistent with MTCA. Additionally, numerous state and federal laws will apply to each proposed alternative related to environmental protection, health and safety, transportation, and disposal. Each of the proposed alternatives can be implemented in compliance with these laws.

7.3 Provide for Compliance Monitoring

All six alternatives include compliance monitoring as required by WAC 173-340-410 and 173-340-720 through 173-340-760. Compliance monitoring will consist of protection, performance, and confirmation monitoring to determine the short- and long-term safety and effectiveness of the selected alternative, as summarized below:

- Protection monitoring is used to confirm that human health and the environment are adequately protected during construction, operation, and maintenance periods. Under Alternative 6, induced vacuum and extracted vapor concentrations by the DPE system would be monitored periodically to ensure the system adequately captures soil vapor and mitigates the vapor intrusion pathway.
- Performance monitoring confirms that the cleanup action has attained cleanup standards or other performance standards, including those outlined in any permits. For each alternative, performance monitoring will include programs designed to: assess rates of natural attenuation, provide data necessary to assess whether LNAPL migration is continuing in areas with soil TPH concentrations exceeding residual saturation, and confirm that groundwater with exceedances of the CULs in the

area of the WSDOT stormwater line does not leave the Lower Yard. During excavation, performance monitoring will be needed to assess if residual groundwater concentrations are less than or reduced to less than the groundwater CUL following excavation. Under Alternative 6, performance monitoring will also assess mass removal rates in the dissolved and vapor phases.

- Confirmation monitoring verifies the long-term effectiveness of the remedial action.

In addition to meeting compliance monitoring criteria listed above, the preferred alternative will also fulfill the requirements from the second amendment to the purchase and sale agreement with the WSDOT, which includes:

- Following construction, a construction completion document will be prepared and submitted confirming that the system was constructed in accordance with Ecology-approved plans and specifications.
- If Alternative 2, 3, or 6 is implemented, following startup a methodology for calculating and performing confirmation field measurements will be provided and implemented. After 12 months of operation, or upon obtaining asymptotic mass removal rates, whichever comes earlier, the ability of the preferred remedy to achieve remediation objectives within the calculated restoration time frame will be evaluated. The evaluation will also assess whether the system's hydraulic capture zone is calculated and confirmed by field measurements to be at least as large as the targeted zone. A compliance monitoring plan will establish the soil and groundwater sampling requirements that will be needed to confirm the remediation has met the calculated CULs throughout the Site, and will document that the treated groundwater meets permit requirements.

7.4 Use Permanent Solutions to the Maximum Extent Practicable

MTCA states that when selecting an alternative, preference will be given to "permanent solutions to the maximum extent practicable." "Permanent" is defined in WAC 173-340- 200 as a cleanup action in which the cleanup standards of WAC 173-340-700 through 173-340-760 are met without requiring further action at the Site being cleaned up, or at any other site involved with the cleanup action, other than the approved disposal of any residue from the treatment of hazardous substances. Evaluating the "maximum extent practicable" for each alternative requires the application of a DCA as described in Section 7.8. In addition, WAC 173-340-440(6) states, "Requirement for primary reliance. In addition to meeting each of the minimum requirements specified in WAC 173-340-360, cleanup actions shall not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action for all or a portion of the site."

Alternatives 4 and 6 meet the definition of a permanent solution because impacts to soil and groundwater would be physically and/or biologically removed throughout the Site. Residual LNAPL in soil surrounding the WSDOT stormwater line would be removed through excavation (Alternative 4) or physical extraction, volatilization and biodegradation (Alternative 6), while soil within the DB-2 area will be permanently removed through excavation (both alternatives). Limited ECs would be put in place to protect human health and environment against any residual risks associated with the Site, especially if the land use changed from its current approved use.

Alternatives 1, 2, 3, and 5 do not meet the definition of a permanent solution because impacts to soil and groundwater would remained at the Site. Residual LNAPL in soil surrounding the WSDOT stormwater line would remained in place and would be remediated through natural attenuation processes. ECs would be put in place to protect human health and environment against any residual risks associated with the Site.

7.5 Provide for a Reasonable Restoration Timeframe

WAC 173-340-360(4) contains guidance for evaluating reasonable restoration timeframes. Preference is given for alternatives that can be implemented in a shorter period of time if other factors such as permanence and costs are equal. Relative restoration timeframes are discussed below. A precise analysis to project expected restoration timeframes for the six alternatives would require site-specific bench and/or pilot studies.

Alternative 1 would have a short restoration timeframe (1 to 3 years) in treated area (DB-2) because the removal of impacted soil would remediate COC concentrations in groundwater to less than CULs. Previous excavation work at the Site has shown that removal of impacted soil in the area of DB-2 will result in a rapid decrease of dissolved-phase COC concentrations in the area. Alternative 1 would have a long restoration timeframe (evaluated at up to 60 years based on published rates of LNAPL source zone depletion) in non-treated area (WSDOT stormwater line) because residual LNAPL in soil surrounding the WSDOT stormwater line would remained in place and would be remediated through natural attenuation processes. ECs would be put in place to protect human health and the environment against any residual risks associated with the Site.

Alternative 2 would have long restoration timeframe (15 to 20 years) in treated area because the groundwater pump and treat system may not directly address residual petroleum hydrocarbon-related soil impacts. Alternative 2 would have a long restoration timeframe (evaluated at up to 60 years based on published rates of LNAPL source zone depletion) in non-treated area (WSDOT stormwater line) because residual LNAPL in soil surrounding the WSDOT stormwater line would remained in place and would be remediated through natural attenuation processes. ECs would be put in place to protect human health and environment against any residual risks associated with the Site.

Alternative 3 would also have a long restoration timeframe (15 to 20 years) in treated area because the trench recovery system may not directly address residual petroleum hydrocarbon-related soil impacts. Alternative 3 would have a long restoration timeframe (evaluated at up to 60 years based on published rates of LNAPL source zone depletion) in non-treated area (WSDOT stormwater line) because residual LNAPL in soil surrounding the WSDOT stormwater line would remained in place and would be remediated through natural attenuation processes. ECs would be put in place to protect human health and environment against any residual risks associated with the Site.

Alternative 4 would have a short restoration timeframe (1 to 3 years) because the removal of petroleum hydrocarbon-related impacts to soil coupled with natural attenuation will remediate COC concentrations in groundwater to less than CULs. Previous excavation work at the Site has shown that removal of impacted soil has resulted in a decrease in dissolved-phase COC concentrations in the area. ECs would be put in place to protect human health and environment against any residual risks associated with the Site, especially if the land use changed from its current approved use.

Alternative 5 would have a short restoration timeframe (1 to 3 years) in treated area because the removal of impacted soil and implementation of ISS coupled with MNA would remediate COC concentrations in groundwater to less than CULs. Previous excavation work at the Site has shown that removal of impacted soil has resulted in a decrease in dissolved-phase COC concentrations in the area. Impacted soil and groundwater near the storm drain would remain in place below 5 feet bgs. Alternative 5 would have a long restoration timeframe (evaluated at up to 60 years based on published rates of LNAPL source zone depletion) in non-treated area (WSDOT stormwater line below 5 feet bgs) because residual LNAPL in soil surrounding the WSDOT stormwater line would remained in place and would be remediated through natural attenuation processes. ECs would be put in place to protect human health and the environment against any residual risks associated with the Site.

Alternative 6 would have a short restoration timeframe (5 to 6 years) because the removal or remediation through DPE system of petroleum hydrocarbon-related impacts to soil coupled with natural attenuation would remediate COC concentrations in groundwater to less than CULs. ECs would be put in place to protect human health and environment against any residual risks associated with the Site, especially if the land use changed from its current approved use.

7.6 Consider Community Concerns

Ecology and Chevron have addressed community concerns throughout this project. Ecology and Chevron will consider additional issues or concerns as part of the cleanup action selection process, per WAC 173-340-600. Public comments on the project and this Draft Final FS Report will be solicited from the community during the formal comment period, following Ecology's input. Common community concerns include noise and traffic, short- and long-term risks, and time frame for any proposed cleanup actions.

7.7 Expectations for Cleanup Action Alternatives

WAC 173-340-370 outlines Ecology's expectations for the development of alternatives and the selection of cleanup actions. Each of the expectation criteria is further described below.

7.7.1 Waste/Hazardous Substances Treatment

Ecology expects that treatment technologies will be used for sites that contain liquid wastes, areas impacted with high concentrations of hazardous substances, highly mobile materials, and/or discrete areas of hazardous substances.

For Alternatives 1, 4, 5, and 6, impacted soil and LNAPL in the DB-2 area would be excavated and removed from the Site and transported to an appropriate waste disposal facility. Alternative 4 also includes the excavation and removal of impacted soil near the WSDOT line and therefore would considerably increase the degree of removal. Alternative 6 uses a DPE system to reduce mass of petroleum in vadose zone and smear zone soils in the subsurface near the WSDOT line.

For Alternative 2, only minimal volumes of soil related to system trenching and extraction well installation would be removed from the Site. Groundwater and LNAPL collected from the pump and treat system would be sent to an onsite treatment system, where LNAPL would be recovered, stored, and eventually disposed of at an appropriate waste disposal facility. Treated groundwater would be discharged to DB-2 or Willow Creek under a NPDES permit or to a sanitary sewer under an appropriate discharge permit.

For Alternative 3, impacted soil and LNAPL excavated during trenching activities would be removed from the Site and transported to an appropriate waste disposal facility. The trench would contain five groundwater/LNAPL recovery sumps. Groundwater and LNAPL would be collected from the trench and sent to an onsite system for treatment, where LNAPL would be recovered, stored, and eventually disposed of at an appropriate waste disposal facility. Treated groundwater would be discharged to DB-2 or Willow Creek under a NPDES permit or to a sanitary sewer under the appropriate discharge permit.

Alternatives 4 and 6 best meet this expectation because the remove or treat petroleum-impacted soils in both the DB-2 vicinity and the WSDOT stormwater line area.

7.7.2 Minimization of Long-Term Management at Small Sites

Ecology expects to minimize the need for long-term management of contaminated materials at sites containing small volumes of hazardous substances by destroying, detoxifying, and/or removing these substances to concentrations less than CULs.

This expectation does not apply to the entire site, due to the large size of the Site; however, it does apply to the limited areas of high concentrations remaining onsite.

Alternatives 1, 2, 3, and 5 would leave limited areas of high COC concentrations requiring long-term management such as maintenance of institutional controls (e.g., soil vapor barrier, EC). Alternatives 4 and 6 remove petroleum from both the DB-2 vicinity and the WSDOT stormwater line area.

Alternatives 4 and 6 best meet this expectation.

7.7.3 Use of Engineering Controls at Large Sites

Per WAC 173-340-37(3), Ecology recognizes the need to use engineering controls, such as containment, for sites or portions of sites that contain large volumes of materials with relatively low levels of hazardous substances where treatment is impracticable.

Alternative 1 proposes to remove impacted soil and LNAPL through excavation near DB-2. Any recovered LNAPL would be stored and eventually disposed of at an appropriate waste disposal facility. Groundwater pumped as part of the excavation dewatering strategy would be treated onsite and disposed of under a NPDES permit to DB-2 or Willow Creek. ECs would be put in place to protect human health and the environment against any residual risks associated with the Site. Regular groundwater monitoring events under a MNA program would continue under this alternative to monitor compliance at POC wells. Engineering controls in the DB-2 area would not be necessary following excavation of DB-2 because impacted soil would be removed and site groundwater concentrations would be less than CULs. Based on available groundwater data, it appears that impacts adjacent to the WSDOT stormwater line have not affected downgradient perimeter wells; however, engineering controls may be required to address remaining impacts in the WSDOT stormwater line.

Alternative 2 proposes to use groundwater containment to control the migration of hazardous substances. Groundwater and LNAPL collected from the pump and treat system would be sent to an onsite system for treatment, where LNAPL would be recovered, stored, and eventually disposed of at an appropriate waste disposal facility. Treated groundwater would be discharged under a NPDES permit to DB-2 or Willow Creek. Regular groundwater monitoring under a MNA program would continue under this alternative to monitor compliance at POC wells. ECs would be put in place to protect human health and the environment against any residual risks associated with the Site.

Alternative 3 proposes to use groundwater containment to control the migration of hazardous substances through a groundwater collection trench. Groundwater and LNAPL would be removed from the collection trench through a series of collection sumps and sent to the onsite treatment system. Treated groundwater would be discharged to the appropriately permitted discharge location (DB-2 or Willow Creek). Regular groundwater monitoring under a MNA program would continue under this alternative to monitor compliance at POC wells. ECs would be put in place to protect human health and the environment against any residual risks associated with the Site.

Alternative 4 proposes to remove impacted soil and LNAPL through excavation near DB-2 and the WSDOT stormwater line. Groundwater pumped as part of the excavation dewatering strategy would be treated onsite and disposed of under a NPDES permit to DB-2 or Willow Creek. Following the implementation of this alternative, the need for engineering controls would be minimal. Previous excavation work at the Site has shown that removal of impacted soil has resulted in a decrease in dissolved-phase COC concentrations in the area excavated. Therefore, this alternative should meet groundwater standards at the standard POC. Regular groundwater monitoring events for an estimate of approximately 3 years would continue under this alternative to monitor compliance at POC wells.

Alternative 5 proposes to remove impacted soil and LNAPL through excavation near DB-2 and to implement ISS near the WSDOT stormwater line. Following the implementation of this alternative, engineering controls in DB-2 area would not be necessary because impacted soil would be removed and site groundwater concentrations would be less than CULs. Previous excavation work at the Site has shown that removal of impacted soil has resulted in a decrease of dissolved-phase COC concentrations in the area. ISS would minimize surface-water infiltration in the WSDOT stormwater line area, which would close the soil leaching to groundwater pathway and decrease the possibility of offsite migration. ECs would be put in place to protect human health and the environment against any residual risks associated with the Site. Based on available groundwater data, it appears that impacts adjacent to the WSDOT stormwater line have not affected downgradient perimeter wells; however, engineering controls may be required to address remaining impacts near the WSDOT stormwater line. Regular groundwater monitoring events under a MNA program would continue under this alternative to monitor compliance at POC wells.

Alternative 6 proposes to excavate impacted soil in DB-2 area and to use a DPE system to remediate soil and groundwater near the WSDOT stormwater line. Groundwater collected from the DPE system would be sent to an onsite system for treatment, and any recovered LNAPL will be stored and eventually disposed of at an appropriate waste disposal facility. Groundwater pumped as part of the excavation dewatering strategy and from the DPE system would be treated onsite and disposed of under a NPDES permit to DB-2 or Willow Creek. Regular groundwater monitoring events would continue during system operation to monitor compliance at POC wells for an estimate of approximately 6 years. Soil vapor would be extracted and treated onsite, initially using engineering controls through a catalytic oxidizer. The vapor concentrations would be destroyed by the oxidizer before being discharged to the atmosphere. Engineering controls would not be necessary following completion of DPE system operation and excavation of DB-2 because impacted soil would be removed or treated to soil concentrations below CULs and site groundwater concentrations would be less than CULs.

In its current condition, the Site does not contain large volumes of hazardous substances at low levels. Previous interim actions have remediated most of the Site to soil concentrations protective of direct contact and wildlife (See Figure 4-2). The DB-2 vicinity and WSDOT stormwater line area are two discrete areas with remaining high levels of petroleum. These areas are amenable to removal and/or treatment. ECs will be necessary to maintain the Site in industrial or commercial use or require additional assessment because the current remediation provides for an industrial or commercial use.

7.7.4 Minimize Stormwater Contamination and Offsite Migration

To minimize the potential for migration of hazardous substances, Ecology expects that active measures will be taken to prevent precipitation and subsequent runoff from coming into contact with impacted soil and waste materials. When such measures are impracticable, such as during active cleanup, Ecology expects that site runoff will be contained and treated prior to release from the Site.

For all alternatives, during excavation and construction activities, standard engineering controls and construction techniques will be applied to avoid stormwater contamination and offsite migration. This will be addressed through standard best practices for runoff control.

For Alternatives 1, 4, 5, and 6, following excavation it is expected that removal of impacted soil and LNAPL in the area of DB-2 would reduce the risk of offsite migration due to stormwater infiltration. Regular groundwater monitoring events would continue under all these alternatives.

Impacted soil adjacent to the WSDOT stormwater line would remain in place under Alternatives 1, 2, 3, and 5. Under Alternative 5, it is expected that ISS would minimize surface-water infiltration and decrease the possibility of offsite migration.

Impacted soil and groundwater adjacent to the WSDOT stormwater line would be addressed under Alternatives 4 and 6. It is expected that remedial action of impacted soil in the WSDOT stormwater line would reduce the risk of offsite migration due to stormwater infiltration, as discussed below:

- Alternative 4 would offer the highest potential of short-term risk to discharge contaminated water to surface water. If the WSDOT stormwater line were to float or split during construction, a direct conduit to Puget Sound would be available through the remaining open stormwater line, or as overland flow. The calculated dewatering volumes would require a large storage and treatment system to handle wastewater prior to discharge.
- Alternative 6 proposes to use DPE in the WSDOT stormwater line area as a strategy to prevent migration of hazardous substances. In addition to regular groundwater monitoring events, system operation and maintenance would continue under this alternative during system operation to monitor mass removal and compliance at POC wells. Critical safety devices would be in place on system components to shut down the remediation system and contain any untreated groundwater from release to surface water and the stormwater collection system if DPE system failure occurs.

Alternatives 2 and 3 propose to use groundwater containment to control the migration of hazardous substances. Groundwater and LNAPL collected from the pump and treat system would be sent to an onsite system for treatment. In the system, LNAPL would be recovered, stored, and eventually disposed of at an appropriate waste disposal facility. Treated groundwater would be discharged to DB-2 or Willow Creek. Regular groundwater monitoring events would continue under this alternative to monitor compliance at POC wells.

Alternatives 4 and 6 best minimize the long-term potential for migration of hazardous substances since they remove the most hazardous substances from both the DB-2 vicinity and the WSDOT stormwater line area. Alternative 4 has more potential for hazardous substance migration during active cleanup.

7.7.5 Minimize Direct Contact and Migration by Consolidating Hazardous Substances

If hazardous substances remain onsite at concentrations that exceed CULs, Ecology expects that those hazardous substances will be consolidated to the maximum extent practicable where needed to minimize the potential for direct contact and migration of hazardous substances (Ecology 2007).

Large volumes of impacted soil, product, and groundwater have been removed through prior interim actions. Additional soil, product, and groundwater will be removed as part of all remedial alternatives.

Under Alternatives 1 and 5, remaining impacted soil would be limited to an area adjacent to the WSDOT stormwater line; therefore, consolidation would not be necessary. ECs would be put in place to minimize the potential for direct contact in case future earthwork activities occur in this area.

Under Alternatives 2 and 3, impacted soil would remain in the areas of DB-2 and the WSDOT stormwater line. However, groundwater containment would be used to control offsite migration; therefore, consolidation would not be necessary. Groundwater would be collected and treated onsite. ECs would be put in place to minimize the potential for direct contact in case future earthwork activities occur in these areas.

Under Alternatives 4 and 6, all impacted soil would be removed or treated in situ from the area of DB-2 and the WSDOT stormwater line; therefore, consolidation would not be necessary.

7.7.6 Avoid Surface-Water Contamination through Control of Runoff and Control of Groundwater Discharge or Migration

For facilities located adjacent to a surface-water body, Ecology expects that active measures will be taken to prevent or minimize releases to surface water via surface runoff and groundwater discharges in excess of CULs. Ecology expects that dilution will not be the sole method for demonstrating compliance with cleanup standards in these instances (Appendix C).

All the alternatives protect against surface-water contamination through the control of runoff because IHSs are generally not present at the surface of the Site. Surface-water runoff is further controlled by the stormwater infrastructure and DB-1 and DB-2.

Under Alternatives 1 and 5, releases to surface water through groundwater discharge would not be expected because removal of impacted soil and LNAPL in the area of DB-2, along with MNA, would decrease dissolved-phase COC concentrations and eliminate the soil to groundwater leaching pathway. Based on available groundwater data, it appears that impacts adjacent to the WSDOT stormwater line have not affected downgradient perimeter monitoring wells where groundwater discharges to surface water. However, in case groundwater conditions change in the future, additional measures may be required to avoid stormwater contamination and offsite migration. Regular groundwater monitoring events would continue under this alternative to monitor compliance at POC wells.

Under Alternatives 2 and 3, groundwater containment would be used to control offsite groundwater migration to surface water. Regular groundwater monitoring events would continue under this alternative to monitor compliance at POC wells. Groundwater would be treated with the onsite remediation system prior to discharge to the stormwater system under a NPDES permit, or to the sanitary sewer under appropriate Ecology permits.

Under Alternative 4, releases to surface water through groundwater discharge would not be expected because removal of impacted soil and LNAPL in the area of DB-2 and adjacent to the WSDOT stormwater line, along with natural attenuation, would decrease dissolved-phase COC concentrations and eliminate the soil to groundwater leaching pathway. Regular groundwater monitoring events would continue under this alternative to monitor compliance at POC wells.

Alternative 6 would control groundwater discharge through containment of groundwater only in the area where the threat exists for groundwater with COC concentrations greater than CULs to leave the Lower Yard. Groundwater modeling shows that at the designed pumping rate of 21 gpm from the DPE system, groundwater flow paths would be directed toward the remediation system pumping wells, containing all off-site migration. Regular groundwater monitoring events would continue under this alternative to monitor compliance at POC wells.

Alternatives 4 and 6 best meet this expectation in the long-term because they remove contaminated soil from the Site so it cannot be brought to the surface by construction, and potentially impact surface water at a later date.

7.7.7 Use of Natural Attenuation

Ecology expects that natural attenuation of hazardous substances may be appropriate at sites where:

- Source control has been conducted to the maximum extent practicable.
- Impacts that remain onsite during the restoration timeframe do not pose an unacceptable threat to human health or the environment.
- Site data show that natural biodegradation or chemical degradation is occurring and will continue to occur at a reasonable rate at the Site.
- Appropriate monitoring requirements are conducted to ensure that the natural attenuation process is taking place and that human health and the environment are protected.

Analytical and biogeochemical data indicate that natural attenuation is occurring at the Site and the remediation time frame is estimated at up to 60 years based on technical guidance published by the ITRC (ITRC, 2009) and published rates of NAPL source zone depletion measured at other sites (Sale and Zimbron, 2013).

An MNA approach alone is not an appropriate technology for the Site; however, natural attenuation is a component of all of the alternatives. Regular groundwater monitoring events would continue under each alternative and would be designed to asses if natural attenuation is happening at the Site throughout the remedial action period.

7.8 Disproportionate Cost Analysis

The DCA involves comparing the costs and benefits of alternatives and selecting the alternative with incremental costs that are not disproportionate to the incremental benefits. As outlined in WAC 173-340-360(3)(e), costs are determined to be disproportionate to benefits if the incremental cost of a more expensive alternative compared to a lower cost alternative exceeds the incremental degree of benefits achieved by the more expensive alternative.

The evaluation criteria for the DCA are specified in WAC 173-340-360(3)(f) and include:

- Protectiveness (Section 7.8.1)
- Permanence (Section 7.8.2)
- Cost (Section 7.8.3)
- Long-term effectiveness (Section 7.8.4)
- Management of short-term risks (Section 7.8.5)
- Technical and administrative implement ability (Section 7.8.6)
- Consideration of public concerns (Section 7.8.7).

Table 7-1 summarizes the comparative analysis. Each alternative was given a relative rating between 1 and 5 (1 is highest, 5 is lowest). A DCA preliminary summary is provided in Section 7.8.8. The alternative that ranked highest after this first analysis is further evaluated in Section 7.9 using the rankings assigned by Ecology. Per WAC 173 340 360(3)(e), the best ranked alternative was compared to the most permanent alternative (Alternative 4), which was selected by Ecology as the most permanent remedy of the alternatives presented, and hence the baseline to which the other alternatives are compared in the DCA. (Ecology 2014b).

7.8.1 Protectiveness

MTCA describes protectiveness as the overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, onsite and offsite risks resulting from implementing the alternative, and improvement of the overall environmental quality.

With proper implementation, all six alternatives are adequately protective of human health and the environment during implementation and after the remedial action has been completed. However, Alternatives 1, 2, 3, and 5 would leave impacts onsite, requiring long-term institutional controls, have much longer restoration time frames, and less certainty about achieving cleanup standards in the WSDOT stormwater line area.

Due to the excavation of soil containing concentrations greater than CULs, Alternatives 1, 4, 5, and 6 are more protective than Alternatives 2 and 3, which leave impacted soil in place in the DB-2 area. Due to the extent of remedial action, Alternatives 4 and 6 are more protective than Alternatives 1,2, 3, and 5. Alternative 5 ranks higher than Alternative 1 because the leaching to groundwater pathway and soil vapor pathway would either be eliminated or reduced. Due to the extent of the groundwater containment through a continuous trench rather than wells at point locations, Alternative 3 is more protective than Alternative 2.

It is expected that Alternatives 4 and 6 will reach groundwater CULs at the compliance wells listed in Table 5-2 through removal of impacted soil and, in the case of Alternative 6, treatment in the WSDOT stormwater line area. Alternatives 1, 2, 3, and 5 are unlikely to achieve groundwater CULs in a reasonable restoration time frame in the WSDOT stormwater line area.

Based on the degree of protectiveness, the following alternatives are ranked from highest to lowest:

- *Highest.* Alternatives 4 and 6 are the most protective alternatives based on the complete remediation of impacted soil and groundwater with COC concentrations greater than CULs. Only limited ECs would be required.
- *Medium.* Alternatives 5 and 1 are less protective than Alternatives 4 and 6 because soil and groundwater with COC concentrations greater than CULs would remain in place in the WSDOT stormwater line area. ECs would be required for any soil or groundwater left in place with COC concentrations greater than CULs.
- *Lowest.* Alternatives 2 and 3 are the least protective because onsite dissolved-phase groundwater COC concentrations, soil COC concentrations, and potentially nonmobile LNAPL may remain in place. ECs would be required for any soil or groundwater left in place with COC concentrations greater than CULs.

7.8.2 Permanence

According to WAC 173-340-360(3)(f)(ii), permanence refers to the degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, reduction or elimination of hazardous substance releases and sources of releases, degree of irreversibility of waste treatment process, and characteristics and quantity of treatment residuals generated.

Alternatives involving excavation provide the greatest degree of permanence, with the removal of impacted soil and LNAPL from the Site. Due to the extent of remedial action, Alternative 4 and 6 are more protective than Alternatives 1 and 5. Because Alternative 4 removes the greatest quantity of impacted soil, it is expected to have the shortest remediation duration. Alternative 5 ranks equally with Alternative 1 because both alternatives leave impacted soil in place in the WSDOT stormwater line area.

Alternatives 2 and 3 only address potentially mobile LNAPL from groundwater in the DB-2 area. It is expected that groundwater compliance will be met through groundwater treatment and MNA in the DB-2 area; however, impacted soil may remain in place in the vadose zone. Due to the extent of the groundwater containment through a continuous trench rather than wells as well as a larger groundwater capture zone, Alternative 3 has a higher degree of removal than Alternative 2 and therefore is ranked higher than Alternative 2. Both alternatives leave impacted soil in place in the WSDOT stormwater line area.

Based on the degree of permanence, the following alternatives are ranked from highest to lowest:

- *Highest*. Alternatives 4 and 6 are the most permanent alternatives based on the complete removal or treatment of soil with COC concentrations greater than CULs. Only limited ECs would be required.
- *Medium*. Alternatives 5 and 1 are less permanent alternatives because soil and groundwater with COC concentrations greater than CULs would remain in place in the WSDOT stormwater line area. ECs would be required for any soil or groundwater left in place with COC concentrations greater than CULs.
- *Lowest*. Alternatives 3 and 2 are the least permanent because onsite dissolved-phase groundwater COC concentrations, soil COC concentrations, and potentially nonmobile LNAPL would remain in place. Protectiveness would be addressed through ECs.

7.8.3 Cost

Cost refers to the cost of implementing the alternative, including construction, net present value of any long-term costs, and agency oversight costs that are cost recoverable. Long-term costs include operation and maintenance, monitoring, equipment replacement costs, and the cost of maintaining institutional controls.

Order of magnitude costs were developed for all six alternatives. The significant assumptions made to develop the cost estimates for the six alternatives are discussed below. For all alternatives involving disposal of water from excavations, dewatering, or treatment it is assumed that disposal can be accomplished by treatment and discharge to Willow Creek under an NPDES permit. Since Alternatives 1, 2, 3, and 5 would leave impacts in the WSDOT stormwater line area, long-term monitoring of 60 years (based on natural attenuation of NAPL source zone) was accounted in the remediation cost of each of these Alternatives.

Alternative 1 is the least expensive alternative and assumes the excavation of known impacts in the area of DB-2. The area is shown on Figure 6-2. The cost analysis is based on approximately 3,000 to 5,800 cubic yards (cy) of material to be excavated and transported to an appropriate waste disposal facility. Long-term costs include continued groundwater monitoring at the Site coupled with ECs placed on the Site. The cost for Alternative 1 is estimated to range from approximately $2,327,000 to $4,030,000 (Table 7-2).

Alternative 2 is the third least expensive alternative and assumes a groundwater extraction system with six extraction wells installed on 40-foot centers. Wells will be advanced to a depth of approximately 15 to 20 feet bgs (maximum historical excavation depth) at pumping rates of approximately 3 to 5 gpm. Installation costs for the groundwater extraction system include drilling, well construction, soil disposal, conveyance piping, and trenching. System costs include electrical connections, system controls, system building, and groundwater pumping and treatment equipment. Long-term costs include 10 years of utility costs, and operation and maintenance of the treatment system, continued groundwater monitoring at the Site and ECs placed on the Site. The estimated cost for Alternative 2 ranges from approximately $3,978,000 to $5,590,000 (Table 7-3).

Alternative 3 is the fourth least expensive alternative and assumes the installation of an approximately 280-foot groundwater extraction trench. Installation costs for the groundwater extraction trench system include specialized trenching equipment, soil disposal, permeable backfill, and conveyance piping. System costs include electrical connections, system controls, system building, and groundwater pumping and treatment equipment. Long-term costs include 10 years of utility costs, and operation and maintenance of the treatment system, continued groundwater monitoring at the Site and ECs placed on the Site. The estimated cost for Alternative 3 ranges from approximately $4,264,000 to $6,019,000 (Table 7-4).

Alternative 4 is the most expensive alternative based on the excavation of known impacts in the area of DB-2 and near the WSDOT stormwater line. The area is shown on Figure 6-5**.** Costs associated with this alternative include the excavation costs from Alternative 1 in addition to excavation activities near the WSDOT stormwater line. Soil analytical results for the WSDOT stormwater line area indicate that excavations would extend to approximately 8 or 9 feet bgs. To create a reasonable estimate for the FS, and based on previous experiences at the Site, excavations were estimated to extend approximately 10 to 15 feet bgs. It is estimated that approximately 7,990 cy of material will be excavated and transported to an appropriate waste disposal facility. Excavation to that depth near the WSDOT stormwater line will require shoring and dewatering. Long-term costs include continued groundwater monitoring at the Site during 3 years and ECs placed on the Site. The cost for implementing Alternative 4 is estimated to range from approximately $5,473,000 to $8,645,000. Of the total approximate cost for Alternative 4, $3,480,000 to $4,880,000 is associated with the remedial of WSDOT stormwater line, with the bulk of the cost for shoring and dewatering requirements near the WSDOT stormwater line (Table 7-5).

Alternative 5 is the fifth least expensive alternative based on the excavation of known impacts in the area of DB-2 and implementing ISS for impacts near the WSDOT stormwater line. The area is shown on Figure 6-6. To complete ISS activities near the WSDOT stormwater line, it is estimated that approximately 710 cy of material will be excavated, mixed with a binding agent, and used as backfill. It is assumed that costs for excavation of impacted soil near DB-2 will be the same as Alternative 1. Long-term costs include continued groundwater monitoring and implementing ECs at the Site. The total cost of Alternative 5 is estimated to be approximately $4,630,000 to $5,011,500 (Table 7-6).

Alternative 6 is the second least expensive alternative based on the excavation of known impacts in the area of DB-2 and implementing DPE system for impacts near the WSDOT stormwater line. The area is shown on Figure 6-7. Long-term costs include continued groundwater monitoring at the Site for 6 years and ECs placed on the Site. It is assumed that costs for excavation of impacted soil near DB-2 will be the same as Alternative 1. The total cost of Alternative 6 is estimated to be approximately $2,652,000 to $4,342,000 (Table 7-7).

A comparison of cost for Alternatives 1 through 6 is presented in Table 7-8. The lowest cost is highlighted in green, while the highest cost is highlighted in red.

Table 7-8. Cost Comparison of Remedial Alternatives

Remedial Alternative No.	Remedial Alternative	Total Lower Cost ($)	Total Upper Cost ($)
1	Excavation and MNA with ECs	$2,327,000	$4,030,000
2	Groundwater Containment System Using Groundwater Extraction Wells, and MNA with ECs	$3,978,000	$5,590,000

Remedial Alternative No.	Remedial Alternative	Total Lower Cost ($)	Total Upper Cost ($)
3	Groundwater Containment System Using Groundwater Extraction Trench, and MNA with ECs	$4,264,000	$6,019,000
4	Excavation with limited ECs	$5,473,000	$8,645,000
5	Excavation and ISS, and MNA with ECs	$4,630,000	$5,011,500
6	Excavation and DPE Treatment with limited ECs	$2,652,000	$4,342,000

Based on the degree of cost, the following alternatives are ranked from highest (least expensive) to lowest (most expensive):

- *Highest.* Alternatives 1 and 6 are the least expensive alternatives. However, Alternative 6 would also remediate both DB-2 and WSDOT stormwater line areas.
- *Medium.* In order, Alternatives 5, 2, and 3 are more expensive to implement than Alternatives 1 and 6, but less expensive than Alternative 4.
- *Lowest.* Alternative 4 is the most expensive alternative and includes excavation of DB-2 and the WSDOT stormwater line. The cost of this alternative is significantly higher due to the remedial action of impacted soil from both DB-2 and WSDOT stormwater line areas and the extensive dewatering and shoring required for the WSDOT stormwater line.

7.8.4 Long-Term Effectiveness

The following criteria will be considered when evaluating the long-term effectiveness of each alternative:

- Degree of certainty that the alternative will be successful.
- How reliable the alternative will be while the hazardous substances remain onsite and exceed CULs.
- Magnitude of residual risk associated with the alternative.
- Effectiveness of controls that are in place to manage treatment residues or remaining wastes.

MTCA provides guidance for determining long-term effectiveness, as presented below (in descending order:

- Destruction or detoxification.
- Immobilization or solidification.
- Onsite or offsite disposal at an appropriate waste disposal facility.
- Onsite isolation or containment with attendant engineering controls.
- Institutional controls and monitoring.

Alternative 4 offers the highest degree of long-term effectiveness because this alternative removes the largest amount of impacted soil and LNAPL from the Site in the shortest time, thereby providing the greatest reduction in residual risk. It is expected that groundwater impacts will also be eliminated by removal of the source area and by natural attenuation through time. Regular groundwater monitoring events will be used to minimize any additional residual risk.

Alternative 6 offers the second highest degree of long-term effectiveness because this alternative removes the largest amount of impacted soil and LNAPL from the Site. The time period for achieving remediation goals using Alternative 6 (treatment and operation of DPE for 6 years) is relatively higher than Alternative 4 and increases the residual risk with the alternative in place for Alternative 4. It is expected that groundwater impacts will also be eliminated by removal of the source area and by natural attenuation through time. Regular groundwater monitoring events will be used to minimize any additional residual risk.

Alternatives 1 and 5 are also expected to offer a high degree of long-term effectiveness because these alternatives remove impacted soil near DB-2. Alternative 5 ranks higher than Alternative 1 because ISS will provide a surface barrier to prevent surface-water infiltration, which would reduce the migration of impacts from soil to groundwater through leaching, if that were occurring.

Alternative 3 offers the second lowest degree of long-term effectiveness because residual risk at the Site is reduced by removing LNAPL from groundwater. Impacted groundwater in the area will be treated through the reactive core mat while LNAPL will be collected using passive bailers or pumps. Alternative 2 offers the least amount of long-term effectiveness. The groundwater pump and treat system will contain and treat impacted groundwater; however, impacted soil and nonmobile LNAPL may remain onsite and institutional controls will be used to reduce residual risks.

Based on the degree of long-term effectiveness, the following alternatives are ranked from highest to lowest:

- *Highest.* Alternative 4 offers the highest degree of long-term effectiveness based on complete removal of soil with COC concentrations greater than CULs. ECs would be limited for this alternative and groundwater compliance sampling would only be required for a short duration.
- *Medium.* Alternatives 1, 5, and 6 provide a high degree of long-term effectiveness; however, given the MTCA's preference for disposal instead of containment, these alternatives were ranked lower than Alternative 4 because some soil with COC concentrations greater than CULs would remain in place. ECs would be required for any soil left in place with COC concentrations greater than CULs.
- *Lowest.* Alternatives 3 and 2 are the least effective for the long term because onsite dissolved-phase groundwater COC concentrations, soil COC concentrations, and nonmobile LNAPL may remain in place and protectiveness would be addressed through ECs.

7.8.5 Management of Short-Term Risks

Management of short-term risks relates to the risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures to control the risk.

All alternatives presenting an excavation component requiring transport and offsite disposal involve higher short-term risk than alternatives involving only groundwater disposal (Alternatives 2 and 3). Additionally, excavation to below the groundwater table will pose short-term risk to construction workers and potential releases to surface water through flooding or mismanagement of groundwater. Onsite decontamination procedures must be implemented to reduce short-term risk to site workers and the public.

Alternatives 2 and 3 involve removing the lowest volume of soil and groundwater during remedial system construction and implementation. Only a minimal amount of soil associated with drilling and conveyance piping and trenching will be removed and disposed of offsite under Alternative 2. Under Alternative 3, the largest volume of soil associated with trenching activities will be removed from the Site; therefore, Alternative 3 ranks lower than Alternative 2. During system operation, minimal short-term risk will be associated with groundwater extraction and treatment. Based on the short-term risks, Alternative 2 has the highest rating with the lowest short-term risk.

Alternative 4 has the largest volume of excavated soil, takes place close to the WSDOT stormwater line, and has the highest short-term risk. In addition, significant engineering design will be required to ensure that the shoring and dewatering infrastructure is sufficient for implementation and protection against the geotechnical concern of slope stability. A considerable amount of groundwater will need to be treated and discharged. This activity offers greater short-term risk in terms of direct contact with site contaminants and worker safety through injury from engulfment from heaving sands, and crushing from floating of the stormwater line.

Alternatives 5 and 6 have the second highest short-term risk. In addition to the earthwork associated with excavation of DB-2, Alternative 5 involves excavating and in-situ mixing of the impacted soil surrounding the WSDOT stormwater line, posing a moderate short-term risk and requiring onsite decontamination. In addition to the earthwork associated with excavation of DB-2, drilling, trenching, and installation of the remediation system and operation and maintenance of the remediation system will be required under Alternative 6, posing a moderate short-term risk and requiring additional groundwater treatment.

Based on the management of short-term risks, the following alternatives are ranked from highest (lowest short-term risk) to lowest (highest short-term risk):

- *Highest (lowest short-term risk).* Alternatives 2 and 3 have the lowest volume of soil and groundwater removed during remedial system construction and implementation and offer the highest degree of management of short-term risk.
- *Medium.* Alternatives 1, 5, and 6 include the removal and handling of moderate volumes of soil and groundwater during remedial implementation and offer a medium degree of management of short-term risk.
- *Lowest (highest short-term risk).* Alternative 4 includes removal of the highest volume of soil and groundwater during remedial system construction activities, work near the WSDOT stormwater line, and the highest exposure of workers to direct contact with site contaminants or at risk of being crushed or engulfed. Therefore, Alternative 4 offers the lowest degree of management of short-term risk.

7.8.6 Technical and Administrative Implementability

Technical and administrative implementability relates to the ability of an alternative to be implemented, including whether the alternative is technically possible, availability of necessary offsite facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.

All six alternatives require long-term groundwater monitoring; therefore, rating the technical and administrative implementability was based on the amount of work required to install and operate the alternative. ECs are required under each alternative, although Alternatives 4 and 6 required only limited ECs.

Alternative 1 is the most implementable in terms of technical and administrative complexities. Soil removal has occurred at the Site and has been shown to reduce COC concentrations in groundwater to less than CULs. The excavation of DB-2 can be accomplished without extensive dewatering or shoring, and minimal long-term maintenance is only required for the EC.

Alternatives 2 and 3 are respectively the second and third most implementable alternatives in terms of technical and administrative complexities. Pump and treat remediation systems have a history of effective implementation at many remediation sites. The operation and maintenance of the remediation equipment reduces the overall rating of implementability and increases the administrative complexity compared to Alternative 1. Under Alternative 3, installation of the trench coupled with backfill material placement increases the technical implementation of this remedial alternative compared to Alternative 2.

Alternative 4 is the least implementable in terms of technical and administrative complexities. The excavation of DB-2 can be accomplished without extensive dewatering or shoring; however, excavation in the WSDOT stormwater line will require considerable engineering measures to manage risk (see Section 7.8.6).

Alternative 5 is the second least implementable in terms of technical and administrative complexities. Technical complexities involved in ISS of soil above the WSDOT stormwater line are related to specialized mixing equipment and field verification. However, during implementation of this technology, extensive dewatering and shoring will not be required. ISS would provide more permanent protection against direct contact with impacted soil and limit the potential vapor intrusion risk, but will result in a semipermanent barrier above an aging stormwater line. If the WSDOT stormwater line is in need of repair, this stabilized soil will offer a barrier to unearthing the pipe.

Of the three alternatives involving remedial action in the WSDOT stormwater line area, Alternative 6 is the most implementable in terms of technical and administrative complexities. As part of Alternatives 4 and 5, remedial action in the WSDOT stormwater line will be implemented. However, under Alternative 6, the DPE alternative is less intrusive and would require less engineering control than Alternative 4; in addition, the WSDOT stormwater line would still be accessible after completion of the remedial activities. Remediation through DPE is an accepted remedial approach and is widely used to remove petroleum hydrocarbon-related impacts within soil and groundwater. Regularly scheduled maintenance is required to continue operation of the system.

Based on the extent and complexity of earthwork and construction activities, the technical and administrative implementability of each alternative is ranked below from highest to lowest:

- *Highest.* Alternative 1 is the most implementable and offers the highest degree of technical and administrative implementability.

- *Medium.* Operation and maintenance of remediation equipment or implementation of the specialized technology in Alternatives 3, 2, 5, and 6 offer medium degree of technical and administrative implementability.
- *Lowest.* Alternative 4 includes extensive dewatering and shoring and offers lowest degree of technical and administrative implementability.

7.8.7 Public Concerns

See Section 7.6.

7.8.8 Disproportionate Cost Analysis Preliminary Summary

Based on the qualitative and quantitative assessment discussed in Section 7, Alternative 6 offers the best solution for the criteria considered: protectiveness, permanence, long-term effectiveness, management of short-term risks, and technical and administrative implementability. Alternative 6 has an average qualitative score of 2.0, which was the lowest (best) of the six alternatives.

7.9 Final Disproportionate Cost Analysis

The alternative that ranked highest after the first analysis is Alternative 6. Per WAC 173 340 360(3)(e), Alternative 6 was compared to Alternative 4, which Ecology selected as the most permanent remedy of the alternatives presented (Ecology 2014b). Both alternatives include excavation of DB-2 and differ only in the remediation of the area near the WSDOT stormwater line.

The final DCA include two passes:

1. *First pass*. The evaluation criteria were weighted using the qualitative assessment described below and the alternatives were assessed using the rankings presented in the Draft FS Report (Arcadis 2014a) plus consideration of public concerns. The analysis is represented in Table 7-9.
2. *Second pass*. Arcadis used the rankings assigned by Ecology in their DCA and weighted the evaluation criteria. Per WAC 173-340-360(3)(e)(ii)(C), the department has the discretion to favor or disfavor qualitative benefits and use that information in selecting a cleanup action. A scale of 1 to 10 was used; the criteria of most importance in selecting a remedy was assigned a weight of 10. The analysis is represented in Table 7-10.

Per Ecology's comments (Ecology 2014b) this two-pass approach was used to assess robustness, and a weighted sum was calculated by multiplying the ranking of each criterion for each alternative by the weight assigned to the criterion. The lowest sum is the alternative that is permanent to the maximum extent practicable.

The summary of the DCA of the two passes for Alternatives 4 and 6 is provided in Table 7-11.

Table 7-11. Disproportionate Cost Analysis Weighted Sums

DCA Weighted Sums	Remedial Alternative 4	Remedial Alternative 6
Pass 1	114	86
Pass 2	106	97

Additional information developed to further evaluate Alternative 6 is presented below

7.9.1 Protectiveness

This criterion was selected as one of the two most important criteria and was assigned a weight of 10 by Ecology. Both alternatives permanently remove and/or treat the impacted media at the Site.

Alternative 6 offers lower onsite (less construction onsite) and offsite (lower quantity of disposal offsite) risks, but a relatively longer time frame is required to reduce environmental risk at the facility. The DPE portion of the system requires considerable dewatering to expose residual LNAPL in the smear zone. The DPE pilot test study shows that throughout remediation, Alternative 6 will contain groundwater impacts near the WSDOT stormwater line and ensure that groundwater with COC concentrations greater than CULs does not leave the Lower Yard. Data have shown that excavation will also result in the eventual cleanup of groundwater to concentrations less than CULs; however, during that time frame, excavation does not protect against discharge to surface water.

Alternative 4 offers swift achievement of soil CULs and relatively swift achievement of groundwater CULs, but does not protect against potential discharges to surface water while monitoring natural attenuation. Alternative 6 offers a comparative level of protectiveness with the added groundwater containment of remaining impacts near the WSDOT stormwater line, with a slightly longer time frame. Therefore, both alternatives were ranked 1 in protectiveness.

7.9.2 Permanence

This criterion was selected as an important criterion and was assigned a weight of 8 by Ecology. Both alternatives permanently remove and/or treat the impacted media at the Site.

Alternative 4 will permanently remove impacted soil near the WSDOT stormwater line and dispose of the soil at an appropriate waste disposal facility. Alternative 6 will treat impacted media and destroy contaminants prior to discharge to the environment.

Alternative 4 will focus on the area of remaining impacts and remediate all media encountered within that area (soil, residual LNAPL, and groundwater); however, Alternative 6 will achieve the treatment and destruction of contaminants within highly mobile media (soil vapor and groundwater) beyond the depth of excavation offered by Alternative 4.

Excavation has nearly the same time frame for remediation as Alternative 6. However, excavation of contaminated materials adjacent to a stormwater line conveying stormwater to Puget Sound presents a risk of breach in the stormwater line pipe and offers a relatively lower degree of irreversibility of the waste treatment process compared to Alternative 6.

Alternative 4 will generate approximately 12,000 tons of soil to be disposed of from WSDOT stormwater line excavation, whereas Alternative 6 will produce an estimated 20 tons of spent GAC. The GAC will be transported offsite to a handling facility and reactivated. Reactivation destroys sorbed COCs and allows for reuse of the reactivated carbon.

Both Alternatives 4 and 6 offer a high degree of permanence. Alternative 4 will achieve a degree of permanence in the relatively near future by permanently removing contaminants from the Site but not from the environment (landfilling). Alternative 6 will destroy contaminants permanently. Therefore, both alternatives are ranked 1.

7.9.3 Cost

This criterion was selected as an important criterion that balances the overall benefit of a cleanup action and was assigned a weight of 8 by Ecology.

The cost of Alternative 4 is the highest ($5.52 to $8.71 MM) and ranked as 5 in DCA Passes 1 and 2. The cost of Alternative 6 ($2.65 to 4.34 MM) is qualitatively ranked as 1 in DCA Pass 1 and is ranked as 2.4 in DCA Pass 2, which is the direct ratio to the cost of Alternative 4. The cost of Alternative 6 includes the cost to complete the cleanup action, including operation and maintenance of the remediation system for 6 years.

7.9.4 Long-Term Effectiveness

This criterion was selected as one of the two most important criteria that a cleanup action must meet and was assigned a weight of 10 by Ecology.

Alternative 4 offers excavation, a technology that has been effectively used onsite and provides a high degree of certainty that the alternative will be successful. Alternative 6 will remove COCs from the soil and groundwater through DPE. DPE has been successfully employed as a remediation technology at petroleum hydrocarbon-impacted sites. The DPE pilot test study shows that drawdown rates required for DPE will remediate residual LNAPL in soil and dissolved-phase COC concentrations near the WSDOT stormwater line. The time period for achieving remediation goals using Alternative 6 (treatment and operation of DPE for 6 years) is relatively higher than Alternative 4 and increases the residual risk with the alternative in place for Alternative 4. Therefore, Alternative 4 is ranked 1 (shows highest effectiveness for the long term) and Alternative 6 is ranked 2.

7.9.5 Management of Short-Term Risks

This criterion is not a primary criterion for a cleanup action, but helps determine the feasibility of the cleanup action and was assigned a weight of 4 by Ecology.

Alternatives 4 and 6 include earthwork associated with excavation of DB-2 (3,000 to 5,800 cy of impacted soils to be removed and disposed of at an appropriate waste disposal facility). In addition, Alternative 4 involves significant earthwork (approximately 8,000 cy of soil to be excavated) and contaminated materials (soil, groundwater, and residual LNAPL) to be handled and disposed of offsite) during construction. Alternative 6 will include limited earthwork (trenching, drilling, and piping for the system) in addition to the construction work conducted for the DB-2 excavation.

Alternative 4 includes additional technical requirements for excavation and management of risks:

- Hazards associated with stormwater line pipe breach.
- Potential risk of a stormwater line breach and potential discharge to Puget Sound.
- Sheet pile installation.
- Significant engineering design to ensure that the shoring and dewatering infrastructure is sufficient for implementation.

Alternative 6 short-term risks include risks associated with:

- Drilling.
- Trenching and installation of the remediation system.
- Operation and maintenance of the remediation system.

Overall, the management of short-term risk is more effective and easily implemented for Alternative 6 because drilling and trenching at low depth are more conventional and less risky than sheet pile installation and excavation at lower depth. In addition, the risk associated with a stormwater line pipe breach are reduced because Alternative 6 is less intrusive than Alternative 4. Therefore, Alternative 6 was ranked 4 Alternative 4 was ranked 5.

7.9.6 Technical and Administrative Implementability

This criterion is not a primary criterion for a cleanup action but helps determine the feasibility of the cleanup action and was assigned a weight of 4 by Ecology.

Alternatives 4 and 6 include post-remediation groundwater monitoring to evaluate efficient treatment operation, but do not include engineering controls or periodic reviews. Both alternatives require limited ECs.

Alternative 4 offers fewer administrative concerns (excavation is widely accepted as an easily implementable and effective cleanup action by the public and Ecology), but more complicated construction work because the excavation activities are performed below the water table adjacent to the stormwater line conveying stormwater to Puget Sound.

Alternative 6 offers easier technical implementation and higher administrative concerns relative to Alternative 4 because the DPE alternative is implemented over a 6 years period. Remediation through DPE is an accepted remedial approach and is widely used to remove petroleum hydrocarbon-related impacts in soil and groundwater. Pilot test data and modelling show that DPE is a technically feasible alternative and can be implemented using standard equipment that is widely available within the environmental remediation industry. Regularly scheduled maintenance is required to continue operation of the system, increasing the administrative requirements of this alternative compared to Alternative 4.

Overall, the technical and administrative implementability of Alternative 6 was assessed to be equivalent relative to Alternative 4 and was ranked as 3.

7.9.7 Consideration of Public Concerns

Ecology emphasized the importance of public participation and concerns on this Site because the Lower Yard will become the property of the State of Washington and will likely be used as a multi-modal transportation facility. Ecology assigned a weight of 6 to this criterion.

According to WAC 173-340-360(3)(f)(vii), this criterion evaluates whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns. This process includes concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the Site. In this case, the community's with interest include the WSDOT (prospective buyer of this property) and the Edmonds Citizens Awareness Committee (ECAC).

Alternatives 4 and 6 meet the expectations of cleanup action by Ecology. Alternative 4 removes contaminated materials and moves them offsite from both areas of remediation (DB-2 and WSDOT stormwater line area). Alternative 6 removes contaminated materials from DB-2 area and treats contaminated media from the WSDOT stormwater line area. Both alternatives will meet the cleanup goals. Both alternatives will not leave impacts onsite at the time of completion (no vapor barriers or ECs in place) and will receive a high degree of public approval. Alternative 6 has additional advantages in the complete removal, excavation, and replacement of the WSDOT stormwater line in relation to public concerns. Construction of the DPE system will require less site traffic and hydrocarbon-impacted material transport from the Site, reducing the number of loads associated with offsite disposal. Construction equipment onsite will be limited to a small excavator for minimal trenching activities, reducing noise and dust. Installation and operation of the DPE system will also keep critical stormwater infrastructure in place while still addressing remediation goals.

Because the WSDOT and the ECAC have expressed concerns regarding ECs and indicated a preference for excavation to address impacts in the WSDOT stormwater line area, we expect that Alternative 4 will be more readily accepted by the WSDOT, the ECAC, and the public, relative to Alternative 6. Therefore Alternative 4 is ranked the highest (1) and Alternative 6 is ranked 2.

7.9.8 Provide for a Reasonable Restoration Time Frame

WAC 173-340-360(4) contains guidance for evaluating reasonable restoration timeframes. Preference is given for alternatives that can be implemented in a shorter period of time if other factors such as permanence and costs are equal. Under the DPE remediation scenario, the LNAPL depletion model shows that TPH concentrations in soil and dissolved TPH concentrations in groundwater in the target treatment zone can be remediated to less than the CUL within approximately 5 and 6 years, respectively. Alternatives 4 and 6 provide for a reasonable restoration time frame.

8 RECOMMENDED REMEDIAL ALTERNATIVE

Alternative 6, Excavation and DPE Treatment, is the recommended remediation action.

The preliminary design is based on standard engineering calculations, modeling, and the DPE pilot test study. Basis of design in terms of well spacing, conveyance piping, and system components are provided below. Each DPE well will be equipped with an electric pump and groundwater discharge conveyance piping. The top of the well casing will be fitted with a connection to vapor extraction conveyance piping from the vacuum blower. Conveyance piping will be placed on grade, and will connect to treatment equipment that will be housed in a newly constructed building located adjacent to the existing equipment shed in the southern area of the Lower Yard. The location of the equipment shed was chosen based on the preliminary layout of the Edmonds Crossing project; however, the equipment shed can be relocated to accommodate the actual layout of the Edmonds Crossing project, or other future development. A preliminary system location in relation to the layout is shown on Figure 6-7. Wells will be constructed of 4-inch Schedule 40 PVC with 0.02-inch wire-wrapped screen from 5 to 35 feet bgs. Below the well screen will be 3 feet of solid casing that will act as a silt collection sump to decrease the occurrence of pump fouling. Well construction details may change based on field observations during the time of drilling.

Extracted vapor and groundwater conveyance piping will connect to the system compound located within the southern portion of Lower Yard as shown on Figure 6-7. The system compound will consist of a system enclosure to house the groundwater and extracted vapor treatment equipment. Extracted vapor will flow through an 14-leg manifold, with each leg consisting of an air flow meter, flow control valve, vacuum gauge, and sampling port. A main header will connect the manifold to an air/water separator prior to the blower. Vapor from the blower will discharge into a catalytic oxidizer for treatment prior to discharge to the atmosphere. Accumulated water from the separator will be transferred using a Moyno progressive cavity or similar pump, to the settling tank that is part of the groundwater treatment equipment. A Grundfos Redi-Flo 4 electric submersible pump will draw down the water table and transfer water to a conical bottom settling tank and holding tank housed within the treatment compound. Each wellhead will be fitted with a flow control valve, and pressure gauge. Each groundwater pumping well will be completed with a well vault fitted with a float to shut off the well if pipe failure or leaks occur at the wellhead. Groundwater conveyance lines will be installed within secondary containment lines.

Groundwater will be pumped through the conveyance lines to a conical bottom tank and holding tank where solids will be allowed to settle. The tanks will be controlled with automatic float switches, pumping water in batches through in-line particulate filters before being treated using liquid GAC beds (two sets of two in series). Treated water will be discharged to Willow Creek or DB-2 under a NPDES permit. Cost estimates for the DPE system are presented in Table 7.7.

Power for the treatment building and equipment will be connected to the existing power service drop located between DB-1 and DB-2 near the north side of the Lower Yard. Electrical conduit will be placed in a trench as shown on Figure 6-7.

9 CONCLUSION

Alternative 6, Excavation and DPE Treatment, is the alternative that is permanent to the maximum extent practicable. The alternative is relatively easy to implement, offers easier short-term risk management procedures, addresses the public's concerns both locally and regionally, removes and/or destroys contaminants permanently, and will cost approximately one-half of the cost of Alternative 4. The increased incremental cost of Alternative 4 over Alternative 6 is disproportionate to the degree of benefits achieved. Therefore, Chevron recommends Alternative 6 as the preferred remedy for the remaining impacts at this Site.

10 SCHEDULE

Following approval of this Draft Final FS Report by Ecology as ready for public review, a Draft Cleanup Action Plan will be prepared and submitted to Ecology for review as required by AO No. DE 4460. The Draft Cleanup Action Plan will present a preferred cleanup action.

Ecology will review the Draft Cleanup Action Plan and use it as the basis for preparing Ecology's Draft Cleanup Action Plan. Ecology's Draft Cleanup Action Plan will be an exhibit to a new draft Consent Decree. The new draft Consent Decree will be issued for public comment and revisions will be made as necessary. Upon entry into Snohomish County Superior Court, the new Consent Decree will take effect and govern further actions at the Site.

This FS Report will be issued for public review concurrently with the draft Cleanup Action Plan and new draft Consent Decree.

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TABLES

Table 2-1
Site Investigations and Remedial Actions Chronology
Chevron Environmental Management Company
FINAL FEASIBILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Year	Activity	Details	Contaminated Soils Removed (tons)	LNAPL Removed (gallons)	Focus Site Area	Report	Author
1986	Phase 1 Site Assessment – GeoEngineers (1986)	• Soil, groundwater, and sediment sampling in the Lower Yard. • Light nonaqueous phase liquid (LNAPL) detected in 10 of 27 wells. Thickness ranged from trace to 3.18 feet. Three separate LNAPL plumes were defined. • Depths to groundwater varied from 3 to 8 feet below ground surface (bgs). • Approximately 20,000 gallons (gal) of recoverable product are reported to be in the vicinity of the tidal basin.			Lower Yard	Background History Report Unocal Edmonds Bulk Fuel Terminal	Maul, Foster, and Alongi (MFA)
1987 - 1991	Product Recovery Project – GeoEngineers (1987, 1988, 1989, 1991)	• Two product recovery systems installed, to the southeast of the tidal basin, and northwest of the facility oil/water separators. • Systems consist of recovery sumps and trenches with perforated drains. • Between May 1988 and September 1990, a total of approximately 7,500 gal was recovered from RW-1. • RW-2 was never activated, but it was estimated that 1,000 gallons of recoverable petroleum product were located in the former RW-2 area at the time.		7,500	Lower Yard	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA
1988	Subsurface Contamination Study, Upland Fuel Tank Area – GeoEngineers (1988)	• Subsurface contamination study to determine conditions within a portion of the Upper Yard. • Consisted of six soil borings, 12 hand auger borings, and installation of groundwater and vapor monitoring wells. • Total petroleum hydrocarbons (TPH) in soil varied from non-detect (ND) to 12,000 milligrams per kilogram (mg/kg), consisting of primarily heavy end hydrocarbons. • Groundwater concentrations were ND for benzene, toluene, ethylbenzene and xylene (BTEX) except for one well with elevated benzene concentrations.			Upper Yard	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA
1988	Phase 1 Site Assessment, Detention Basin No. 1 – GeoEngineers (1988)	• Phase 1 assessment of Detention Basin No. 1 (DB-1), surface water, soil and tar samples collected for analysis. • TPH concentrations of the lake sediments and tar exceeded 100,000 mg/kg, ethylbenzene ranged from ND to 3.9 mg/kg, and total xylenes varied from 2 to over 1,000 mg/kg. • No volatile or semivolatile organic compounds were detected in water samples analyzed. TPH concentrations ranged from 560 to 930 micrograms per liter (µg/L).			Detention Basin No.1	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA
1989	Phase 2 Site Assessment, Detention Basin No. 1 – GeoEngineers (1989)	• Investigation to determine the possibility of contamination of groundwater by DB-1. • Installed three new monitoring wells and drilled exploratory borings along the northwest margin of the original limits of DB-1. • TPH in soil ranged from 65 to 360 mg/kg, TPH in groundwater varied from 0.84 to 1.8 milligrams per liter (mg/L). Benzene ranged from ND to 110 µg/L.			Detention Basin No.1	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA

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1989	Site Contamination Assessment, Waste Soil Stockpile Area – GeoEngineers (1989)	• Purpose of the study was to evaluate the waste soil stockpile area (southeast Lower Yard) for subsurface contamination. • Five hand auger borings and one groundwater monitoring well installed. • Soil in stockpile was from the Unocal Station No. 5353 from 1980, and from Unocal Station No. 6211 from 1987. • TPH in soil varied from 510 to 6,300 mg/kg. TPH immediately below or adjacent to the stockpile ranged from ND to 100 mg/kg. The highest benzene concentration was 110 micrograms per kilogram (µg/kg).			Lower Yard	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA
1990	Site Contamination Study, Marine Diesel Spill – GeoEngineers (1990)	• On May 5, 1990, approximately 350 gal of marine diesel fuel spilled in the Lower Yard. • Ten soil samples were analyzed for TPH, results ranged from 9 to 14,000 mg/kg. The highest concentrations were found beneath the aboveground pipe racks. Contamination was noted up to 2 to 3 feet bgs, and estimated to be about 100 cubic yards.			Lower Yard	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA
1990	Site Contamination Assessment, Lower Yard – GeoEngineers (1990)	• Purpose was to determine the extent of soil contamination due to past releases. • Excavated and collecting soil samples from 25 test pits for TPH and BTEX, and evaluated ongoing landfarming activities. • Soil samples collected in 23 of 25 test pits between 6 and 8 feet bgs. • Benzene concentrations ranged from ND to 3 mg/kg, toluene from ND to 17 mg/kg, ethylbenzene from ND to 43 mg/kg, and total xylenes from ND to 310 mg/kg. TPH varied from 12 to 16,000 mg/kg, TPH in the gasoline range (TPH-G) from ND to 2,800 mg/kg, and TPH in the diesel range (TPH-D) from ND to 23,000 mg/kg. • Landfarming efforts reduced TPH levels from 2,600 mg/kg to less than 200 mg/kg.			Lower Yard	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA
1991	Supplemental Subsurface Contamination Assessment, Upper Yard – GeoEngineers (1991)	• Purpose was to explore subsurface conditions in the eastern portion of the Upper Yard and the BNSF property north of the Lower Yard. • Excavated four test pits, drilled five borings in the eastern portion of the Upper Yard, installed groundwater monitoring wells in each Upper Yard boring, installed 15 hand auger borings throughout the Upper Yard, and installed three borings and groundwater monitoring wells in the BNSF right-of-way. • BTEX components in soil were detected in two of 20 samples. Benzene was not detected in any sample. TPH-G varied from 7 to 2,700 mg/kg, TPH-D ranged from 90 to 19,000 mg/kg, and TPH varied from ND to 30,000 mg/kg. • BTEX components were detected at very low levels in groundwater; TPH-G and TPH-D were ND.			Upper Yard	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA

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Year	Activity	Details	Contaminated Soils Removed (tons)	LNAPL Removed (gallons)	Focus Site Area	Report	Author
1991	Harbor Square Phase 1 Site Assessment – Landau Associates (1991) – Offsite investigations	• This assessment was conducted for the Port of Edmonds to assess the nature and extent of potential contamination at a portion of the Port's Harbor Square property. • Identified a report in Ecology files documenting a leaking 2,000 gallon underground storage tank on the BNSF property ~700 feet north of Harbor Square (which was removed in 1990). TPH in soil surrounding the tank ranged from ND to 64,000 mg/kg. • Four soil borings were completed. TPH in soil varied from 2,000 to 4,400 mg/kg, and TPH ranged from ND to 7,900 mg/kg. • The Phase 1 indicated that the source was most likely from the Unocal terminal and the railroad spur on the west side of the Site.			Harbor Square	Background History Report Unocal Edmonds Bulk Fuel Terminal	Maul, Foster, and Alongi
1991	Harbor Square Phase 2 Site Assessment – Landau Associates (1991) – Offsite investigations	• This assessment was conducted for the Port of Edmonds to assess the nature and extent of potential contamination at a portion of the Port's Harbor Square property. • Drilled and sampled five soil borings, and installed five monitoring wells. • TPH in soil ranged from 14 to 110,000 mg/kg, PAHs in soil ranged from 2.9 to 680 mg/kg. • It was reported that up to 4 feet of soil was encountered at one location that was saturated with a viscous tar-like substance. • All groundwater results were ND.			Harbor Square	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA
1992	Preliminary Remedial Investigation – EMCON (1992)	• Focused on evaluating the aerial extent of LNAPL plumes. Six soil borings were completed, four of which were completed as groundwater monitoring wells. • TPH-G in soil ranged from ND to 2.7 mg/kg, TPH-D in soil ranged from ND to 2,670 mg/kg, and TPH in the heavy oil range (TPH-O) ranged from ND to 2,250 mg/kg. Benzene was not detected in any soil sample. • TPH-G in groundwater ranged from ND to 15 mg/L, TPH-D ranged from ND to 4.96 mg/L, benzene was detected from ND to 0.585 mg/L.			Lower Yard	Background History Report Unocal Edmonds Bulk Fuel Terminal	MFA
1994	UST Decommissioning	• Two Lower Yard and three Upper Yard USTs were decommissioned. • Petroleum hydrocarbon products were detected above MTCA Method A cleanup levels, at two of the tank excavations and in one of the product line trenches.			Upper and Lower Yard	Underground Storage Tank Decommissioning, 1995	EMCON

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1996	Remedial Investigation (RI) Report	• This RI was performed between October 1994 and August 1996. Field investigation included 31 surface soil samples, 120 shallow soil borings, installation of 39 additional monitoring wells and nine piezometers, 17 basin sediment/soil samples, three test pits, and four trenches. Four quarters of groundwater monitoring were collected, seven monthly rounds of water levels were measured, one round of surface water and storm water samples, and aquifer characterization tests. • LNAPL was found in six Lower Yard plumes. Approximately 8,600 gal of LNAPL were recovered (1996) and it was estimated that 5,200 gal of LNAPL remained. LNAPL consisted of TPH-G, TPH-D, and TPH-O. Field observations indicated that much of the LNAPL may have been heavy end hydrocarbons. LNAPL migration rates were estimated to be less than six feet per year. • Dissolved phase hydrocarbons were primarily found near LNAPL plumes, and in areas with LNAPL trapped in the vadose zone. • Zinc was present at elevated levels in groundwater along the perimeter of the site. • High concentrations of petroleum hydrocarbons in soil were primarily found near LNAPL plumes and in areas with LNAPL trapped in the vadose zone. High concentrations of petroleum hydrocarbons were also found in soil within DB- 1. • Elevated metals concentrations were found in surface soil in areas of sand blast grit and paint chips, but not found in significant concentrations in subsurface soil. • Petroleum-related compounds were detected in onsite stormwater, but at low levels. The highest metal and PAH concentrations were found in surface water upgradient of the Terminal. • Sediment samples passed all criteria for bioassay testing. Limited toxic effects were exhibited in bioassay testing. • Four different vegetation communities were found at the Terminal, but the habitat value was deemed low to moderate.		8,600	Lower Yard	Draft Remedial Investigation Report, 1998	EMCON

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Year	Activity	Details	Contaminated Soils Removed (tons)	LNAPL Removed (gallons)	Focus Site Area	Report	Author
1992 - 2000	Free Petroleum Product Recovery Operations - EMCON (1994-1998), MFA (1999-2000)	• Four monitoring wells redeveloped, and Welex Environmental, Inc., Hydro-Skimmer units installed in each well for passive recovery of LNAPL. • Two of the Hydro-Skimmer units were removed after it was determined that the product was too viscous to pass through the units' filters. • Between December 1992 and September 1993, monitoring wells containing LNAPL were hand-bailed, and the Hydro-Skimmer units were drained, on a biweekly basis. An estimated 100 gal of petroleum product were recovered by this action. • During 1994, 22 gal of petroleum product were removed from monitoring wells by hand-bailing. • Starting in 1995, product was pumped on a weekly or biweekly basis from monitoring wells and from recovery well RW-1 using a peristaltic pump. • Petroleum product was recovered: 718 gal in 1995; 491 gal in 1996; 223 gal in 1997; 136 gal in 1998; and 111 gal in 1999. • In 2000, more effective product pumping methods were employed at RW-1 and 169 gal of petroleum products were recovered (including 85 gal from RW-1).		1,970	Lower Yard	1998 Interim Product Recovery Operations Report 2000 Interim Product Recovery Operations Report	EMCON MFA
2001	Interim Action	• Consisted of the removal of LNAPL saturated soils from four areas of the Lower Yard. • Excavations were left open for weeks to allow floating LNAPL to be recovered. • 10,763 tons of soil was shipped offsite, 76,237 gallons of product, water, and associated solids were removed from the excavations (including an estimated 2,524 gallons of petroleum product).	10,763	2,524	Lower Yard	Lower Yard Interim Action As-Built Report, 2002	MFA
2001	Interim Action	• Demolition, removal of ASTs, piping and process structures, excavation and removal of 98,000 tons of impacted soil.	98,000		Upper Yard	Interim Action Report, 2003	MFA
2003	Supplemental Remedial Investigation – MFA (2003)	• Offsite contamination at the Port of Edmonds South Marina Property (SMP) was investigated. Borings were completed in South Admiral Way. • The highest concentration of TPH-D was ~2,100 mg/kg, the highest concentration found on the SMP is in excess of 20,000 mg/kg. It was determined that the petroleum impacts on the SMP were not due to migration from the Terminal. Samples from test pits excavated along the southwest Lower Yard contained concentrations of TPH-D at ~13,000 mg/kg but were ~350 feet from the SMP. • The highest concentrations of TPH in soil were found in the far eastern corner of the Lower Yard, in DB-1, and in the central portion of the Lower Yard. • Groundwater conditions were similar to prior years. • Surface water samples from Willows Creek did not contain concentrations of TPH. • It was determined that it was not likely that TPH was migrating offsite from the Terminal.			Lower Yard	Supplemental Remedial Investigation Report, 2003	MFA

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Year	Activity	Details	Contaminated Soils Removed (tons)	LNAPL Removed (gallons)	Focus Site Area	Report	Author
2003	Interim Action	• Excavation of DB1, the Southwestern Lower Yard, Metals Area 3, and the stormdrain line area. • A total of 39,130 tons of soil were removed. • A total of 1,861,520 gal of groundwater were extracted from the excavation and effectively treated on site before being discharged into DB2.	39,130	Not measured. LNAPL mixed with groundwater that was treated on site.	Lower Yard	Lower Yard Interim Action As-Built Report, 2004	MFA
2007	Phase I - Interim Action	• Bulk of soil excavation, 108,000 tons removed and ~9,700 gal of LNAPL recovered.	108,000	9,700	Lower Yard	Phase I As-Built Report, 2007	Arcadis
2008	Additional Site Assessment	• Soil boring installation, soil sample collection along WSDOT line and other areas of concern in the Lower Yard.			Lower Yard, WSDOT line	2008 Additional Site Investigation and Groundwater Monitoring Report, 2010	Arcadis
2008	Phase II - Interim Action	• Sediments removal, remaining soil excavation. 14,825 tons of soil removed, 131 gal of LNAPL and 2,000 tons of sediment from Willow Creek.	16,825	131	Lower Yard	Phase II As-Built Report, 2008	Arcadis
2008	Post-excavation Groundwater Monitoring Program Begins	• Post-excavation groundwater monitoring program begins, POC wells established.			Lower Yard	Reported Annually	Arcadis
2011	Soil Investigation, Tidal Study, Hydraulic Conductivity Testing	• DB-2 soil and LNAPL investigation, piezometer installation, site-wide tidal study, site-wide hydraulic conductivity testing.			Lower Yard, Willow Creek	Final 2011 Site Investigation Completion Report, 2012	Arcadis
2012	Monitoring Well Installation, soil sampling, sediment	• Installed monitoring wells MW-525 to MW-532, collected confirmation sediment samples from Willow Creek.			Lower Yard, Willow Creek	Final Conceptual Site Model, 2012	Arcadis
2015	Well Installation, Dual Phase System Extraction (DPE) pilot test study	• Installed DPE wells (DPE-1, DPE-2, and DPE-3) and three piezometers (PZ-1, PZ-2, and PZ-3/DPE-4) , conducted pilot testing at wells DPE-1, DPE-2 and DPE-3.			Lower Yard	Engineering Design Report. 2016	Arcadis

Table 2-4
Remaining Impacts - Soil Sample Locations
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Soil Sample Location	Cleanup Action / Investigation	Location	Concentration (mg/kg) exceeded Site			Remarks
			REL for TPH[1] (2,775 mg/kg)	CUL for cPAHs TEQ (0.14mg/kg)	CUL for benzene (18 mg/kg)	
STRM-6FLOOR-7	2003 Point Edwards Storm Drain Line Excavation	Point Edwards Storm Drain Line	17,439	-	54.9	These samples location were not over-excavated. The Point Edwards Storm Drain Line Excavation was conducted to facilitate installation of a new stormwater outfall for Point Edwards, and was not specifically intended as a remedial action. These locations will be remediated through the DPE system.
STRM-4WALLE(2)-3			15,388	0.56	-	
SWLY-D-3 Wall-3.75[2]	2003 Excavation	Southwest Lower Yard	2,923	-	-	This sample location at the base of the steep decline of the Upper Yard was not over-excavated. TPH concentration of this sample was below the REL for TPH appropriate at time of excavation (3,000 mg/kg).
EX-B11-U-10-SSW-5	2007 - Phase I excavation activities	Close to the WSDOT stormwater line	-	0.159	-	These sample locations were not over-excavated to preserve the integrity of the WSDOT stormwater line. These locations will be remediated through the DPE system.
EX-A2-Q-14-6			3,060	-	-	
EX-A2-O-15-SSW-6			7,540	-	-	
EX-A2-N-16-SSW-6			7,550	-	-	
EX-B20-M-17-SSW-6			15,700	0.166	-	
EX-B18-VV-1-6SW[2]		Close to the BNSF Railway	4,980	-	-	Soil in the area of this sample was not over-excavated because of its location on the property boundary between the Lower Yard and the BNSF Railway right-of-way. Soil was removed up to the property boundary, but excavation activities were ceased to maintain the integrity of the BNSF Railway line.
EX-B1-F-44-4[2]	2008 - Phase II excavation activities	Southeast Lower Yard	-	0.212	-	Soil in the area of this sample was not over-excavated.
MW129R-7.0[2]	2008	Northeast Lower Yard	3,007	-	-	Sample collected during the installation of monitoring well MW-129R was not removed.
SB-65-6.5		Close to the WSDOT stormwater line	16,900	1.01	35.8	These sample locations were not over-excavated during the Phase II Excavation activities in 2008 to preserve the integrity of the WSDOT stormwater line. These locations will be remediated through the DPE system.
SB-66-6.0			11,900	0.209	-	
SB-68-4.0			5,470	0.165	-	
SB-69-6.0			3,720	0.236	-	
SB-80-7.5			4,660	0.693	-	
B-4-9.5-10	2011[3]	Near DB-2, monitoring well MW-510, and Willow Creek	4,413	-	-	These locations will be excavated.
B-5-9.5-10			27,021	-	-	
B-6-9-9.5			220,400	3.2	-	
B-7-8-8.5			111,400	2.8	-	
B-8-9.5-10			75,730	0.5	-	
B-9-8.5-9			20,970	0.29	-	
B-10-0.5-1			-	0.2	-	
B-11-10-10.5			37,150	3.4	-	
B-13-7-7.5			15,900	-	-	
B-16-4-4.5			-	0.145**	-	
B-17-(depth varies)			22,201 (4-4.5 ft)	116* (4.5-5 ft)	-	
MW-525-6	2012	Close to the WSDOT stormwater line	17,850	0.29	34	These locations will be remediated through the DPE system.
MW-532-7			10,540	-	-	

NOTES:

[1] In 2003, the Site interim action REL for TPH was 3,000 mg/kg. In 2007/2008, the Site interim action REL for TPH was 2,975 mg/kg.

[2] Four isolated soil samples, corresponding to less than 0.5 percent of the samples, are recorded thorough the Lower Yard out of the two areas that will be further remediated. Those four isolated soil samples are not further considered for remedial treatment since they are considered in compliance with WAC-173-340-740(7) and were removed to the maximum extent practicable at the time of the former interim actions.

[3] Maximum concentrations are displayed per boring location.

* The GC/MS semivolatile internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

** This data point was previously reported as .1 in the 2011 Investigation tables. Analytical results report it as 0.145

CUL = Cleanup level
REL = Remediation level
- = concentration below appropriate CULs/RELs
mg/kg = milligrams/killograms
TEQ = Total cPAHs adjusted for toxicity
cPAHs = Carcinogenic polycyclic aromatic hydrocarbons
TPH = Total petroleum hydrocarbons

Table 2-6
2013 Soil Vapor Analytical Results
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Sample ID	Sample Depth (ft bgs)	Sample Date	Analytical Method	Dilution Factor	Benzene	Naphthalene	Σ(C5-C6AL) + (>C6-C8AL)	Σ(>C8-C10AL) + (>C10-C12AL)	>C8-C10AR	>C10-C12AR	Oxygen	Methane	Carbon Dioxide	Helium
Analysis Method (units)					TO-15 GC/MS ($\mu g/m^3$)						ASTM D-1946 (%)			
VP-1	5	10/09/13[2]	TO-17	4	>530,000 SJ	9,700 J	NA	NA	NA	NA	5.0	>5.0	2.62	6.4[3]
		11/21/13	TO-15	108	**710,000**	**ND<11,000**	**35,000,000**	**6,600,000**	**34,000**	ND<120,000	2.6	29	11	ND<0.11
VP-2	5	10/09/13[2]	TO-15	1	940	ND<40	23,400	37,000	ND<1,100	ND<1,200	1.8	2.0	8.0	ND<0.11
		10/09/13[2]	TO-17	22.4	310	ND<230	NA	NA	NA	NA	4.8	1.7	1.92	0.19[3]
		11/21/13	TO-15	9.04	**340**	**ND<95**	**33,700**	**36,000**	1,200	ND<500	1.6	2.6	12	ND<0.11
(DUP)				8.48	**300**	**ND<89**	**27,800**	**25,000**	1,000	ND<460	4.0	2.3	10	ND<0.11
VP-3	5	10/09/2013[2]	TO-17	1.00	190	8.5	NA	NA	NA	NA	5.4	>5.0	2.1	4.5[3]
		11/21/13	TO-15	21.0	**46**	**ND<220**	**529,000**	**305,000**	ND<1,700	ND<1,900	1.3	23	11	ND<0.10
Field Blank	NA	10/09/2013[2]	TO-17	1.00	ND<21	ND<1.7	NA	NA	NA	NA	NA	NA	NA	NA
Equipment Blank	NA	10/09/2013[2]	TO-15	2.33	31	ND<6.1	4,530	1,870	210	ND<130	0.79	0.0015	ND<0.023	ND<0.12
Equipment Blank	NA	11/21/13	TO-15	2.10	ND<0.67	ND<5.5	ND<154	ND<270	ND<100	ND<120	2.5	ND<0.00021	ND<0.021	ND<0.10
DOE Method B Soil Gas Screening Levels for Shallow Soil Gas[1]					**3.2**	**14**	**27,000**	**1,400**	**1,800**	**NA**	**NA**	**NA**	**NA**	**NA**

NOTES:
Concentrations are in micrograms per cubic meter ($\mu g/m^3$).
Highlighted cells indicate detected concentrations above the Ecology Method B Screening Level.
Greyed data was collected during the October 2013 sampling event and was not used for data evaluation.
Fixed gas data for TO-17 samples was collected in the field.
DUP = Duplicate sample
[1]Sub-slab or shallow soil gas screening level just beneath a building or less than 15 feet bgs.
[2]Equipment blank results indicate potential contamination of sampling equipment. Data collected during this sampling event are considered questionable.
[3]Methane causes interference with helium detector and these readings are indicative of methane. To prove the readings were methane interference, the concentration of helium inside the shroud was more than doubled, to 50%; however, a corresponding increase in the helium was not observed.
J = Estimated value due to bias in the Continuous Calibration Value (CCV)
S = Saturated peak; data reported as estimated
<ND = Non-detect, Value listed is laboratory reporting limit.
ft bgs = feet below ground surface
NA = Not applicable.

Table 6-1
Remedial Alternatives Screening
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Potential Remedial Technology	Description	Effectiveness	Implementability	Retained (yes/no)	Comments
1. Environmental Covenant (EC)	An EC is an administrative control which will limit the future uses of the site and therefore limit exposure.	An EC does not involve the implementation of active remedial activities and will not remove or treat contaminated soils or LNAPL (Light Nonaqueous Phase Liquid) in the Detention Basin No. 2 (DB-2) area.	This technology is implementable at the site in supplement with a primary active remedial alternative.	Yes	Does not meet all requirements of Agreed Order (AO) No. DE 4460.
2. Groundwater Monitored Natural Attenuation (MNA)	Natural Attenuation (NA) includes a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants in groundwater.	NA is occurring in the groundwater beneath the lower yard; however, NA does not meet requirements for restoration within a reasonable timeframe; thus is not effective as a stand-alone technology. When combined with another alternative, compliance monitoring will have to continue to demonstrate that NA is occurring at the predicted rate. Cleanup contingency plans may have to be prepared if expected NA rate is not obtained.	This technology is implementable at the site in supplement with a primary remedial alternative.	Yes	Does not meet all requirements of AO No. DE 4460 .
3. Excavation	Excavation includes the physical removal of impacted soil and LNAPL from the site.	Effective at removing impacted soils and reducing dissolved-phase petroleum hydrocarbons. Extensive excavation has been completed at the site and is an effective way to meet cleanup levels (CULs) because contaminants are physically removed from the site.	This technology will help meet direct contact CULs in soil and groundwater CULs at the point of compliance boundary. Excavation is implementable at the site. Approximately 146,000 tons of material have been removed from the site successfully.	Yes	Preferred alternative outlined in AO No. DE 4460 to remediate observed LNAPL.
4. In-Situ Solidification	In-situ solidification (ISS) involves mixing binding agents (typically Portland cement) into the soil to provide physical sequestration of contaminants and a physical barrier between the ground surface and the soil beneath the treated monolith.	Effective at providing a physical barrier between the ground surface and soils beneath the treated monolith. This barrier can also minimize surface water infiltration which will stop migration of contaminants from soil to groundwater through leaching. Does not directly treat impacted soils or LNAPL.	This technology is implementable at the site in supplement with a primary remedial alternative.	Yes	Technology will need to be coupled with excavation to meet the requirements of AO No. DE 4460.
5. Enhanced Anaerobic Bio-Oxidation (ABOx)	Electron acceptors are injected into the subsurface to promote a reducing environment, which enhances ABOx of contaminants.	The technology is generally less effective on the predominant contaminant at the Lower Yard (fuel hydrocarbons) and may require several injections to see reduction in LNAPL and dissolved phase. ABOx injections will not address residual LNAPL in vadose zone soils.	This technology has low implementability because the volume of contaminated soil at the Lower Yard is likely too low for chemical reduction/oxidation to be implementable on a cost-effective basis.	No	Technology will need to be coupled with excavation to meet the requirements of AO No. DE 4460.
6. Surfactant Flushing	Clean water and surfactant is injected into the subsurface to mobilize contaminants in-situ for subsequent recovery.	Surfactant flushing can be effective in the reduction of organic- and inorganic-contaminant levels within the saturated zone, but may not be effective in addressing LNAPL impacted soil in the vadose zone.	Technology and downgradient monitoring would be difficult to implement as Willow Creek is located adjacent downgradient (<25 feet) of the remaining LNAPL impacts.	No	Does not address remaining impacts in soil and will have to be coupled with excavation to meet direct contact CULs and terms of AO No. DE 4460.
7. Groundwater Containment System using Groundwater Extraction Wells	The groundwater extraction wells would be installed downgradient of DB-2 in order to contain constituent of concern (COC) concentrations and control plume migration off site. Extracted LNAPL and groundwater would be treated prior to discharge.	This technology will act as a barrier to offsite migration of LNAPL and dissolved phase COCs.	This technology is implementable at the site.	Yes	This technology does not address non-mobile LNAPL in soils upgradient of the extraction radius of influence and will have to be coupled with excavation to meet direct contact CULs and terms of AO No. DE 4460.

Table 6-1
Remedial Alternatives Screening
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Potential Remedial Technology	Description	Effectiveness	Implementability	Retained (yes/no)	Comments
8. Groundwater Containment System using Groundwater Extraction Trench	A Groundwater interceptor trench with high permeability backfill would be installed downgradient of DB-2 in order to contain COC concentrations and control plume migration offsite. There would be a series of collection sumps within the trench to extract groundwater. Extracted LNAPL and groundwater would be treated prior to discharge.	This technology will act as a barrier to offsite migration of LNAPL and dissolved phase COCs.	This technology is potentially implementable at the site.	Yes	This technology does not address non-mobile LNAPL in soils upgradient of the extraction radius of influence and will have to be coupled with excavation to meet direct contact CULs and terms of AO No. DE 4460.
9. LNAPL Barrier Trench with Reactive Core Mat	The LNAPL barrier trench would be constructed with a reactive core mat to essentially lock LNAPL in place and ensure no offsite migration occurs. When LNAPL comes into contact with the reactive organoclay mat, it eventually becomes an impenetrable barrier.	This technology may be effective in preventing migration of contaminants or LNAPL, however is not effective as a long-term solution because it does not treat LNAPL or upgradient groundwater contaminants.	This technology is not potentially implementable at the site.	No	Does not meet all requirements of AO No. DE 4460.
10. Funnel and Gate with in-situ Remediation	Install a funnel and gate system to direct groundwater movement toward the extraction system.	This technology is likely not effective due to the limited net groundwater movement because of dampening tidal effects and recharge from Willow Creek. Additionally, there is limited downgradient area for adequate installation of the in-situ reactive zone consisting of sparge wells. Additionally, this technology is not adaptable to changing conditions and does not treat LNAPL within a reasonable restoration timeframe.	This technology is not implementable at the site.	No	Does not meet requirements of AO No. DE 4460.
11. Funnel and Gate with Groundwater Extraction.	Install a reactive barrier to allow groundwater outside of extraction influence to pass through and remove contaminants.	This technology is likely not effective due to the limited net groundwater movement because of dampening tidal effects and recharge from Willow Creek. Additionally, this technology is not adaptable to changing conditions and does not treat LNAPL within a reasonable restoration timeframe.	This technology is not implementable at the site.	No	Does not meet requirements of AO No. DE 4460.
12. Soil and Groundwater Treatment using Dual Phase Extraction (DPE)	The groundwater extraction wells would be installed downgradient of DB-2 in order to contain constituent of concern (COC) concentrations and control plume migration off site. Extracted LNAPL and groundwater would be treated prior to discharge.	A DPE system will be appropriate to remediate remaining soil impacts surrounding the WSDOT stormwater line, and act as a groundwater intercept system ensuring that offsite migration of dissolved phase COCs does not occur.	This technology is implementable at the site.	Yes	This technology will meet direct contact CULs and terms of AO No. DE 4460 in the WSDOT stormwater line vicinity. Additonnally excavation will be required in the DB-2 area to meet direct contact CULs and terms of AO No. DE 4460.

Notes:
Shading indicates that the process option was eliminated during the initial screening stage.

Table 7-1
Remedial Alternatives Evaluation
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

		Remedial Alternative 1	Remedial Alternative 2	Remedial Alternative 3	Remedial Alternative 4	Remedial Alternative 5	Remedial Alternative 6
Disproportionate Cost Analysis Parameter	**Uses Rank in FS Report**	**Excavation of DB-2 and MNA with ECs**	**Groundwater Containment Using Extraction Wells and MNA with ECs**	**Groundwater Containment Using Groundwater Extraction Trench and MNA with ECs**	**Excavation of DB-2 and WSDOT Storm Drain Line and Limited ECs**	**Excavation of DB-2 and In-Situ Solidification near WSDOT Storm Drain Line and MNA with ECs**	**Excavation of DB-2, Dual-Phase Extraction Treatment near WSDOT Storm Drain Line and Limited ECs**
Protectiveness	Overall protectiveness of human health and the environment	3	5	4	1	2	1
Permanence	The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances	3	5	4	1	2	1
Cost	The cost to implement the alternative	1	2	3	5	4	1
Effectiveness over the long term	The degree of certainty of success, the reliability of the alternative, the magnitude of residual risk, and the effectiveness of controls	3	5	4	1	2	2
Management of short-term risks	The risk to human health and environment associated with construction and implementation of the alternatives	3	1	2	5	4	4
Technical and administrative implementability	Technical feasibility of the alternative and administrative requirements	1	2	3	5	4	3
Consideration of public concerns	Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns.	4	5	5	1	5	2
	Average	**2.6**	**3.6**	**3.6**	**2.7**	**3.3**	**2.0**

Legend
MNA =Monitored Natural Attenuation
ECs =Environmental Covenants
DB-2 = Detention Basin No. 2
WSDOT = Washington State Department of Transportation

Table 7-2
Cost Estimate for Remedial Alternative 1
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Alternative 1: Excavation and Monitored Natural Attenuation with Environmental Covenants

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
Pre-Design Costs							
Surveying - Establish Control Points, Base Mapping, As-builts, Etc	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	
Engineering Design		Lump Sum	$10,000	$15,000	$19,000	$28,500	
Remediation Activities							
Mobilization/Demobilization	1	Lump Sum	$50,000	$100,000	$50,000	$100,000	
Excavation Work	3,000-5,800	Cubic Yards	$10	$15	$30,000	$86,730	Lower cost based on anticipated minimum excavation of DB-2 and upper cost based on the assumption that DB2 was built on top of the former Slops pond and complete removal of DB-2 and replacement assumed.
Lab (soil)	50-60	Sample	$572	$572	$28,600	$34,320	
Lab (water)	6	Sample	$950	$950	$5,700	$5,700	
Excavation Water Mangement	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Material Handling - Impacted Soils	3,000-5,800	Cubic Yards	$7	$11	$21,000	$63,602	
Material Stockpile Area & Management	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Truck Loading Area	1	Lump Sum	$5,000	$7,500	$5,000	$7,500	
Odor/Dust Control System & Material	1	Month	$5,000	$7,500	$5,000	$7,500	
Transportation and Off-Site Disposal							
- Hazardous Soil	0	Tons	$250	$375	$0	$0	
- Non-Hazardous Soil	4,500-8,700	Tons	$60	$90	$270,000	$780,570	
Air Monitoring	1	Lump Sum	$8,000	$12,000	$8,000	$12,000	
Excavation Restoration Activities							
Furnish Backfill	4,500-8,700	Ton	$15	$20	$67,500	$173,460	
Placement & Compaction of Backfill	3,000-5,800	CY	$6	$10	$18,000	$57,820	
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$43,984	$111,256	$43,984	$111,256	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$63,456	$163,104	$63,456	$163,104	
Groundwater Monitored Natural Attenuation							
Groundwater Monitored Natural Attenuation	1	Lump Sum	$1,100,000	$1,375,000	$1,100,000	$1,375,000	Annual Sampling and reporting during 60 years
Environmental Covenant							
Environmental Covenant	1	Lump Sum	$30,000	$50,000	$30,000	$50,000	

Complete Remedial Alternative 1 Subtotal Cost	**$1,790,000**	**$3,100,000**
Contingency (30%)	**$537,000**	**$930,000**
Complete Remedial Alternative 1 Cost	**$2,327,000**	**$4,030,000**

Table 7-3
Cost Estimate for Remedial Alternative 2
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Alternative 2: Groundwater Containment System Using Extraction Wells, and Monitored Natural Attenuation with Environmental Covenants

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
Pre-Design Costs							
Surveying - Establish Control Points, Base Mapping,	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	Assume Survey for Well Locations
Pilot Testing	1	Lump Sum	$40,000	$60,000	$40,000	$60,000	Pilot Testing with one well and additional Peizometers - includes Pilot Test Designa and Implementation
System Design Costs							
System Design	1	Lump Sum	$25,000	$37,500	$25,000	$37,500	Includes Post Pilot testing system design
Permitting and Fees	1	Lump Sum	$15,000	$22,500	$15,000	$22,500	Includes permitting fees for PSCAA, Construction and NPDES
Remediation Activities							
Mobilization/Demobilization (5% of Construction Costs, Excludes T&D Costs	1	Lump Sum	$21,900	$32,850	$21,900	$32,850	
Soil Disposal	40	Cubic Yards	$10	$15	$400	$600	Assume 40 yds for trenching and Well spoils
Well Installation	6	Wells	$6,000	$9,000	$36,000	$54,000	6 wells based on Groundwater Modeling
Trenching/Piping Installation	1	Lump sum	$115,000	$172,500	$115,000	$172,500	Assumes 300 feet of trenching with indivicual piping for each well. Piping includes Air delivery, water and shutoff
Discharge Piping	1	LS	$10,000	$15,000	$10,000	$15,000	Discharge piping includes connection to stormwater discharge and associated trenching and piping
System Electrical Installation	1	Lump sum	$25,000	$37,500	$25,000	$37,500	Electrical installation includes new power drop to site
Remediation Equipment	1	LS	$250,000	$375,000	$250,000	$375,000	Remediation equipment includes 10 X 20 building, oumps, treatment train, system controls
Operation & Maintenance							
Routine Operation	10	years	$72,000	$108,000	$720,000	$1,080,000	Based on bi-monthly site visits for parameter readings
Maintenance Costs	10	years	$15,000	$22,500	$150,000	$225,000	Based on two carbon changeouts per year along with oil changes, filters and contingency costs.
Utilities	10	years	$24,000	$36,000	$240,000	$360,000	Based on $2000 per month in electrical utilites
Groundwater Monitoring and Sampling	1	Lump Sum	$1,100,000	$1,375,000	$1,100,000	$1,375,000	Annual Sampling and reporting during 60 years
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$220,024	$308,036	$220,024	$308,036	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$54,996	$82,494	$54,996	$82,494	
Environmental Covenant							
Environmental Covenant	1	Lump Sum	$30,000	$50,000	$30,000	$50,000	

Complete System Install Subtotal Cost	**$3,060,000**	**$4,300,000**
Contingency (30%)	**$918,000**	**$1,290,000**
Complete Alternative 2 Cost	**$3,978,000**	**$5,590,000**

Table 7-4
Cost Estimate for Remedial Alternative 3
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Alternative 3: Groundwater Containment System Using Groundwater Extraction Trench, and Monitored Natural Attenuation with Environmental

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
Pre-Design Costs							
Surveying - Establish Control Points, Base Mapping,	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	Assume Survey for Well Locations
Pilot Testing	1	Lump Sum	$70,000	$105,000	$70,000	$105,000	Pilot Testing with trench section and additional peizometers - includes Pilot Test Design and Implementation
System Design Costs							
System Design	1	Lump Sum	$30,000	$45,000	$30,000	$45,000	Additional costs above well extraction system include trench design
Permitting and Fees	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Remediation Activities							
Mobilization/Demobilization (5% of Construction Costs, Excludes T&D Costs)	1	Lump Sum	$29,400	$44,100	$29,400	$44,100	
Soil Disposal	250	Cubic Yards	$10	$15	$2,500	$3,750	250 yds of soil for trench at 280 feet X 4 feet X 20 feet
Trenching Equipment	5	Days	$20,000	$30,000	$100,000	$150,000	Trenching Equipment at $20,000 per day assume 5 days for install
Trenching One Pass	280	LF	$250	$375	$70,000	$105,000	Trenching costs per lineal foot
Trenching/Piping Installation	1	Lump sum	$100,000	$150,000	$100,000	$150,000	Includes additional conveyance piping and trenching
Discharge Piping	1	LS	$10,000	$15,000	$10,000	$15,000	Discharge piping includes connection to stormwater discharge and associated trenching and piping
System Electrical Installation	1	Lump sum	$25,000	$37,500	$25,000	$37,500	
Remediation Equipment	1	LS	$280,000	$420,000	$280,000	$420,000	System will require Larger treatment train to handle 7 GPM
Operation & Maintenance							
Routine Operation	10	years	$72,000	$108,000	$720,000	$1,080,000	Based on bi-monthly site visits for parameter readings
Maintenance Costs	10	years	$15,000	$22,500	$150,000	$225,000	Based on two carbon changeouts per year along with oil changes, filters and contingency costs.
Utilities	10	years	$24,000	$36,000	$240,000	$360,000	Based on $2000 per month in electrical utilites
Groundwater Monitoring and Sampling	1	Lump Sum	$1,100,000	$1,375,000	$1,100,000	$1,375,000	Annual Sampling and reporting during 60 years
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$235,112	$330,668	$235,112	$330,668	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$74,028	$111,042	$74,028	$111,042	
Environmental Covenant							
Environmental Covenant	1	Lump Sum	$30,000	$50,000	$30,000	$50,000	

Complete System Install Subtotal Cost	**$3,280,000**	**$4,630,000**
Contingency (30%)	**$984,000**	**$1,389,000**
Complete Alternative 3 Cost	**$4,264,000**	**$6,019,000**

Table 7-5
Cost Estimate for Remedial Alternative 4
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Alternative 4: Excavation and Limited Environmental Covenants

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
DB-2 Excavation Costs							
Pre-Design Costs							
Surveying - Establish Control Points, Base Mapping, As-builts, Etc	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	
Engineering Design		Lump Sum	$10,000	$15,000	$19,000	$28,500	
Remediation Activities							
Mobilization/Demobilization	1	Lump Sum	$50,000	$100,000	$50,000	$100,000	
Excavation Work	3,000-5,800	Cubic Yards	$10	$15	$30,000	$86,730	Lower cost based on anticipated minimum excavation of DB-2 and upper cost based on the assumption that DB2 was built on top of the former Slops pond and complete removal of DB-2 and replacement assumed.
Lab (soil)	50-60	Sample	$572	$572	$28,600	$34,320	
Lab (water)	6	Sample	$950	$950	$5,700	$5,700	
Excavation Water Mangement	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Material Handling - Impacted Soils	3,000-5,800	Cubic Yards	$7	$11	$21,000	$63,602	
Material Stockpile Area & Management	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Truck Loading Area	1	Lump Sum	$5,000	$7,500	$5,000	$7,500	
Odor/Dust Control System & Material	1	Month	$5,000	$7,500	$5,000	$7,500	
Transportation and Off-Site Disposal							
- Hazardous Soil	0	Tons	$250	$375	$0	$0	
- Non-Hazardous Soil	4,500-8,700	Tons	$60	$90	$270,000	$780,570	
Air Monitoring	1	Lump Sum	$8,000	$12,000	$8,000	$12,000	
Excavation Restoration Activities							
Furnish Backfill	4,500-8,700	Ton	$15	$20	$67,500	$173,460	
Placement & Compaction of Backfill	3,000-5,800	CY	$6	$10	$18,000	$57,820	
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$43,984	$111,256	$43,984	$111,256	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$63,456	$163,104	$63,456	$163,104	
				DB-2 Excavation Subtotal Cost	**$660,000**	**$1,670,000**	

Table 7-5
Cost Estimate for Remedial Alternative 4
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Alternative 4: Excavation and Limited Environmental Covenants

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
WSDOT Stormwater Line Excavation Costs							
Pre-Design Costs							
Surveying - Establish Control Points, Base Mapping, As-builts, Etc	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	
Geotechnical Investigation	1	Lump Sum	$30,000	$45,000	$30,000	$45,000	Assume 3 MR borings to 50 feet bgs and index property testing.
Sheetpile Design	1	Lump Sum	$30,000	$45,000	$30,000	$45,000	Design 2 sheet sections, provide drawings and specs to team
Remediation Activities							
Mobilization/Demobilization	1	Lump Sum	$50,000	$100,000	$50,000	$100,000	
Excavation Work	7990	Cubic Yards	$10	$15	$79,900	$119,850	
15 Foot Excavation Shoring Materials (Drive Extract, Salvage (43 Foot Depth	281	Tons	$1,900	$2,200	$533,828	$618,116	From RSMeans
10 Foot Excavation Shoring Materials (Drive Extract, Salvage (29 Foot Depth	168	Tons	$2,300	$2,800	$386,193	$470,148	From RSMeans + extra for light sheets and higher wieght to labor cost
Water Tight Sealant (sheets sealed to 20 ft bgs)	8600	LF	$3	$5	$25,800	$38,700	
Geotechnical Monitoring	1	Month	$10,000	$20,000	$10,000	$20,000	
Excavation Dewatering -Set up of Water Treatment System	1	Lump Sum	$15,000	$22,500	$15,000	$22,500	Approximate
Excavation Dewatering - Operation of Water Treatment System	1,728,000	Gallons	$0.40	$1	$691,200	$1,036,800	Assumes 60 gpm for 20 continuous days.
Material Handling - Impacted Soils	7990	Cubic Yards	$7	$11	$55,930	$83,895	Material Handling - Relocation and temporary stockpile for subsequent load-out. Double Handling of soils.
Material Stockpile Area & Management	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Truck Loading Area	1	Lump Sum	$5,000	$7,500	$5,000	$7,500	
Odor/Dust Control System & Material	1	Month	$5,000	$7,500	$5,000	$7,500	Assumes equipment will be kept on standby for dust/odor control due to existing active facility/tenants
Transportation and Off-Site Disposal							
- Hazardous Soil	0	Tons	$250	$375	$0	$0	
- Non-Hazardous Soil	11985	Tons	$60	$90	$719,100	$1,078,650	
Air Monitoring	1	Lump Sum	$8,000	$12,000	$8,000	$12,000	Assumes air monitoring will be performed as part of work for H&S and active facility/tenants (Provided by Team)
Excavation Restoration Activities							
Pipe Replacement	1	Lump Sum	$20,000	$30,000	$20,000	$30,000	Approximate
Furnish Backfill	11,985	Ton	$15	$20	$179,775	$239,700	
Placement & Compaction of Backfill	7,990	CY	$6	$10	$47,940	$79,900	From RSMeans
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$232,373	$325,861	$232,373	$325,861	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$341,120	$477,631	$341,120	$477,631	
				WSDOT Stormwater Line Excavation Subtotal Cost	**$3,480,000**	**$4,880,000**	

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
Groundwater Monitoring and Sampling							
Groundwater Monitoring and Sampling	1	Lump Sum	$40,000	$50,000	$40,000	$50,000	Annual Sampling and reporting during 3 years
Environmental Covenant							
Environmental Covenant	1	Lump Sum	$30,000	$50,000	$30,000	$50,000	
				Complete Excavation and MNA Cost	**$4,210,000**	**$6,650,000**	
				Contingency (30%)	**$1,263,000**	**$1,995,000**	
				Complete Alternative 4 Cost	**$5,473,000**	**$8,645,000**	

Table 7-6
Cost Estimate for Remedial Alternative 5
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Alternative 5: Excavation with MNA and In-Situ Solidificationwith Environmental Covenants

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
DB-2 Excavation Costs							
Pre-Design Costs							
Surveying - Establish Control Points, Base Mapping, As-builts, Etc	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	
Engineering Design		Lump Sum	$10,000	$15,000	$19,000	$28,500	
Remediation Activities							
Mobilization/Demobilization	1	Lump Sum	$50,000	$100,000	$50,000	$100,000	
Excavation Work	3,000-5,800	Cubic Yards	$10	$15	$30,000	$86,730	Lower cost based on anticipated minimum excavation of DB-2 and upper cost based on the assumption that DB2 was built on top of the former Slops pond and complete removal of DB-2 and replacement assumed.
Lab (soil)	50-60	Sample	$572	$572	$28,600	$34,320	
Lab (water)	6	Sample	$950	$950	$5,700	$5,700	
Excavation Water Mangement	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Material Handling - Impacted Soils	3,000-5,800	Cubic Yards	$7	$11	$21,000	$63,602	
Material Stockpile Area & Management	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Truck Loading Area	1	Lump Sum	$5,000	$7,500	$5,000	$7,500	
Odor/Dust Control System & Material	1	Month	$5,000	$7,500	$5,000	$7,500	
Transportation and Off-Site Disposal							
- Hazardous Soil	0	Tons	$250	$375	$0	$0	
- Non-Hazardous Soil	4,500-8,700	Tons	$60	$90	$270,000	$780,570	
Air Monitoring	1	Lump Sum	$8,000	$12,000	$8,000	$12,000	
Excavation Restoration Activities							
Furnish Backfill	4,500-8,700	Ton	$15	$20	$67,500	$173,460	
Placement & Compaction of Backfill	3,000-5,800	CY	$6	$10	$18,000	$57,820	
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$43,984	$111,256	$43,984	$111,256	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$63,456	$163,104	$63,456	$163,104	
				DB-2 Excavation Subtotal Cost	**$660,000**	**$1,670,000**	

Table 7-6
Cost Estimate for Remedial Alternative 5
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Alternative 5: Excavation with MNA and In-Situ Solidificationwith Environmental Covenants

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
WSDOT Pipe ISS Costs							
Pre-Design Costs							
Surveying - Establish Control Points, Base Mapping, As-builts, Etc	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	
Geotechnical Investigation	1	Lump Sum	$5,000	$7,500	$5,000	$7,500	
ISS Design	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Remediation Activities							
Mobilization/Demobilization	1	Lump Sum	$13,000	$19,500	$13,000	$19,500	5% of labor
Excavation Work	710	Cubic Yards	$10	$15	$7,100	$10,650	Assumed top foot would be removed, then the ISS would bulk into that space, no ISS spoil excavation needed
Material Handling - Impacted Soils	710	Cubic Yards	$7	$11	$4,970	$7,455	
Mobilization/Demobilization & Setup of the ISSS Batch Mixing Plant	1	Lump Sum	$100,000	$150,000	$100,000	$150,000	
In-Situ Soil Mixing - Excavator Mixing (1-5 feet depth interval)	2840	Lump Sum	$50	$75	$142,000	$213,000	
Water Supply	1	Lump Sum	$20,000	$30,000	$20,000	$30,000	
Portland Cement (5%)	213	Tons	$120	$180	$25,560	$38,340	
Performance Monitoring (1 Per 300 Cubic Yards)	10	Each	$1,500	$2,250	$15,000	$22,500	
Odor/Dust Control System & Material	1	Month	$5,000	$7,500	$5,000	$7,500	
Transportation and Off-Site Disposal							
- Hazardous Soil	0	Tons	$250	$375	$0	$0	
- Non-Hazardous Soil	1065	Tons	$60	$90	$63,900	$95,850	
Air Monitoring	1	Lump Sum	$8,000	$12,000	$8,000	$12,000	
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$33,722	$50,584	$33,722	$50,584	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$48,544	$72,815	$48,544	$72,815	
				WSDOT Pipe ISS Subtotal Cost	**$510,000**	**$760,000**	
Groundwater Monitored Natural Attenuation							
Groundwater Monitored Natural Attenuation	1	Lump Sum	$1,100,000	$1,375,000	$1,100,000	$1,375,000	Annual Sampling and reporting during 60 years
Environmental Covenant							
Environmental Covenant	1	Lump Sum	$30,000	$50,000	$30,000	$50,000	
				Excavation, ISS, MNA, and Environmental Covenant Cost	**$2,300,000**	**$3,855,000**	
				Contingency (30%)	**$690,000**	**$1,156,500**	
				Complete Alternative 5 Cost	**$4,630,000**	**$5,011,500**	

Table 7-7
Cost Estimate for Remedial Alternative 6
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Alternative 6: Alternative 6: Excavation and Dual Phase Extraction Treatment

Task Description	Quantity	Units	Unit Lower Cost ($)	Unit Upper Cost ($)	Total Lower Cost ($)	Total Upper Cost ($)	Assumptions / Descriptions
Pre-Design Costs							
Surveying - Establish Control Points, Base Mapping, As-builts, Etc	1	Lump Sum	$2,000	$3,000	$2,000	$3,000	
Engineering Design		Lump Sum	$10,000	$15,000	$19,000	$28,500	
Remediation Activities							
Mobilization/Demobilization	1	Lump Sum	$50,000	$100,000	$50,000	$100,000	
Excavation Work	3,000-5,800	Cubic Yards	$10	$15	$30,000	$86,730	Lower cost based on anticipated minimum excavation of DB-2 and upper cost based on the assumption that DB2 was built on top of the former Slops pond and complete removal of DB-2 and replacement assumed.
Lab (soil)	50-60	Sample	$572	$572	$28,600	$34,320	
Lab (water)	6	Sample	$950	$950	$5,700	$5,700	
Excavation Water Mangement	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Material Handling - Impacted Soils	3,000-5,800	Cubic Yards	$7	$11	$21,000	$63,602	
Material Stockpile Area & Management	1	Lump Sum	$10,000	$15,000	$10,000	$15,000	
Truck Loading Area	1	Lump Sum	$5,000	$7,500	$5,000	$7,500	
Odor/Dust Control System & Material	1	Month	$5,000	$7,500	$5,000	$7,500	
Transportation and Off-Site Disposal							
- Hazardous Soil	0	Tons	$250	$375	$0	$0	
- Non-Hazardous Soil	4,500-8,700	Tons	$60	$90	$270,000	$780,570	
Air Monitoring	1	Lump Sum	$8,000	$12,000	$8,000	$12,000	
Excavation Restoration Activities							
Furnish Backfill	4,500-8,700	Ton	$15	$20	$67,500	$173,460	
Placement & Compaction of Backfill	3,000-5,800	CY	$6	$10	$18,000	$57,820	
Management							
Project Management (8% of Overall Costs)	1	Lump Sum	$43,984	$111,256	$43,984	$111,256	
Construction Oversight and Health & Safety (12% of Construction Costs)	1	Lump Sum	$63,456	$163,104	$63,456	$163,104	
				DB-2 Excavation Subtotal Cost	**$660,000**	**$1,670,000**	
DPE on WSDOT SD line							
DPE on WSDOT SD line	1	Lump Sum	$1,263,777	$1,516,532	$1,263,777	$1,516,532	
				DPE on WSDOT SD line Subtotal Cost	**$1,270,000**	**$1,520,000**	
Groundwater Monitoring and Sampling							
Groundwater Monitoring and Sampling	1	Lump Sum	$80,000	$100,000	$80,000	$100,000	Annual Sampling and reporting during 6 years
Environmental Covenant							
Environmental Covenant	1	Lump Sum	$30,000	$50,000	$30,000	$50,000	
				DB-2 Excavation and DPE on WSDOT SD line Cost	**$2,040,000**	**$3,340,000**	
				Contingency (30%)	**$612,000**	**$1,002,000**	
				Complete Alternative 6 Cost	**$2,652,000**	**$4,342,000**	

Table 7-9
Remedial Alternative 6 Versus Remedial Alternative 4 Pass 1 Evaluation
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Disproportionate Cost Analysis: Pass 1 (Ecology Weighting, Chevron Rankings and Public Concerns Criterion Added)

			Remedial Alternative 1	Remedial Alternative 2	Remedial Alternative 3	Remedial Alternative 4	Remedial Alternative 5	Remedial Alternative 6
Disproportionate Cost Analysis Parameter	**Parameter Weight**	**Uses Rank in FS Report***	**Excavation of DB-2 and MNA with ECs**	**Groundwater Containment Using Extraction Wells and MNA with ECs**	**Groundwater Containment Using Groundwater Extraction Trench and MNA with ECs**	**Excavation of DB-2 and WSDOT Storm Drain Line and Limited ECs**	**Excavation of DB-2 and In-Situ Solidification near WSDOT Storm Drain Line and MNA with ECs**	**Excavation of DB-2, Dual-Phase Extraction Treatment near WSDOT Storm Drain Line and Limited ECs**
Protectiveness	10	Overall protectiveness of human health and the environment	3	5	4	1	2	1
Permanence	8	The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances	3	5	4	1	2	1
Cost	8	The cost to implement the alternative	1	2	3	5	4	1
Effectiveness over the long term	10	The degree of certainty of success, the reliability of the alternative, the magnitude of residual risk, and the effectiveness of controls	3	5	4	1	2	2
Management of short-term risks	4	The risk to human health and environment associated with construction and implementation of the alternatives	3	1	2	5	4	4
Technical and administrative implementability	4	Technical feasibility of the alternative and administrative requirements	1	2	3	5	4	3
Consideration of public concerns	6	Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns.	4	5	5	1	5	2
		WEIGHTED SUMS:	**132**	**198**	**186**	**114**	**150**	**86**

Legend
[grey box] Remedial alternative rejected by Ecology
*: Except consideration of public concerns
MNA =Monitored Natural Attenuation
ECs =Environmental Covenants
DB-2 = Detention Basin No. 2
WSDOT = Washington State Department of Transportation

Table 7-10
Remedial Alternative 6 Versus Remedial Alternative 4 Pass 2 Evaluation
Chevron Environmental Management Company
FINAL FEASABILITY STUDY REPORT
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

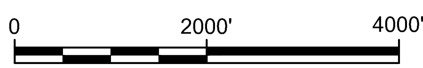
Disproportionate Cost Analysis: Pass 2 (Ecology Weighting and Rankings, and Public Concerns Criterion Added)

			Remedial Alternative 1	Remedial Alternative 2	Remedial Alternative 3	Remedial Alternative 4	Remedial Alternative 5	Remedial Alternative 6
Disproportionate Cost Analysis Parameter	**Parameter Weight**	**Uses Rank in FS Report***	**Excavation of DB-2 and MNA with ECs**	**Groundwater Containment Using Extraction Wells and MNA with ECs**	**Groundwater Containment Using Groundwater Extraction Trench and MNA with ECs**	**Excavation of DB-2 and WSDOT Storm Drain Line and Limited ECs**	**Excavation of DB-2 and In-Situ Solidification near WSDOT Storm Drain Line and MNA with ECs**	**Excavation of DB-2, Dual-Phase Extraction Treatment near WSDOT Storm Drain Line and Limited ECs**
Protectiveness	10	Overall protectiveness of human health and the environment	3	5	5	1	3	1
Permanence	8	The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances	3	5	5	1	3	1
Cost	8	The cost to implement the alternative	2.1	3.6	3.9	5	4.2	2.4
Effectiveness over the long term	10	The degree of certainty of success, the reliability of the alternative, the magnitude of residual risk, and the effectiveness of controls	3	5	5	1	3	2
Management of short-term risks	4	The risk to human health and environment associated with construction and implementation of the alternatives	3	1	2	5	4	4
Technical and administrative implementability	4	Technical feasibility of the alternative and administrative requirements	3	3	3	3	5	3
Consideration of public concerns	6	Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns.	3	5	5	1	5	2
		WEIGHTED SUMS:	**143**	**215**	**221**	**106**	**184**	**97**

Legend
[gray shading] Remedial alternative rejected by Ecology
*: Except consideration of public concerns
MNA =Monitored Natural Attenuation
ECs =Environmental Covenants
DB-2 = Detention Basin No. 2
WSDOT = Washington State Department of Transportation

FIGURES

REFERENCE: BASE MAP USGS QUADS., 7.5 MIN. SERIES (TOPOGRAPHIC) - EDMONDS EAST, WASH. AND EDMONDS WEST, WASH.



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

FORMER UNOCAL BULK FUEL TERMINAL LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-1

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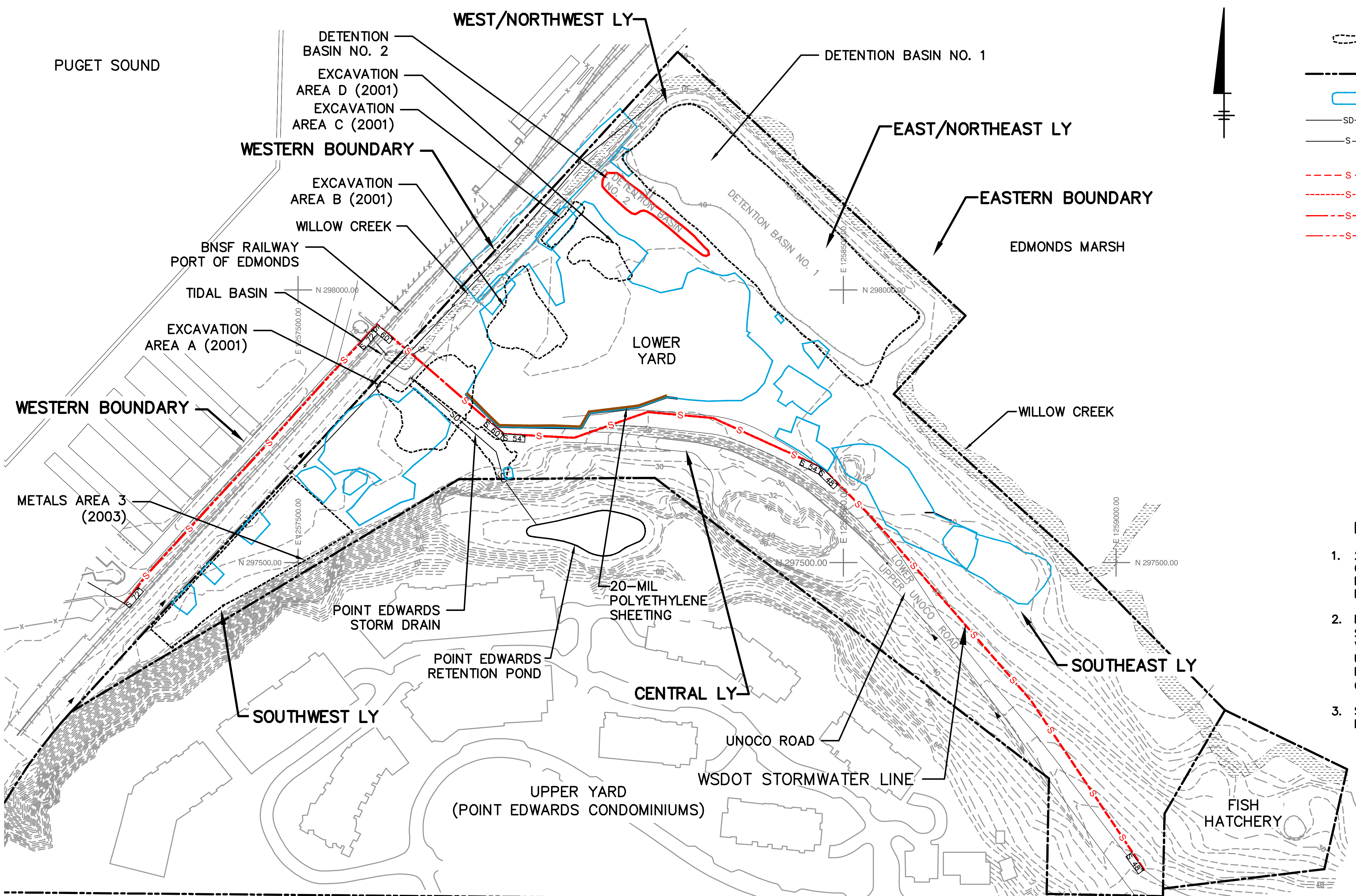
PUBLIC REVIEW DRAFT



LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- SD — POINT EDWARDS STORM DRAIN LINE
- S — WSDOT STORMWATER LINE (DIAMETER OF STORMWATER LINE INDICATED BY DASHED LINE)
- S — 48" DIAMETER STORMWATER LINE
- S — 54" DIAMETER STORMWATER LINE
- S — 60" DIAMETER STORMWATER LINE
- S — 72" DIAMETER STORMWATER LINE

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
VERTICAL DATUM: N.A.V.D. 88
UNITS: U.S. SURVEY FEET
HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

FORMER UNOCAL BULK FUEL TERMINAL LAYOUT

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-2

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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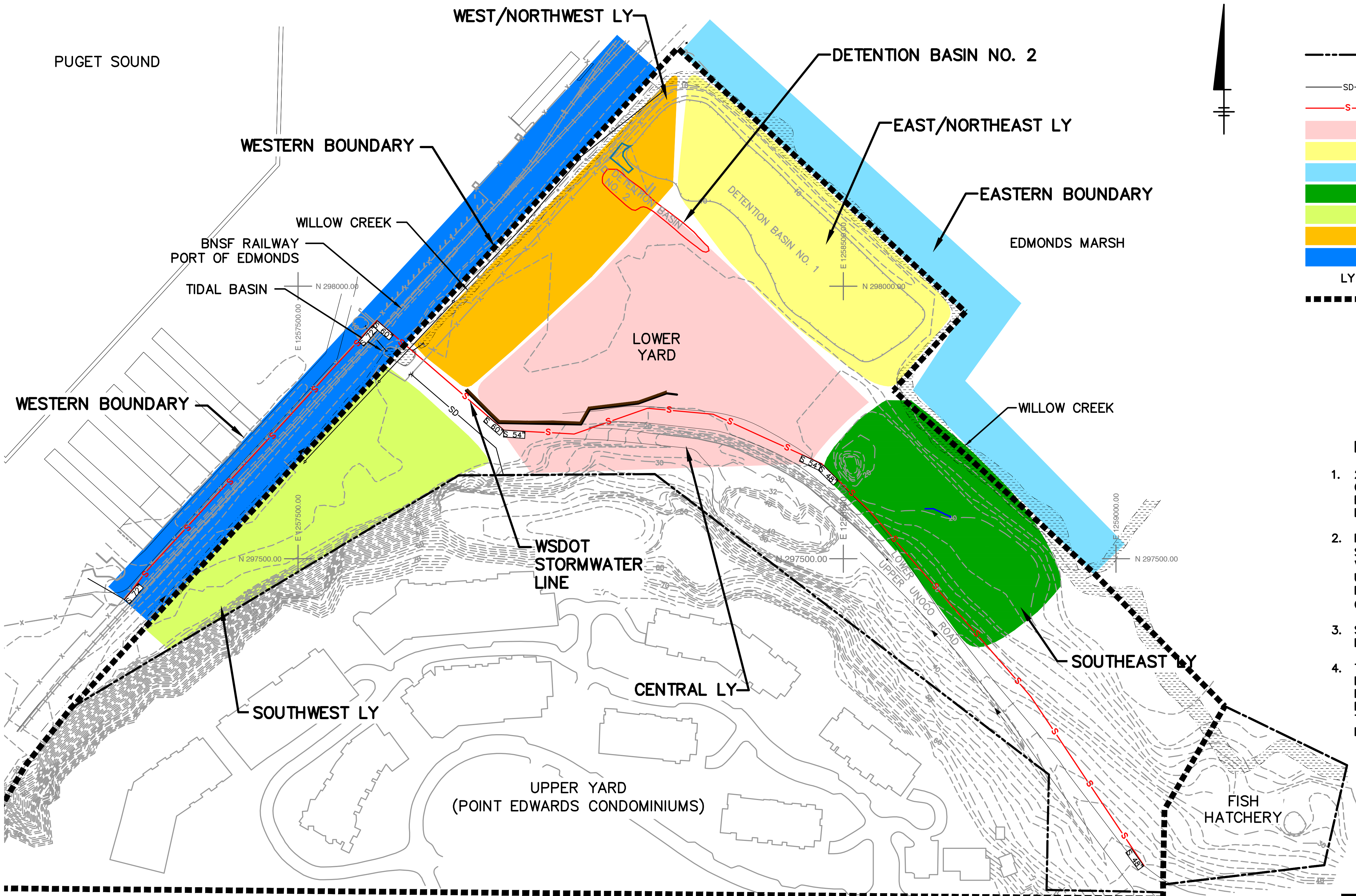


LEGEND:

- FORMER UNOCAL BULK FUEL PROPERTY BOUNDARY
- POINT EDWARDS STORM DRAIN LINE
- WSDOT STORMWATER LINE
- CENTRAL LY
- EAST/NORTHEAST LY
- EASTERN BOUNDARY
- SOUTHEAST LY
- SOUTHWEST LY
- WEST/NORTHWEST LY
- WESTERN BOUNDARY
- LY — LOWER YARD
- SITE BOUNDARY

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. THE SITE IS NOW COMPRISED OF THE AREAS OF THE LOWER YARD AND THE UPPER YARD WHERE A HAZARDOUS SUBSTANCE HAS COME TO BE LOCATED. THE FISH HATCHERY IS NO LONGER INCLUDED AS PART OF THE SITE AS A RESULT OF THE REVIEW OF HISTORICAL INFORMATION.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

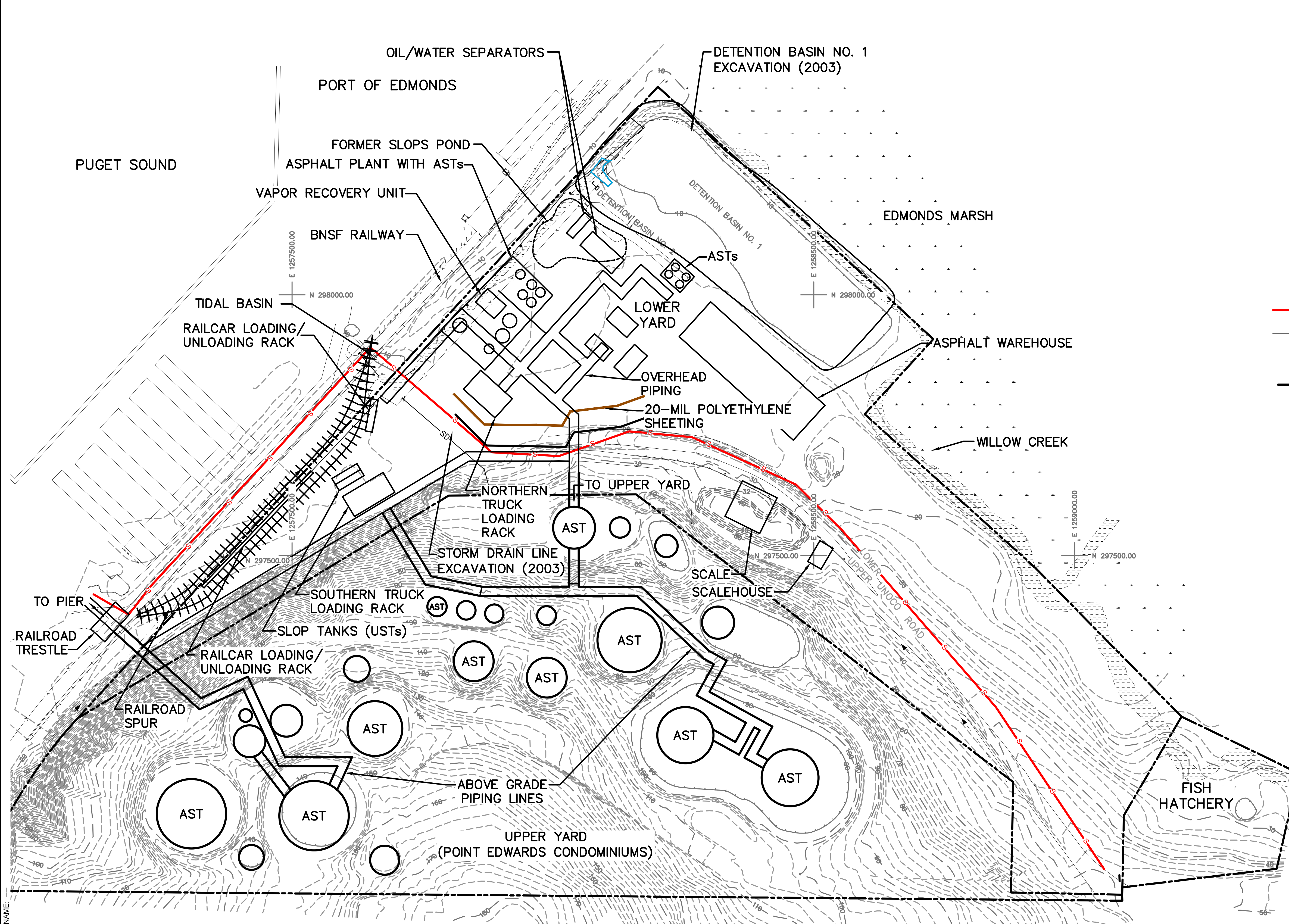
FORMER UNOCAL BULK FUEL TERMINAL AREA OF THE LOWER YARD

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1-3

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
\\arcadis-us.com\officedata\Minneapolis-MN\ENVCAD\Minneapolis-MN\ACT\B0045362\0008\00005\CMP\DWG\45362I01-3.dwg LAYOUT: 1-3 SAVED: 5/2/2017 4:38 PM ACADVER: 20.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 5/2/2017 4:40 PM BY: REYES, ALEC
XREFS: 45362X02 45362X03 IMAGES: PROJECTNAME: ----

PUBLIC REVIEW DRAFT



LEGEND:

- WSDOT STORMWATER LINE
- POINT EDWARDS STORMWATER LINE
- HISTORICAL FEATURE
- PROPERTY BOUNDARY
- AST — ABOVEGROUND STORAGE TANKS (ASTs)
- UST — UNDERGROUND STORAGE TANK

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

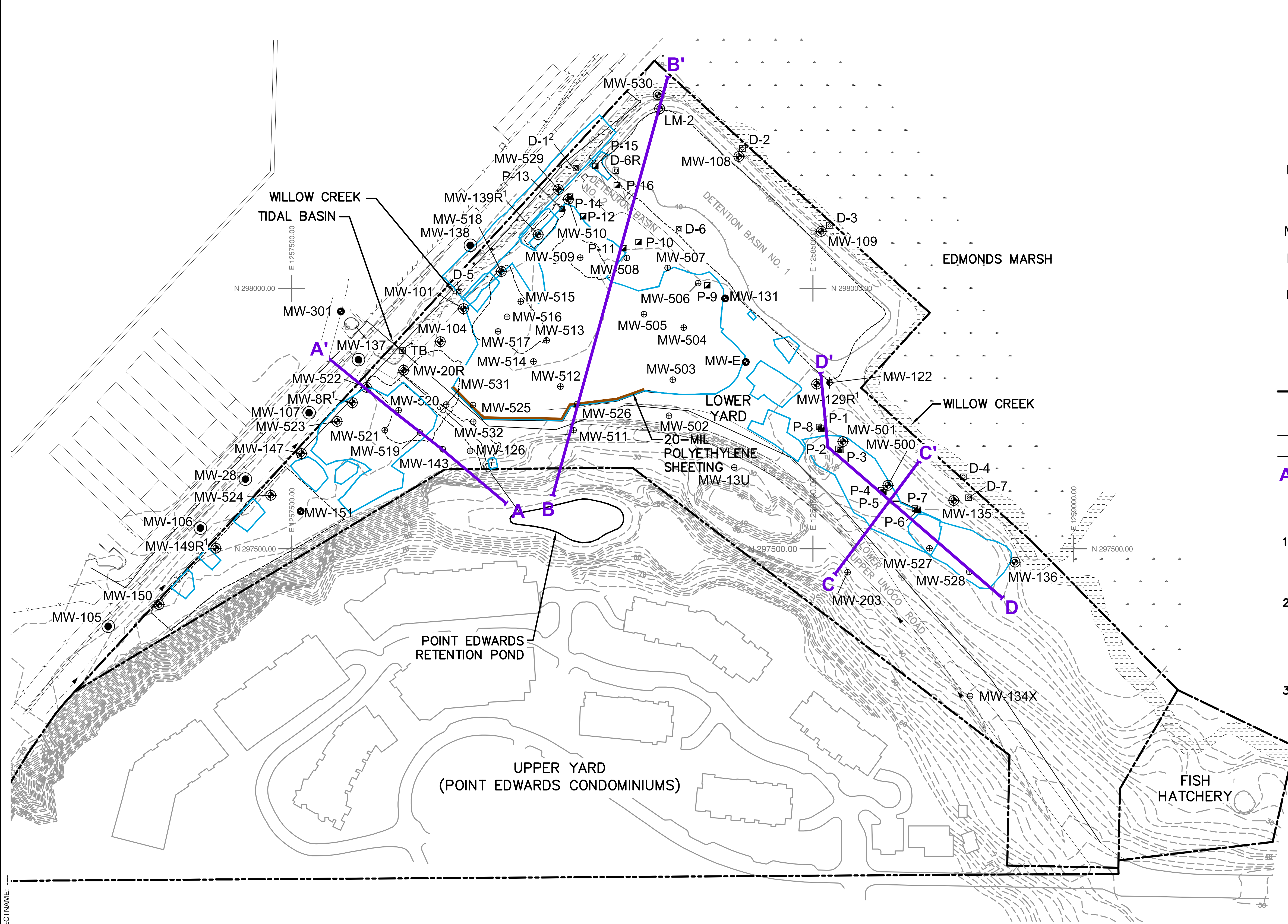
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

HISTORICAL FACILITIES LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-1

PUBLIC REVIEW DRAFT



LEGEND:

- MW-203 ⊕ INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-301 MONITORING WELL
- MW-105 BNSF WELLS (DECOMISSIONED)
- MW-122 DEEP MONITORING WELL LOCATION AND DESIGNATION
- MW-109 PERIMETER MONITORING WELL LOCATION
- P-11 PIEZOMETER
- D-1 STAFF GAUGE
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- —S— WSDOT STORMWATER LINE
- —SD— POINT EDWARDS STORM DRAIN LINE
- A—A' CROSS SECTION LOCATIONS

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
   VERTICAL DATUM: N.A.V.D. 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

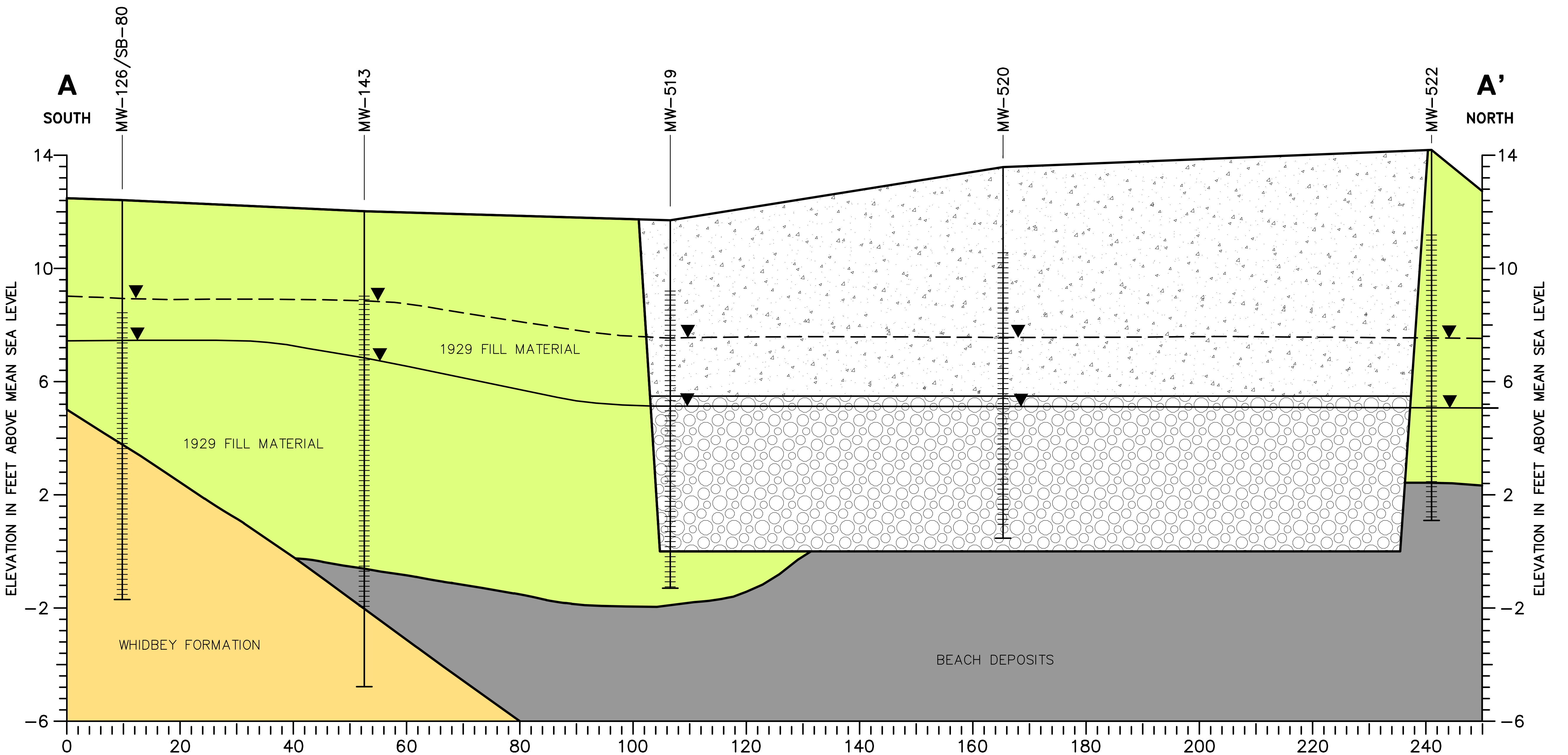
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

CROSS SECTION LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-2

PUBLIC REVIEW DRAFT



VERTICAL EXAGGERATION: 5x

0 4' 8'

VERTICAL SCALE

0 20' 40'

HORIZONTAL SCALE

NOTES:

- HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
- VERTICAL DATUM: N.A.V.D. 88
- UNITS: U.S. SURVEY FEET
- HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).

LEGEND:

MW-126 — WELL OR BORING ID

GROUND SURFACE

HISTORICAL HIGH WATER LEVEL

HISTORICAL LOW WATER LEVEL

LITHOLOGIC CONTACT (DASHED WHERE INFERRED)

SCREENED INTERVAL

BOTTOM OF BORING

1929 FILL MATERIAL

BEACH DEPOSITS

TRANSITIONAL SILT BED

WHIDBEY FORMATION

MARSH DEPOSITS

2007/2008 FILL (GRAVEL)

2007/2008 FILL (SILT, SAND AND GRAVEL)

(35' SE)=OFFSET DISTANCE FROM CROSS SECTION PROFILE

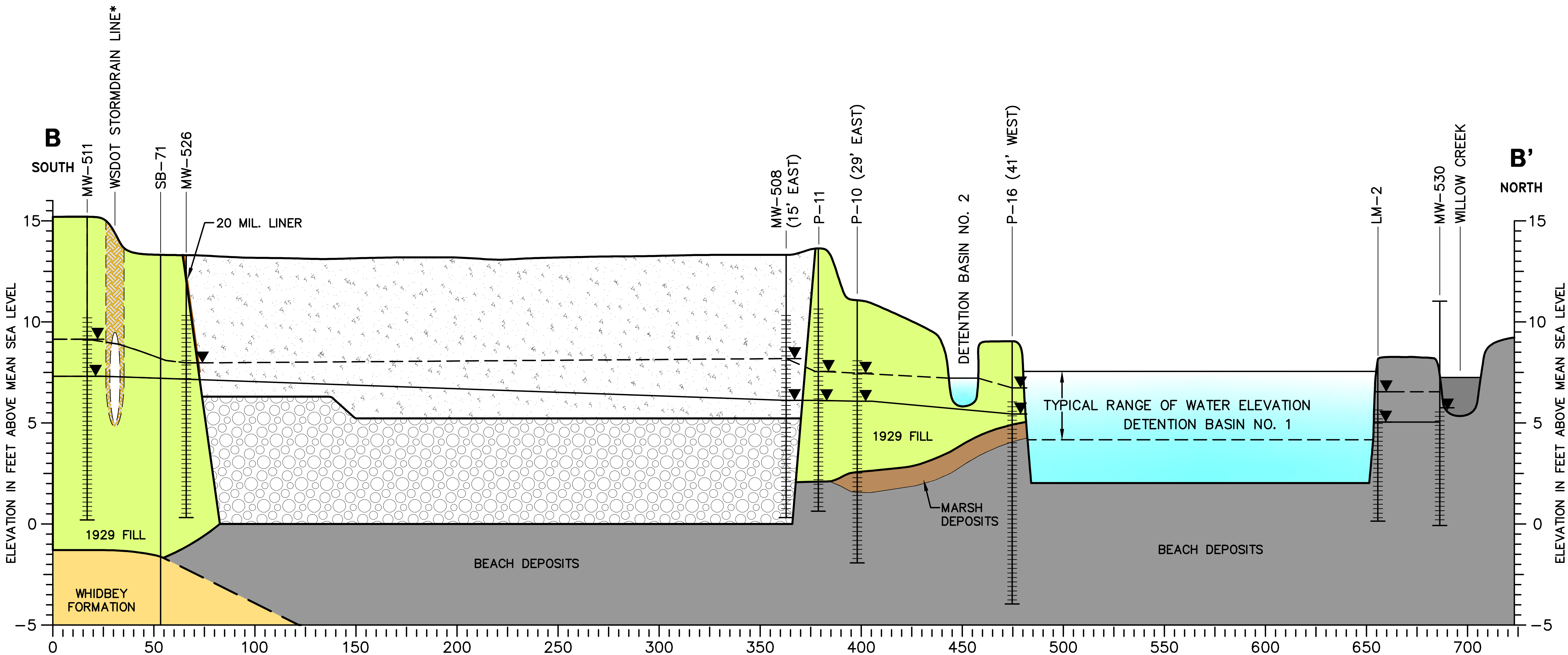
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

LOWER YARD
GEOLOGIC CROSS SECTION A-A'

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-3

PUBLIC REVIEW DRAFT



VERTICAL EXAGGERATION: 10x

0 5' 10'

VERTICAL SCALE

0 50' 100'

HORIZONTAL SCALE

NOTES:

1. WSDOT STORMDRAIN LINE LOCATION IS APPROXIMATE AND DRAWN TO A NON EXAGGERATED SCALE FOR CLARITY.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
   VERTICAL DATUM: N.A.V.D. 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).

LEGEND:

- MW-511 — WELL OR BORING ID
- GROUND SURFACE
- HISTORICAL HIGH WATER LEVEL
- HISTORICAL LOW WATER LEVEL
- LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
- SCREENED INTERVAL
- BOTTOM OF BORING
- DISTURBED TRENCH MATERIAL
- 1929 FILL MATERIAL
- BEACH DEPOSITS
- WHIDBEY FORMATION
- MARSH DEPOSITS
- 2007/2008 FILL (GRAVEL)
- 2007/2008 FILL (SILT, SAND AND GRAVEL)
- (29' E)=OFFSET DISTANCE FROM CROSS SECTION PROFILE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

LOWER YARD GEOLOGIC CROSS SECTION B-B'

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-4

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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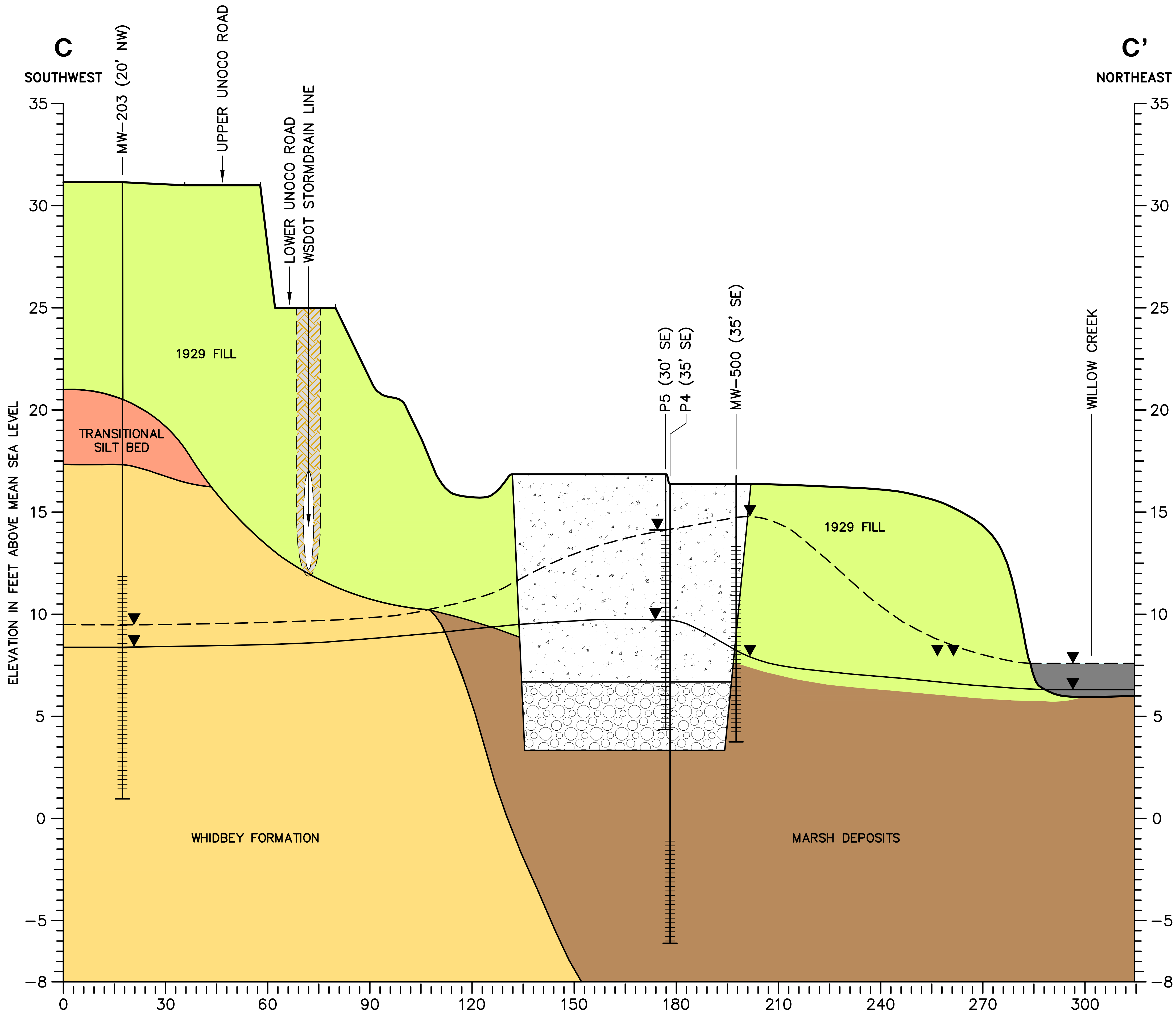
XREFS: 45362X0D IMAGES: PROJECTNAME: ---

PUBLIC REVIEW DRAFT



LEGEND:

- MW-500 — WELL OR BORING ID
- GROUND SURFACE
- HISTORICAL HIGH WATER LEVEL
- HISTORICAL LOW WATER LEVEL
- LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
- SCREENED INTERVAL
- BOTTOM OF BORING
- DISTURBED TRENCH MATERIAL
- 1929 FILL MATERIAL
- BEACH DEPOSITS
- TRANSITIONAL SILT BED
- WHIDBEY FORMATION
- MARSH DEPOSITS
- 2007/2008 FILL (GRAVEL)
- 2007/2008 FILL (SILT, SAND AND GRAVEL)
- (35' SE)=OFFSET DISTANCE FROM CROSS SECTION PROFILE

NOTES:

1. WSDOT STORMWATER LINE LOCATION IS APPROXIMATE AND DRAWN TO A NON EXAGGERATED SCALE FOR CLARITY.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
   VERTICAL DATUM: N.A.V.D. 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).

VERTICAL EXAGGERATION: 6x

0 5' 10'
VERTICAL SCALE

0 30' 60'
HORIZONTAL SCALE

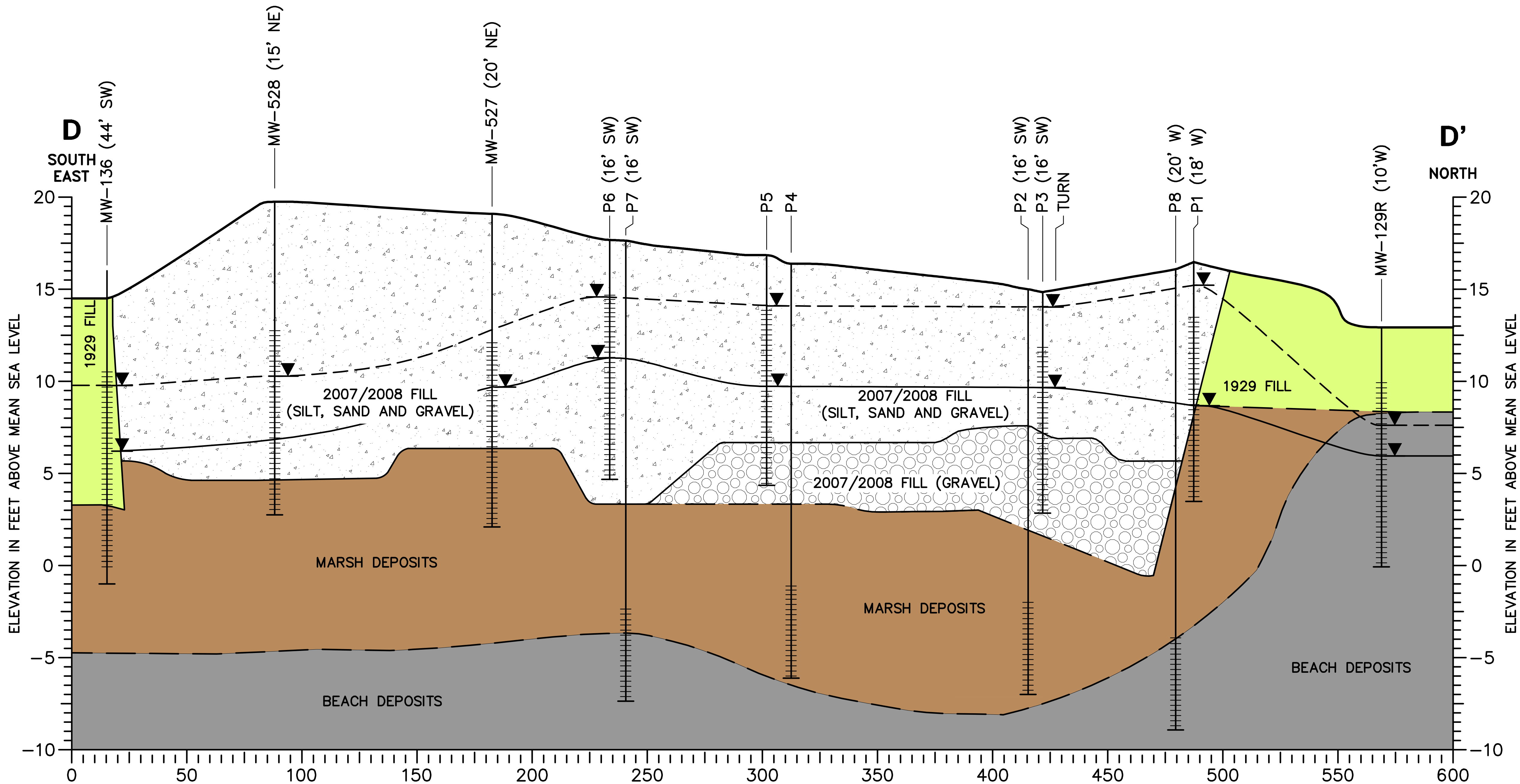
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

SOUTHEAST LOWER YARD GEOLOGIC CROSS SECTION C-C'

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-5

PUBLIC REVIEW DRAFT



LEGEND:

MW-136	WELL OR BORING ID
	GROUND SURFACE
	HISTORICAL HIGH WATER LEVEL
	HISTORICAL LOW WATER LEVEL
	LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
	SCREENED INTERVAL
	BOTTOM OF BORING

- 1929 FILL MATERIAL
- BEACH DEPOSITS
- TRANSITIONAL SILT BED
- WHIDBEY FORMATION
- MARSH DEPOSITS
- 2007/2008 FILL (GRAVEL)
- 2007/2008 FILL (SILT, SAND AND GRAVEL)

(20' W)= OFFSET DISTANCE FROM CROSS SECTION PROFILE

NOTES:

1. CROSS SECTION DEPICTS SOIL CHARACTERISTICS OF EXCAVATION SIDE WALLS. EXCAVATIONS REACHED TOTAL DEPTHS OF 15 FT. BGS. (<0 FEET AMSl).
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).

VERTICAL EXAGGERATION: 8x

0 6.25' 12.5'
VERTICAL SCALE

0 50' 100'
HORIZONTAL SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

SOUTHEAST LOWER YARD GEOLOGIC CROSS SECTION D-D'

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-6

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* G:\ENVCAD\Minneapolis-MN\ACT\B0045362\0007\00002\2017 FS\DWG\45362D02-6.dwg LAYOUT: 2-6 SAVED: 12/6/2016 11:17 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 12/6/2016 11:17 AM BY: OBERLANDER, ROSEANNE
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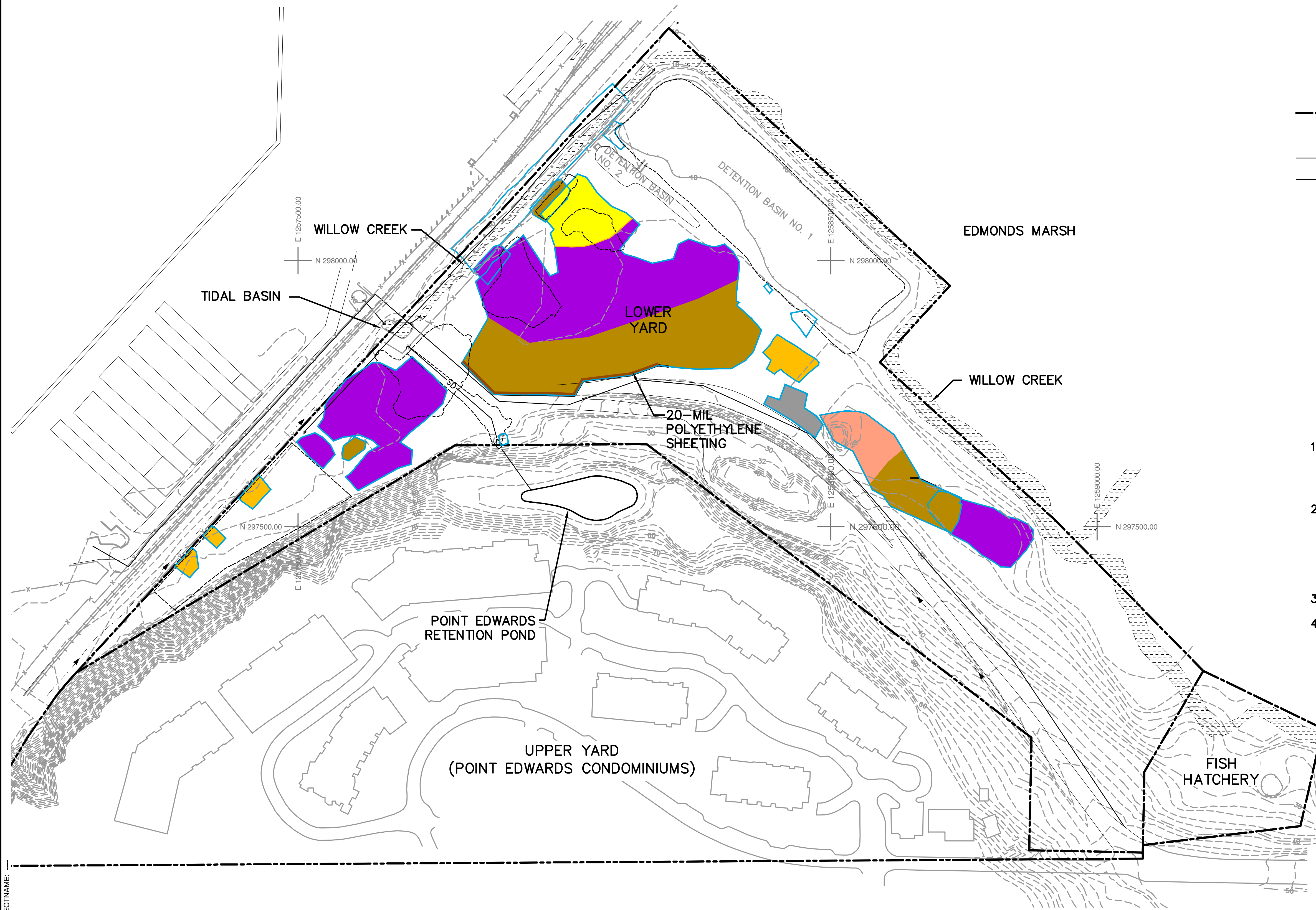

LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- S — WSDOT STORMWATER LINE
- SD — POINT EDWARDS STORM DRAIN LINE

TOP OF GRAVEL BACKFILL ELEVATION:

- 2 – 3 FT AMSL
- 4 – 5 FT AMSL
- 5 – 6 FT AMSL
- 6 – 7 FT AMSL
- 7 – 8 FT AMSL
- 9 – 11 FT AMSL

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
VERTICAL DATUM: N.A.V.D. 88
UNITS: U.S. SURVEY FEET
HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. FT AMSL = FEET ABOVE MEAN SEA LEVEL.
4. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

TOP OF 2008 GRAVEL BACKFILL ELEVATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-7

PUBLIC REVIEW DRAFT

LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- LOWER YARD PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE

BOTTOM OF GRAVEL BACKFILL ELEVATION:

- 8 – 9 FT AMSL
- 6 – 4 FT AMSL
- 4 – 2 FT AMSL
- 2 – 0 FT AMSL
- 0 TO –2 FT AMSL

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
   VERTICAL DATUM: N.A.V.D. 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. FT AMSL = FEET ABOVE MEAN SEA LEVEL.
4. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

BOTTOM OF 2008 GRAVEL BACKFILL ELEVATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE **2-8**

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* G:\ENVCAD\Minneapolis-MN\ACT\B0045362\0007\00002\2017 FS\DWG\45362D02-8.dwg LAYOUT: 2-8 SAVED: 12/13/2016 9:37 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 12/13/2016 9:42 AM BY: OBERLANDER, ROSEANNE
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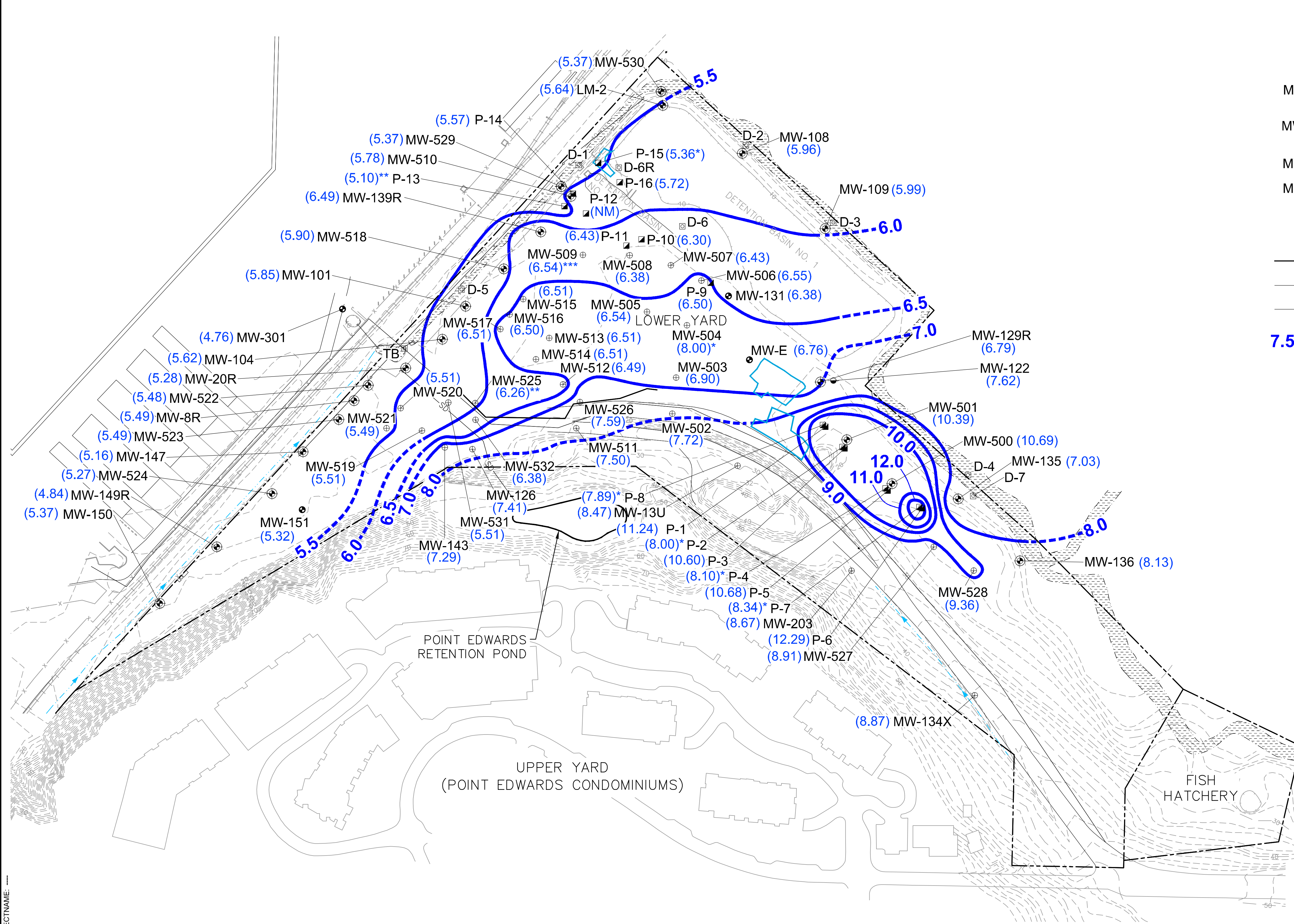


LEGEND:

MW-203 ⊕	INTERIOR MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-301	MONITORING WELL
MW-109	PERIMETER MONITORING WELL LOCATION
P-11	PIEZOMETER
D-1	STAFF GAUGE
—·—·—	LOWER YARD PROPERTY BOUNDARY
—S—	WSDOT STORM DRAIN LINE
—SD—	POINT EDWARDS STORM DRAIN LINE
7.5 ——	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
(12.29)	GROUNDWATER ELEVATION
(8.10)*	GROUNDWATER ELEVATION NOT USED IN CONTOURING
(5.57)**	GROUNDWATER ELEVATION ADJUSTED FOR THE PRESENCE OF LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL)
(NM)	NOT MEASURED
***	GAUGED ON LATER DATE DUE TO PRESENCE OF BEES AND NOT USED IN CONTOURING

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORM DRAIN LINE HAS NOT BEEN SURVEYED.

0 200' 400'

GRAPHIC SCALE

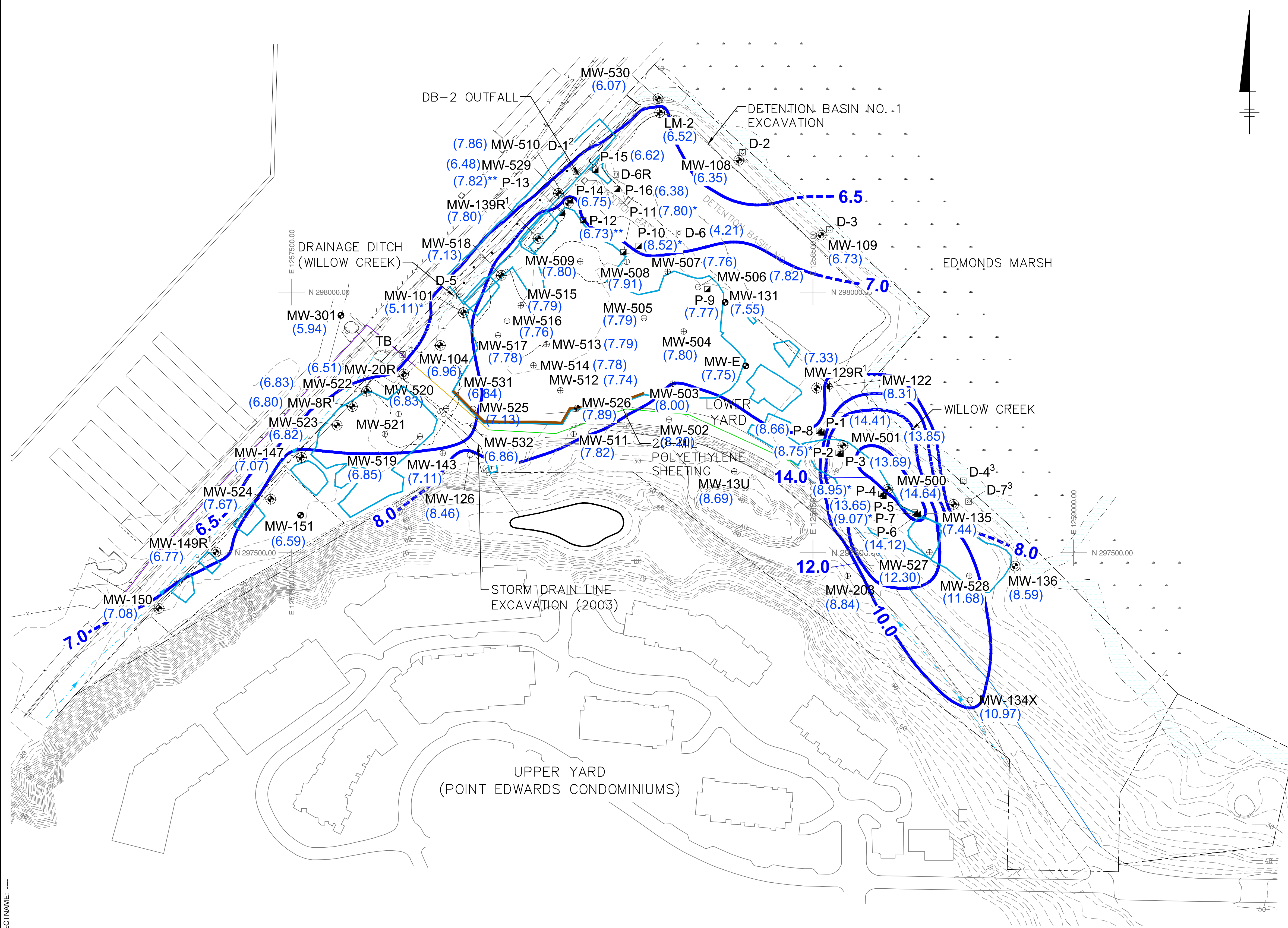
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

SECOND QUARTER 2015 GROUNDWATER ELEVATIONS AND CONTOURS - JUNE 22, 2015

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-9

PUBLIC REVIEW DRAFT



LEGEND:

MW-203 ⊕	INTERIOR MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-301	MONITORING WELL
MW-109	PERIMETER MONITORING WELL LOCATION
P-11	PIEZOMETER
D-1	STAFF GAUGE
	LOWER YARD PROPERTY BOUNDARY
—S—	WSDOT STORM DRAIN LINE
—SD—	POINT EDWARDS STORM DRAIN LINE
7.5	GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
(12.29)	GROUNDWATER ELEVATION
(8.10)*	GROUNDWATER ELEVATION NOT USED IN CONTOURING
(6.73)**	GROUNDWATER ELEVATION ADJUSTED FOR THE PRESENCE OF LIGHT NON-AQUEOUS PHASE LIQUID (LNAPL)
***	GAUGED ON LATER DATE DUE TO PRESENCE OF BEES AND NOT USED IN CONTOURING

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORM DRAIN LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

FOURTH QUARTER 2016 GROUNDWATER ELEVATIONS AND CONTOURS OCTOBER 27, 2016

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-10

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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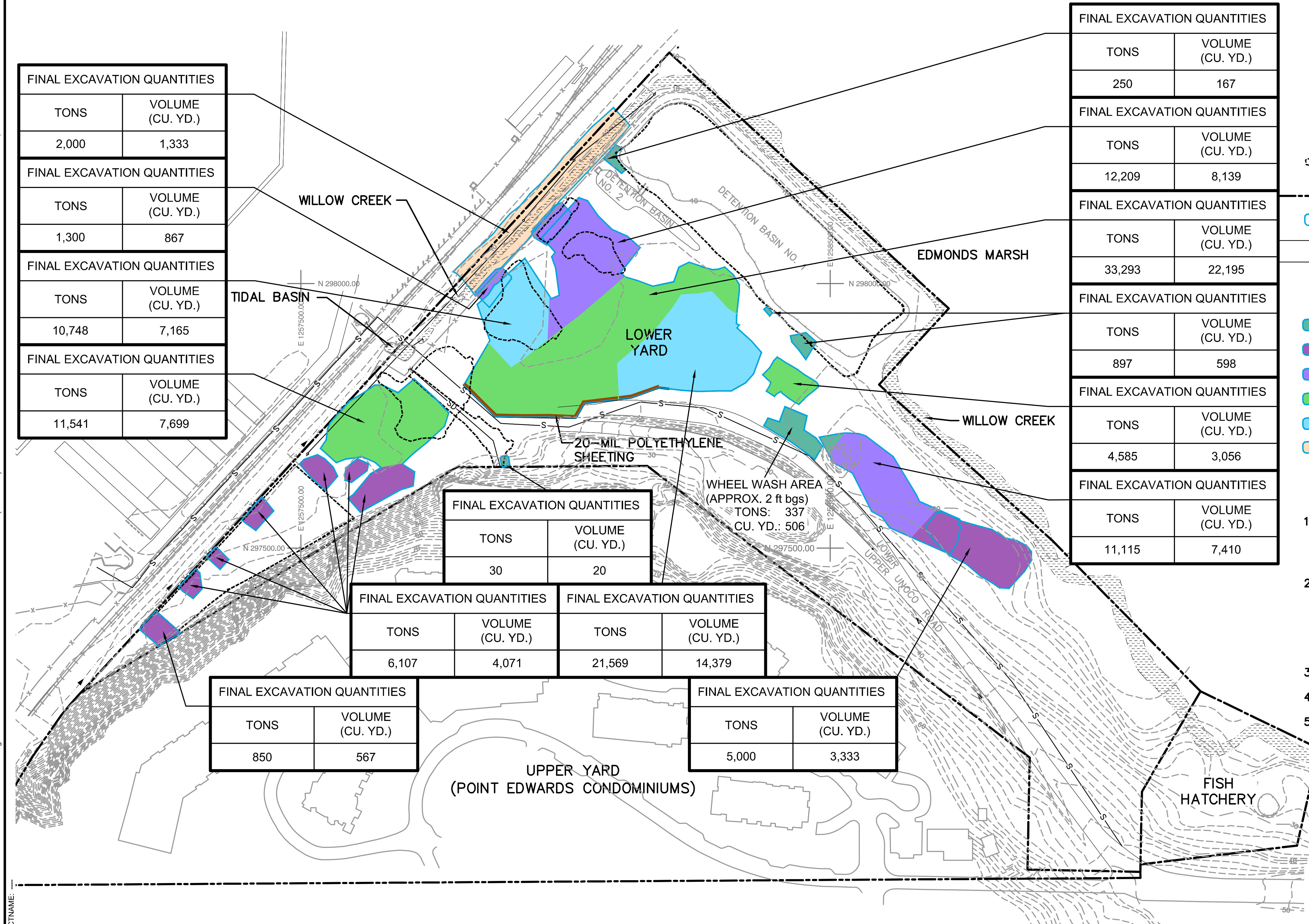


FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
2,000	1,333

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
1,300	867

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
10,748	7,165

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
11,541	7,699

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
30	20

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
6,107	4,071

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
21,569	14,379

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
850	567

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
5,000	3,333

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
250	167

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
12,209	8,139

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
33,293	22,195

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
897	598

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
4,585	3,056

FINAL EXCAVATION QUANTITIES

TONS	VOLUME (CU. YD.)
11,115	7,410

LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- S — WSDOT STORMWATER LINE
- SD — POINT EDWARDS STORM DRAIN LINE

BOTTOM OF GRAVEL BACKFILL ELEVATION:

- 8 – 9 FT AMSL
- 6 – 4 FT AMSL
- 4 – 2 FT AMSL
- 2 – 0 FT AMSL
- 0 TO –2 FT AMSL
- WILLOW CREEK SEDIMENT REMOVAL AREA (1 FOOT SCRAPE)

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. CU. YD. = CUBIC YARDS
4. FT AMSL = FEET ABOVE MEAN SEA LEVEL.
5. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

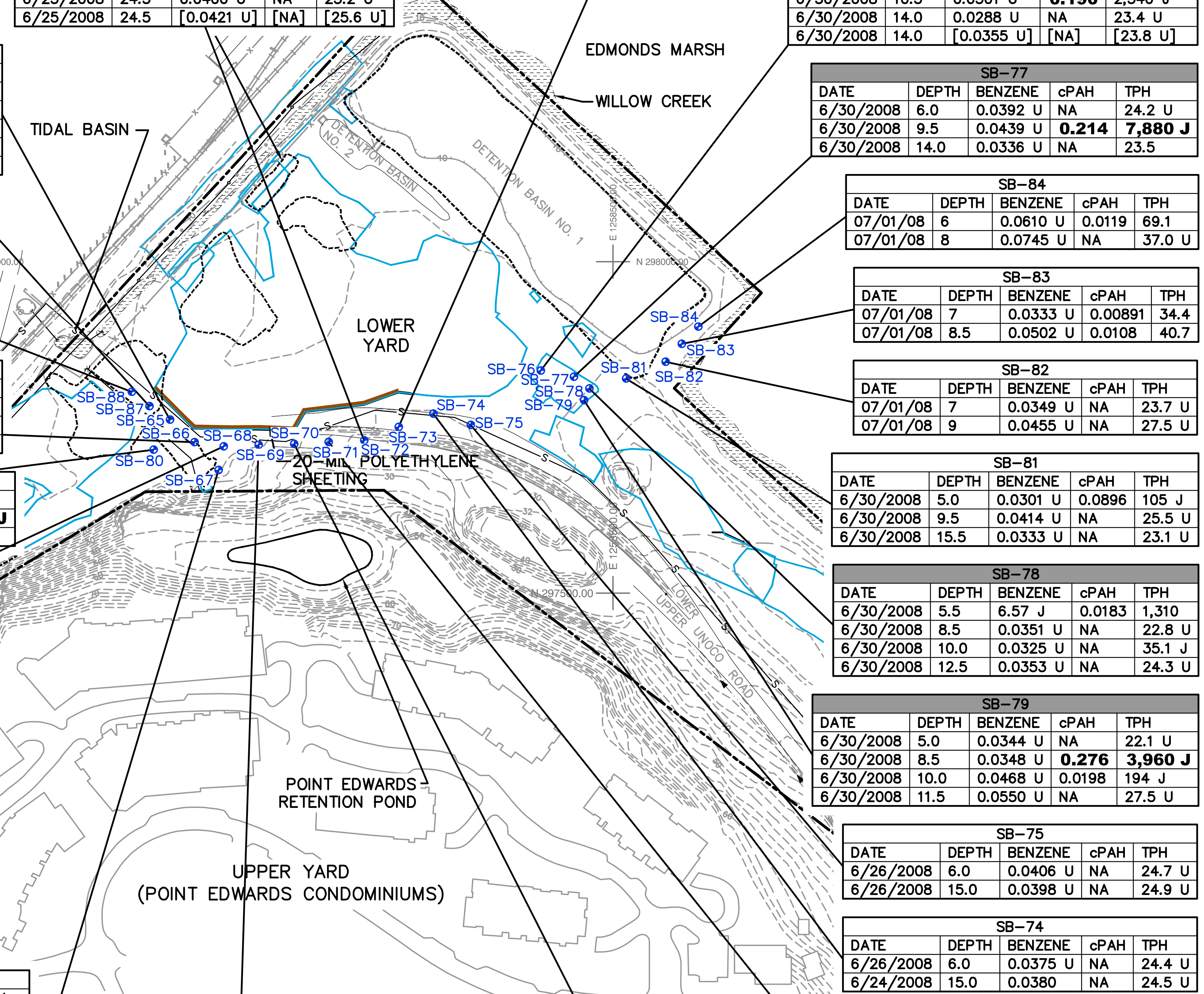
2007/2008 INTERIM ACTION FINAL EXCAVATION LIMITS AND VOLUMES

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-11

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\Minneapolis-MN\ACT\B0045362\0007\00002\2017 FS\DWG\45362D02-11.dwg LAYOUT: 2-11 SAVED: 12/13/2016 11:38 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 12/13/2016 11:39 AM BY: OBERLANDER, ROSEANNE
XREFS: 45362X02 45362X03 45362X0D IMAGES: PROJECTNAME: ----

PUBLIC REVIEW DRAFT



SB-72

DATE	DEPTH	BENZENE	cPAH	TPH
6/25/2008	6.5	0.0371 U	NA	23.6 U
6/25/2008	15.5	0.0348 U	NA	24.0 U
6/25/2008	24.5	0.0400 U	NA	25.2 U
6/25/2008	24.5	[0.0421 U]	[NA]	[25.6 U]

SB-73

DATE	DEPTH	BENZENE	cPAH	TPH
6/26/2006	6.0	0.0445 U	NA	26.5 U
6/26/2008	15.0	0.0369 U	NA	24.1 U

SB-76

DATE	DEPTH	BENZENE	cPAH	TPH
6/30/2008	4.5	0.0389 U	NA	29.1
6/30/2008	9.0	0.0436 U	**0.198**	**17,100 J**
6/30/2008	10.5	0.0501 U	**0.190**	2,540 J
6/30/2008	14.0	0.0288 U	NA	23.4 U
6/30/2008	14.0	[0.0355 U]	[NA]	[23.8 U]

SB-65

DATE	DEPTH	BENZENE	cPAH	TPH
6/26/2008	6.5	**35.8 J**	1.01	**16,900 J**
6/26/2008	8.0	14.5	0.0928	**4,390**
6/28/2008	16.0	0.0588	0.00883	225
6/28/2008	20.0	0.259	0.0161	210
6/28/2008	23.0	0.275	0.158	161

SB-77

DATE	DEPTH	BENZENE	cPAH	TPH
6/30/2008	6.0	0.0392 U	NA	24.2 U
6/30/2008	9.5	0.0439 U	**0.214**	**7,880 J**
6/30/2008	14.0	0.0336 U	NA	23.5

SB-87

DATE	DEPTH	BENZENE	cPAH	TPH
7/25/2008	6.0	0.0600	0.0535	243 J
7/25/2008	14.0	0.0477	NA	24.7 U

SB-84

DATE	DEPTH	BENZENE	cPAH	TPH
07/01/08	6	0.0610 U	0.0119	69.1
07/01/08	8	0.0745 U	NA	37.0 U

SB-88

DATE	DEPTH	BENZENE	cPAH	TPH
7/25/2008	8.0	0.0145 U	0.0167	137

SB-83

DATE	DEPTH	BENZENE	cPAH	TPH
07/01/08	7	0.0333 U	0.00891	34.4
07/01/08	8.5	0.0502 U	0.0108	40.7

SB-66

DATE	DEPTH	BENZENE	cPAH	TPH
6/26/2008	6.0	0.0746	**0.209**	**11,900 J**
6/30/2008	11.5	0.0381 U	0.00914	33.4
6/30/2008	15.0	0.0331 U	NA	23.1 U

SB-82

DATE	DEPTH	BENZENE	cPAH	TPH
07/01/08	7	0.0349 U	NA	23.7 U
07/01/08	9	0.0455 U	NA	27.5 U

SB-80

DATE	DEPTH	BENZENE	cPAH	TPH
6/26/2008	7.5	0.0392 U	**0.693**	**4,660 J**
6/26/2008	11.0	0,0518 U	NA	28.1 U

SB-81

DATE	DEPTH	BENZENE	cPAH	TPH
6/30/2008	5.0	0.0301 U	0.0896	105 J
6/30/2008	9.5	0.0414 U	NA	25.5 U
6/30/2008	15.5	0.0333 U	NA	23.1 U

SB-68

DATE	DEPTH	BENZENE	cPAH	TPH
6/24/2008	4.0	0.334 U	**0.165**	**5,470**
6/24/2008	5.5	0.350 U	0.101	**4,660**
6/25/2008	13.5	0.0367 U	0.00898	100
6/25/2008	15.0	0.0364 U	NA	24.1 U

SB-78

DATE	DEPTH	BENZENE	cPAH	TPH
6/30/2008	5.5	6.57 J	0.0183	1,310
6/30/2008	8.5	0.0351 U	NA	22.8 U
6/30/2008	10.0	0.0325 U	NA	35.1 J
6/30/2008	12.5	0.0353 U	NA	24.3 U

SB-79

DATE	DEPTH	BENZENE	cPAH	TPH
6/30/2008	5.0	0.0344 U	NA	22.1 U
6/30/2008	8.5	0.0348 U	**0.276**	**3,960 J**
6/30/2008	10.0	0.0468 U	0.0198	194 J
6/30/2008	11.5	0.0550 U	NA	27.5 U

SB-75

DATE	DEPTH	BENZENE	cPAH	TPH
6/26/2008	6.0	0.0406 U	NA	24.7 U
6/26/2008	15.0	0.0398 U	NA	24.9 U

SB-74

DATE	DEPTH	BENZENE	cPAH	TPH
6/26/2008	6.0	0.0375 U	NA	24.4 U
6/24/2008	15.0	0.0380	NA	24.5 U

SB-85

DATE	DEPTH	BENZENE	cPAH	TPH
7/02/2008	5.5	0.0357 U	0.0225	92.5
7/02/2008	7.5	0.114 U	NA	214 U

SB-71

DATE	DEPTH	BENZENE	cPAH	TPH
6/25/2008	8.0	0.0368 U	NA	23.6 U
6/25/2008	15.5	0.0363 U	0.00876	50.9
6/25/2008	24.0	0.0366 U	NA	23.7 U

SB-86

DATE	DEPTH	BENZENE	cPAH	TPH
7/02/2008	4.5	0.0324 U	0.0182	112 J
7/02/2008	6.5	0.0513 U	NA	29.1 U

SB-69

DATE	DEPTH	BENZENE	cPAH	TPH
6/26/2008	6.0	0.149 J	**0.236**	**3,720**
6/26/2008	12.0	0.0385 U	NA	24.0 U
6/26/2008	15.0	0.0393 U	NA	24.1 U
6/26/2008	15.0	[0.0384 U]	NA	[32.6]

SB-70

DATE	DEPTH	BENZENE	cPAH	TPH
6/24/2008	6.0	0.0371 U	NA	22.1 U
6/24/2008	7.0	0.0369 U	NA	23.2 U
6/25/2008	12.5	0.0366 U	NA	23.4 U
6/25/2008	20.5	0.0340 U	NA	23.4 U

SB-67

DATE	DEPTH	BENZENE	cPAH	TPH
6/24/2008	5.5	0.0398 U	NA	24.1 U

LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- S — WSDOT STORMWATER LINE
- SD — POINT EDWARDS STORM DRAIN LINE
- SOIL BORING/HAND AUGER LOCATION
- cPAH — CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS, ADJUSTED FOR TOXICITY
- TPH — TOTAL PETROLEUM HYDROCARBONS
- [ ] — VALUES SHOWN IN BRACKETS INDICATE DUPLICATE RESULTS
- NA — INDICATES ANALYSIS NOT CONDUCTED
- U — THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT
- J — INDICATES AN ESTIMATED VALUE
- ALL DATA REPORTED AS MILLIGRAMS PER KILOGRAMS (mg/kg)
- SAMPLE DEPTHS REPORTED AS FEET BELOW GROUND SURFACE (ft bgs)
- BOLDED DATA INDICATES CONCENTRATIONS GREATER THAN APPLICABLE SITE CULs/RELs
- SAMPLE WAS COLLECTED WITHIN THE 2007/2008 EXCAVATION BOUNDARIES

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I OF THE 2007/2008 EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
VERTICAL DATUM: N.A.V.D. 88
UNITS: U.S. SURVEY FEET
HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

2008 SITE INVESTIGATION SAMPLE LOCATIONS AND ANALYTICAL RESULTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-12

PUBLIC REVIEW DRAFT

B-12 8/24/2011		
Sample Depth	Total cPAHs	Total TPH
0.5–1	0.0117	299
1–1.5	0.00072 UU	254
2.5–3	0.079	248
3.5–4	0.00063	33

B-14 8/25/2011		
Sample Depth	Total cPAHs	Total TPH
0.5–1	0.029	155
1.5–2	NA	6 UU
2.5–3	NA	24 UU
3.5–4	0.0009	98

B-15 8/23/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	0.0005	22
6.5–7	NA	20
8.5–9	0.0008	63
11–11.5	NA	16 UU

B-13/P-15 8/23/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	0.0046	81
6–6.5	0.036	368
7–7.5	0.054 R	**15,900**
9–9.5	NA	9 UU
10–10.5	0.026	2,150
11.5–12	NA	9 UU

B-10 8/25/2011		
Sample Depth	Total cPAHs	Total TPH
0.5–1	**0.2**	758
1.5–2	0.018	86
2.5–3	0.00068 UU	37
3.5–4	0.00072	57

B-16/P-16 8/24/2011		
Sample Depth	Total cPAHs	Total TPH
3.5–4	0.018	386
4–4.5	**0.1**	1,290
4.5–5	0.00123	11
6–6.5	NA	9 UU

B-17 8/24/2011		
Sample Depth	Total cPAHs	Total TPH
3.5–4	0.00109	1,756
4–4.5	0.0008 UU	**22,201**
4.5–5	**116 R**	268
5.5–6	NA	18 UU

B-11/P-14 8/23/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	**0.24**	1,011
7.5–8	0.012	**35,240**
8.5–9	0.012	53
9.5–10	**1.6 T**	12
10–10.5	**3.4**	**37,150**
11–11.5	0.01	461
13.5–14	NA	8 UU

B-5/P-10 8/22/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	NA	8 UU
9–9.5	0.0138	**27,021**
11.5–12	NA	9 UU
13.5–14	NA	8 UU

B-9/P-13 8/23/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	NA	29
8.5–9	**0.29**	**20,970**
9.5–10	0.0024	30
10.5–11	0.025	921
11–11.5	**0.15 T**	**16,250**
12.5–13	0.00065	15

B-3 8/22/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	NA	8 UU
7–7.5	0.00076	181
12–12.5	0.00077	96
14–14.5	NA	8

B-1/P-9 8/22/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	0.00052	16
9.5–10	0.0082	72
14–14.5	NA	11 UU

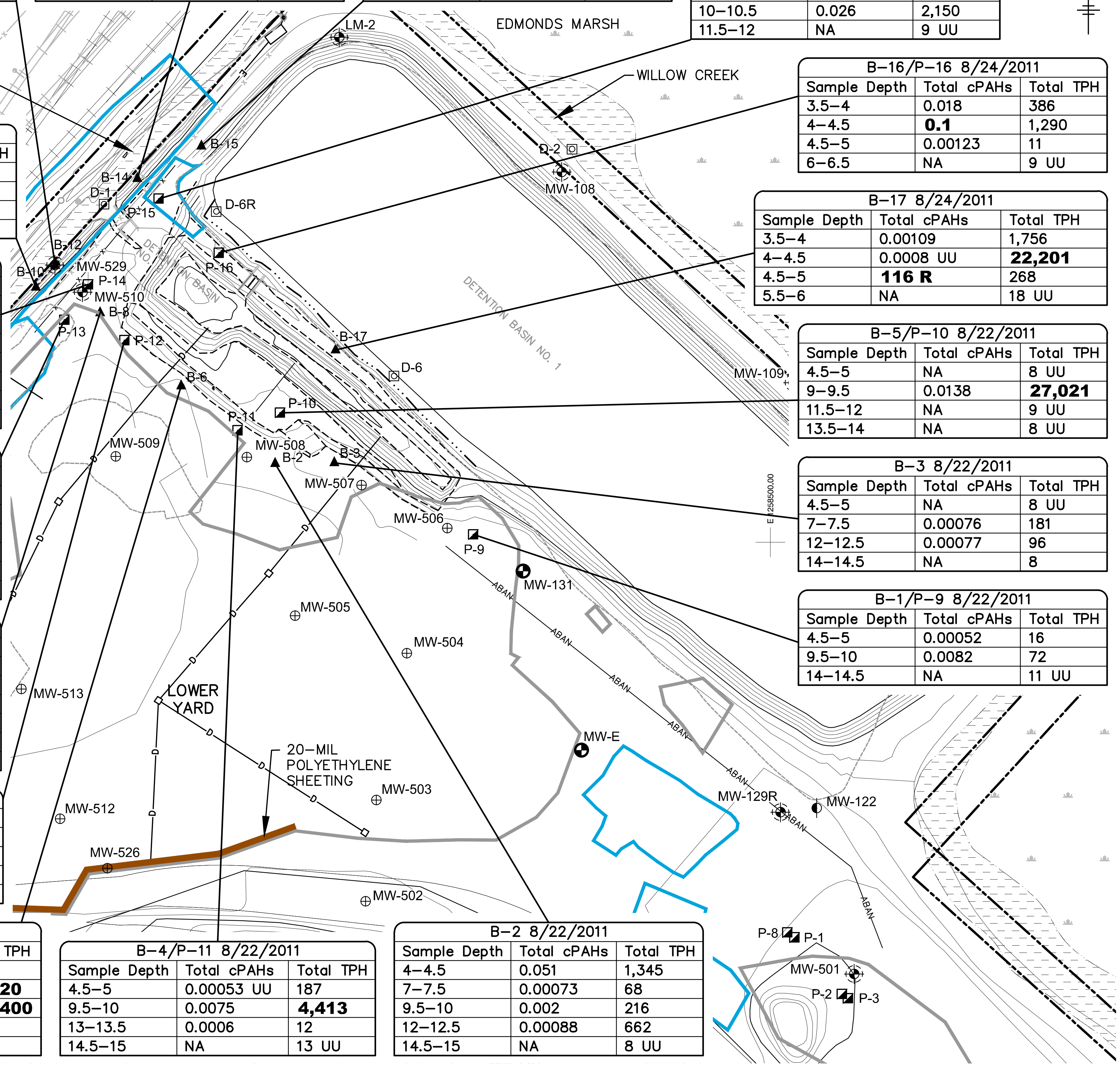
B-8 8/23/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	0.114	**16,500**
7.5–8	0.077	**9,360**
9.5–10	**0.5 T**	**75,730**
11–11.5	0.09	**8,200**
13.5–14	**0.1**	55
14.5–15	NA	8 UU

B-7/P-12 8/22/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	0.071	700
8–8.5	**2.8 T**	**111,400**
9.5–10	0.037 T	**5,947**
14–14.5	NA	8 UU

B-6 8/22/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	0.09	970
7–7.5	**0.36**	**21,620**
9–9.5	**3.2 T**	**220,400**
11–11.5	0.012	317
13–13.5	NA	8 UU

B-4/P-11 8/22/2011		
Sample Depth	Total cPAHs	Total TPH
4.5–5	0.00053 UU	187
9.5–10	0.0075	**4,413**
13–13.5	0.0006	12
14.5–15	NA	13 UU

B-2 8/22/2011		
Sample Depth	Total cPAHs	Total TPH
4–4.5	0.051	1,345
7–7.5	0.00073	68
9.5–10	0.002	216
12–12.5	0.00088	662
14.5–15	NA	8 UU



LEGEND:

- MW-203 ⊕ INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-122 DEEP MONITORING WELL LOCATION AND DESIGNATION
- MW-301 MONITORING WELL
- MW-109 PERIMETER MONITORING WELL LOCATION
- P-11 PIEZOMETER
- D-1 STAFF GAUGE
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- S WSDOT STORMWATER LINE
- SD POINT EDWARDS STORM DRAIN LINE

LOCATION ID SAMPLE DATE		
Sample Depth	Total cPAHs	Total TPH
Depth in feet below ground surface	Total carcinogenic polynuclear aromatic hydrocarbons (mg/kg)	Total petroleum hydrocarbons (mg/kg)

THE CONSTITUENTS MAKING UP THE TOTAL ARE ALL NON-DETECTS

UU – REPORTING LIMITS WERE RAISED DUE TO INTERFERENCE FROM THE SAMPLE MATRIX

T – THE GC/MS SEMIVOLATILE INTERNAL STANDARD PEAK AREAS WERE OUTSIDE OF THE QC LIMITS FOR BOTH THE INITIAL INJECTION AND THE RE-INJECTION

R – ANALYSIS NOT CONDUCTED

NA – MILLIGRAMS PER KILOGRAM

mg/kg – BOLD CONCENTRATIONS REPRESENT EXCEEDANCE OF SITE CLEAN-UP LEVELS

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 80' 160'

GRAPHIC SCALE

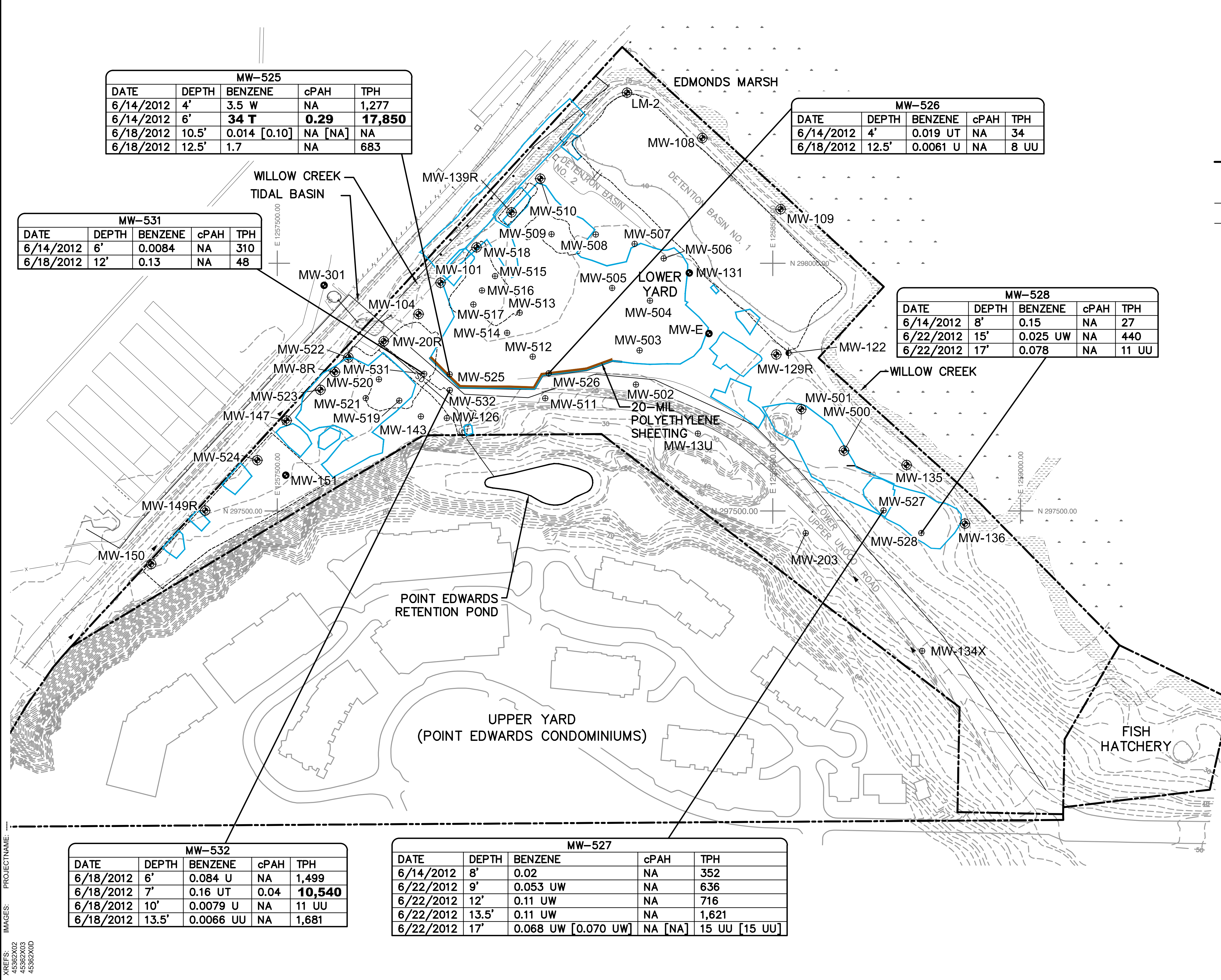
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

2011 SITE INVESTIGATION SOIL SAMPLE LOCATIONS AND ANALYTICAL RESULTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-13

PUBLIC REVIEW DRAFT



MW-525				
DATE	DEPTH	BENZENE	cPAH	TPH
6/14/2012	4'	3.5 W	NA	1,277
6/14/2012	6'	**34 T**	**0.29**	**17,850**
6/18/2012	10.5'	0.014 [0.10]	NA [NA]	NA
6/18/2012	12.5'	1.7	NA	683

MW-526				
DATE	DEPTH	BENZENE	cPAH	TPH
6/14/2012	4'	0.019 UT	NA	34
6/18/2012	12.5'	0.0061 U	NA	8 UU

MW-531				
DATE	DEPTH	BENZENE	cPAH	TPH
6/14/2012	6'	0.0084	NA	310
6/18/2012	12'	0.13	NA	48

MW-528				
DATE	DEPTH	BENZENE	cPAH	TPH
6/14/2012	8'	0.15	NA	27
6/22/2012	15'	0.025 UW	NA	440
6/22/2012	17'	0.078	NA	11 UU

MW-532				
DATE	DEPTH	BENZENE	cPAH	TPH
6/18/2012	6'	0.084 U	NA	1,499
6/18/2012	7'	0.16 UT	0.04	**10,540**
6/18/2012	10'	0.0079 U	NA	11 UU
6/18/2012	13.5'	0.0066 UU	NA	1,681

MW-527				
DATE	DEPTH	BENZENE	cPAH	TPH
6/14/2012	8'	0.02	NA	352
6/22/2012	9'	0.053 UW	NA	636
6/22/2012	12'	0.11 UW	NA	716
6/22/2012	13.5'	0.11 UW	NA	1,621
6/22/2012	17'	0.068 UW [0.070 UW]	NA [NA]	15 UU [15 UU]

LEGEND:

- MW-203 ⊕ INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-301 MONITORING WELL
- MW-122 DEEP MONITORING WELL LOCATION AND DESIGNATION
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- S — WSDOT STORMWATER LINE
- SD — POINT EDWARDS STORM DRAIN LINE
- cPAH CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS, ADJUSTED FOR TOXICITY
- TPH TOTAL PETROLEUM HYDROCARBONS
- [ ] VALUES SHOWN IN BRACKETS INDICATE DUPLICATE RESULTS
- NA INDICATES ANALYSIS NOT CONDUCTED
- U THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT
- UU THE CONSTITUENTS MAKING UP THE TOTAL ARE ALL NON-DETECTS
- J INDICATES AN ESTIMATED VALUE
- W REPORTING LIMITS WERE RAISED DUE TO SAMPLE FOAMING
- T REPORTING LIMITS WERE RAISED DUE TO INTERFERENCE FROM THE SAMPLE MATRIX

ALL DATA REPORTED AS MILLIGRAMS PER KILOGRAMS (mg/kg)

SAMPLE DEPTHS REPORTED AS FEET BELOW GROUND SURFACE (ft bgs)

BOLDED DATA INDICATES CONCENTRATIONS GREATER THAN APPLICABLE SITE CULs/RELs

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'

GRAPHIC SCALE

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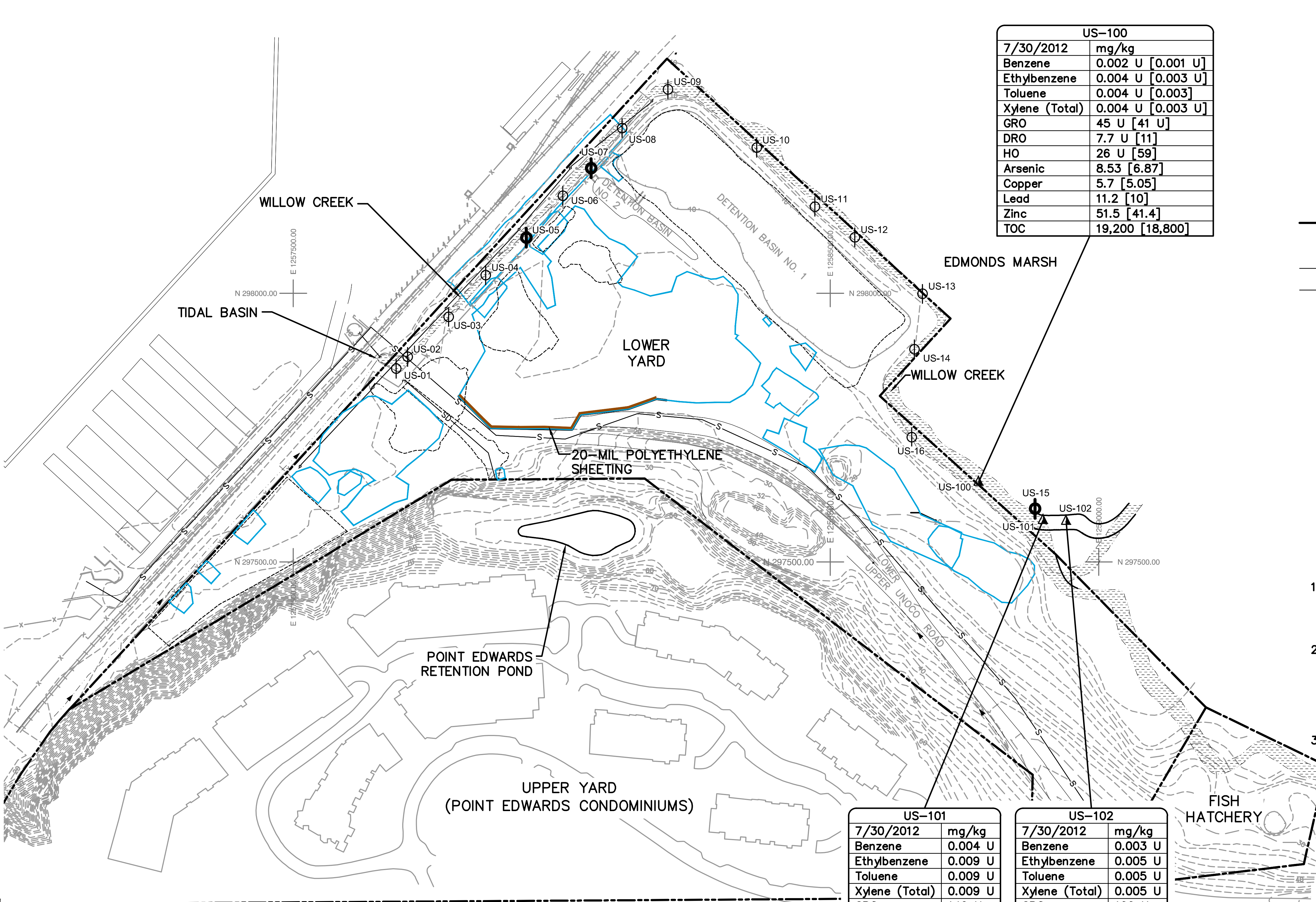
FINAL FEASIBILITY STUDY REPORT

2012 SOIL SAMPLE LOCATIONS AND ANALYTICAL RESULTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-14

PUBLIC REVIEW DRAFT



US-100	
7/30/2012	mg/kg
Benzene	0.002 U [0.001 U]
Ethylbenzene	0.004 U [0.003 U]
Toluene	0.004 U [0.003]
Xylene (Total)	0.004 U [0.003 U]
GRO	45 U [41 U]
DRO	7.7 U [11]
HO	26 U [59]
Arsenic	8.53 [6.87]
Copper	5.7 [5.05]
Lead	11.2 [10]
Zinc	51.5 [41.4]
TOC	19,200 [18,800]

US-101	
7/30/2012	mg/kg
Benzene	0.004 U
Ethylbenzene	0.009 U
Toluene	0.009 U
Xylene (Total)	0.009 U
GRO	140 U
DRO	29
HO	170
Arsenic	29.1
Copper	43.6
Lead	107
Zinc	319
TOC	64,700

US-102	
7/30/2012	mg/kg
Benzene	0.003 U
Ethylbenzene	0.005 U
Toluene	0.005 U
Xylene (Total)	0.005 U
GRO	100 U
DRO	17
HO	110
Arsenic	20.2
Copper	21.6
Lead	60.6
Zinc	144
TOC	65,200

LEGEND:

- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- S — WSDOT STORMWATER LINE
- SD — POINT EDWARDS STORM DRAIN LINE
- SEDIMENT SAMPLE LOCATIONS (2003)
- SEDIMENT SAMPLE LOCATIONS (2012)
- BOLDED SEDIMENT SAMPLE LOCATIONS INDICATE FAILED BIOASSAY TESTING IN 2003.

GRO = Total petroleum hydrocarbons in the gasoline range
DRO = Total petroleum hydrocarbons in the diesel range
HO = Total petroleum hydrocarbons in the heavy oil range
TOC = Total Organic Carbon
U = Indicates the value was below the Method Detection Limit.
[ ] = Duplicate results are shown in brackets

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
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3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

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SEDIMENT SAMPLING LOCATIONS AND 2012 ANALYTICAL RESULTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2-15

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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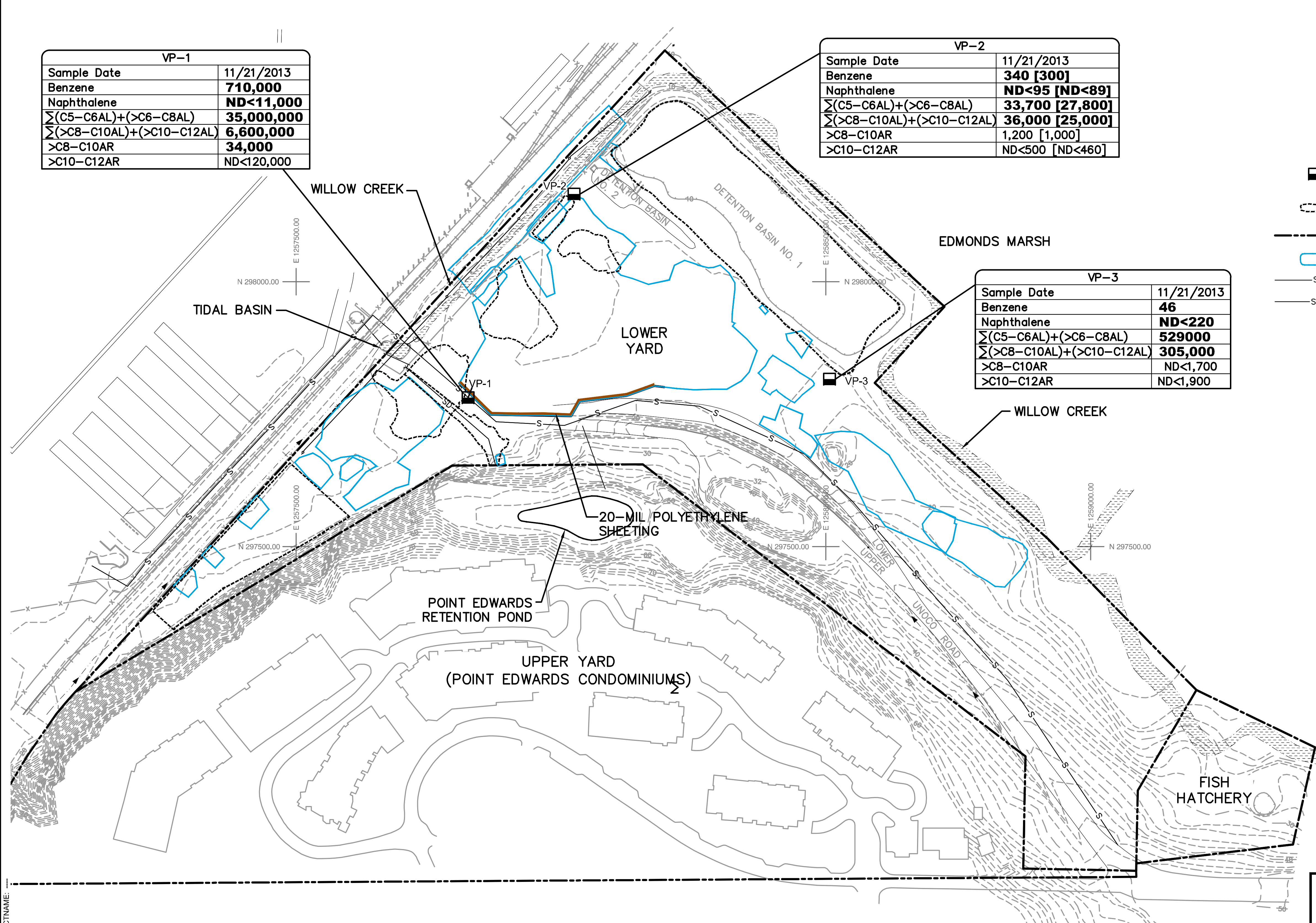
XREFS: 45362X02 45362X03 45362X0D IMAGES: PROJECTNAME: ----

PUBLIC REVIEW DRAFT



VP-1	
Sample Date	11/21/2013
Benzene	**710,000**
Naphthalene	**ND<11,000**
∑(C5–C6AL)+(>C6–C8AL)	**35,000,000**
∑(>C8–C10AL)+(>C10–C12AL)	**6,600,000**
>C8–C10AR	**34,000**
>C10–C12AR	ND<120,000

VP-2	
Sample Date	11/21/2013
Benzene	**340 [300]**
Naphthalene	**ND<95 [ND<89]**
∑(C5–C6AL)+(>C6–C8AL)	**33,700 [27,800]**
∑(>C8–C10AL)+(>C10–C12AL)	**36,000 [25,000]**
>C8–C10AR	1,200 [1,000]
>C10–C12AR	ND<500 [ND<460]

VP-3	
Sample Date	11/21/2013
Benzene	**46**
Naphthalene	**ND<220**
∑(C5–C6AL)+(>C6–C8AL)	**529000**
∑(>C8–C10AL)+(>C10–C12AL)	**305,000**
>C8–C10AR	ND<1,700
>C10–C12AR	ND<1,900

LEGEND:

- SOIL VAPOR PROBE/SAMPLING LOCATION
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- S — WSDOT STORMWATER LINE
- SD — POINT EDWARDS STORM DRAIN LINE

AL = vapor phase hydrocarbon aliphatic carbon range

AR = vapor phase hydrocarbon aromatic carbon range

<ND = Non-detect, value listed is laboratory reporting limit.

[ ] = Duplicate results are shown in brackets

bgs = below ground surface

All results are in micrograms per cubic meter (µg/m3).
All samples were collected from soil vapor probes installed at 5 feet bgs.
Bolded cells indicate detected concentrations above the Ecology Method B Screening.
Level for sample locations just beneath a building or less than 15 feet bgs.

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

2013 SOIL VAPOR SAMPLE LOCATIONS AND ANALYTICAL RESULTS

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FIGURE
2-16

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* G:\ENVCAD\Minneapolis-MN\ACT\B0045362\0007\00002\2017 FS\DWG\45362D02-16.dwg LAYOUT: 2-16 SAVED: 12/13/2016 11:43 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 12/13/2016 11:43 AM BY: OBERLANDER, ROSEANNE
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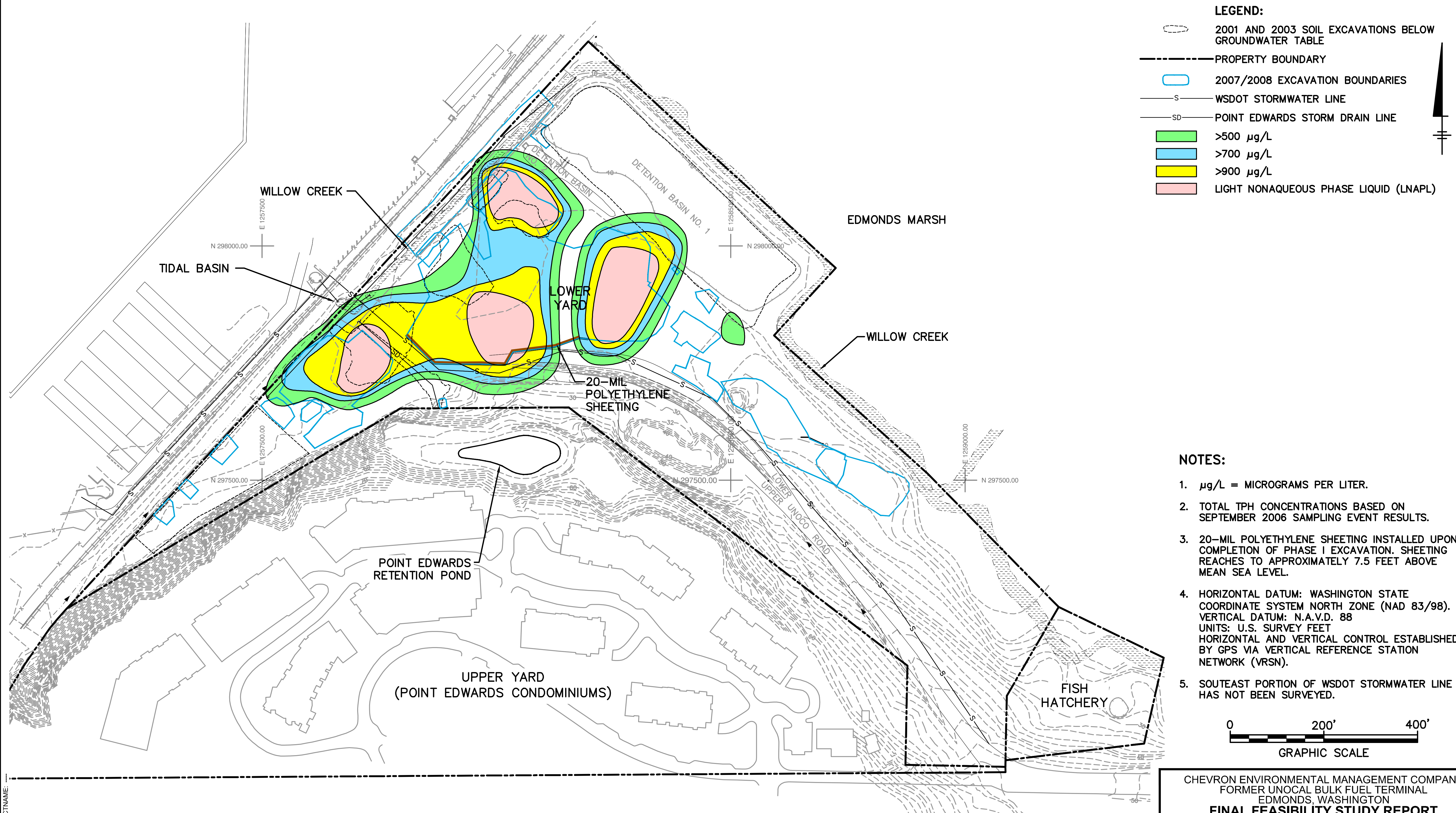
PUBLIC REVIEW DRAFT



NOTES:

1. µg/L = MICROGRAMS PER LITER.
2. TOTAL TPH CONCENTRATIONS BASED ON SEPTEMBER 2006 SAMPLING EVENT RESULTS.
3. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
4. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
5. SOUTEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
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EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

PRE-REMEDIATION DISSOLVED TOTAL PETROLEUM HYDROCARBON CONCENTRATION AND LNAPL MAP (2006)

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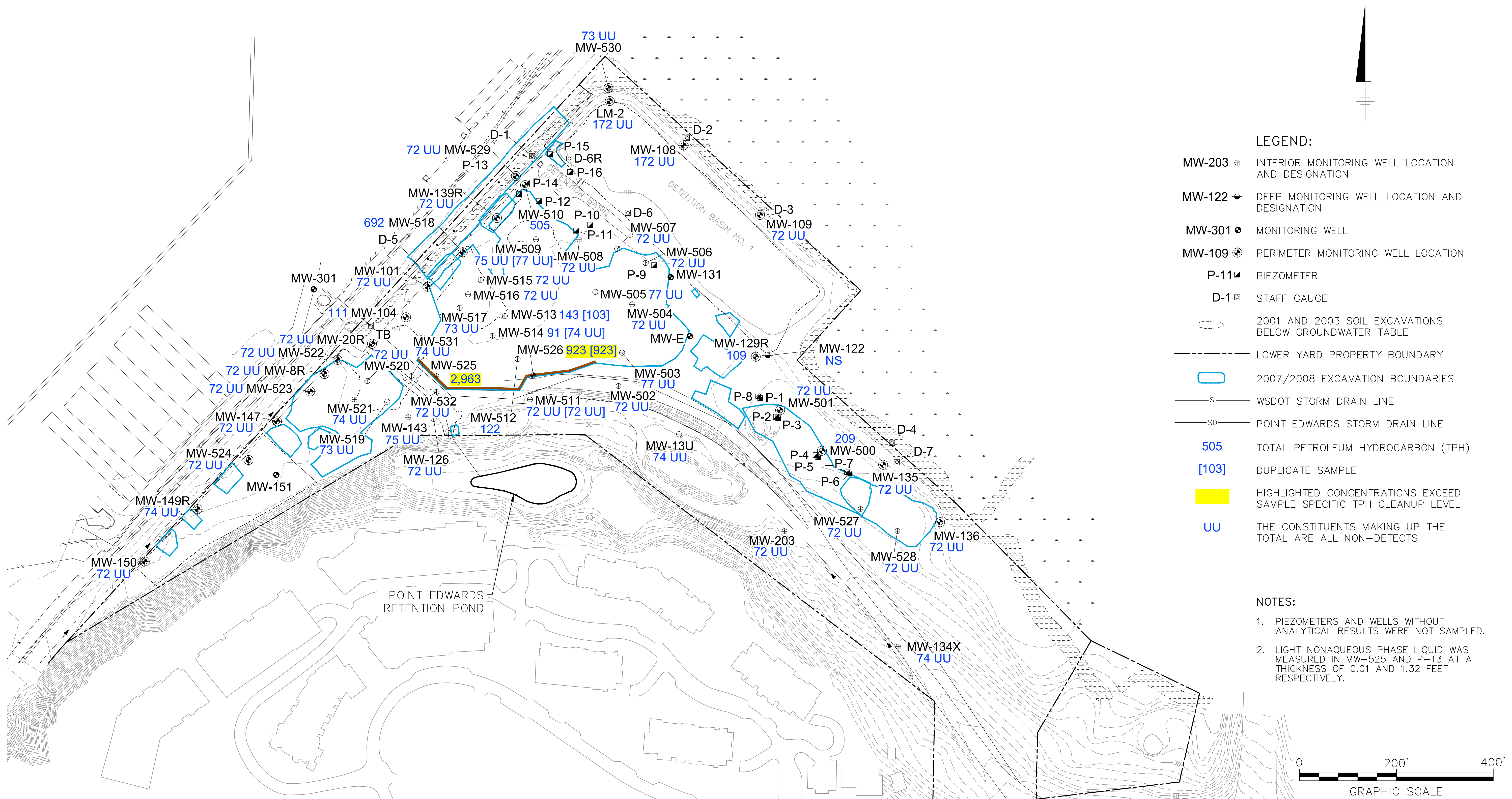
FIGURE
3-1

PUBLIC REVIEW DRAFT



NOTES:

1. PIEZOMETERS AND WELLS WITHOUT ANALYTICAL RESULTS WERE NOT SAMPLED.
2. LIGHT NONAQUEOUS PHASE LIQUID WAS MEASURED IN MW-525 AND P-13 AT A THICKNESS OF 0.01 AND 1.32 FEET RESPECTIVELY.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
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EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

SECOND QUARTER 2015
TPH CONCENTRATIONS

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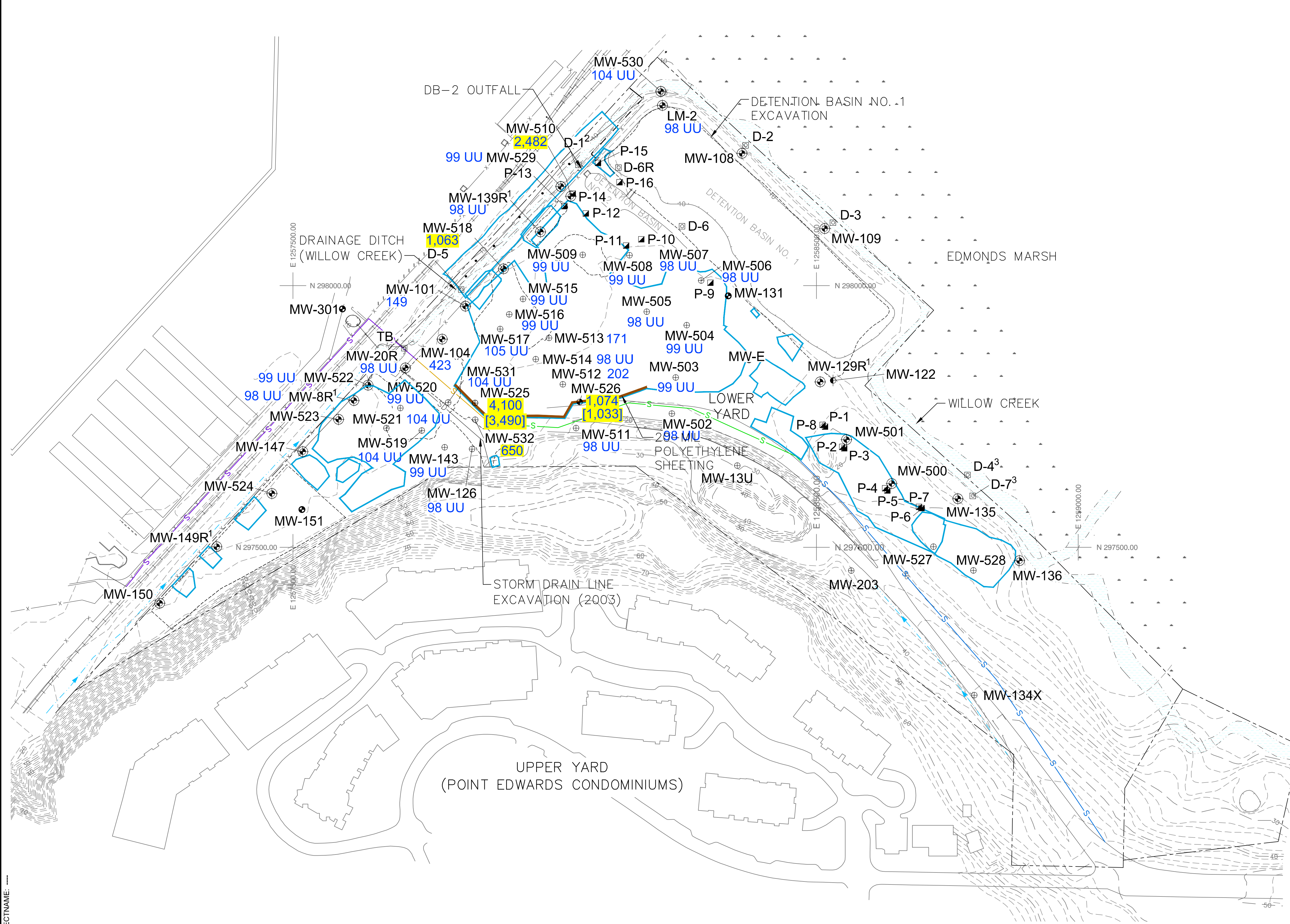
FIGURE
3-2

PUBLIC REVIEW DRAFT



LEGEND:

MW-203 ⊕	INTERIOR MONITORING WELL LOCATION AND DESIGNATION
MW-122	DEEP MONITORING WELL LOCATION AND DESIGNATION
MW-301	MONITORING WELL
MW-109	PERIMETER MONITORING WELL LOCATION
P-11	PIEZOMETER
D-1	STAFF GAUGE
	2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
	LOWER YARD PROPERTY BOUNDARY
	2007/2008 EXCAVATION BOUNDARIES
—S—	WSDOT STORM DRAIN LINE
—SD—	POINT EDWARDS STORM DRAIN LINE
505	TOTAL PETROLEUM HYDROCARBON (TPH)
[1,033]	DUPLICATE SAMPLE
	HIGHLIGHTED CONCENTRATIONS EXCEED SAMPLE SPECIFIC TPH CLEANUP LEVEL
UU	THE CONSTITUENTS MAKING UP THE TOTAL ARE ALL NON-DETECTS
	RESULTS PRESENTED IN MICROGRAMS PER LITER (ug/L)

NOTES:

1. PIEZOMETERS AND WELLS WITHOUT ANALYTICAL RESULTS WERE NOT SAMPLED.
2. LIGHT NONAQUEOUS PHASE LIQUID WAS MEASURED IN P-12 AND P-13 AT A THICKNESS OF 0.47 AND 0.13 FEET RESPECTIVELY.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

FOURTH QUARTER 2016
TPH CONCENTRATIONS

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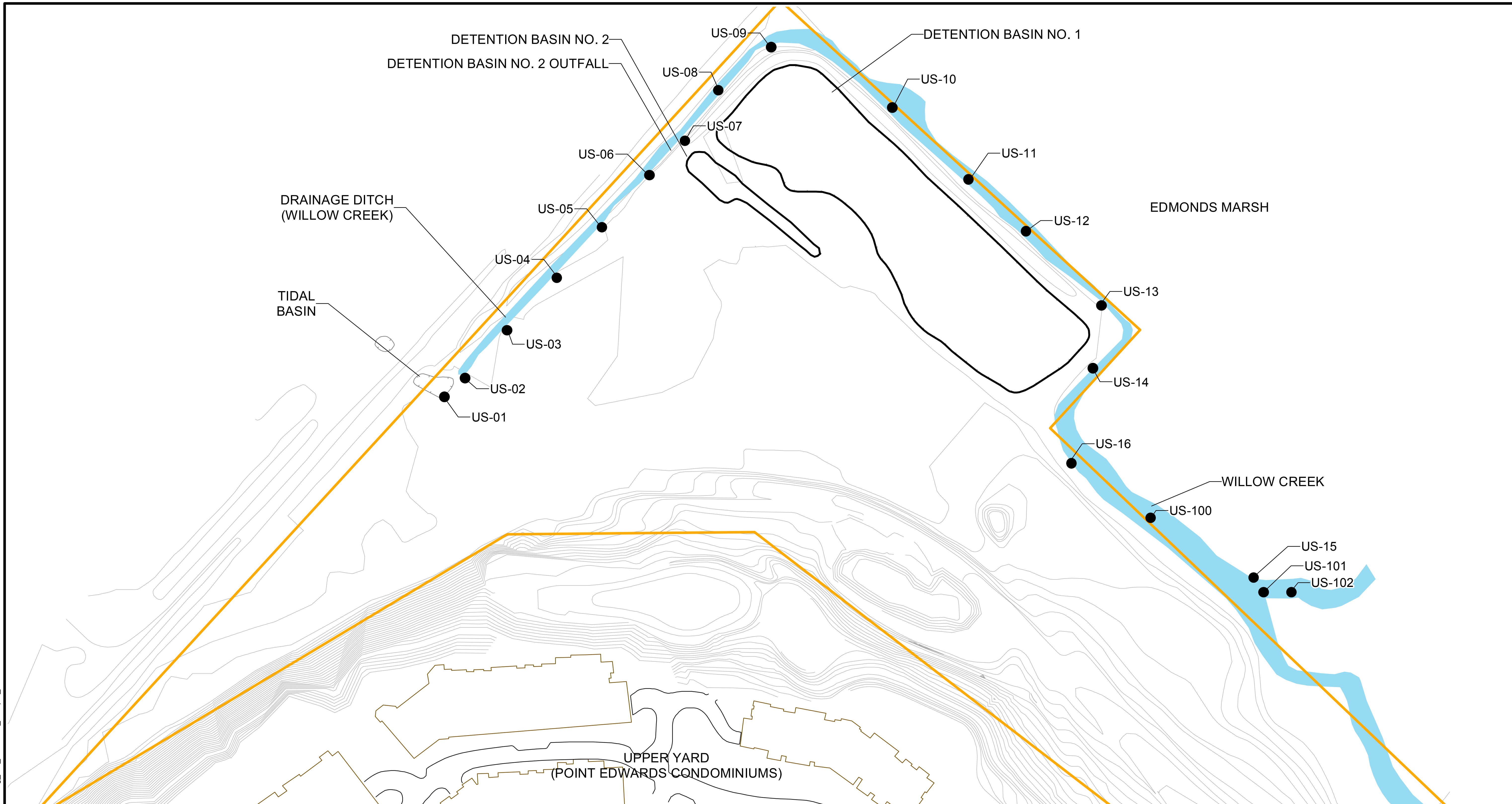
FIGURE
3-3

PUBLIC REVIEW DRAFT



LEGEND

● SEDIMENT SAMPLE LOCATIONS

LOWER YARD PROPERTY BOUNDARY

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASABILITY STUDY REPORT

SEDIMENT SAMPLE LOCATIONS

ARCADIS

FIGURE
3-4

CITY:HIGHLANDS RANCH, CO DIV/GROUP:(ENVGIS) DB: B GRIFFITH
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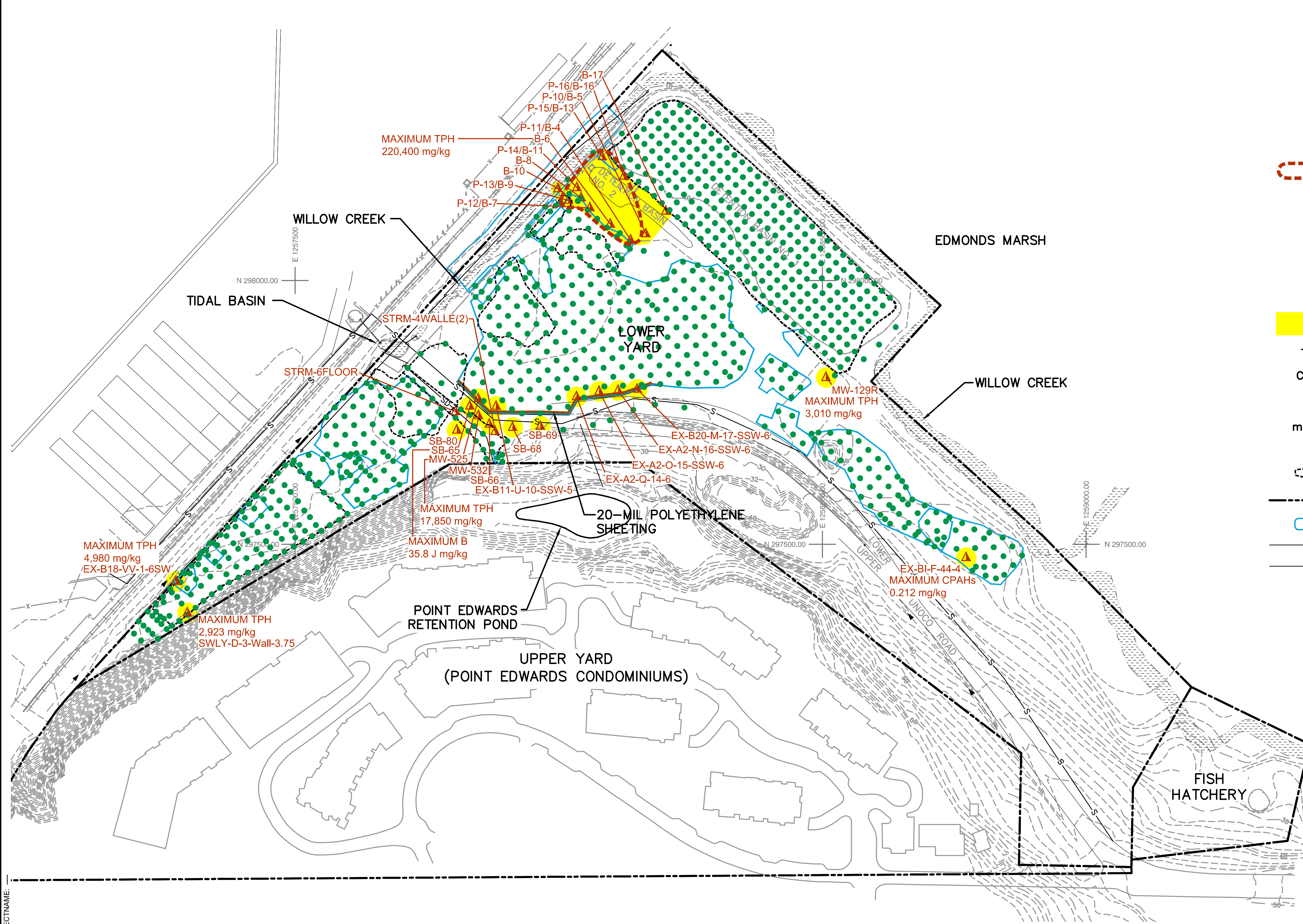

LEGEND:

- ESTIMATED RECOVERABLE LNAPL BOUNDARY
- SOIL SAMPLE COLLECTION LOCATION WITH CONCENTRATIONS OF TOTAL TPH AND, cPAH AND/OR BENZENE NOT EXCEEDING APPLICABLE SITE CULs AND / OR RELs.
- SOIL SAMPLE COLLECTION LOCATION WITH CONCENTRATIONS OF TOTAL TPH AND/OR CPAHS EXCEEDING APPLICABLE SITE CULs AND/OR RELs.
- AREA WITH REMAINING SOIL IMPACTS EXCEEDING SITE CULs AND/OR RELs
- TPH — TOTAL PETROLEUM HYDROCARBONS
- CPAH — CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS
- B — BENZENE
- mg/kg — MILLIGRAMS PER KILOGRAM
- J — INDICATES AN ESTIMATED VALUE
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- S — WSDOT STORMWATER LINE
- SD — POINT EDWARDS STORM DRAIN LINE

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 200' 400'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

LOWER YARD REMAINING SOIL IMPACTS MAP

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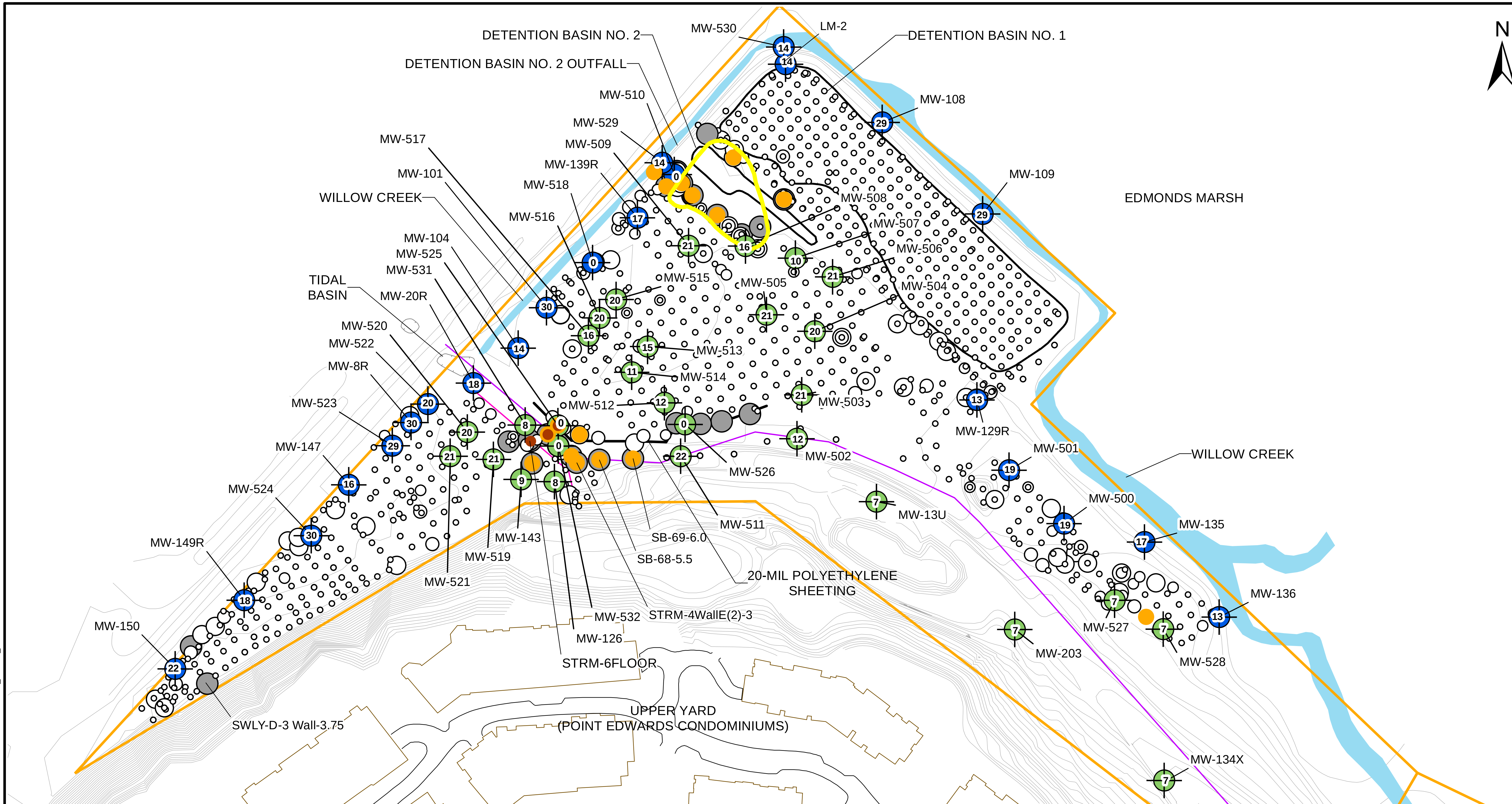
FIGURE
4-1

PUBLIC REVIEW DRAFT



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LEGEND

- (25) PERIMETER WELL AND NUMBER OF CONSECUTIVE SAMPLING ROUNDS SHOWING CONCENTRATIONS OF TPH LESS THAN PROPOSED GW CULS
- (18) INTERIOR WELL AND NUMBER OF CONSECUTIVE SAMPLING ROUNDS SHOWING CONCENTRATIONS OF TPH LESS THAN PROPOSED GW CULS
- SOIL TPH CONCENTRATION <250 mg/kg
- SOIL TPH CONCENTRATION OF 250 - 500 mg/kg
- SOIL TPH CONCENTRATION OF 500 - 1,000 mg/kg
- SOIL TPH CONCENTRATION OF 1,000 - 2,775 mg/kg
- SOIL TPH CONCENTRATION > 2,775 mg/kg
- SOIL BENZENE CONCENTRATION > CUL (18mg/kg)
- SOIL cPAH CONCENTRATION > CUL (0.14 mg/kg)
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- LOWER YARD PROPERTY BOUNDARY
- ESTIMATED LNAPL BOUNDARY

0 150 300
SCALE IN FEET

NOTES:
1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

TPH - TOTAL PETROLEUM HYDROCARBONS
MG/KG - MILLIGRAMS PER KILOGRAM
CPAH - CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS, ADJUSTED FOR TOXICITY
CUL - CLEANUP LEVEL

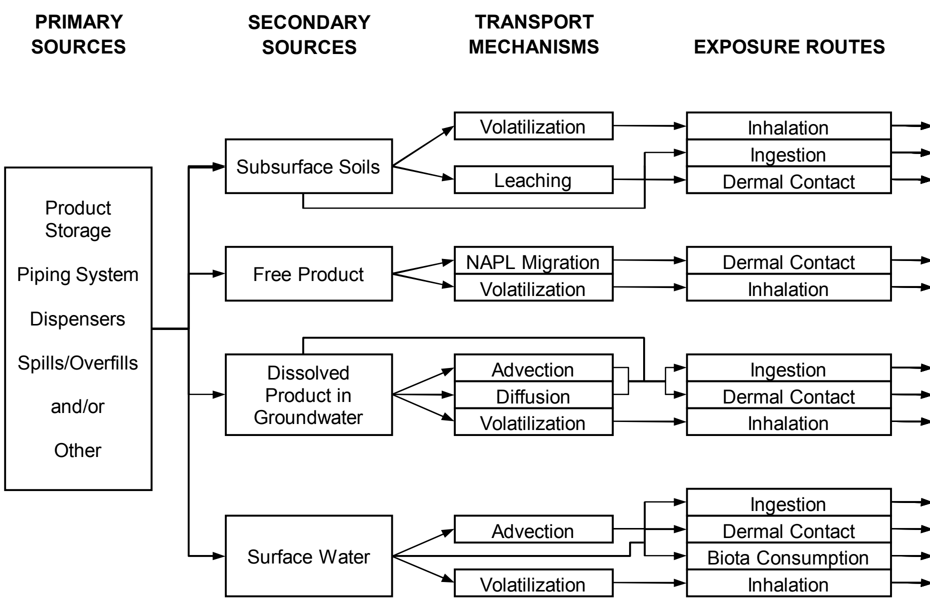
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASABILITY STUDY REPORT

SITE SOIL AND GROUNDWATER REMEDIATION STATUS - FOURTH QUARTER 2016

ARCADIS

FIGURE
4-2

PUBLIC REVIEW DRAFT



Secondary Source	Exposure Route	Residential Future	Commercial Future	Trespassers Current	Trespassers Future	Construction & Excavation Future	Aquatic Biota Current	Aquatic Biota Future	Terrestrial Biota Current	Terrestrial Biota Future
Subsurface Soils	Inhalation	P	P	U	-	P	-	-	P	P
	Ingestion	P	P	U	-	P	-	-	P	P
	Dermal Contact	P	P	U	-	P	-	-	P	P
Free Product	Dermal Contact	-	-	-	-	P	-	-	P	P
	Inhalation	P	P	U	-	P	-	-	P	P
Dissolved Product in Groundwater	Ingestion	-	-	-	-	P	-	-	-	-
	Dermal Contact	-	-	-	-	P	-	-	-	-
	Inhalation	U	P	U	-	P	-	-	-	-
Surface Water	Ingestion	P	P	U	-	P	-	-	P	P
	Dermal Contact	P	P	U	-	P	-	-	P	P
	Biota Consumption	P	P	U	-	P	-	-	P	P
	Inhalation	P	P	U	-	P	-	-	P	P

(POTENTIAL RECEPTORS)

Notes:
NAPL = nonaqueous phase liquid
P = This route is a potential source of exposure
U = Unlikey source of exposure
- = There is no exposure by this route

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS TERMINAL, LOWER YARD
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

CONCEPTUAL SITE MODEL
EXPOSURE PATHWAYS

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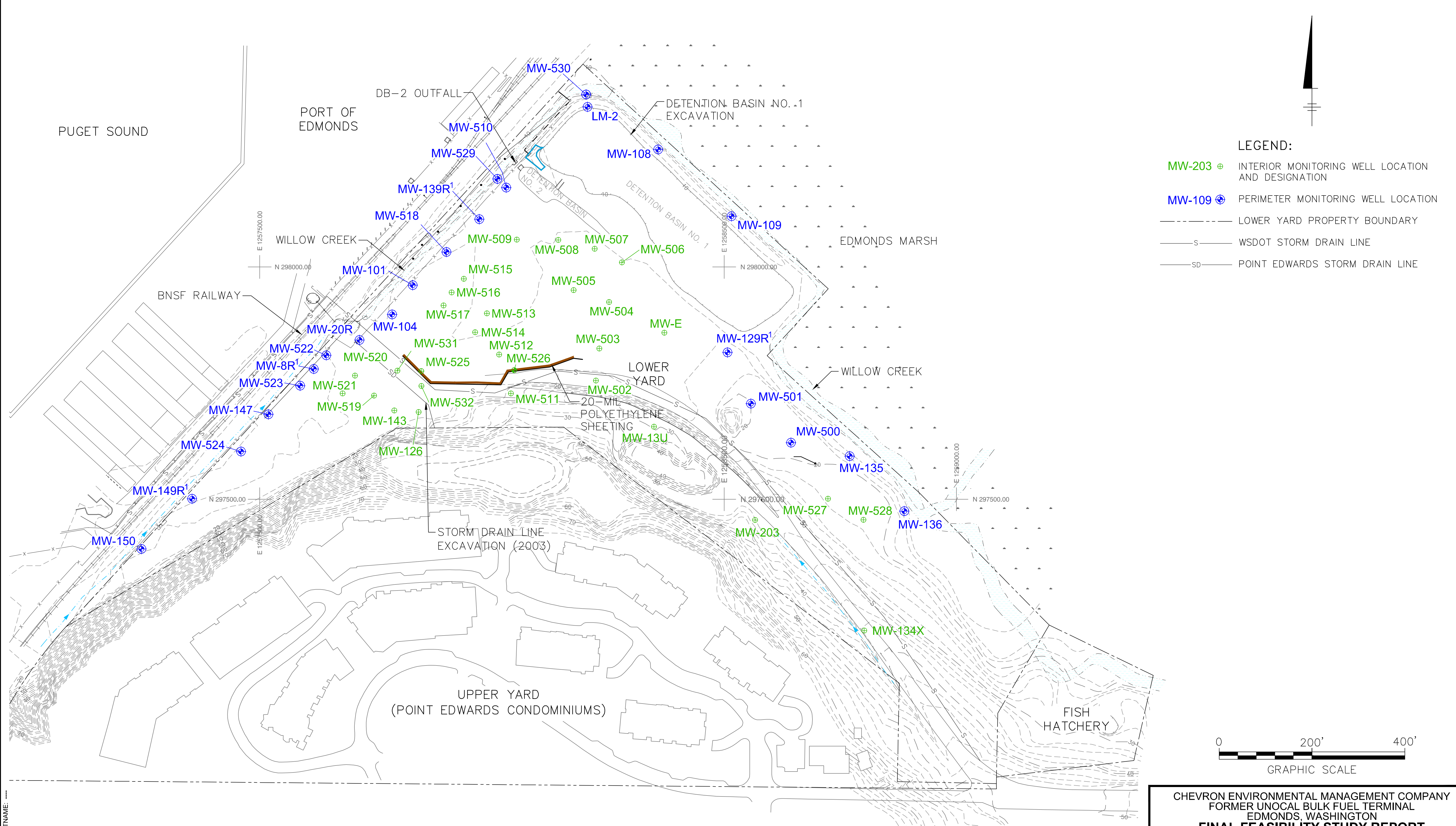
FIGURE
4-3

PUBLIC REVIEW DRAFT



CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

COMPLIANCE MONITORING WELLS

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FIGURE
5-1

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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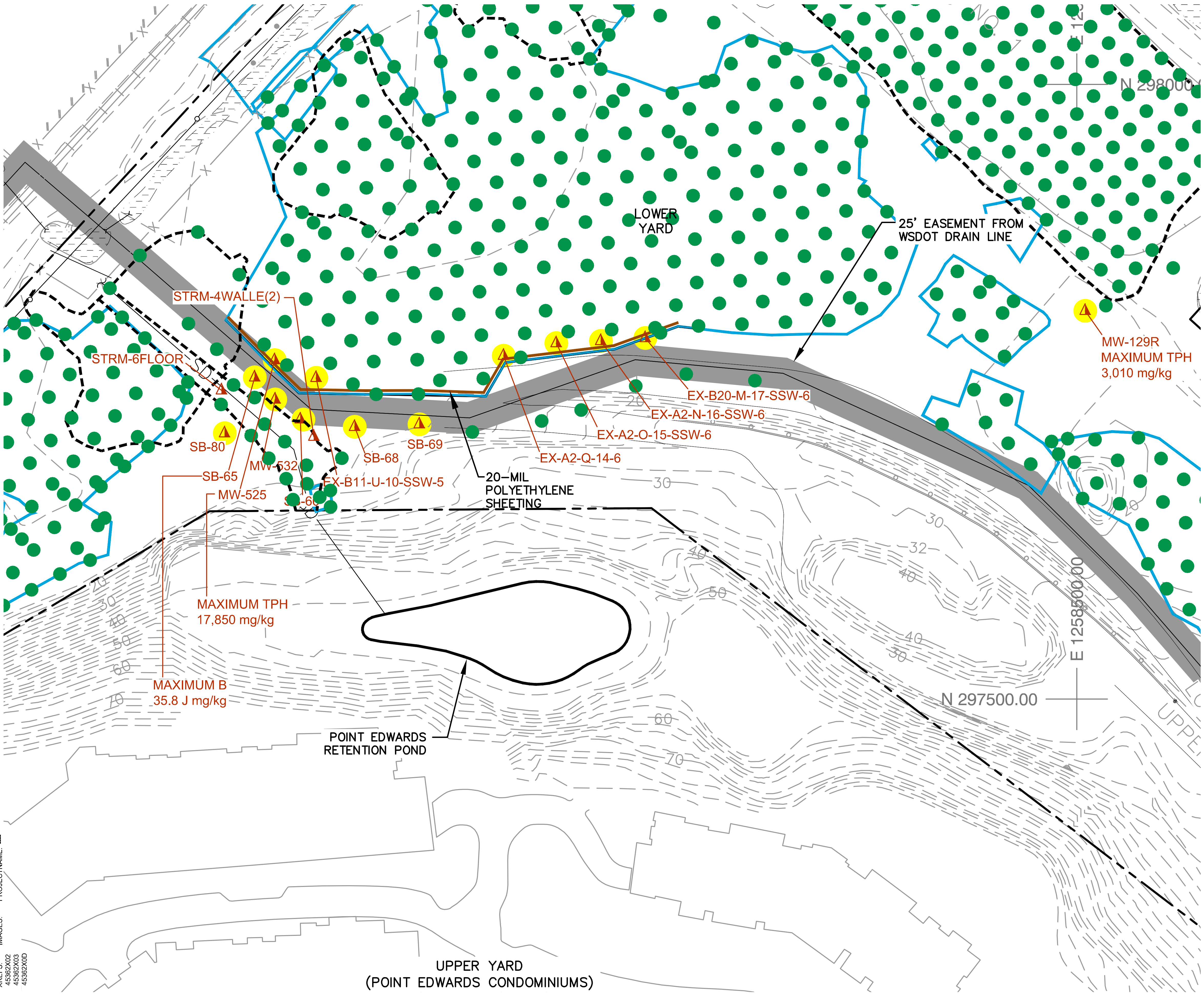

LEGEND:

- ESTIMATED RECOVERABLE LNAPL BOUNDARY
- SOIL SAMPLE COLLECTION LOCATION WITH CONCENTRATIONS OF TOTAL TPH AND, cPAH AND/OR BENZENE NOT EXCEEDING APPLICABLE SITE CULs AND / OR RELs.
- SOIL SAMPLE COLLECTION LOCATION WITH CONCENTRATIONS OF TOTAL TPH AND/OR CPAHS EXCEEDING APPLICABLE SITE CULs AND/OR RELs.
- AREA WITH REMAINING SOIL IMPACTS EXCEEDING SITE CULs AND/OR RELs
- TPH — TOTAL PETROLEUM HYDROCARBONS
- CPAH — CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS
- B — BENZENE
- mg/kg — MILLIGRAMS PER KILOGRAM
- J — INDICATES AN ESTIMATED VALUE
- 2001 AND 2003 SOIL EXCAVATIONS BELOW GROUNDWATER TABLE
- PROPERTY BOUNDARY
- 2007/2008 EXCAVATION BOUNDARIES
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- WSDOT CONSTRUCTION EASEMENT

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 80' 160'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

CURRENT WSDOT CONSTRUCTION EASEMENT

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FIGURE
6-1

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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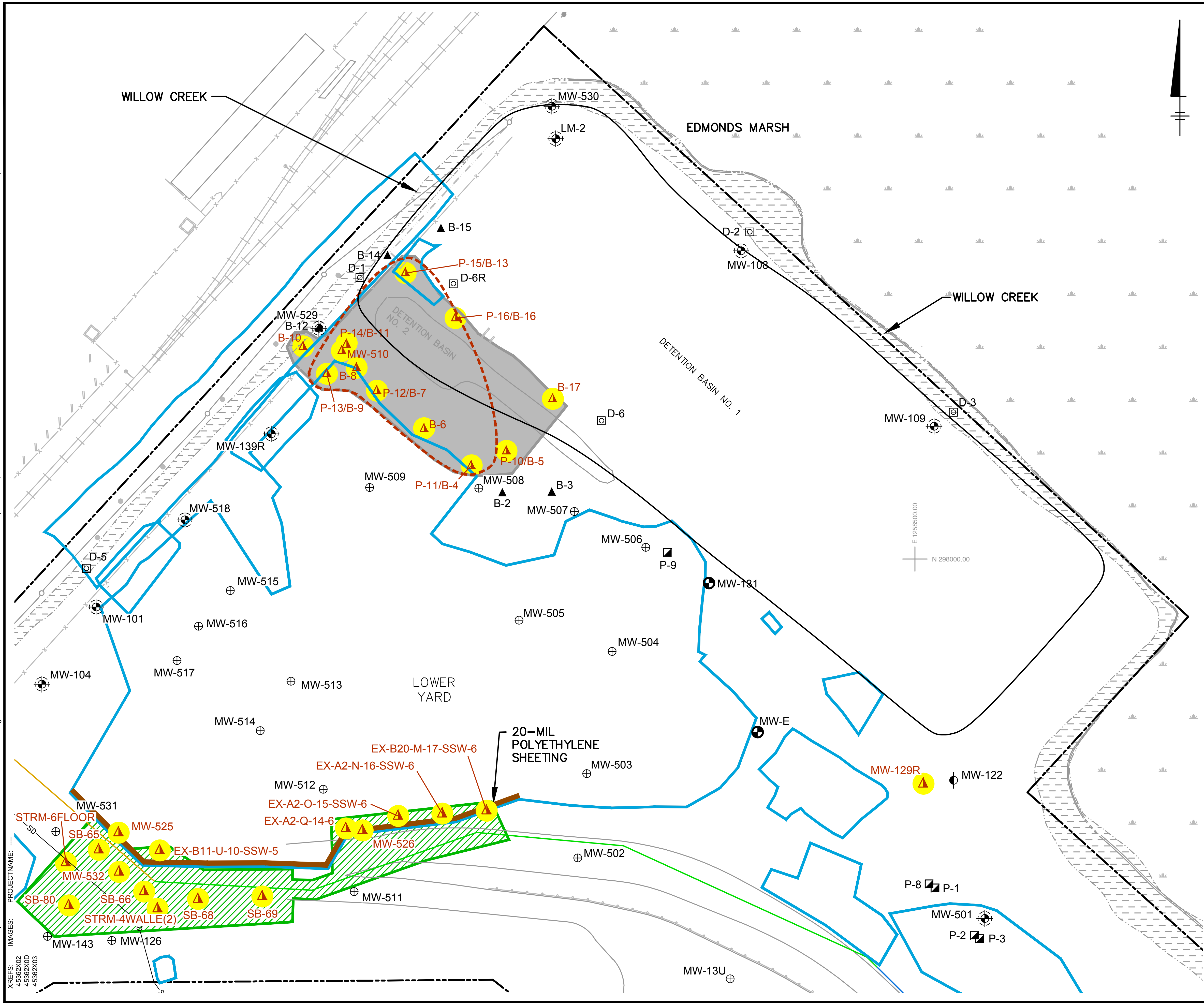

LEGEND:

- ESTIMATED RECOVERABLE LNAPL BOUNDARY
- SOIL SAMPLE COLLECTION LOCATION WITH CONCENTRATIONS OF TOTAL TPH AND/OR CPAHS EXCEEDING APPLICABLE SITE CULs AND/OR RELs.
- AREA WITH REMAINING SOIL IMPACTS EXCEEDING SITE CULs AND/OR RELs
- MW-203 INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-122 DEEP MONITORING WELL LOCATION AND DESIGNATION
- MW-109 PERIMETER MONITORING WELL LOCATION
- MW-301 MONITORING WELL
- P-11 PIEZOMETER
- D-1 STAFF GAUGE
- 2007/2008 EXCAVATION BOUNDARIES
- PROPERTY BOUNDARY
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- SOIL BORING
- EXCAVATION BOUNDARY
- ENVIRONMENTAL COVENANT AREA

NOTES:

1. 20–MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 80' 160'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

ALTERNATIVE 1: EXCAVATION AND MONITORED NATURAL ATTENUATION WITH ENVIRONMENTAL COVENANTS

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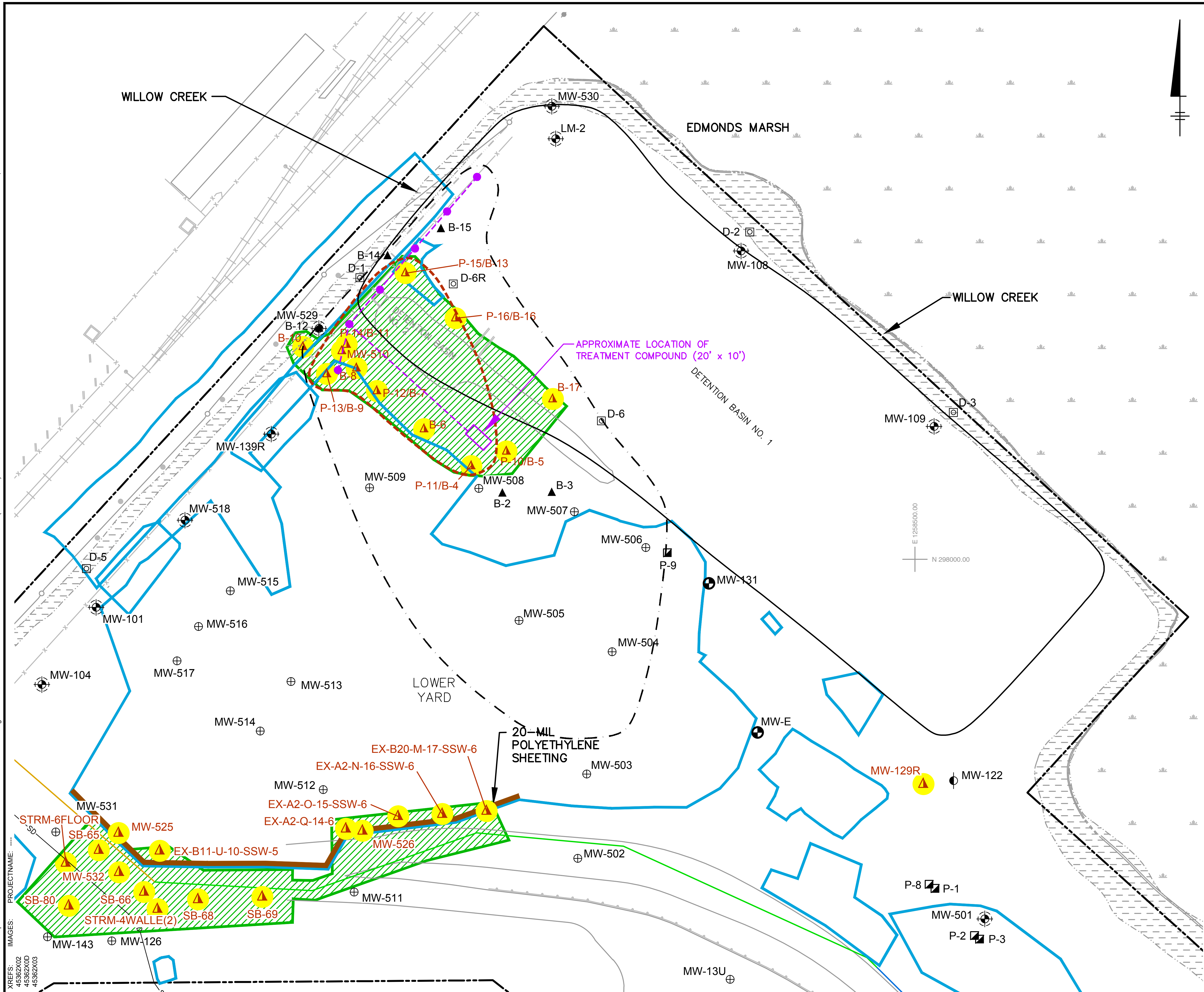
FIGURE
6-2

PUBLIC REVIEW DRAFT



LEGEND:

- ESTIMATED RECOVERABLE LNAPL BOUNDARY
- SOIL SAMPLE COLLECTION LOCATION WITH CONCENTRATIONS OF TOTAL TPH AND/OR CPAHS EXCEEDING APPLICABLE SITE CULs AND/OR RELs.
- AREA WITH REMAINING SOIL IMPACTS EXCEEDING SITE CULs AND/OR RELs
- MW-203 INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-122 DEEP MONITORING WELL LOCATION AND DESIGNATION
- MW-109 PERIMETER MONITORING WELL LOCATION
- MW-301 MONITORING WELL
- P-11 PIEZOMETER
- D-1 STAFF GAUGE
- 2007/2008 EXCAVATION BOUNDARIES
- PROPERTY BOUNDARY
- S WSDOT STORMWATER LINE
- SD POINT EDWARDS STORM DRAIN LINE
- SOIL BORING
- ENVIRONMENTAL COVENANT AREA
- PROPOSED GROUNDWATER EXTRACTION WELL
- PROPOSED GROUNDWATER EXTRACTION SYSTEM HEADER PIPE
- PREDICTED GROUNDWATER CAPTURE ZONE

NOTES:

1. 20–MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 80' 160'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

FINAL FEASIBILITY STUDY REPORT

ALTERNATIVE 2: GROUNDWATER CONTAINMENT SYSTEM USING GROUNDWATER EXTRACTION WELLS, AND MONITORED NATURAL ATTENUATION WITH ENVIRONMENTAL COVENANTS

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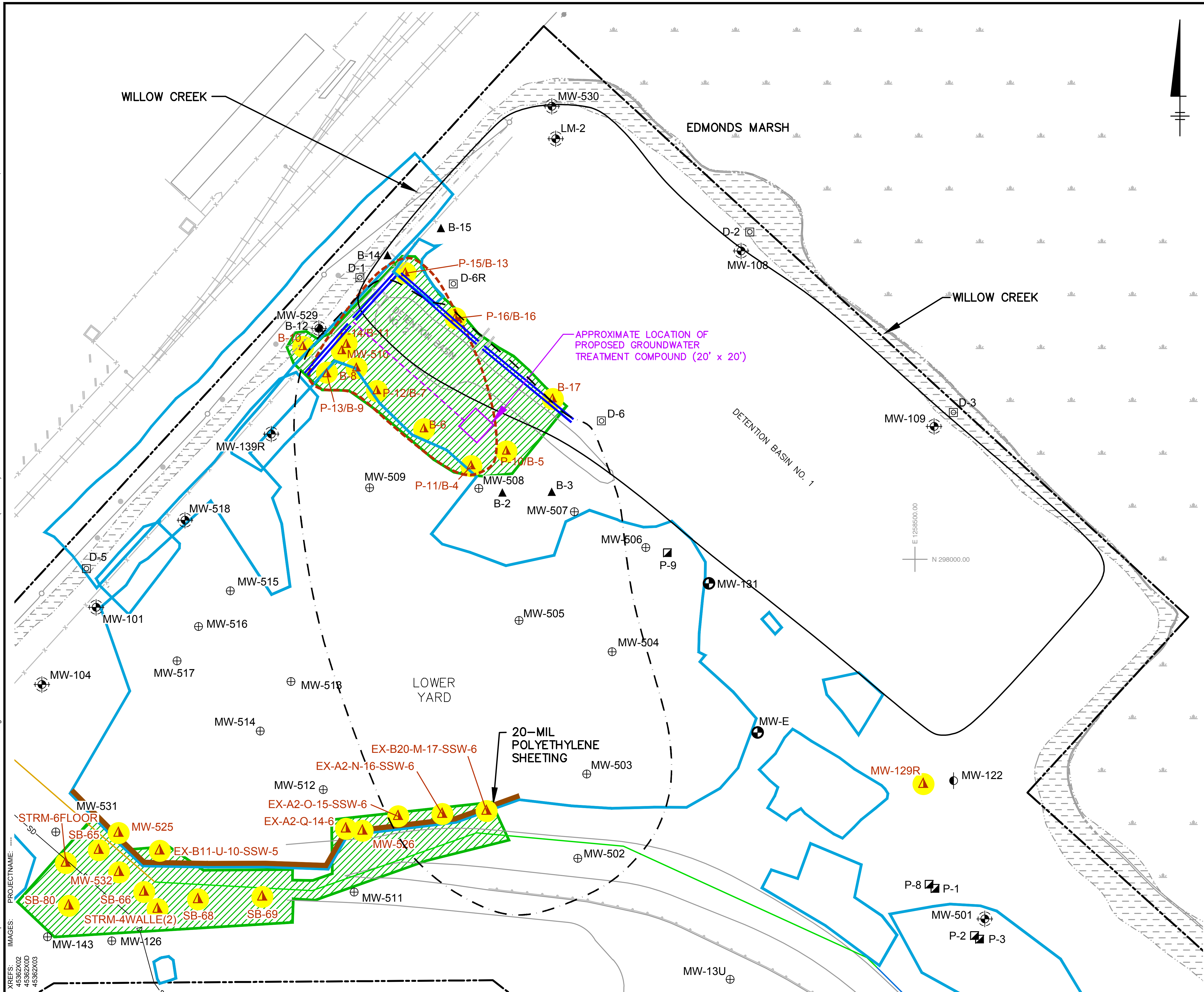
FIGURE
6-3

PUBLIC REVIEW DRAFT



LEGEND:

- ESTIMATED RECOVERABLE LNAPL BOUNDARY
- SOIL SAMPLE COLLECTION LOCATION WITH CONCENTRATIONS OF TOTAL TPH AND/OR CPAHS EXCEEDING APPLICABLE SITE CULs AND/OR RELs.
- AREA WITH REMAINING SOIL IMPACTS EXCEEDING SITE CULs AND/OR RELs
- MW-203 INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-122 DEEP MONITORING WELL LOCATION AND DESIGNATION
- MW-109 PERIMETER MONITORING WELL LOCATION
- MW-301 MONITORING WELL
- P-11 PIEZOMETER
- D-1 STAFF GAUGE
- 2007/2008 EXCAVATION BOUNDARIES
- PROPERTY BOUNDARY
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- SOIL BORING
- ENVIRONMENTAL COVENANT AREA
- PROPOSED GROUNDWATER EXTRACTION SUMP
- PROPOSED GROUNDWATER EXTRACTION SYSTEM HEADER PIPE
- PROPOSED GROUNDWATER CONTAINMENT TRENCH
- PREDICTED GROUNDWATER CAPTURE ZONE

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 80' 160'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

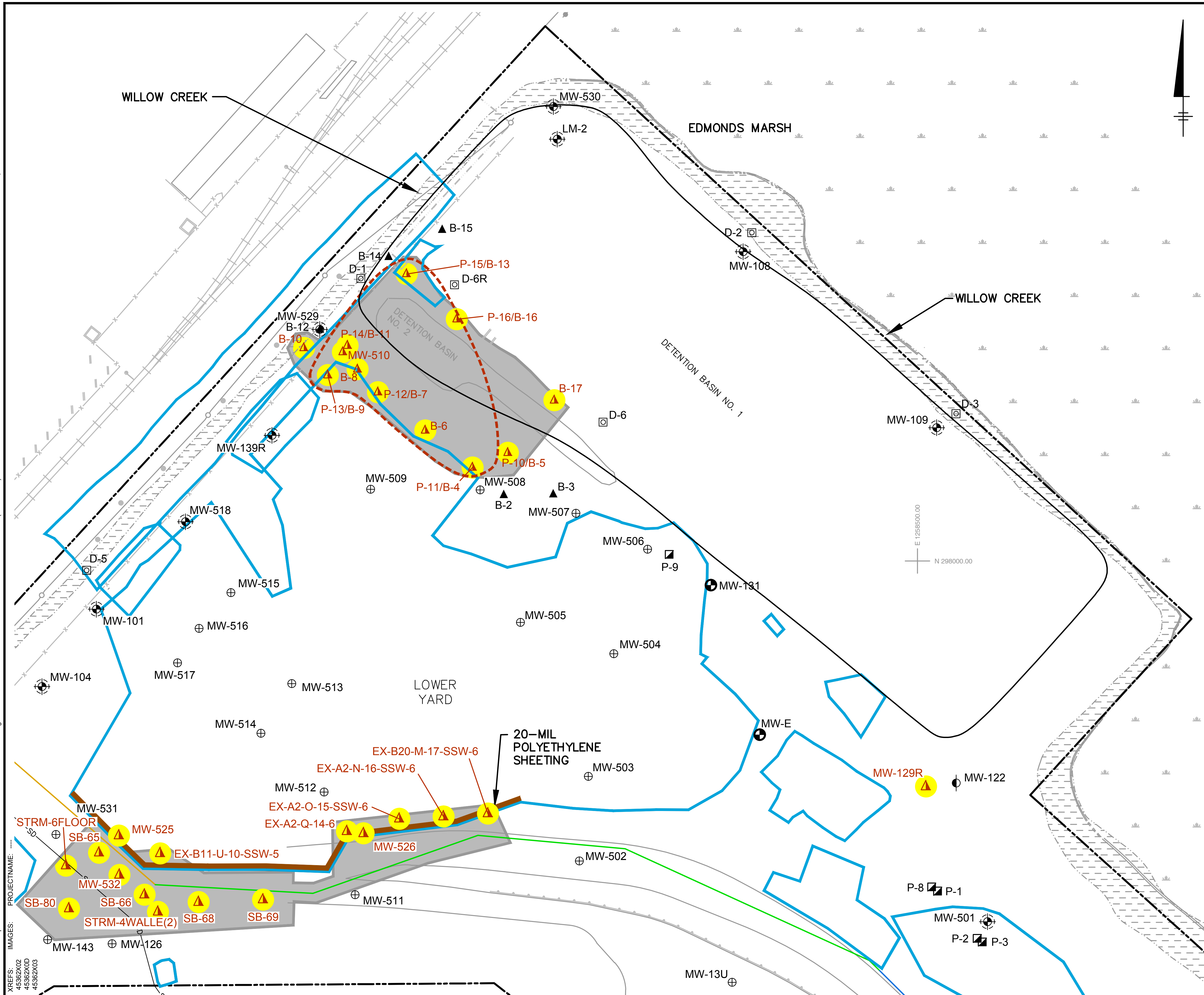
FINAL FEASIBILITY STUDY REPORT

ALTERNATIVE 3: GROUNDWATER CONTAINMENT SYSTEM USING GROUNDWATER EXTRACTION TRENCH, AND MONITORED NATURAL ATTENUATION WITH ENVIRONMENTAL COVENANTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6-4

PUBLIC REVIEW DRAFT



LEGEND:

- ESTIMATED RECOVERABLE LNAPL BOUNDARY
- SOIL SAMPLE COLLECTION LOCATION WITH CONCENTRATIONS OF TOTAL TPH AND/OR CPAHS EXCEEDING APPLICABLE SITE CULs AND/OR RELs.
- AREA WITH REMAINING SOIL IMPACTS EXCEEDING SITE CULs AND/OR RELs
- MW-203 INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-122 DEEP MONITORING WELL LOCATION AND DESIGNATION
- MW-109 PERIMETER MONITORING WELL LOCATION
- MW-301 MONITORING WELL
- P-11 PIEZOMETER
- D-1 STAFF GAUGE
- 2007/2008 EXCAVATION BOUNDARIES
- PROPERTY BOUNDARY
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- SOIL BORING
- EXCAVATION BOUNDARY

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 80' 160'
GRAPHIC SCALE

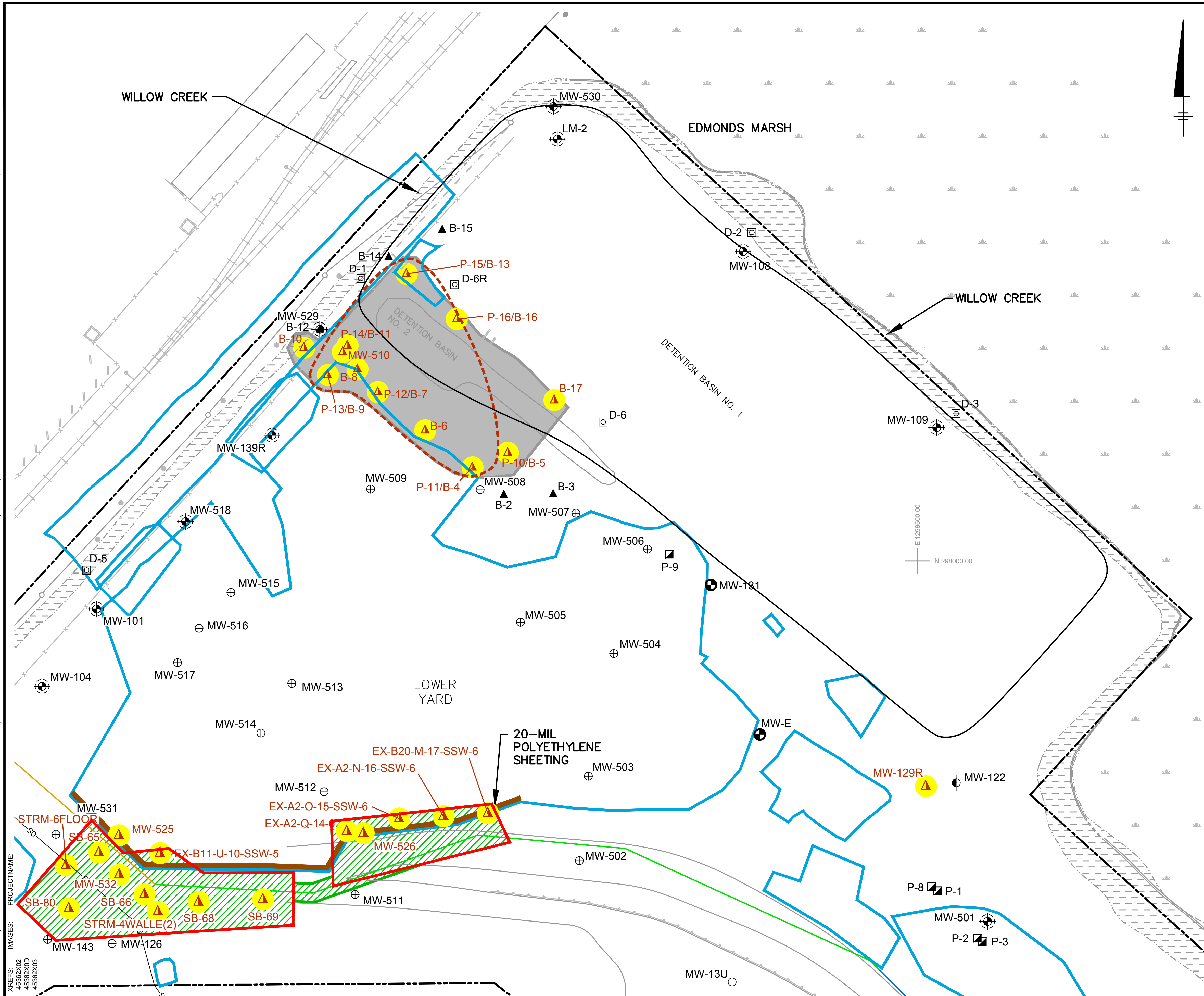
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

ALTERNATIVE 4: EXCAVATION (DB-2 AND WSDOT STORMWATER LINE) AND LIMITED ENVIRONMENTAL COVENANT

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6-5

PUBLIC REVIEW DRAFT



LEGEND:

- ESTIMATED RECOVERABLE LNAPL BOUNDARY
- SOIL SAMPLE COLLECTION LOCATION WITH CONCENTRATIONS OF TOTAL TPH AND/OR CPAHS EXCEEDING APPLICABLE SITE CULs AND/OR RELs.
- AREA WITH REMAINING SOIL IMPACTS EXCEEDING SITE CULs AND/OR RELs
- MW-203 INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-122 DEEP MONITORING WELL LOCATION AND DESIGNATION
- MW-109 PERIMETER MONITORING WELL LOCATION
- MW-301 BNSF WELLS
- P-11 PIEZOMETER
- D-1 STAFF GAUGE
- 2007/2008 EXCAVATION BOUNDARIES
- PROPERTY BOUNDARY
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- SOIL BORING
- EXCAVATION BOUNDARY
- ENVIRONMENTAL COVENANT AREA
- IN-SITU SOLIDIFICATION TREATMENT AREAS

NOTES:

1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

0 80' 160'

GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

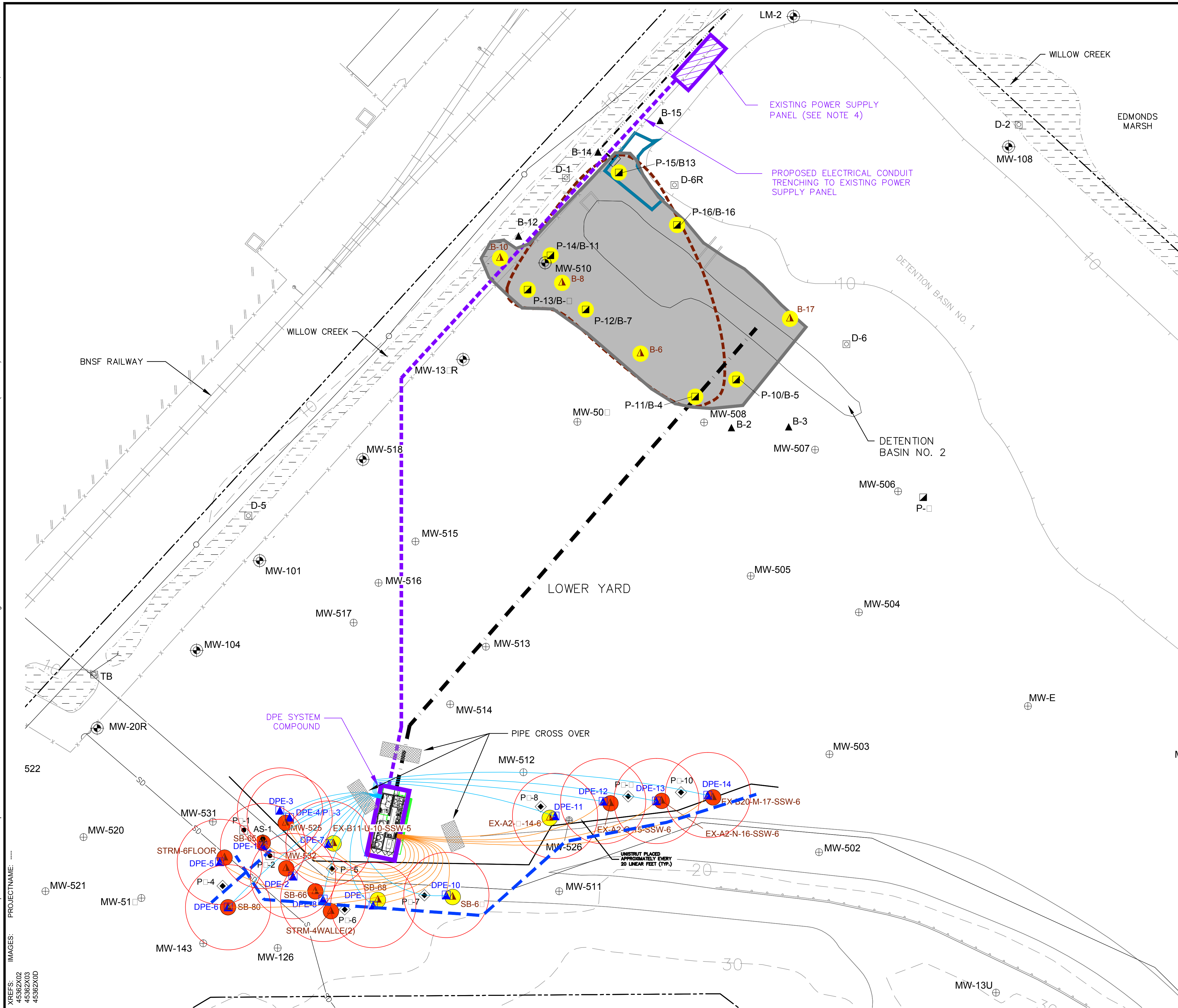
FINAL FEASIBILITY STUDY REPORT

ALTERNATIVE 5: EXCAVATION, IN-SITU SOLIDIFICATION AND MONITORED NATURAL ATTENUATION WITH ENVIRONMENTAL COVENANTS

ARCADIS Design & Consultancy for natural and built assets

FIGURE **6-6**

PUBLIC REVIEW DRAFT



LEGEND:

- ESTIMATED RECOVERABLE LNAPL BOUNDARY
- MW-203 — INTERIOR MONITORING WELL LOCATION AND DESIGNATION
- MW-108 — PERIMETER MONITORING WELL LOCATION
- P-11 — PIEZOMETER
- DPE-14 — DUAL PHASE EXTRACTION (DPE) AND DESIGNATION
- EXCAVATION BOUNDARY
- CUL — CLEANUP LEVEL
- REL — REMEDIATION LEVEL
- PROPERTY BOUNDARY
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- PROPOSED DPE MONITORING PIEZOMETERS
- EXISTING DPE MONITORING PIEZOMETERS
- SOIL SAMPLE LOCATION WITH ANALYTE CONCENTRATIONS EXCEEDING SITE CULs OR RELs
- SOIL SAMPLE LOCATION WITH ANALYTE CONCENTRATIONS EXCEEDING TWICE THE CUL
- PROPOSED ELECTRICAL CONDUIT TRENCHING
- TREATED GROUNDWATER DISCHARGE LINE
- GROUNDWATER CONVEYING PIPING
- VAPOR CONVEYING PIPING
- ESTIMATED DPE ROI – 30 FOOT RADIUS OF INFLUENCE
- PROPOSED PIPE TRENCHING

NOTES:

1. 20–MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
   VERTICAL DATUM: N.A.V.D. 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. LOCATION OF EXISTING POWER SUPPLY PANEL HAS NOT BEEN SURVEYED.

0 70' 140'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASIBILITY STUDY REPORT

ALTERNATIVE 6: EXCAVATION, DUAL PHASE EXTRACTION TREATMENT AND LIMITED ENVIRONMENTAL COVENANT

ARCADIS Design & Consultancy for natural and built assets

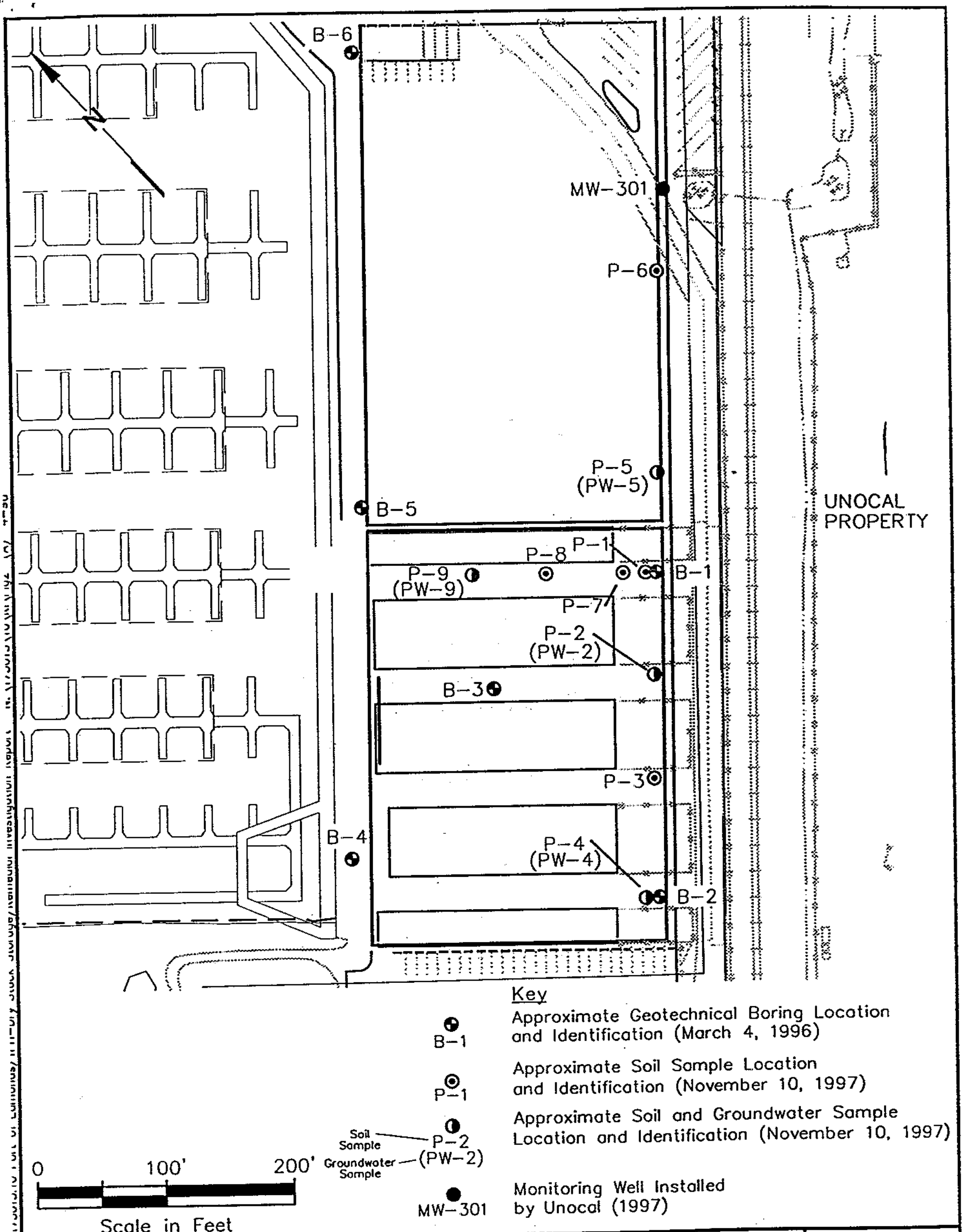
FIGURE
6-7

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* \\arcadis-us.com\officedata\Minneapolis-MN\ENVCAD\Minneapolis-MN\ACT\B0045362\0007\00002\2017 FS\DWG\45362D06-7.dwg LAYOUT: 6-7 SAVED: 4/5/2017 2:13 PM ACADVER: 1…1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 4/7/2017 8:13 AM BY: HARRIS, JESSICA
XREFS: 45362X02 45362X03 45362X0D IMAGES: PROJECTNAME: ----

APPENDIX A

Selected Data from Previous Investigations

Landau Associates, Inc. 1998. Petroleum Hydrocarbon Investigations, South Marina, Port of Edmonds, Washington. April 8, 1998



Exploration Locations

Figure 2

TABLE 1

SOIL ANALYSIS RESULTS
PROPOSED DRY STACK STORAGE FACILITY (mg/kg, ppm)

Sample ID (depth)		Diesel Range		Motor Oil Range	
Method blank		5.0	U	10	U
P-1 S-2	5.9' - 6.3'	1,100		2,200	
P-1 S-3	8.6' - 9'	17,000		20,000	
P-2 S-3	9.7' - 10'	450		740	
P-3 S-3	9.5' - 10'	69		140	
P-4 S-3	9.2' - 9.8'	5.5	U	11	U
P-5 S-3	9.0' - 10.0'	120		250	
P-6 S-3	9.0' - 10.0'	5.4	U	11	U
P-7 S-2	6.0' - 6.75'	5.3	U	11	U
P-7 S-3	8.5' - 9.5'	16,000		16,000	
P-7 S-4	12.0' - 12.75'	9,800		10,000	
P-8 S-3	8.5' - 9.2'	15,000		15,000	
P-8 S-4	12.0' - 12.75'	590		530	
P-9 S-3	9.0' - 10.0'	5.5	U	11	U
P-9 S-4	11.25' - 12.0'	6.6		12	
P-9 S-4	deep	6.2		12	

TABLE 2

GROUNDWATER ANALYSIS RESULTS
PROPOSED DRY STACK STORAGE FACILITY (mg/L, ppm)

Sample ID (depth)		Diesel Range		Motor Oil Range	
Method blank		0.25	U	0.50	U
PW-2	9.0'	13		11	
PW-4	9.0'	0.26		0.50	U
PW-5	8.5'	0.92		1.0	
PW-9	9.25'	0.44		0.50	U

EMCON. 1998. Remedial Investigation Report, Unocal Edmonds Bulk Fuel Terminal. October 19, 1998

Table 2-1

Soil Petroleum Hydrocarbon Data
UNOCAL Edmonds Bulk Fuel Terminal

Location Number	Date Sampled	Depth Sampled (feet)	TPH as Gasoline[a]	TPH as Diesel[a]	TPH-IR[b]	Benzene[c]	Toluene[c]	Ethylbenzene[c]	Total Xylenes[c]
General Lower Yard									
HA-24	04/30/91	1.0	14	160	3,100	—	—	—	—
HA-25[f]	04/30/91	2.0	<10	1,200	11,000	—	—	—	—
HA-101A	12/23/92	2.5	<5J	<25[d]	—	<0.05J	<0.1J	<0.1J	<0.1J
HA-102A	12/23/92	2.0	<5J	<25[d]	—	<0.05J	<0.1J	<0.1J	<0.1J
LM-1	4/17/89	3.0	—	—	260	—	—	—	—
LM-1	4/17/89	8.0	—	—	120	—	—	—	—
LM-2	4/17/89	1.5	—	—	65	—	—	—	—
LM-3	4/17/89	2.0	—	—	360	—	—	—	—
MW-27-1 (BNRR)	05/03/91	2.5	<5	<5	<5	—	—	—	—
MW-27-3 (BNRR)	05/03/91	12.5	<5	<5	—	<0.025	<0.025	<0.025	<0.025
MW-28-2 (BNRR)	05/03/91	7.5	<5	<5	<5	—	—	—	—
MW-28-3 (BNRR)	05/03/91	12.5	<5	<5	—	<0.025	<0.025	<0.025	<0.025
MW-29-2 (BNRR)	05/03/91	7.5	<5	<5	<5	—	—	—	—
MW-29-3 (BNRR)	05/03/91	12.5	<5	<5	—	<0.025	<0.025	<0.025	<0.025
MW-101B	12/22/92	5.5	<5J	<25[d]	—	<0.05J	<0.1J	<0.1J	<0.1J
MW-101C	12/22/92	8.0	43J	<25[d]	—	<0.05J	0.1J	0.3J	0.8J
MW-102B	12/22/92	6.0	<5J	<25[d]	—	<0.05J	<0.1J	<0.1J	<0.1J
MW-102C	12/22/92	8.0	2.7J	2,360*[d]	—	<0.05J	3.7J	5.1J	33.6J
MW-103B	12/22/92	6.0	<5J	2,670J*[d]	—	<0.05J	<0.1J	<0.1J	<0.1J
MW-103C	12/22/92	8.0	<5J	<25[d]	—	<0.05J	<0.1J	<0.1J	<0.1J
MW-104A	12/22/92	5.0	<5J	<25[d]	—	<0.05J	<0.1J	<0.1J	<0.1J
MW-104B	12/22/92	7.5	<5J	<25[d]	—	<0.05J	<0.1J	<0.1J	<0.1J
TP-5	09/90	2.0	<5	180	530	<0.025	<0.025	<0.025	<0.025

Table 5-1
TPH and BTEX in Soil
Admiral Way Borings
UNOCAL Edmonds Terminal

SITE	DATE	DEPTH	TPH - DRO (mg/kg)	TPH - HO (mg/kg)	TPH - GRO (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total xylenes (mg/kg)
SB-1	08/23/01	3.5	<10.0	<25.0	<5.00	<0.0300	<0.0500	<0.0500	<0.100
SB-1	08/23/01	6	2190 J	<275	366 J	<0.120 J	0.348 J	<0.200 J	1.05 J
SB-2	08/23/01	6	88.4	84.5	<5.00	<0.0300	<0.0500	<0.0500	<0.100
SB-3	08/24/01	7	15.1	43.8	<5.00	<0.0300	<0.0500	<0.0500	<0.100
SB-4	08/23/01	3.5	<10.0 J	<25.0 J	<5.00 J	<0.0300 J	<0.0500 J	<0.0500 J	<0.100 J
SB-4	08/23/01	6	2010	1190	<5.00	<0.0300	<0.0500	<0.0500	<0.100
SB-5	08/24/01	7	<10.0	<25.0	<5.00	<0.0300	<0.0500	<0.0500	<0.100
SB-6	08/24/01	5	82.3 J	159 J	<5.00 J	<0.0300 J	<0.0500 J	<0.0500 J	<0.100 J
SB-7	08/24/01	5	<10.0	<25.0	<5.00	<0.0300	<0.0500	<0.0500	<0.100

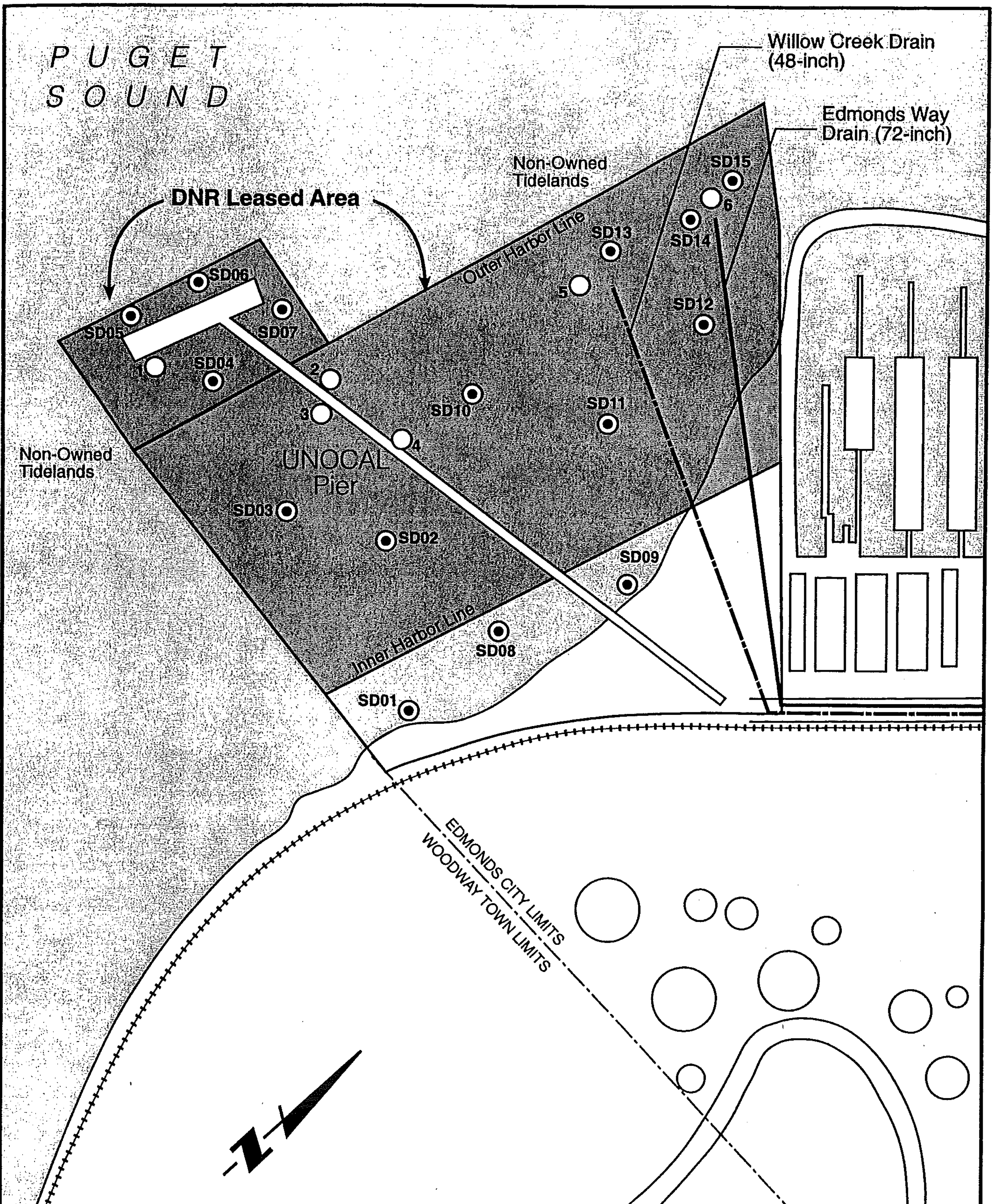
Values represent total concentration unless noted. < = Not detected at indicated reporting limit. --- = Not analyzed. J = Estimated result.

Table 5-2
PAHs in Soil
Admiral Way Borings
UNOCAL Edmonds Terminal

CONSTITUENT	(Units in mg/kg)	SITE DATE DEPTH (ft)	SB-1 8/23/01 3.5	SB-1 8/23/01 6	SB-2 8/23/01 6	SB-3 8/24/01 7	SB-4 8/23/01 3.5	SB-4 8/23/01 6	SB-5 8/24/01 7	SB-6 8/24/01 5	SB-7 8/24/01 5
1-Methylnaphthalene			<0.200	1.68	<0.200	<0.200	<0.100 J	<0.200	<0.100	<0.200	<0.100
2-Methylnaphthalene			<0.200	1.13	<0.200	<0.200	<0.100 J	<0.200	<0.100	<0.200	<0.100
Acenaphthene			<0.0200	0.352	0.0238	<0.0100	<0.0100 J	0.154	<0.0100	<0.0200	<0.0100
Acenaphthylene			<0.0200	<0.0200	<0.0200	<0.0100	<0.0100 J	<0.0200	<0.0100	<0.0200	<0.0100
Anthracene			<0.0200	<0.0200	0.0409	<0.0100	0.011 J	0.373	<0.0100	<0.0200	<0.0100
Benzo(a)anthracene			<0.0200	0.0978	0.0426	<0.0100	0.0378 J	0.721	<0.0100	0.0406	<0.0100
Benzo(a)pyrene			<0.0200	0.0349	0.0358	<0.0100	0.0549 J	0.305	<0.0100	0.0469	<0.0100
Benzo(b)fluoranthene			<0.0200	0.0559	0.0613	<0.0100	0.057 J	0.315	<0.0100	0.0734	<0.0100
Benzo(ghi)perylene			<0.0200	<0.0200	0.0375	<0.0100	0.0364 J	0.194	<0.0100	0.0687	<0.0100
Benzo(k)fluoranthene			<0.0200	<0.0200	<0.0200	<0.0100	0.0124 J	0.048	<0.0100	<0.0200	<0.0100
Chrysene			<0.0200	0.0992	0.0562	<0.0100	0.0343 J	0.803	<0.0100	0.0625	<0.0100
Dibenzo(a,h)anthracene			<0.0200	<0.0200	<0.0200	<0.0100	0.022 J	<0.0200	<0.0100	0.0593	<0.0100
Fluoranthene			<0.0200	0.299	0.177	<0.0100	0.0735 J	1.16	<0.0100	0.0765	<0.0100
Fluorene			<0.0200	0.939	0.0324	<0.0100	<0.0100 J	0.374	<0.0100	<0.0200	<0.0100
Indeno(1,2,3-cd)pyrene			<0.0200	0.0559	0.08	<0.0100	0.059 J	0.166	<0.0100	0.106	<0.0100
Naphthalene			0.0307	0.0796	0.0272	<0.0100	<0.0100 J	<0.0200	<0.0100	<0.0200	<0.0100
Phenanthrene			<0.0200	1.07	0.0851	<0.0100	0.0391 J	1.42	<0.0100	0.0234	<0.0100
Pyrene			<0.0200	0.314	0.155	<0.0100	0.0851 J	1.41	<0.0100	0.0718	<0.0100

Values represent total concentration unless noted.
< = Not detected at indicated reporting limit.
--- = Not analyzed.
J = Estimated result.

CH2MHILL. 2000. Draft work Plan. City of Edmonds Sediment Investigation. June 2000. And associated EIM results



SCALE IN FEET

0 200 400

SCALE IN METERS

0 50 100

Legend

- ○ Unocal Sample
- ⦿ CH2M HILL Sediment Sample Location

Figure 6

Sediment Sampling Locations and Historical UNOCAL Sampling Locations

154090.G1.06_E052000017SEA • Edmonds Sed. Investigation • New Sediment Sampling2 • 12/21/00 • DK/LW/jg

TABLE 2

Comparison of Edmonds Sediment Data to Applicable Standards or Screening Values

Method	Compound	CAS	Units	Criteria Source[a]	Standard Criteria	SD-01	SD-02	SD-03	SD-04	SD-04D	SD-05	SD-06	SD-07	SD-08	SD-09	SD-10
SW8260	1,3-Dichlorobenzene	541-73-1	ug/kg-dry	Marine AET	>170	1.1 U	0.8 U	0.9 U	0.9 U	0.9 U	0.9 U	1 U	0.9 U	1 U	0.9 U	0.9 U
SW8260	1,4-Dichlorobenzene	106-46-7	ug/kg-dry	Marine AET	110	1.1 U	0.8 U	0.9 U	0.9 U	0.9 U	0.9 U	1 U	0.9 U	1 U	0.9 U	0.9 U
PSDDA	bis(2-Ethylhexyl)phthalate	117-81-7	ug/kg-dry	Marine AET	1300	39	19 U	19 U	19 U	19 U	63	33	20 U	19 U	25	19 U
PSDDA	Butylbenzylphthalate	85-68-7	ug/kg-dry	Marine AET	63	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
PSDDA	Di-n-Butylphthalate	84-74-2	ug/kg-dry	Marine AET	1400	19 U	19 U	19 U	34	19 U	20 U	20 U	20 U	19 U	19 U	19 U
PSDDA	Di-n-Octyl phthalate	117-84-0	ug/kg-dry	Marine AET	>420	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
PSDDA	Dibenzofuran	132-64-9	ug/kg-dry	Marine AET	540	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
PSDDA	Diethylphthalate	84-66-2	ug/kg-dry	Marine AET	>48	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
PSDDA	Dimethylphthalate	131-11-3	ug/kg-dry	Marine AET	71	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
SW8081	Hexachlorobenzene	118-74-1	ug/kg-dry	Marine AET	22	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SW8081	Hexachlorobutadiene	87-68-3	ug/kg-dry	Marine AET	11	0.2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
PSDDA	Hexachloroethane	67-72-1	ug/kg-dry	Marine AET	73	19 U	19 U	19 U	19 U	19 U	20 U	20 U		19 U	19 U	19 U
PSDDA	N-Nitrosodiphenylamine	86-30-6	ug/kg-dry	Marine AET	28	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
Semi Volatiles (analytes that do not have organic carbon normalized Marine SQS)																
PSDDA	2,4-Dimethylphenol	105-67-9	ug/kg-dry	Marine SQS	29000	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
PSDDA	2-Methylphenol	95-48-7	ug/kg-dry	Marine SQS	63000	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
PSDDA	4-Methylphenol	106-44-5	ug/kg-dry	Marine SQS	670000	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
PSDDA	Benzoic Acid	65-85-0	ug/kg-dry	Marine SQS	650000	190 U	190 U	190 U	190 U	190 U	120 J	200 U	200 U	190 U	190 U	190 U
PSDDA	Benzyl Alcohol	100-51-6	ug/kg-dry	Marine SQS	57000	19 U	19 U	19 U	19 U	19 U	20 U	20 U	20 U	19 U	19 U	19 U
PSDDA	Pentachlorophenol	87-86-5	ug/kg-dry	Marine SQS	360000	97 U	94 U	93 U	96 U	95 U	98 U	99 U	98 U	97 U	93 U	94 U
PSDDA	Phenol	108-95-2	ug/kg-dry	Marine SQS	420000	19 U	19 U	19 U	19 U	19 U	140	20 U	20 U	19 U	19 U	19 U

All analytes are below sediment criteria and screening levels.

[a] Marine SQS - Marine Sediment Qualifity Standard from Sediment Management Standard (WAC 173-204) Revised December 1995. Marine AET - Apparent Effects Threshold from PSEP, 1988. Hexachloroethane AET based on draft 1998 and 1999 AETs since no published values are available.

Q - Data Qualifiers

J = Estimated value.
U = Non-detected at the given detection limit.
Y = Raised reporting limit due to matrix interferences. Analyte may be present at or below the listed concentration.

Acronyms

ug/kg-dry = micrograms per kilogram, dry weight
mg/kg-dry = milligrams per kilogram, dry weight

LPAH - includes Acenaphthene, Acenaphtylene, Anthracene, Fluorene, Naphthalene, and Phenanthrene.
HPAH - includes Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Total Benzofluoranthenes, Benzo(a)pyrene, Indeno(1,2,3,-c,d)pyrene, Dibenzo(a,h)anthracene, and Benzo(g,h,i)perylene
Total PCBs - includes Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242, Aroclor 1248, Aroclor 1254, and Aroclor 1260.

TABLE 2

Comparison of Edmonds Sediment Data to Applicable Standards or Screening Values

Method	Compound	CAS	Units	Criteria Source[a]	Standard Criteria	SD-10-D	SD-11	SD-12	SD-13	SD-14	SD-15	SDREF-1	SDREF-2	SDREF-3
General Chemistry														
EPA 350.1M	N-Ammonia		mg-N/kg			0.53	1.9	0.23	2.9	4.1	2.8	2.6	3.6	8.2
EPA 376.2	Sulfide		mg/kg			0.32 U	0.3 U	0.27 U	16	12	7.5	0.3 U	0.32 U	0.32 U
Plumb,1981	Total Organic Carbon		Percent			0.051	0.094	0.06	0.12	0.11	1.3	0.36	0.33	0.34
EPA 160.3	Total Solids		Percent			81	82.2	84.4	75.9	79.4	75.1	79.4	79.4	80.9
PCBs														
Total PCBs				Marine AET	130	5.6 U	2.9 U	5.5 U	5.5 U	5.6 U	5.9 U	5.5 U	5.5 U	5.4 U
SW8081	Aroclor 1016	12674-11-2	ug/kg-dry			2.8 U	2.9 U	2.7 U	2.7 U	2.8 U	2.8 U	2.7 U	2.8 U	2.7 U
SW8081	Aroclor 1221	11104-28-2	ug/kg-dry			5.6 U	5.7 U	5.5 U	5.5 U	5.6 U	5.6 U	5.5 U	5.5 U	5.4 U
SW8081	Aroclor 1232	11141-16-5	ug/kg-dry			2.8 U	2.9 U	2.7 U	2.7 U	2.8 U	2.8 U	2.7 U	2.8 U	2.7 U
SW8081	Aroclor 1242	53469-21-9	ug/kg-dry			2.8 U	2.9 U	2.7 U	2.7 U	2.8 U	2.8 U	2.7 U	2.8 U	2.7 U
SW8081	Aroclor 1248	12672-29-6	ug/kg-dry			2.8 U	2.9 U	2.7 U	2.7 U	2.8 U	2.8 U	2.7 U	2.8 U	2.7 U
SW8081	Aroclor 1254	11097-69-1	ug/kg-dry			2.8 U	2.9 U	2.7 U	2.7 U	2.8 U	2.8 U	2.7 U	2.8 U	2.7 U
SW8081	Aroclor 1260	11096-82-5	ug/kg-dry			2.8 U	2.9 U	2.7 U	2.7 U	2.8 U	2.8 U	2.7 U	2.8 U	2.7 U
Metals														
6010	Antimony	7440-36-0	mg/kg-dry			6 U	6 U	6 U	7 U	6 U	7 U	7 U	7 U	7 U
6010	Arsenic	7440-38-2	mg/kg-dry	Marine SQS	57	6 U	6 U	6 U	7 U	6 U	7 U	7 U	7 U	7 U
6010	Cadmium	7440-43-9	mg/kg-dry	Marine SQS	5.1	0.2 U	0.2 U	0.2 U	0.3 U	0.2 U	0.3 U	0.3 U	0.3 U	0.3 U
6010	Chromium	7440-47-3	mg/kg-dry	Marine SQS	260	25.9	17	13.7	23.8	22.6	27.2	13.3	12.9	14.6
6010	Copper	7440-50-8	mg/kg-dry	Marine SQS	390	5.7	6.4	7.9	9.7	7.5	11.3	3.4	3.1	3.8
6010	Lead	7439-92-1	mg/kg-dry	Marine SQS	450	10	4	3	4	5	5	4	4	5
7471	Mercury	7439-97-6	mg/kg-dry	Marine SQS	0.41	0.05 U	0.05 U	0.05 U	0.07 U	0.06 U	0.06 U	0.06 U	0.05 U	0.07 U
6010	Nickel	7440-02-0	mg/kg-dry			21	18	17	29	28	35	11	9	11
6010	Silver	7440-22-4	mg/kg-dry	Marine SQS	6.1	0.3 U	0.4 U	0.3 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
6010	Zinc	7440-66-6	mg/kg-dry	Marine SQS	410	25.3	24.2	28.8	26.6	32.7	34.8	14.9	13.9	16.5
PAHs														
Low Molecular Weight Polynuclear Aromatic Hydrocarbon				Marine AET	5200	19 U	19 U	19 U	19 U	19 U	42	19 U	19 U	19 U
PSDDA	Acenaphthene	83-32-9	ug/kg-dry	Marine AET	500	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
PSDDA	Acenaphthylene	208-96-8	ug/kg-dry	Marine AET	>560	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
PSDDA	Anthracene	120-12-7	ug/kg-dry	Marine AET	960	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
PSDDA	Fluorene	86-73-7	ug/kg-dry	Marine AET	540	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
PSDDA	Naphthalene	91-20-3	ug/kg-dry	Marine AET	2100	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
PSDDA	Phenanthrene	85-01-8	ug/kg-dry	Marine AET	1500	19 U	19 U	19 U	19 U	19 U	42	19 U	19 U	19 U
PSDDA	2-Methylnaphthalene	91-57-6	ug/kg-dry	Marine AET	670	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
High Molecular Weight Polynuclear Aromatic Hydrocarbon				Marine AET	12000	19 U	19 U	29 J	53	19 U	348	19 U	19 U	19 U
PSDDA	Benzo(a)anthracene	56-55-3	ug/kg-dry	Marine AET	1300	19 U	19 U	19 U	19 U	19 U	33	19 U	19 U	19 U
PSDDA	Benzo(a)pyrene	50-32-8	ug/kg-dry	Marine AET	1600	19 U	19 U	19 U	19 U	19 U	29	19 U	19 U	19 U
PSDDA	Benzo(b)fluoranthene	205-99-2	ug/kg-dry	Marine AET	3200	19 U	19 U	19 U	19 U	19 U	26	19 U	19 U	19 U
PSDDA	Benzo(g,h,i)perylene	191-24-2	ug/kg-dry	Marine AET	670	19 U	19 U	19 U	19 U	19 U	21	19 U	19 U	19 U
PSDDA	Benzo(k)fluoranthene	207-08-9	ug/kg-dry	Marine AET	3200	19 U	19 U	19 U	19 U	19 U	25	19 U	19 U	19 U
PSDDA	Chrysene	218-01-9	ug/kg-dry	Marine AET	1400	19 U	19 U	19 U	19 U	19 U	31	19 U	19 U	19 U
PSDDA	Dibenz(a,h)anthracene	53-70-3	ug/kg-dry	Marine AET	230	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
PSDDA	Fluoranthene	206-44-0	ug/kg-dry	Marine AET	1700	19 U	19 U	16 J	33	19 U	120	19 U	19 U	19 U
PSDDA	Indeno(1,2,3-cd)pyrene	193-39-5	ug/kg-dry	Marine AET	600	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U
PSDDA	Pyrene	129-00-0	ug/kg-dry	Marine AET	2600	19 U	19 U	13 J	20	19 U	63	19 U	19 U	19 U
Semi Volatiles (analytes that have organic carbon normalized Marine SQS)														
SW8260	1,2,4-Trichlorobenzene	120-82-1	ug/kg-dry	Marine AET	31	4.9 U	3.7 U	4.7 U	4.4 U	4.9 U	4.7 U	5.2 U	5.3 U	5 U
SW8260	1,2-Dichlorobenzene	95-50-1	ug/kg-dry	Marine AET	35	1 U	0.7 U	0.9 U	0.9 U	1 U	0.9 U	1 U	1.1 U	1 U

Maul Foster & Alongi, Inc. 2003b. Draft Supplemental Remedial Investigation Report, Unocal Edmonds Terminal, Edmonds, Washington. April 28, 2003. SIT3.12

LEGEND:

Sample Depth (in feet below ground surface)	TPH (as gasoline or gasoline-range) (mg/kg)	TPH (as diesel or diesel-range) (mg/kg)	TPH (as oil or heavy oil) (mg/kg)
0.0	0	0	0
2.5	0	0	0
5.0	0	0	0
7.5	0	0	0
10	0	0	0

U = NOT DETECTED AT OR ABOVE THE METHOD REPORTING LIMIT.

CONCENTRATIONS IN mg/kg.

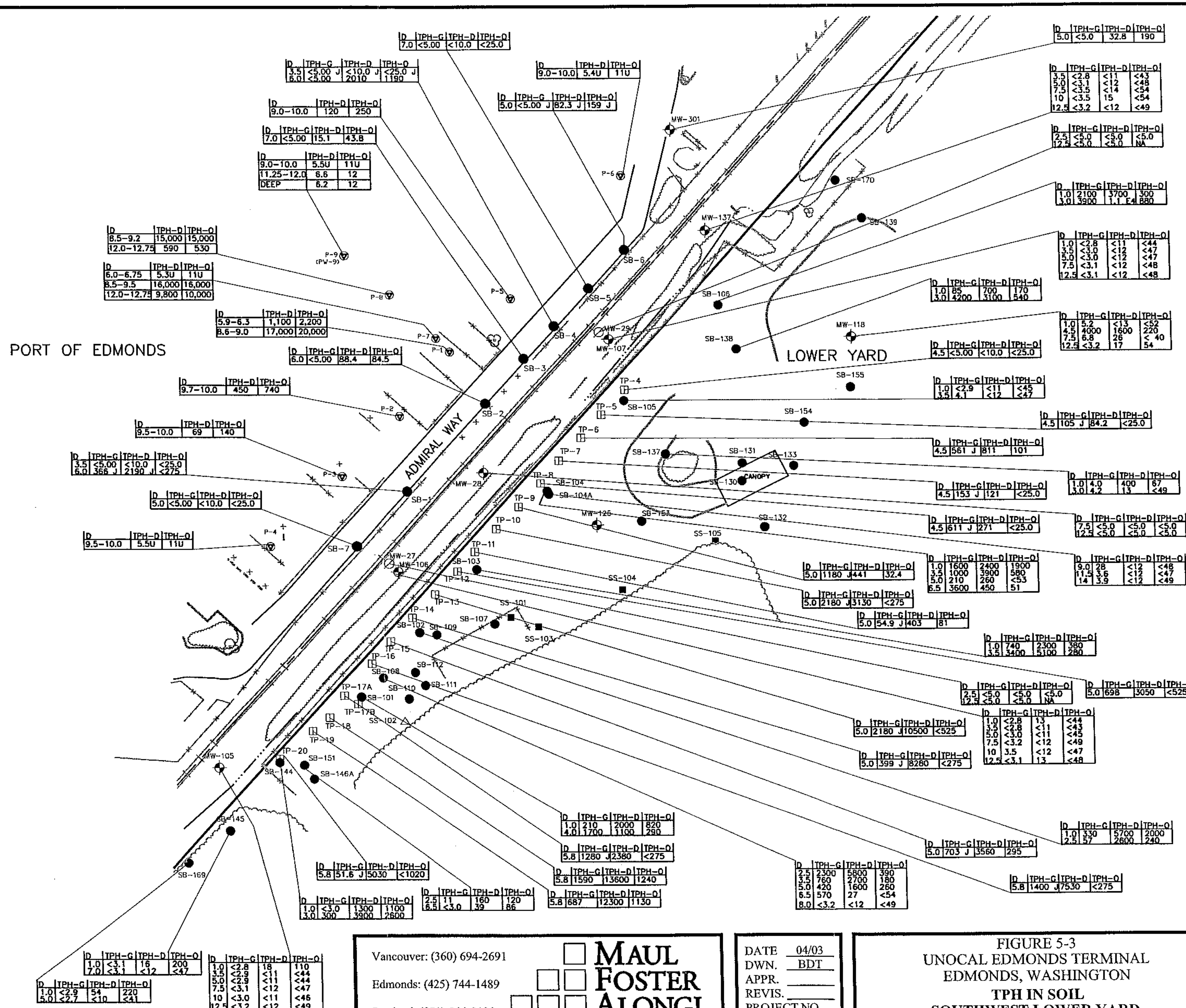
NOTES:
1) P-1 THROUGH P-9 DATA WERE COLLECTED BY LANDAU ASSOCIATES, INC. IN NOVEMBER 1997.

2) MW-27 THROUGH MW-29 DATA WERE COLLECTED BY GEOENGINEERS IN 1991.

3) SB-100 SERIES AND MW-100 SERIES DATA WERE COLLECTED BY EMCON IN 1995.

4) SB-1 THRU SB-7 AND TP-4 THRU TP-20 DATA WERE COLLECTED BY MFA IN 2001.

- Property Boundary
- Test Pit
- Soil Boring
- Monitoring Well/Boring
- Abandoned Monitoring Well/Boring



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Portland: (971) 544-2139

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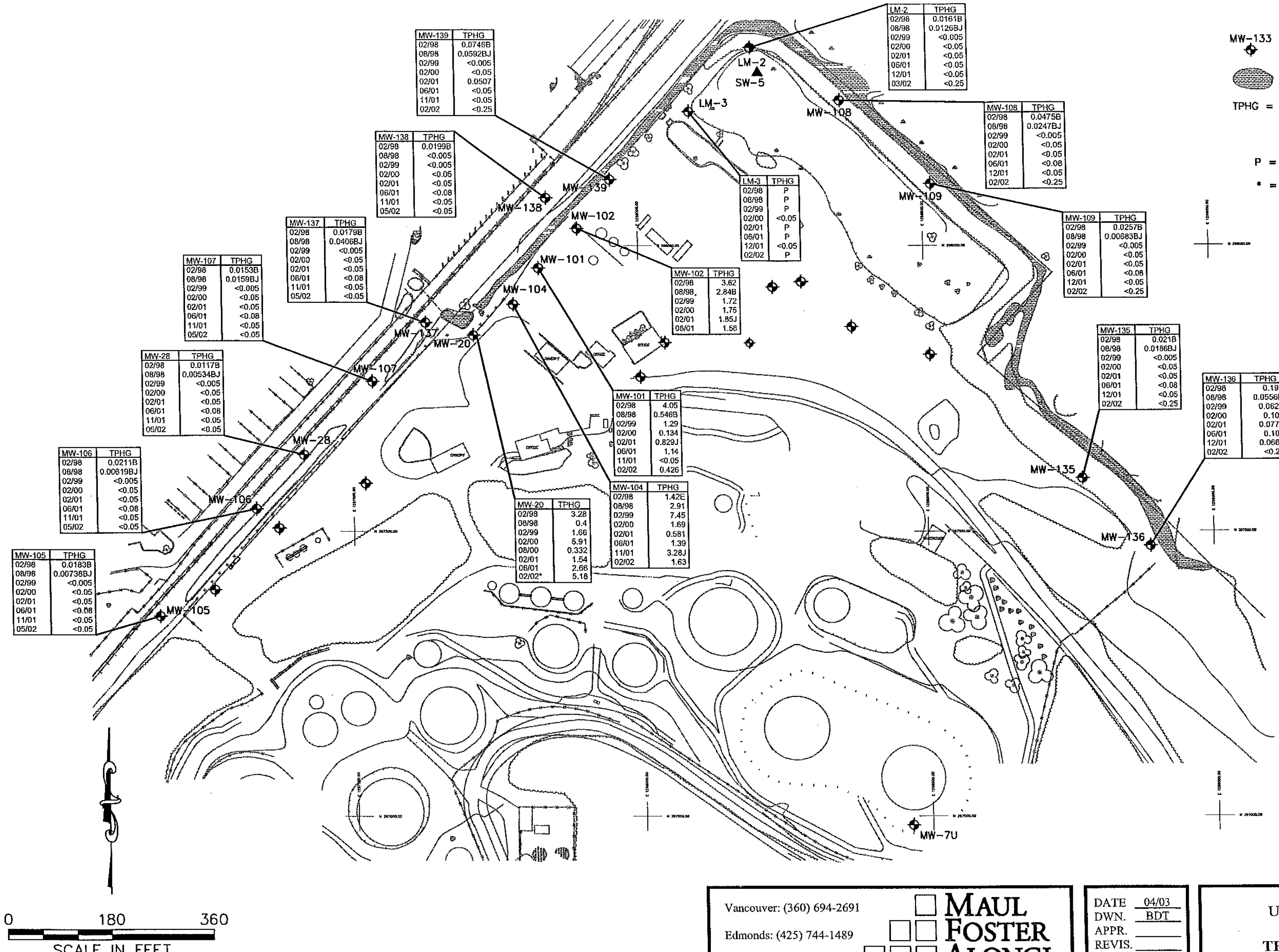
FIGURE 5-3
UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON
TPH IN SOIL
SOUTHWEST LOWER YARD, ADMIRAL WAY, PORT OF EDMONDS

File: \9077\01.05\006-5-3.DWG Last edited: APR 24, 2003 by: btookey Xrefs: wells Black/White

LAYOUT: 1



MW-139	TPHG
02/98	0.0746B
08/98	0.0592BJ
02/99	<0.005
02/00	<0.05
02/01	0.0507
06/01	<0.05
11/01	<0.05
02/02	<0.25

MW-138	TPHG
02/98	0.0199B
08/98	<0.005
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.08
11/01	<0.05
05/02	<0.05

MW-137	TPHG
02/98	0.0179B
08/98	0.0406BJ
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.08
11/01	<0.05
05/02	<0.05

MW-107	TPHG
02/98	0.0153B
08/98	0.0159BJ
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.08
11/01	<0.05
05/02	<0.05

MW-28	TPHG
02/98	0.0117B
08/98	0.00534BJ
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.08
11/01	<0.05
05/02	<0.05

MW-106	TPHG
02/98	0.0211B
08/98	0.00619BJ
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.08
11/01	<0.05
05/02	<0.05

MW-105	TPHG
02/98	0.0183B
08/98	0.00738BJ
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.08
11/01	<0.05
05/02	<0.05

LM-2	TPHG
02/98	0.0161B
08/98	0.0126BJ
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.05
12/01	<0.05
03/02	<0.25

LM-3	TPHG
02/98	P
08/98	P
02/99	P
02/00	<0.05
02/01	P
06/01	P
12/01	<0.05
02/02	P

MW-108	TPHG
02/98	0.0475B
08/98	0.0247BJ
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.08
12/01	<0.05
02/02	<0.25

MW-109	TPHG
02/98	0.0257B
08/98	0.00683BJ
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.08
12/01	<0.05
02/02	<0.25

MW-102	TPHG
02/98	3.62
08/98	2.84B
02/99	1.72
02/00	1.75
02/01	1.85J
06/01	1.58

MW-101	TPHG
02/98	4.05
08/98	0.546B
02/99	1.29
02/00	0.134
02/01	0.829J
06/01	1.14
11/01	<0.05
02/02	0.426

MW-104	TPHG
02/98	1.42E
08/98	2.91
02/99	7.45
02/00	1.69
02/01	0.581
06/01	1.39
11/01	3.28J
02/02	1.63

MW-20	TPHG
02/98	3.28
08/98	0.4
02/99	1.66
02/00	5.91
08/00	0.332
02/01	1.54
06/01	2.66
02/02*	5.18

MW-135	TPHG
02/98	0.021B
08/98	0.0186BJ
02/99	<0.005
02/00	<0.05
02/01	<0.05
06/01	<0.08
12/01	<0.05
02/02	<0.25

MW-136	TPHG
02/98	0.191
08/98	0.0556B
02/99	0.0629
02/00	0.101
02/01	0.0775
06/01	0.105
12/01	0.0662
02/02	<0.25

Legend

MW-133 Monitoring Well

Surface Water

TPHG = Total Petroleum Hydrocarbons in the gasoline range

Concentrations in mg/L

P = Product in well; sample not collected

* = Result is from replacement well MW-20R

NOTE:
The method reporting limit for NWTPH-G_x is 0.25 mg/L.

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FIGURE 5-4
UNOCAL EDMONDS TERMINAL
EDMONDS, WASHINGTON
TPH-G/GRO IN GROUNDWATER PERIMETER MONITORING WELL NETWORK 1998 - 2002

File: \9077\01.05\006-5-4.DWG Last edited: APR 22, 2003 by: btookey Xrefs: none black/white

Integral Consulting, Inc. 2003. Unocal Sediment Bioassay Testing. December 11, 2003

Table 1. Summary of Detected Chemicals with SMS Criteria in Unocal Sediment

Analyte	SQS	CSL	SMS Units	US-01-1003	US-02-1003	US-03-1003	US-04-1003	US-05-1003	US-06-1003	US-07-1003	US-08-1003	US-09-1003	US-10-1003	US-11-1003
SVOCs (mg/kg oc)														
2-Methylnaphthalene	38	64	mg/kg oc	9.26 U	1.66 J	1.16 U	1.41 U	0.37 U	1.32 U	1.47 U	0.18 U	0.06 U	0.08 U	0.17
bis(2-Ethylhexyl)phthalate	47	78	mg/kg oc	92.58 U	NA	NA	7.78	NA	NA	21.87	NA	NA	1.90	NA
Butylbenzylphthalate	4.9	64	mg/kg oc	92.58 U	NA	NA	7.04 U	NA	NA	7.33 U	NA	NA	0.41 U	NA
Di-n-butylphthalate	220	1700	mg/kg oc	37.08 U	NA	NA	9.26	NA	NA	5.85 U	NA	NA	0.33 U	NA
PAHs (mg/kg oc)														
Acenaphthene	16	57	mg/kg oc	3.71 U	1.42 U	0.46 U	6.07	0.15 U	0.53 U	0.59 U	0.07 U	0.25	0.03 U	0.70
Acenaphthylene	66	66	mg/kg oc	4.35	1.42 U	0.46 U	0.56 U	0.15 U	0.53 U	0.59 U	0.07 U	1.03	0.08	3.65
Anthracene	220	1200	mg/kg oc	3.71 U	1.42 U	0.46 U	9.81	0.26 J	0.88 J	0.59 U	0.07 U	1.52	0.03 U	3.39
Fluorene	23	79	mg/kg oc	3.71 U	1.42 U	0.46 U	9.32	0.15 U	0.53 U	0.59 U	0.07 U	0.02 U	0.03 U	0.54
Naphthalene	99	170	mg/kg oc	9.26 U	1.42 U	0.46 U	0.56 U	0.19 J	0.53 U	0.59 U	0.07 U	0.02 U	0.03	0.32
Phenanthrene	100	480	mg/kg oc	3.71 U	1.42 U	1.45	34.07	0.75	0.53 U	0.59 U	0.07 U	0.24	0.04	4.26
calculated LPAH [1]	370	780	mg/kg oc	4.35	1.66	1.45	59.28	1.20	0.88	0.58 U	0.18 U	3.04	0.15	13.01
Benzo(a)anthracene	110	270	mg/kg oc	9.26 U	1.42 U	0.46 U	0.56 U	0.15 U	0.53 U	12.47	0.07 U	5.22 D10	0.03 U	5.68
Benzo(a)pyrene	99	210	mg/kg oc	9.26 U	1.42 U	2.68	0.56 U	0.73	0.53 U	4.91	0.07 U	2.73	0.03 U	6.52
Benzo(g,h,i)perylene	31	78	mg/kg oc	3.71 U	1.42 U	NA	0.56 U	NA	0.53 U	5.69	NA	1.11	0.03 U	3.17
Benzofluoranthenes	230	450	mg/kg oc	7.39 U	1.42 U	3.54	1.12 U	1.36	1.06 U	11.27	0.15 U	2.85	0.06 U	7.65
Chrysene	110	460	mg/kg oc	9.47	1.42 U	3.08	5.43	1.36	0.53 U	18.40	0.07 U	3.86	0.03 U	5.74
Dibenz(a,h)anthracene	12	33	mg/kg oc	9.26 U	1.42 U	0.46 U	0.56 U	0.15 U	0.53 U	0.59 U	0.07 U	0.29	0.03 U	0.68
Fluoranthene	160	1200	mg/kg oc	7.27	1.42 U	3.84	3.94	1.57	2.87	7.20	0.18 U	1.15	0.10	5.52
Indeno(1,2,3-cd)pyrene	34	88	mg/kg oc	9.26 U	1.42 U	1.70	0.56 U	0.52	0.53 U	2.26	0.07 U	0.80	0.03 U	2.81
Pyrene	1000	1400	mg/kg oc	9.11	1.42 U	4.60	11.23	1.98	3.69	11.53	0.07 U	1.93	0.03 U	8.00
calculated HPAH [1]	960	5300	mg/kg oc	25.86	1.42 U	19.45	20.60	7.52	6.57	73.73	0.15 U	19.93	0.10	45.76
SVOCs (ug/kg)														
3-&4-Methylphenol	670	670	ug/kg	309 U	NA	NA	182 U	NA	NA	176 U	NA	NA	52.7 U	NA
Phenol	420	1200	ug/kg	155 U	NA	NA	91.1 U	NA	NA	87.8 U	NA	NA	26.4 U	NA
PCBs (mg/kg oc)														
calculated Total PCBs [1]	12	65	mg/kg oc	2.80 U	NA	NA	0.94 U	NA	NA	32.27	NA	NA	0.50 U	NA
Metals (mg/kg)														
Arsenic	57	93	mg/kg	2.08	4.24	6.22	3.4	1.47 J	12.2	2.99	4.81	10.8	20.7	3.79 J
Chromium	260	270	mg/kg	15.3	NA	NA	21.4	NA	NA	15.9	NA	NA	35.2	NA
Copper	390	390	mg/kg	10.4	12.7	21.3	7.58	2.24 J	17.8	12.1	19.8	19	24.7	10.2
Lead	450	530	mg/kg	11.7	6.25	10.4	5.91	1.32 U	67.4	21	1.84 J	48.7	23.8	18.3
Mercury	0.41	0.59	mg/kg	0.0113 U	NA	NA	0.0682 B1	NA	NA	0.0664 B1	NA	NA	0.162 B1	NA
Zinc	410	960	mg/kg	37.9	34	48.4	31.5	11.4	80.2	78.9	35.8	86.1	42.8	43.1
Conventionals (%)														
TOC	--	--	--	0.42	1.27	2.24	1.62	0.52	2.95	1.50	1.48	9.06	8.11	3.10

Notes:

Bold font indicates detected concentrations

NA = not analyzed

-- = not applicable

SMS criteria for 4-Methylphenol were applied to data for 3-&4-Methylphenol

[1] It was assumed that non-detects were equal to zero except where all individual compounds were non-detect in which case the highest DL was assumed to be the concentration as per WAC 173-204-320(2)(b)(i)

concentration exceeds SQS

concentration exceeds CSL

US-12-1003	US-13-1003	US-14-1003	US-15-1003	US-16-1003	US-20-1003 (US-06 Dup)	US-21-1003 (US-09 Dup)
0.07 U	0.10 U	0.26	0.08 U	0.07 U	0.10 U	7.58 U
NA	1.38	NA	2.53	NA	NA	NA
NA	0.49 U	NA	1.24	NA	NA	NA
NA	0.40 U	NA	0.54	NA	NA	NA
0.07	0.08	0.04 U	0.06	0.03 U	0.04 U	3.03 U
0.10	0.08	0.08 J	0.03 U	0.07	0.25	3.03 U
0.03 U	0.08	0.20	0.11	0.04 J	1.30	3.03 U
0.03 U	0.04 U	0.21	0.10	0.03 U	0.04 U	3.03 U
0.03 U	0.04 U	0.07 J	0.03 U	0.03 U	0.04 U	3.03 U
0.03 J	0.21	1.08	0.47	0.05	0.53	3.03 U
0.20	0.46	1.90	0.73	0.16	2.08	7.58 U
0.03 U	0.34	0.04 U	0.03 U	0.03 U	1.34	3.03 U
0.03 U	0.37	0.04 U	0.30	0.03 U	0.79	3.03 U
0.03 U	0.04 U	0.04 U	0.03 U	0.03 U	0.04 U	3.03 U
0.06 U	0.67	0.08 U	0.60	0.05 U	0.08 U	6.06 U
0.03 U	0.34	0.59	0.03 U	0.03 U	1.07	49.74
0.03 U	0.04 U	0.04 U	0.03 U	0.03 U	0.04 U	3.03 U
0.10 J	0.73	0.27	0.55	0.12 J	1.25	7.58 U
0.03 U	0.04 U	0.04 U	0.28	0.03 U	0.04 U	3.03 U
0.09	0.68	0.60	0.63	0.15	1.98	105.64
0.20	3.14	1.46	2.36	0.27	6.43	155.38
NA	66.1 U	NA	84.8 J	NA	NA	NA
NA	33 U	NA	41.4 J	NA	NA	NA
NA	0.56 U	NA	0.50 U	NA	NA	NA
7.55	12	4.53	12	36.9	12.2	12.4
NA	49.5	NA	21.6	NA	NA	NA
21	27.3	22.1	17.3	58.7	16.7	20.2
11.1	49.6	7.68	73.4	262	69.1	55.6
NA	0.189 B1	NA	0.128 B1	NA	NA	NA
45	121	40.2	102	378	77.4	99.4
5.41	8.35	2.92	7.38	15.30	3.61	7.80

and (ii)

Table 2. Summary of Unocal Sediment TPH Concentrations - Bulk and Organic Carbon Normalized

	Bulk TPH (mg/kg)				Organic Carbon Normalized TPH (mg/kg oc)			
Station	#2 Diesel (NWTPH-D)	Motor Oil (NWTPH-D)	Gasoline (NWTPH-G)	Total TPH	#2 Diesel (NWTPH-D)	Motor Oil (NWTPH-D)	Gasoline (NWTPH-G)	Total TPH
US-01-1003	378 X1	1820	2.42	2,200	90,431	435,407	579	523,910
US-02-1003	54.7	344	5.25 U	401	4,307	27,087	413 U	31,600
US-03-1003	215 X1	1120	8.52	1,344	9,598	50,000	380	59,979
US-04-1003	1470 X1	5480	9.76	6,960	90,741	338,272	602	429,615
US-05-1003	16.2 U	32.4 U	4.85	29	3098 U	6195 U	927	5,606
US-06-1003	180 X1	353 X1	8.12	541	6,102	11,966	275	18,343
US-07-1003	598 X1	325	59.1	982	39,867	21,667	3,940	65,473
US-08-1003	22.4 U	44.8 U	17.1	51	1514 U	3027 U	1,155	3,426
US-09-1003	191 X1	492 X1	15.8	699	2,108	5,430	174	7,713
US-10-1003	57 U	270 X2	11.9	310	703 U	3,329	147	3,827
US-11-1003	24.9 U	110 X2	8.04 U	126	803 U	3,548	259 U	4,080
US-12-1003	32.3 U	64.6 U	10.7 U	54	597 U	1194 U	198 U	994
US-13-1003	71.8 J	490 X2	10.9	573	860	5,868	131	6,859
US-14-1003	27.9 J	47.7 J	7.83 U	80	955	1,634	268 U	2,723
US-15-1003	47.4 J	362	14.3 U	417	642	4,905	194 U	5,644
US-16-1003	81.4 U	470 X2	24.7 U	523	532 U	3,072	161 U	3,419
US-20-1003 (US-06 Dup)	302 X1	555 X1	5.22	862	8,366	15,374	145	23,884
US-21-1003 (US-09 Dup)	256 X1	627 X1	15.7 U	891	3,282	8,038	201 U	11,421

T

	Conventionals
Station	TOC (%)
US-01-1003	0.418
US-02-1003	1.27
US-03-1003	2.24
US-04-1003	1.62
US-05-1003	0.523
US-06-1003	2.95
US-07-1003	1.5
US-08-1003	1.48
US-09-1003	9.06
US-10-1003	8.11
US-11-1003	3.1
US-12-1003	5.41
US-13-1003	8.35
US-14-1003	2.92
US-15-1003	7.38
US-16-1003	15.3
US-20-1003 (US-06 Dup)	3.61
US-21-1003 (US-09 Dup)	7.8

Table 3. Summary of Available Conventional Parameters for Unocal Sediment (2003)

Station	Solids (%)	Ammonia Nitrogen (mg/kg)	Total Volatile Solids (mg/kg)	TOC (%)
US-01-1003	84.95	19.4	1.8	0.418
US-02-1003	NA	NA	NA	1.27
US-03-1003	NA	NA	NA	2.24
US-04-1003	62.42	88.8	5.33	1.62
US-05-1003	NA	NA	NA	0.523
US-06-1003	NA	NA	NA	2.95
US-07-1003	70.43	94.2	4.65	1.5
US-08-1003	NA	NA	NA	1.48
US-09-1003	NA	NA	NA	9.06
US-10-1003	21.68	661	22.8	8.11
US-11-1003	NA	NA	NA	3.1
US-12-1003	NA	NA	NA	5.41
US-13-1003	18.47	945	16.5	8.35
US-14-1003	NA	NA	NA	2.92
US-15-1003	26.06	564	24.7	7.38
US-16-1003	NA	NA	NA	15.3
US-20-1003 (US-06 Dup)	NA	NA	NA	3.61
US-21-1003 (US-09 Dup)	NA	NA	NA	7.8

NA - Not available.

Table 4. Summary of Sediment Grain Size from Historical Samples

Area	Sample Location	TOC (%)	Gravel(%)	Sand (%)	Fines (%)
Site	US-01	0.78	45.30	51.30	3.30
Site	US-02	0.97	2.00	76.00	22.00
Site	US-03	3.51	0.00	57.60	42.40
Site	US-04	1.27	11.30	81.90	6.80
Site	US-05	1.78	0.90	69.30	29.70
Site	US-06	2.54	2.20	55.10	42.80
Site	US-07	1.58	7.70	76.20	16.10
Site	US-08	2.74	0.70	18.00	81.30
Site	US-09	8.18	5.20	40.50	54.30
Site	US-10	7.38	3.20	30.00	66.80
Site	US-11	6.35	0.40	37.80	61.80
Site	US-12	6.73	0.70	31.20	68.00
Site	US-13	9.43	1.40	28.90	69.70
Site	US-14	7.04	6.60	9.00	84.40
Site	US-15	0.73	0.00	92.80	7.20
Site	US-20	9.97	1.60	28.50	69.90
Background	NISQ	1.05	0.10	75.60	24.30
Background	CARR	0.55	0.00	43.50	56.40
Summary					
Site minumum		0.73	0.00	9.00	3.30
Site maximum		9.97	45.30	92.80	84.40

Table 5. Summary of Historical (1995) Sediment Bioassay Results

Test Species	Amphipod (*Eohaustarius estuaria* s)	Bivalve (*Mytilus edulis*)	Juvenile Polychaete (*Neanthes arenaceodentata*)	Current (2003) Sediment Chemistry				
Sample Number	Average Mortality (%)	Average Normal Survival (%)	Mean Growth Rate (mg/individual/day)	Gasoline (mg/kg)	#2 Diesel (mg/kg)	Motor Oil (mg/kg)	Bulk Total TPH (mg/kg)	OC Normalized Total TPH (mg/kg oc)
US-01	6	67	0.609	2.42	378 X1	1820	2,200	523,910
US-02	4	67	0.376	5.25 U	54.7	344	401	31,600
US-03	20 *	55 +	0.369	8.52	215 X1	1120	1,344	59,979
US-04	8	76	0.455	9.76	1470 X1	5480	6,960	429,615
US-05	46 * + CSL	61 +	0.416	4.85	16.2 U	32.4 U	29	5,606
US-06	8	77	0.358	8.12	180 X1	353 X1	541	18,343
US-07	7	70	0.362	59.1	598 X1	325	982	65,473
US-08	6	54 * + SQS	0.402	17.1	22.4 U	44.8 U	51	3,426
US-09	22 *	62 +	0.273 * + SQS	15.8	191 X1	492 X1	699	7,713
US-10	14	70	0.456	11.9	57 U	270 X2	310	3,827
US-11	5	78	0.374	8.04 U	24.9 U	110 X2	126	4,080
US-12	19 *	68	0.444	10.7 U	32.3 U	64.6 U	54	994
US-13	18 *	64	0.298 * + SQS	10.9	71.8 J	490 X2	573	6,859
US-14	10	75	0.339	7.83 U	27.9 J	47.7 J	80	2,723
US-15	4	45 * + CSL	0.412	14.3 U	47.4 J	362	417	5,644
NISQ	4	36 * + CSL	0.437	NA	NA	NA	NA	NA
CARR	3	73	0.402	NA	NA	NA	NA	NA
Control-1	2	62	0.275	NA	NA	NA	NA	NA
Control-2	2	69	0.288	NA	NA	NA	NA	NA
Control-3	NA	92	NA	NA	NA	NA	NA	NA

Notes:

* indicates that the test result is significantly different from the reference result

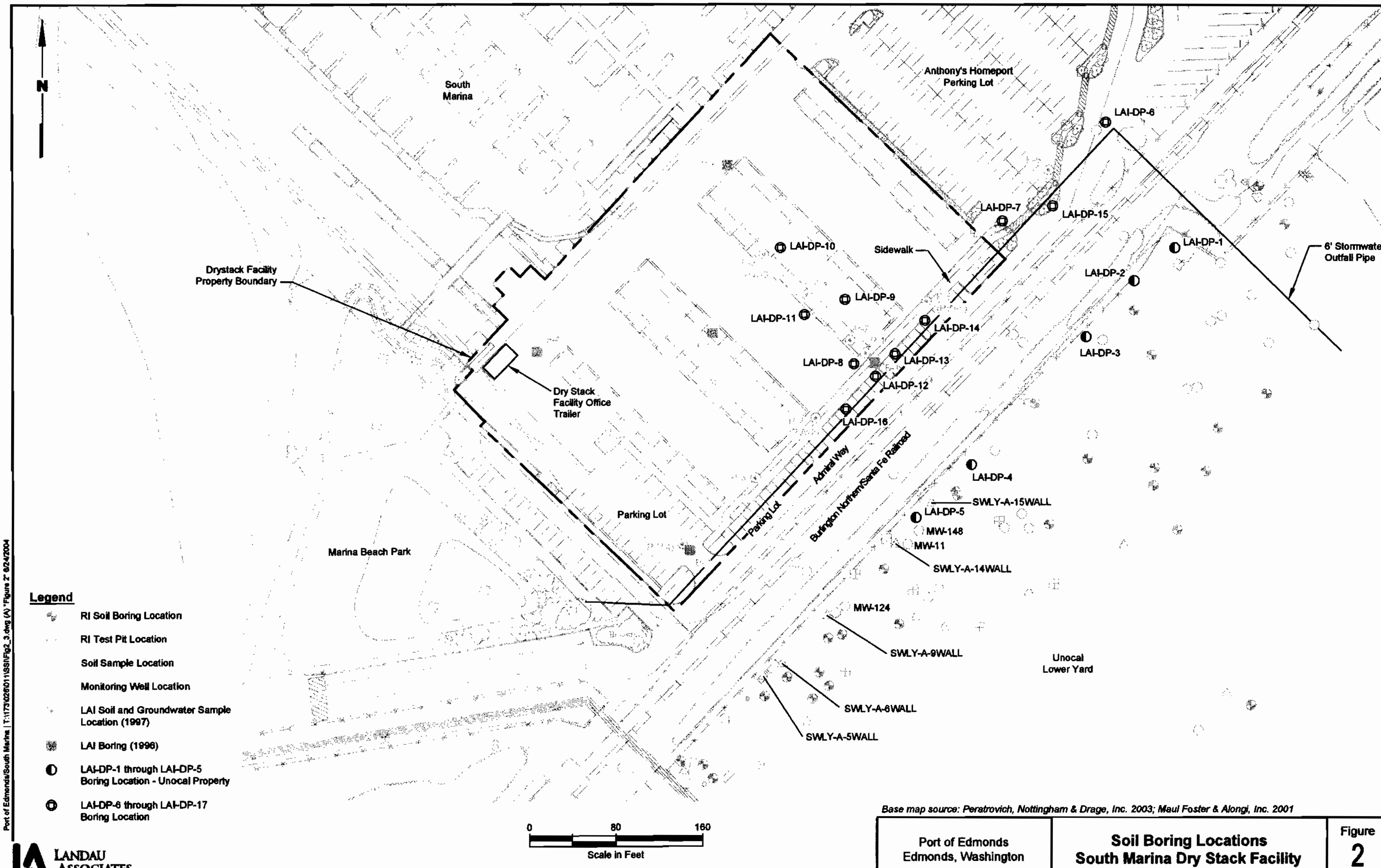
+ indicates that the test result is different from the reference by the magnitude specified in SMS

SQS indicates that the result meets the criteria for a SQS "hit"

CSL indicates that the result meets the criteria for a CSL "hit"

NA = not available

Landau Associates, Inc. 2004. Petroleum Hydrocarbon Investigations, South Marina Dry Stack Storage Facility, Port of Edmonds, Washington. June 24, 2004



Legend

- RI Soil Boring Location
- RI Test Pit Location
- Soil Sample Location
- Monitoring Well Location
- LAI Soil and Groundwater Sample Location (1997)
- LAI Boring (1996)
- LAI-DP-1 through LAI-DP-5 Boring Location - Unocal Property
- LAI-DP-6 through LAI-DP-17 Boring Location

Base map source: Peratrovich, Nottingham & Drage, Inc. 2003; Maul Foster & Alongi, Inc. 2001

Port of Edmonds/South Marina | T:\1173\026\011\SS\Fig2_3.dwg (A) "Figure 2" 6/24/2004

LANDAU ASSOCIATES

Port of Edmonds Edmonds, Washington	**Soil Boring Locations** **South Marina Dry Stack Facility**	Figure **2**

TABLE 1
SOIL ANALYTICAL RESULTS
SOUTH MARINA DRY STACK STORAGE FACILITY

	MTCA Method A Soil Cleanup Levels for Unrestricted Land Uses	LAI-DP-1 7-8 ft BGS B4E0395-01 5/11/2004	LAI-DP-2 4.5-6 ft BGS B4E0395-02 5/11/2004	LAI-DP-3 3.5-4.5 ft BGS B4E0395-03 5/11/2004	LAI-DP-4 6-8 ft BGS B4E0395-04 5/11/2004	LAI-DP-5 7-8 ft BGS B4E0395-05 5/11/2004	LAI-DP-6 8-10 ft BGS B4E0395-06 5/11/2004	LAI-DP-7 9-11 ft BGS B4E0395-07 5/11/2004	LAI-DP-8 14-16 ft BGS B4E0395-08 5/11/2004	LAI-DP-9 10-12 ft BGS B4E0395-09 5/11/2004
GASOLINE AND BTEX (mg/kg)										
NWTPH-G/EPA 8021B										
Gasoline	30	NA	1580	5.00 U	7680 J (a)	5.00 U	NA	NA	46.8 (b)	225 J (b)
Benzene	0.03	NA	1.54 J	0.0300 U	2.25 J (a)	0.0300 U	NA	NA	0.0300 U	0.120 U
Toluene	7	NA	2.42 J (a)	0.0500 U	8.86	0.0500 U	NA	NA	0.0500 U	0.200 U
Ethylbenzene	6	NA	2.54 J	0.0500 U	33.9	0.0500 U	NA	NA	0.0500 U	0.350 J (a)
Xylenes (total)	9	NA	3.72 J (a)	0.100 U	61.4	0.100 U	NA	NA	0.116 J (a)	1.11 J (a)
NWTPH-Dx (mg/kg)										
Diesel-Range Hydrocarbons	2000	10.0 U	4440	10.0 U	788 (c)	10.0 U	71.9	105	5450	14800
Lube Oil-Range Hydrocarbons	2000	25.0 U	570	25.0 U	1000 U	25.0 U	196	217	5170	14600
cPAHs (mg/kg)										
8270-SIM										
Benzo(a)anthracene		NA	0.0613 J	NA	0.0483	NA	NA	NA	0.152	NA
Benzo(a)pyrene		NA	0.0288 J	NA	0.0257	NA	NA	NA	0.114	NA
Benzo(b)fluoranthene		NA	0.0140 J	NA	0.0294	NA	NA	NA	0.159	NA
Benzo(k)fluoranthene		NA	0.0100 U	NA	0.0226	NA	NA	NA	0.100 U	NA
Chrysene		NA	0.119 J	NA	0.0506	NA	NA	NA	0.561	NA
Dibenz(a,h)anthracene		NA	0.0185 J	NA	0.0128	NA	NA	NA	0.144	NA
Indeno(1,2,3-cd)pyrene		NA	0.0111 J	NA	0.0113	NA	NA	NA	0.100 U	NA
cPAH TEQ (mg/kg)	0.1	NA	0.046	NA	0.042	NA	NA	NA	0.208	NA
DRY WEIGHT (%)		85.0	90.6	85.4	89.8	92.2	86.5	82.7	87.3	93.9

DRAFT

TABLE 1
SOIL ANALYTICAL RESULTS
SOUTH MARINA DRY STACK STORAGE FACILITY

	MTCA Method A Soil Cleanup Levels for Unrestricted Land Uses	LAI-DP-9B 10-12 ft BGS B4E0395-10 5/11/2004	LAI-DP-10 12-16 ft BGS B4E0395-11 5/12/2004	LAI-DP-11 10.5-12 ft BGS B4E0395-12 5/12/2004	LAI-DP-12 10-12 ft BGS B4E0395-13 5/12/2004	LAI-DP-13 9-11 ft BGS B4E0395-14 5/12/2004	LAI-DP-14 9-11 ft BGS B4E0395-15 5/12/2004	LAI-DP-16 9-11 ft BGS B4E0395-16 5/12/2004	LAI-DP-16B 9-11 ft BGS B4E0395-17 5/12/2004
GASOLINE AND BTEX (mg/kg)									
NWTPH-G/EPA 8021B									
Gasoline	30	268 J (b)	NA	NA	94.8 (b)	NA	NA	104 (b)	55.0 (b)
Benzene	0.03	0.120 U	NA	NA	0.0300 U	NA	NA	0.0300 U	0.0435
Toluene	7	0.200 U	NA	NA	0.0500 U	NA	NA	0.0500 U	0.0500 U
Ethylbenzene	6	0.285 J (a)	NA	NA	0.0507 J (a)	NA	NA	0.0500 U	0.0500 U
Xylenes (total)	9	1.03 J (a)	NA	NA	0.290 J (a)	NA	NA	0.339 J (a)	0.239 J (a)
NWTPH-Dx (mg/kg)									
Diesel-Range Hydrocarbons	2000	11100	10.0 U	17900	1680	595	200	955	1000
Lube Oil-Range Hydrocarbons	2000	9840	25.0 U	16100	1850	833	353	1050	1180
cPAHs (mg/kg)									
8270-SIM									
Benzo(a)anthracene		NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene		NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene		NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene		NA	NA	NA	NA	NA	NA	NA	NA
Chrysene		NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene		NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene		NA	NA	NA	NA	NA	NA	NA	NA
cPAH TEQ (mg/kg)	0.1	NA	NA	NA	NA	NA	NA	NA	NA
DRY WEIGHT (%)		92.4	80.7	95.5	87.1	89.3	83.5	92.3	88.7

(a) As reported by the laboratory, the analyte concentration may be artificially elevated due to coeluting compounds or components.
(b) As reported by the laboratory, results reported for the gas range are primarily due to overlap from diesel range hydrocarbons.
(c) As reported by the laboratory, the sample chromatographic pattern does not resemble the fuel standard used for quantitation.
BGS = Below ground surface.
NA = Not analyzed.
U = Indicates the compound was undetected at the reported concentration.
J = Data validation flag indicating the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
Box indicates exceedance of soil cleanup level.

DRAFT

APPENDIX C

North Creek Analytical Summary Memorandum: Chromatograph Comparison

Memorandum

To: David Nelson, Landau Associates

CC: Jeannie Garthwaite; Brad Meadows

From: Katharine Nunn

Date: 6/24/2004

Re: Work Order B4E0495 Chromatogram comparison

I compared the diesel analysis chromatograms for B4E0495-02 (DP-2-4.5-6) to the other samples in the work order per your request. The table below shows what I found:

Lab Sample ID	Client Sample ID	Contamination Type
B4E0395-01	DP-1-7-8	No discernable contamination
B4E0395-02	DP-2-4.5-6	Mixture of jet fuel (not the same as jet fuel in 395-04) and diesel
B4E0395-03	DP-3-3.5-4.5	No discernable contamination
B4E0395-04	DP-4-6-8	Appears to be jet fuel – possibly JP-5
B4E0395-05	DP-5-7-8	No discernable contamination
B4E0395-06	DP-6-8-10	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-07	DP-7-9-11	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-08	DP-8-14-16	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-09	DP-9-10-12	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-10	DP-9B-10-12	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-11	DP-10-12-16	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-12	DP-11-10.5-12	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-13	DP-11-10.5-12	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-14	DP-13-9-11	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-15	DP-14-9-11	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-16	DP-16-9-11	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil
B4E0395-17	DP-16B-9-11	Appears to be a mixture of hydrocarbons possibly weathered diesel and motor oil

I compared the Gas/BTEX analysis chromatograms for B4E0495-04 (DP-4-6-8) to the other samples in the work order per your request. I don't have as many standards run by purge and trap – so I can't give you as much information as the diesel range. Here's the information I can give:

Lab Sample ID	Client Sample ID	Similarity to B4E0395-04 (DP-4-6-8)
B4E0395-02	DP-2-4.5-6	Appears to contain some of the same components
B4E0395-03	DP-3-3.5-4.5	No discernable contamination
B4E0395-05	DP-5-7-8	No discernable contamination
B4E0395-08	DP-8-14-16	Hydrocarbon pattern is completely different and elutes later
B4E0395-09	DP-9-10-12	Hydrocarbon pattern is completely different and elutes later
B4E0395-10	DP-9B-10-12	Hydrocarbon pattern is completely different and elutes later
B4E0395-13	DP-11-10.5-12	Hydrocarbon pattern is completely different and elutes later
B4E0395-16	DP-16-9-11	Hydrocarbon pattern is completely different and elutes later
B4E0395-17	DP-16B-9-11	Hydrocarbon pattern is completely different and elutes later

I hope this information helps. Please feel free to call me with any questions you have or if you would like me to look at anything else. My direct number is 425-420-9224.

SLR International Corp. 2006. Groundwater Sampling Report – Fall 2006 Sampling Event, Unocal Edmonds Terminal. Edmonds, Washington. November 22, 2006

Table 4
Groundwater Sample Analytical Results - All Events
TPH, Benzene, Total Dissolved cPAH, and Dissolved Arsenic Concentrations
Unocal Edmonds Terminal

Location	Sample ID	Date	Gasoline Range Hydrocarbons[a] (µg/L)	Diesel Range Hydrocarbons[b] (µg/L)	Heavy Oil Range Hydrocarbons[b] (µg/L)	TPH[c] (µg/L)	Benzene[d] (µg/L)	Total Dissolved cPAHs[e,f] (µg/L)	Dissolved Arsenic[g] (µg/L)
Proposed Site Groundwater Cleanup Levels						506/706[h]	51	0.018	34
Proposed Surface Water Compliance Wells									
MW-148	MW148-0804	8/12/2004	4,900	1,350	<500	6,500	1,380	—	4.34
	MW148-0205	2/10/2005	<50	<250	<500	400[i]	0.64	—	<1.0
	MW148-0805	8/25/2005	258	<250	<500	633	24	—	3.30
	MW148-0206	2/9/2006	<50	<236	<472	379[i]	<0.50	0.0086[j]	<1.0
	MW148-0806	8/29/2006	<100	<236	<472	404[i]	<1.0	0.0085[j]	<1.0
MW-149	MW149-0804	8/12/2004	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW149-0205	2/10/2005	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW149-0805	8/25/2005	<50	<250	<500	400[i]	<0.50	—	0.80
	MW149-0206	2/9/2006	<50	<236	<472	379[i]	<0.50	0.0086[j]	<1.0
	MW149-0806	8/29/2006	<100	<236	<472	404[i]	<1.0	0.0085[j]	<1.0
MW-150	MW150-0804	8/12/2004	<50	<250	<500	400[i]	0.76	—	3.24
	MW150-0205	2/10/2005	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW150-0805	8/24/2005	<50	<250	<500	400[i]	<0.50	—	3.30
	MW150-0206	2/9/2006	<50	<236	<472	379[i]	<0.50	0.0086[j]	<1.0
	MW150-0806	8/29/2006	<100	<236	<472	404[i]	<1.0	0.0085[j]	2.44
Off-Site Monitoring Wells									
MW-28	BNRR-MW28-1295	12/4/1995	<100	<240	<710	525[i]	<0.50	—	—
	MW-28-0296	2/21/1996	<100	<240	<710	525[i]	<0.50	—	—
	MW-28-0596	5/14/1996	<100	<250	<750	550[i]	<0.50	—	—
	MW-28-0896	8/14/1996	<100	<240	<710	525[i]	<0.50	—	<0.007
	MW-28-1196	11/5/1996	<100	<240	<710	525[i]	<0.50	—	<0.007
	MW-28-0297	2/25/1997	<50	<250	<750	525[i]	<5.0	—	<0.02
	MW-28-0897	8/12/1997	<50	<250	<500	400[i]	<0.50	—	<0.02 E
	MW-28-0298	2/19/1998	12 B	99.7 B	<92	158	<0.10	—	<0.015
	MW-28-0598	8/26/1998	5.3 BJ	70.5 J	<750	451	<0.10	—	<0.015
	MW-28-0299	2/16/1999	<50	29.1 BJ	<750	429	<0.10	—	<0.10
	MW-28-0200	2/23/2000	<50	<250	<750	525[i]	<0.50	—	0.19
	MW-28-0201	2/7/2001	<50	<250	<750	525[i]	<0.50	—	0.18 U
	MW-28-0601	6/28/2001	<80	<250	<500	415[i]	<0.50	—	0.35 J
	MW-28-1101	11/30/2001	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-28-0502	5/28/2002	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-28-0802	8/28/2002	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-28-0203	2/27/2003	<50	<250	<500	400[i]	<0.50	—	—
	MW-28-0204	2/13/2004	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW28-0804	8/24/2004	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW28-0805	8/24/2005	<50	<250	<500	400[i]	<0.50	—	0.60
	MW28-0206	2/17/2006	<50	<236	<472	379[i]	<0.50	0.0087[j]	<1.0
	MW28-0906	9/28/2006	—	<236	<472	—	—	0.0085[j]	<1.0
	MW28-1006	10/4/2006	<50	—	—	379[i]	<0.50	—	—

Table 4
Groundwater Sample Analytical Results - All Events
TPH, Benzene, Total Dissolved cPAH, and Dissolved Arsenic Concentrations
Unocal Edmonds Terminal

Location	Sample ID	Date	Gasoline Range Hydrocarbons[a] (µg/L)	Diesel Range Hydrocarbons[b] (µg/L)	Heavy Oil Range Hydrocarbons[b] (µg/L)	TPH[c] (µg/L)	Benzene[d] (µg/L)	Total Dissolved cPAHs[e,f] (µg/L)	Dissolved Arsenic[g] (µg/L)
Proposed Site Groundwater Cleanup Levels						506/706[h]	51	0.018	34
Off-Site Monitoring Wells									
MW-105	MW-105-1295	12/27/1995	<100	680	<710	1,085	<0.50	—	—
	MW-105-1295-Dup	12/27/1995	<100	690	740	1,480	<0.50	—	—
	MW-105-0296	2/21/1996	<100	510	890	1,450	<0.50	—	—
	MW-105-0596	5/14/1996	<100	1,000	1,100	2,150	<0.50	—	—
	MW-105-0896	8/14/1996	<100	620	<710	1,025	<0.50	—	3.30 J
	MW-105-1196	11/5/1996	<100	940	1,000	1,990	<0.50	—	6.0 J
	MW-105-0297	2/25/1997	5.50 BJ	705	<750	1,086	<5.0	—	9.5
	MW-105-0897	8/12/1997	<50	944	<500	1,219	<0.50	—	5.70 E
	MW-105-0298	2/19/1998	18 B	285 B	323	626	<0.10	—	7.95
	MW-105-0298-Dup	2/19/1998	14 B	459 B	443	916	—	—	8.6
	MW-105-0598	8/26/1998	7.40 BJ	87.6 J	95 J	190	<0.10	—	2.86
	MW-105-0299	2/16/1999	<50	52.9 BJ	<750	453	<0.10	—	11.3
	MW-105-0200	2/23/2000	<50	<250	<750	525[i]	<0.50	—	7.78
	MW-105-0201	2/7/2001	<50	<250	<750	525[i]	<0.50	—	4.68
	MW-105-0601	6/28/2001	<50	<250	<500	400[i]	<0.50	—	4.08
	MW-105-1101	11/30/2001	<50	<250	<500	400[i]	<0.50	—	8.28
	MW-105-0502	5/28/2002	<50	<250	<500	400[i]	<0.50	—	4.16
	MW-105-0802	8/28/2002	<50	<250	<500	400[i]	<0.50	—	4.49
	MW-105-0203	2/27/2003	<50	<250	<500	400[i]	<0.50	—	—
	MW-105-0204	2/13/2004	<50	<250	<500	400[i]	<0.50	—	7.81
	MW105-0804	8/24/2004	<50	<250	<500	400[i]	<0.50	—	5.11
	MW105-0805	8/24/2005	<50	<250	<500	400[i]	<0.50	—	5.30
	MW105-0206	2/17/2006	<50	<236	<472	379[i]	<0.50	0.0087[j]	8.63
	MW105-0906	9/26/2006	—	<236	<472	—	—	0.017[j]	6.04
	MW105-1006	10/4/2006	<50	—	—	379[i]	<0.50	—	—
MW-106	MW-106-1295	12/27/1995	<100	1,600	<1,300	2,300	<0.50	—	—
	MW-106-0296	2/21/1996	<100	530 E	<710	935	<0.50	—	—
	MW-106-0596	5/14/1996	<100	1,700	1,300	3,050	<0.50	—	—
	MW-106-0896	8/14/1996	<100	1,700	1,000	2,750	<0.50	—	<0.07
	MW-106-1196	11/5/1996	<100	1,200	740	1,990	<0.50	—	<0.007
	MW-106-0297	2/25/1997	11 BJ	2,400	1,520	3,931	<5.0	—	<0.20
	MW-106-0897	8/12/1997	<50	2,100	<500	2,375	<0.50	—	<0.02 E
	MW-106-0298	2/19/1998	21 B	1,750	1,080	2,861	<0.10	—	<0.15
	MW-106-0598	8/26/1998	6.20 BJ	137 J	<750	518	<0.10	—	<0.015
	MW-106-0299	2/16/1999	<50	122 BJ	<750	522	0.22 BJ	—	<0.01

Table 4
Groundwater Sample Analytical Results - All Events
TPH, Benzene, Total Dissolved cPAH, and Dissolved Arsenic Concentrations
Unocal Edmonds Terminal

Location	Sample ID	Date	Gasoline Range Hydrocarbons[a] (µg/L)	Diesel Range Hydrocarbons[b] (µg/L)	Heavy Oil Range Hydrocarbons[b] (µg/L)	TPH[c] (µg/L)	Benzene[d] (µg/L)	Total Dissolved cPAHs[e,f] (µg/L)	Dissolved Arsenic[g] (µg/L)
Proposed Site Groundwater Cleanup Levels						506/706[h]	51	0.018	34
Off-Site Monitoring Wells									
MW-106 (Cont.)	MW-106-0200	2/23/2000	<50	<250	<750	525[i]	<0.50	—	0.16
	MW-106-0201	2/7/2001	<50	<250	<750	525[i]	<0.50	—	<0.34
	MW-106-0601	6/28/2001	<80	257	<500	547	<0.50	—	0.48 J
	MW-106-1101	11/30/2001	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-106-0502	5/28/2002	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-106-0802	8/28/2002	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-106-0203	2/27/2003	<50	<250	<500	400[i]	<0.50	—	—
	MW-106-0204	2/13/2004	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW106-0804	8/24/2004	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW106-0805	8/24/2005	<50	<250	<500	400[i]	<0.50	—	0.40
	MW106-0206	2/17/2006	<50	<236	<472	379[i]	<0.50	0.0087[j]	<1.0
	MW106-0906	9/26/2006	—	<236	<472	—	—	0.017[j]	<1.0
	MW106-1006	10/4/2006	<50	—	—	379[i]	<0.50	—	—
MW-107	MW-107-1295	12/27/1995	<100	<240	<710	525[i]	<0.50	—	—
	MW-107-0296	2/21/1996	<100	<240	<710	525[i]	<0.50	—	—
	MW-107-0596	5/14/1996	<100	<250	<740	545[i]	<0.50	—	—
	MW-107-0896	8/14/1996	<100	<240	<720	530[i]	<0.50	—	2.30 J
	MW-107-1196	11/5/1996	<100	<240	<710	525[i]	<0.50	—	<0.007
	MW-107-0297	2/25/1997	34 BJ	252	<750	630	<0.50	—	<0.02
	MW-107-0897	8/12/1997	<50	533	<500	808	<0.50	—	<0.02 E
	MW-107-0298	2/19/1998	15 B	110 B	117	242	<0.10	—	<0.015
	MW-107-0598	8/26/1998	16 BJ	93.1 J	<750	484	<0.10	—	<0.015
	MW-107-0299	2/16/1999	<50	51.6 BJ	<750	452	<0.10	—	<0.01
	MW-107-0200	2/23/2000	<50	<250	<750	525[i]	<0.50	—	<0.0068
	MW-107-0201	2/7/2001	<50	<250	<750	525[i]	<0.50	—	<0.11
	MW-107-0201-Dup	2/7/2001	<50	<250	<750	525[i]	<0.50	—	—
	MW-107-0601	6/28/2001	<80	<250	<500	415[i]	<0.50	—	0.24 J
	MW-107-1101	11/30/2001	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-107-0502	5/28/2002	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-107-0802	8/28/2002	<50	<250	<500	400[i]	<0.50	—	2.03
	MW-107-0203	2/27/2003	<50	<250	<500	400[i]	<0.50	—	—
	MW-107-0204	2/13/2004	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW107-0804	8/24/2004	<50	<250	<500	400[i]	<0.50	—	1.34
	MW107-0805	8/24/2005	<50	<250	<500	400[i]	<0.50	—	0.40
	MW107-0206	2/17/2006	<50	<236	<472	379[i]	<0.50	0.0087[j]	<1.0
	MW107-0906	9/26/2006	—	<236	<472	—	—	0.0085[j]	1.78
	MW107-1006	10/4/2006	<50	—	—	379[i]	<0.50	—	—

Table 4
Groundwater Sample Analytical Results - All Events
TPH, Benzene, Total Dissolved cPAH, and Dissolved Arsenic Concentrations
Unocal Edmonds Terminal

Location	Sample ID	Date	Gasoline Range Hydrocarbons[a] (µg/L)	Diesel Range Hydrocarbons[b] (µg/L)	Heavy Oil Range Hydrocarbons[b] (µg/L)	TPH[c] (µg/L)	Benzene[d] (µg/L)	Total Dissolved cPAHs[e,f] (µg/L)	Dissolved Arsenic[g] (µg/L)
Proposed Site Groundwater Cleanup Levels						506/706[h]	51	0.018	34
Off-Site Monitoring Wells									
MW-137	MW-137-1295	12/27/1995	<100	<240	<730	535[i]	<0.50	—	—
	MW-137-0296	2/21/1996	<100	<240	<710	525[i]	<0.50	—	—
	MW-137-0596	5/14/1996	<100	<240	<730	535[i]	<0.50	—	—
	MW-137-0896	8/14/1996	<100	<240	<710	525[i]	<0.50	—	1.20 J
	MW-137-1196	11/5/1996	<100	<250	<740	545[i]	<0.50	—	<0.007
	MW-137-0297	2/25/1997	<50	<250	<750	525[i]	<5.0	—	<0.02
	MW-137-0897	8/12/1997	<50	<250	<500	650[i]	<0.50	—	2.0 E
	MW-137-0298	2/19/1998	18 B	132 B	139	289	<0.10	—	<0.15
	MW-137-0598	8/26/1998	41 BJ	99.5 J	<750	516	<0.10	—	<0.015
	MW-137-0299	2/17/1999	<50	<250	<750	525[i]	<0.10	—	<0.01
	MW-137-0200	2/23/2000	<50	<250	<750	525[i]	<0.50	—	0.17
	MW-137-0201	2/7/2001	<50	<250	<750	525[i]	<0.50	—	<0.56
	MW-137-0601	6/28/2001	<80	<250	<500	415[i]	<0.50	—	0.29 J
	MW-137-1101	11/30/2001	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-137-0502	5/28/2002	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-137-0802	8/28/2002	<50	<250	<500	400[i]	<0.50	—	3.68
	MW-137-0203	2/27/2003	<50	<250	<500	400[i]	<0.50	—	—
	MW-137-0204	2/13/2004	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW137-0804	8/24/2004	<50	<250	<500	400[i]	<0.50	—	7.57
	MW137-0805	8/25/2005	<50	<250	<500	400[i]	<0.50	—	1.40
	MW137-0206	2/17/2006	<50	<238	<476	382[i]	<0.50	0.0087[j]	<1.0
	MW137-0906	9/26/2006	—	<236	<472	—	—	0.0085[j]	20.3 JF
	MW137-1006	10/4/2006	<50	—	—	379[i]	<0.5	—	—
MW-138	MW-138-1295	12/28/1995	<100	<240	<720	530[i]	<0.50	—	—
	MW-138-0296	2/21/1996	<100	<240	<710	525[i]	<0.50	—	—
	MW-138-0596	5/14/1996	<100	<250	<750	550[i]	<0.50	—	—
	MW-138-0896	8/14/1996	<100	<250	<740	545[i]	<0.50	—	<0.007
	MW-138-1196	11/5/1996	<100	<240	<710	525[i]	<0.50	—	<0.07
	MW-138-0897	8/12/1997	<50	<250	<500	400[i]	<0.50	—	<0.02 E
	MW-138-0298	2/19/1998	<20	134 B	233	377	<0.10	—	<0.15
	MW-138-0598	8/26/1998	<50	99.2 J	<750	499	<0.10	—	<0.03
	MW-138-0299	2/17/1999	<50	22.4 BJ	<750	422	<0.10	—	0.69 J
	MW-138-0299-Dup	2/17/1999	<50	<250	<750	525[i]	<0.10	—	0.65 J
	MW-138-0200	2/23/2000	<50	<250	<750	525[i]	<0.50	—	0.43
	MW-138-0201	2/7/2001	<50	<250	<750	525[i]	<0.50	—	<0.83
	MW-138-0601	6/28/2001	<80	<250	<500	415[i]	<0.50	—	1.15
	MW-138-1101	11/30/2001	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-138-0502	5/28/2002	<50	<250	<500	400[i]	<0.50	—	<1.0

Table 4
Groundwater Sample Analytical Results - All Events
TPH, Benzene, Total Dissolved cPAH, and Dissolved Arsenic Concentrations
Unocal Edmonds Terminal

Location	Sample ID	Date	Gasoline Range Hydrocarbons[a] (µg/L)	Diesel Range Hydrocarbons[b] (µg/L)	Heavy Oil Range Hydrocarbons[b] (µg/L)	TPH[c] (µg/L)	Benzene[d] (µg/L)	Total Dissolved cPAHs[e,f] (µg/L)	Dissolved Arsenic[g] (µg/L)
Proposed Site Groundwater Cleanup Levels						506/706[h]	51	0.018	34
Off-Site Monitoring Wells									
MW-138 (Cont.)	MW-138-0802	8/28/2002	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW-138-0203	2/27/2003	<50	<250	<500	400[i]	<0.50	—	—
	MW-138-0204	2/13/2004	<50	<250	<500	400[i]	<0.50	—	<1.0
	MW138-0804	8/24/2004	<50	<250	<500	400[i]	<0.50	—	2.72
	MW138-0805	8/25/2005	<50	<250	<500	400[i]	<0.50	—	3.20
	MW138-0206	2/17/2006	<50	<238	<476	382[i]	<0.50	0.0087[j]	1.20
	MW138-0906	9/26/2006	—	<236	<472	—	—	0.0085[j]	21.5 JF
	MW138-1006	10/4/2006	<50	—	—	379[i]	<0.50	—	—

Notes:

µg/L = Micrograms per liter.
Bold values exceed the proposed site cleanup levels.
NA = Not available.
— = Not analyzed.
BJ = Estimated result due to contamination in associated method blank.
JD = Estimated result due to sample dilution.
E = Analyte concentration exceeds instrument calibration range.
JS = Estimated result due to sample matrix interference associated with surrogate recoveries.
B = Contamination present in associated method blank.
BCR = Result rejected due to contaminant in the associated method blank.
R = The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
J = The analyte was positively identified; the associated numerical value is estimated.
JF = The analyte was positively identified; the associated numerical value is estimated due to uncertainty about whether the laboratory filtered the sample.
UJ = The analyte was not detected; the results may be biased low due to a low bias in the internal laboratory standard.
UJS = The analyte was not detected; result may be biased low due to sample matrix interference associated with surrogate recoveries.

[a] Gasoline range hydrocarbons (GRO) analyzed by Ecology Methods NWTPH-Gx or WTPH-G.
[b] Diesel and heavy oil range hydrocarbons (DRO and HO) analyzed by Ecology Methods NWTPH-Dx or WTPH-D.
[c] TPH = Total petroleum hydrocarbons (combined concentrations of GRO, DRO and HO). If nondetected, ½ of the method reporting limit (MRL) was used to calculate TPH.
[d] Benzene analyzed by EPA Method 8021B.
[e] Total dissolved carcinogenic polycyclic aromatic hydrocarbons (cPAHs) analyzed by EPA Method 8270C.
[f] Each cPAH compound in a sample was multiplied by that component's toxicity equivalency factor and then the adjusted concentrations were summed to determine the total cPAH concentration. If a cPAH compound was not detected in a sample at a concentration above the MRL, then 1/2 of the MRL for that compound was used.
[g] Dissolved arsenic analyzed by EPA 200 Series Method.
[h] Proposed site cleanup level for TPH is 506 µg/L beneath the eastern part of the lower yard and 706 µg/L beneath the western part of the lower yard.
[i] GRO, DRO, and HO were not detected and the TPH concentration equals the sum of ½ of the MRL of each constituent.
[j] CPAH compounds were not detected in the sample and the total dissolved cPAH concentration equals the sum of 1/2 of the MRL of each compound multiplied by the compound's toxicity equivalence factor.

2007-2008 Phase I Remedial
Implementation As-Built Report

TABLE 4
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B	T	E	X					
			REL = 18 mg/kg				CUL = 0.14 mg/kg				REL = 2,975
B2-TP1-5	5	02/18/08	0.0305 U	0.0508 U	0.0508 U	0.102 U	0.0179	23.6 JZ	2,170 Q9	393 Q9	2,590 J
B2-TP1-10	10	02/18/08	0.0371 U	0.0618 U	0.0618 U	0.124 U	0.0370	9.96 JZ	211 Q9	60.8	282 J
B2-TP1-15	15	02/18/08	0.0325 U	0.0541 U	0.0541 U	0.108 U	0.00893	12.7 JZ	274 Q9	76.9	364 J
B2-TP2-5	5	02/18/08	0.0371 U	0.0619 U	0.0619 U	0.124 U	0.00853	6.19 U	54.6 Q9	103	161
B2-TP2-10	10	02/18/08	0.0319 U	0.0532 U	0.0532 U	0.106 U	0.00846	25.9 JZ	105 Q9	46.2	177 J
B2-TP2-13	13	02/18/08	0.341 U	0.568 U	0.568 U	3.40	0.519	659 JZ	1,680	1,120	3,460 J
EX-A1-C-16-7	7	11/15/07	0.0303 U	0.0504 U	0.0504 U	0.101 U	NA	5.04 U	11.9 U	29.6 U	23.3 UU
EX-A1-C-16-NSW-3	3	11/15/07	0.0301 U	0.0502 U	0.0502 U	0.100 U	0.00892	5.02 U	93.9 Q4	165 Q4	261
EX-A1-C-17-3	3	11/15/07	0.0608	0.0771	0.0499 U	0.0998 U	0.0154	19.5	70.6 Q4	123 Q4	213
EX-A1-D-16-12	12	11/19/07	0.0299 U	0.0498 U	0.0498 U	0.0996 U	NA	4.98 U	12.1 U	30.2 U	23.6 UU
EX-A1-D-17-12	12	11/15/07	0.0294 U	0.0490 U	0.0490 U	0.0981 U	NA	4.90 U	12.6 U	31.5 U	24.5 UU
EX-A1-D-17-ESW-5	5	11/15/07	0.0316 U	0.0526 U	0.0526 U	0.105 U	NA	5.26 U	11.7 U	29.1 U	23.0 UU
EX-A1-D-17-ESW-10	10	11/15/07	0.0272 U	0.0453 U	0.0453 U	0.0907 U	NA	4.53 U	11.7 U	29.4 U	22.8 UU
EX-A1-E-15-15	15	11/08/07	0.0299 U	0.0498 U	0.0498 U	0.0996 U	NA	4.98 U	12.3 U	30.7 U	24.0 UU
EX-A1-E-16-15	15	11/08/07	0.0279 U [0.0311 U]	0.0465 U [0.0518 U]	0.0465 U [0.0518 U]	0.0930 U [0.104 U]	NA [NA]	4.65 U [5.18 U]	11.6 U [12.6 U]	29.0 U [31.5 U]	22.6 UU [24.6 UU]
EX-A1-E-17-12	12	11/14/07	0.0291 U	0.0485 U	0.0485 U	0.0970 U	NA	4.85 U	12.2 U	30.4 U	23.7 UU
EX-A1-E-17-ESW-4	4	11/15/07	0.0637	0.0514 U	0.0514 U	0.103 U	NA	5.14 U	12.2 U	30.6 U	24.0 UU
EX-A1-F-15-15	15	11/08/07	0.0270 U	0.0451 U	0.0451 U	0.0902 U	NA	4.51 U	12.2 U	30.4 U	23.6 UU
EX-A1-F-16-15	15	11/08/07	0.137	0.0454 U	0.0454 U	0.0907 U	NA	4.54 U	12.0 U	30.1 U	23.3 UU
EX-A1-F-17-3	3	10/29/07	0.0267 U	0.0444 U	0.0444 U	0.0889 U	NA	4.44 U	11.2 U	28.0 U	21.8 UU
EX-A1-F-17-12	12	11/14/07	0.0301 U	0.0501 U	0.0501 U	0.100 U	NA	5.01 U	12.3 U	30.8 U	24.1 UU
EX-A1-F-18-4	4	10/29/07	0.0979 [0.0591]	0.0816 [0.0492]	0.351 [0.222]	1.01 [0.670]	0.0432 [0.0441]	201 JZ [139 JZ]	405 Q11 [1,020 Q11]	158 [339]	764 J [1,500 J]
EX-A1-F-18-5	5	11/05/07	0.0273 U [0.0291 U]	0.0455 U [0.0485 U]	0.0455 U [0.0485 U]	0.0911 U [0.0970 U]	NA [NA]	4.55 U [4.85 U]	11.3 U [11.3 U]	28.2 U [28.3 U]	22.0 UU [22.2 UU]
EX-A1-G-15-15	15	11/08/07	0.0289 U	0.0482 U	0.0482 U	0.0964 U	NA	4.82 U	11.7 U	29.3 U	22.9 UU
EX-A1-G-16-15	15	10/31/07	0.0387	0.0494 U	0.0494 U	0.0989 U	NA	4.94 U	11.7 U	29.3 U	23.0 UU
EX-A1-G-17-15	15	10/29/07	0.0291 U	0.0485 U	0.0485 U	0.0970 U	NA	4.85 U	12.0 U	30.1 U	23.5 UU
EX-A1-H-15-15	15	11/08/07	0.0291 U	0.0486 U	0.0486 U	0.0971 U	NA	4.86 U	12.8 U	31.9 U	24.8 UU
EX-A1-H-16-15	15	10/31/07	0.0303 U	0.0505 U	0.0505 U	0.101 U	NA	5.05 U	11.7 U	29.4 U	23.1 UU
EX-A1-H-17-15	15	10/29/07	0.0298 U [0.0282 U]	0.0497 U [0.0470 U]	0.0497 U [0.0470 U]	0.0993 U [0.0939 U]	NA [NA]	4.97 U [4.70 U]	12.8 U [12.7 U]	31.9 U [31.7 U]	24.8 UU [24.6 UU]
EX-A1-I-16-15	15	10/31/07	0.0285 U	0.0474 U	0.0474 U	0.0948 U	NA	4.74 U	12.5 U	31.1 U	24.2 UU
EX-A1-I-17-15	15	10/29/07	0.0317 U	0.0528 U	0.0528 U	0.106 U	NA	5.28 U	12.7 U	31.8 U	24.9 UU
EX-A1-J-16-15	15	10/31/07	0.0306 U	0.0511 U	0.0511 U	0.102 U	NA	5.11 U	12.7 U	31.7 U	24.8 UU
EX-A1-J-17-15	15	10/29/07	0.0316 U	0.0527 U	0.0527 U	0.105 U	NA	5.27 U	13.6 U	34.0 U	26.4 UU
EX-A1-J-19-8	8	10/23/07	0.0312 U	0.0519 U	0.0519 U	0.104 U	NA	5.19 U	12.6 U	31.5 U	24.6 UU
EX-A1-K-17-15	15	10/30/07	0.0308 U	0.0513 U	0.0513 U	0.103 U	NA	5.13 U	12.7 U	31.8 U	24.8 UU
EX-A1-K-18-12	12	10/23/07	0.0278 U	0.0463 U	0.0463 U	0.0926 U	NA	4.63 U	11.7 U	29.3 U	22.8 UU
EX-A1-K-18-SSW-3	3	10/30/07	0.0282 U	0.0470 U	0.0470 U	0.0941 U	NA	4.70 U	10.5 U	26.1 U	20.7 UU
EX-A1-K-18-SSW-8	8	10/30/07	0.0291 U	0.0486 U	0.0486 U	0.0972 U	NA	4.86 U	11.4 U	28.4 U	22.3 UU
EX-A1-K-19-3	3	10/30/07	0.0322 U	0.0536 U	0.0536 U	0.107 U	NA	5.36 U	11.6 U	29.0 U	23.0 UU
EX-A1-L-17-12	12	11/08/07	0.117	0.0465 U	0.0465 U	0.0930 U	NA	4.65 U	11.7 U	29.4 U	22.9 UU
EX-A2-O-9-10	10	01/28/08	0.369 U [0.344 U]	0.615 U [0.573 U]	0.989 [0.819]	1.72 [1.43]	0.0515 [0.0484]	466 JZ [389 JZ]	149 [371]	78.5 [91.5]	694 J [852 J]

TABLE 4
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B	T	E	X					
			REL = 18 mg/kg				*CUL = 0.14 mg/kg*				*REL = 2,975*
EX-A2-O-10-10	10	01/28/08	0.0299 U	0.169	0.0864	0.215	0.0239	73.9 JZ	30.6	29.3 U	119 J
EX-A2-O-11-10	10	01/28/08	0.0270 U	0.0450 U	0.0450 U	0.0900 U	NA	4.50 U	11.8 U	29.6 U	23.0 UU
EX-A2-O-12-10	10	01/28/08	0.0305 U	0.0508 U	0.0508 U	0.102 U	NA	5.08 U	13.0 U	32.5 U	25.3 UU
EX-A2-O-13-10	10	01/28/08	0.0351 U	0.0585 U	0.0585 U	0.117 U	NA	5.85 U	12.9 U	32.3 U	25.5 UU
EX-A2-N-16-SSW-6	6	02/20/08	0.0382 U	0.0636 U	0.0654	0.845	0.0868	489 JZ	6,770 D	577 U	7,550 J
EX-A2-O-15-SSW-6	6	02/20/08	1.69	0.645 U	1.07	3.10	0.0308	1,500 JZ	5,750 DQ10	579 U	7,540 J
EX-A2-P-9-15	15	01/30/08	0.0289 U	0.0482 U	0.0482 U	0.0965 U	NA	4.82 U	12.0 U	30.1 U	23.5 UU
EX-A2-P-10-11	11	01/30/08	0.0350 U	0.0583 U	0.0583 U	0.117 U	NA	5.83 U	12.7 U	31.8 U	25.2 UU
EX-A2-P-11-11	11	01/30/08	0.0301 U	0.0501 U	0.0501 U	0.100 U	NA	5.01 U	11.3 U	28.2 U	22.3 UU
EX-A2-P-12-10	10	01/30/08	0.0275 U	0.0458 U	0.0458 U	0.0916 U	0.00921	4.58 U	17.2 JY	43.2	62.7 J
EX-A2-P-13-10	10	01/30/08	0.0318 U	0.0531 U	0.0531 U	0.106 U	NA	5.31 U	12.9 U	32.4 U	25.3 UU
EX-A2-P-14-12	12	02/22/08	0.0364 U	0.0607 U	0.0607 U	0.326	0.00974	67.7 JZ	229	32.2	329 J
EX-A2-Q-9-12	12	02/01/08	0.0333 U	0.0555 U	0.0555 U	0.111 U	NA	5.55 U	11.8 U	29.5 U	23.4 UU
EX-A2-Q-10-12	12	02/01/08	0.0364 U	0.0606 U	0.0606 U	0.121 U	NA	6.06 U	11.9 U	29.8 U	23.9 UU
EX-A2-Q-11-12	12	02/01/08	0.0366 U	0.0610 U	0.0610 U	0.122 U	NA	6.10 U	12.2 U	30.5 U	24.4 UU
EX-A2-Q-12-13	13	02/01/08	0.0324 U	0.0539 U	0.0539 U	0.108 U	NA	5.39 U	12.2 U	30.6 U	24.1 UU
EX-A2-Q-13-12	12	02/22/08	0.0404 U	0.0673 U	0.0673 U	0.135 U	NA	6.73 U	12.8 U	32.1 U	25.8 UU
EX-A2-Q-14-6	6	02/20/08	0.169 J	0.0968 J	0.182 J	1.51 J	0.0241	570 JZ	2,250 J	236 JQ7	3,060 J
EX-A2-R-10-12	12	02/15/08	0.0422 U [0.0375 U]	0.0704 U [0.0626 U]	0.0704 U [0.0626 U]	0.141 U [0.125 U]	NA [NA]	7.04 U [6.26 U]	12.8 U [12.1 U]	31.9 U [30.3 U]	25.9 UU [24.3 UU]
EX-A2-R-11-12	12	02/15/08	0.0484 U	0.0806 U	0.0806 U	0.161 U	NA	8.06 U	13.8 U	34.6 U	28.2 UU
EX-A2-R-12-12	12	02/15/08	0.0380 U	0.0634 U	0.0634 U	0.127 U	NA	6.34 U	12.2 U	30.5 U	24.5 UU
EX-A2-R-13-12	12	02/22/08	0.0433 U	0.0721 U	0.0721 U	0.144 U	NA	7.21 U	13.2 U	33.0 U	26.7 UU
EX-A2-R-14-6	6	02/20/08	0.0380 U	0.0633 U	0.0633 U	0.127 U	0.0157	51.3 JZ	224	65.5	341 J
EX-A2-S-12-12	12	02/22/08	0.0406 U	0.0676 U	0.0676 U	0.135 U	NA	6.76 U	12.8 U	32.0 U	25.8 UU
EX-A2-S-12-SSW-6	6	02/15/08	0.0339 U	0.0565 U	0.0565 U	0.113 U	0.00815	224 JZ	900	37.4 Q7	1,160 J
EX-A2-S-13-6	6	02/15/08	0.0356 U	0.0594 U	0.0594 U	0.406	0.00861	194 JZ	683	54.8 Q7	932 J
EX-A3-AA-5-10	10	09/26/07	0.0290 U	0.0484 U	0.0484 U	0.0968 U	NA	4.84 U	12.3 U	30.7 U	23.9 UU
EX-A3-AA-6-10	10	09/21/07	0.0309 U	0.0515 U	0.0515 U	0.103 U	NA	5.15 U	10.9 U	27.1 U	21.6 UU
EX-A3-AA-7-10	10	09/21/07	0.0333 U	0.0556 U	0.0556 U	0.111 U	NA	5.56 U	12.5 U	31.3 U	24.7 UU
EX-A3-AA-7-ESW-4	4	09/20/07	0.0307 U	0.0511 U	0.0511 U	0.102 U	NA	5.11 U	12.7 U	31.8 U	24.8 UU
EX-A3-BB-6-10	10	09/21/07	0.0296 U [0.0299 U]	0.0493 U [0.0498 U]	0.0493 U [0.0498 U]	0.0986 U [0.0996 U]	NA [NA]	4.93 U [4.98 U]	12.7 U [13.0 U]	31.7 U [32.6 U]	24.7 UU [25.3 UU]
EX-A3-BB-7-10	10	09/21/07	0.0703	0.0527 U	0.0527 U	0.105 U	NA	5.27 U	11.9 U	29.7 U	23.4 UU
EX-A3-BB-7-ESW-4	4	09/21/07	0.158	0.152	0.0856	0.282	0.00997	88.0	18.9	32.6 U	123
EX-A3-CC-6-10	10	10/01/07	2.76	0.0582 U	0.0582 U	0.116 U	NA	7.09 J	12.3 U	30.9 U	28.7 J
EX-A3-CC-7-10	10	10/01/07	1.21 [1.73]	0.0671 U [0.0580 U]	0.0671 U [0.0580 U]	0.134 U [0.116 U]	NA [NA]	6.71 U [5.90]	12.1 U [12.1 U]	30.3 U [30.3 U]	24.6 UU [27.1]
EX-A3-CC-7-ESW-4	4	10/02/07	0.110	0.0512 U	0.245	0.221	0.00876	25.8	85.6 Q4	44.7 Q4	156
EX-A3-DD-6-10	10	10/02/07	0.0878	0.0534 U	0.0534 U	0.107 U	NA	5.34 U	11.9 U	29.6 U	23.4 UU
EX-A3-Y-4-8	8	09/21/07	0.0214 U	0.0357 U	0.0357 U	0.0713 U	NA	3.57 U	10.4 U	25.9 U	19.9 UU
EX-A3-Y-4-NSW-4	4	09/20/07	0.0267 U	0.0446 U	0.0446 U	0.0891 U	0.00868	8.24 JZ	169	140	317 J
EX-A3-Y-4-WSW-4	4	09/20/07	0.0114 U	0.0190 U	0.0190 U	0.0380 U	NA	1.90 U	10.4 U	25.9 U	19.1 UU
EX-A3-Y-5-8	8	09/21/07	0.0275 U	0.0458 U	0.0458 U	0.0916 U	NA	4.58 U	10.3 U	25.9 U	20.4 UU
EX-A3-Y-5-NSW-4	4	09/20/07	0.0498 U	0.0830 U	0.0830 U	0.166 U	0.00880	19.4 JZ	111	122	252 J
EX-A3-Y-6-8	8	09/20/07	3.32 U	5.53 U	5.53 U	11.1 U	0.176	3,000	6,340 J	1,270 J	10,600 J
EX-A3-Y-6-10	10	09/25/07	0.387	0.0500 U	0.0500 U	0.100 U	NA	5.25	12.2 U	30.5 U	26.6
EX-A3-Y-6-NSW-4	4	09/20/07	0.0232 U	0.0386 U	0.0386 U	0.134	0.00793	27.7 JZ	37.4	41.0	106 J
EX-A3-Y-7-8	8	09/20/07	0.194	0.315	0.330	0.403	0.0883	182 JZ	2,240 J	386 J	2,810 J
EX-A3-Y-7-10	10	09/25/07	0.0299 U	0.0498 U	0.0498 U	0.0996 U	NA	4.98 U	11.7 U	29.4 U	23.0 UU
EX-A3-Y-7-ESW-4	4	09/20/07	0.546	0.0518 U	0.0518 U	0.104 U	0.00908	9.13 JZ	103	91.9	204 J
EX-A3-Y-7-NSW-4	4	09/20/07	0.0393 [0.0562 U]	0.0532 [0.0937 U]	0.0735 [0.0937 U]	0.191 [0.187 U]	0.00929 [0.00876]	50.7 JZ [34.1 JZ]	62.9 [133]	60.0 [96.0]	174 J [263 J]
EX-A3-Z-4-10	10	09/21/07	0.0294	0.0485 U	0.0485 U	0.0969 U	NA	5.83	11.4 U	28.4 U	25.7
EX-A3-Z-5-10	10	09/21/07	0.0275 U	0.0459 U	0.0459 U	0.0918 U	NA	4.59 U	11.6 U	29.1 U	22.6 UU
EX-A3-Z-6-10	10	09/21/07	0.191	0.0520 U	0.0520 U	0.104 U	0.00944	5.20 U	18.8	32.0 U	37.4
EX-A3-Z-7-10	10	09/21/07	0.0503	0.0440 U	0.0440 U	0.0879 U	NA	4.40 U	11.1 U	27.8 U	21.7 UU
EX-A3-Z-7-ESW-4	4	09/20/07	0.0207 U	0.0345 U	0.0345 U	0.0690 U	NA	3.45 U	10.6 U	26.4 U	20.2 UU

TABLE 4
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Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B *REL = 18 mg/kg*	T	E	X	*CUL = 0.14 mg/kg*				*REL = 2,975*
EX-A4-F-6-4	4	09/12/07	0.0296 U [0.0255 U]	0.0494 U [0.0424 U]	0.0494 U [0.0424 U]	0.0988 U [0.0849 U]	0.00967 [0.00854]	4.94 U [4.24 U]	112 Q4 [209 Q4]	66.2 Q4 [109 Q4]	181 [320]
EX-A4-F-7-4	4	09/12/07	0.295	0.0487 U	0.130	0.415	0.00861	85.0 JZ	13.3 Q11	28.5 U	113 J
EX-A4-F-8-4	4	09/12/07	0.126	0.271	0.383	0.555	0.196	149 JZ	1,510 JQ4	710 JQ4	2,370 J
EX-A4-F-8-6	6	10/17/07	0.0740	0.0567 U	0.0567 U	0.129	0.0465	105 JZ	632	246	983 J
EX-A4-F-8-7	7	11/07/07	0.0313 U	0.0522 U	0.0522 U	0.104 U	NA	5.22 U	12.8 U	32.0 U	25.0 UU
EX-A4-F-8-NSW-3.5	3.5	11/13/07	0.0256 U	0.0427 U	0.0427 U	0.0853 U	NA	4.27 U	10.4 U	26.0 U	20.3 UU
EX-A4-F-8-NSW-4	4	11/07/07	0.0288 U	0.0480 U	0.0480 U	0.0960 U	0.0481	30.9 JZ	793 Q4	429	1,250 J
EX-A4-F-9-9	9	10/17/07	0.0646	0.0509 U	0.0619	0.102 U	NA	20.1	11.9 U	29.7 U	40.9
EX-A4-F-9-ESW-4	4	10/17/07	0.0349 U	0.0581 U	0.0581 U	0.116 U	0.0100	5.81 U	17.3 Q12	33.3 U	36.9
EX-A4-F-9-NSW-3.5	3.5	11/07/07	0.0318 U	0.0530 U	0.0530 U	0.106 U	0.0402	5.30 U	330 Q4	356	689
EX-A4-F-9-NSW-4	4	10/17/07	0.248	0.248	0.208	0.105 U	0.0710	219 JZ	731	222	1,170 J
EX-A4-G-6-9	9	10/01/07	0.0307 U	0.0512 U	0.0512 U	0.102 U	NA	5.12 U	12.7 U	31.8 U	24.8 UU
EX-A4-G-7-9	9	09/27/07	0.0295 U	0.0492 U	0.0492 U	0.0983 U	NA	4.92 U	12.7 U	31.7 U	24.7 UU
EX-A4-G-8-9	9	09/27/07	0.0311 U	0.0519 U	0.0519 U	0.104 U	NA	5.19 U	11.7 U	29.2 U	23.0 UU
EX-A4-G-9-9	9	10/17/07	0.0295 U	0.0492 U	0.0492 U	0.0985 U	NA	4.92 U	12.5 U	31.1 U	24.3 UU
EX-A4-G-9-ESW-4	4	10/17/07	0.0290 U [0.0283 U]	0.0483 U [0.0472 U]	0.0483 U [0.0472 U]	0.0965 U [0.0945 U]	0.00853 [0.00868]	9.59 JZ [4.72 U]	41.4 [33.5]	36.0 [32.7]	87.0 J [68.6]
EX-A4-H-6-9	9	09/27/07	0.0269 U [0.0295 U]	0.0448 U [0.0491 U]	0.0448 U [0.0491 U]	0.0897 U [0.0982 U]	NA [NA]	4.48 U [4.91 U]	12.6 U [12.4 U]	31.5 U [31.1 U]	24.3 UU [24.2 UU]
EX-A4-H-7-9	9	09/27/07	0.0318 U	0.0530 U	0.0530 U	0.106 U	NA	5.30 U	12.9 U	32.3 U	25.3 UU
EX-A4-H-8-4	4	09/12/07	0.0286 U	0.0476 U	0.0476 U	0.0952 U	0.0858	19.6 JZ	1,250 JQ4	788 JQ4	2,060 J
EX-A4-H-8-9	9	09/27/07	0.0885	0.0499 U	0.0499 U	0.0997 U	NA	4.99 U	12.3 U	30.8 U	24.0 UU
EX-A4-H-9-9	9	10/17/07	0.323	0.0736 U	0.0736 U	0.147 U	NA	7.36 U	16.8 U	42.0 U	33.1 UU
EX-A4-H-9-ESW-4	4	10/17/07	0.0273 U	0.0455 U	0.0455 U	0.0911 U	0.00861	4.55 U	203	50.3	256
EX-A4-I-6-9	9	09/21/07	0.0565 U	0.0942 U	0.0942 U	0.188 U	NA	9.42 U	19.9 U	49.7 U	39.5 UU
EX-A4-I-7-9	9	10/16/07	0.0372 U	0.0620 U	0.0620 U	0.124 U	NA	6.20 U	12.1 U	30.2 U	24.3 UU
EX-A4-I-8-9	9	10/16/07	0.0396 U	0.0660 U	0.0660 U	0.132 U	NA	6.60 U	12.1 U	30.2 U	24.5 UU
EX-A4-J-6-9	9	09/21/07	0.0288 U	0.0479 U	0.0479 U	0.0959 U	NA	4.79 U	12.1 U	30.4 U	23.6 UU
EX-A4-J-6-SSW-9	9	09/21/07	0.0304 U	0.0507 U	0.0507 U	0.101 U	0.0383	22.1	111 Q4	105 Q4	238
EX-A4-J-7-9	9	09/21/07	0.0299 U	0.0498 U	0.0498 U	0.0996 U	NA	4.98 U	12.2 U	30.4 U	23.8 UU
EX-A4-J-7-SSW-4	4	09/21/07	0.0342 U	0.0569 U	0.0569 U	0.114 U	0.0388	5.69 U	119 Q4	119 Q4	241
EX-A4-J-8-9	9	10/16/07	0.0340 U	0.0566 U	0.0566 U	0.113 U	NA	5.66 U	11.9 U	29.8 U	23.7 UU
EX-A4-K-8-9	9	10/16/07	0.0367 U	0.0612 U	0.0612 U	0.122 U	NA	6.12 U	12.3 U	30.8 U	24.6 UU
EX-B2-E-33(2)-6	6	02/27/08	0.0345 U	0.0575 U	0.0575 U	0.115 U	0.00872	25.1 JZ	203 Q9	126	354 J
EX-B2-E-33-6	6	02/25/08	0.0326 U	0.0543 U	0.0543 U	0.109 U	0.00883	8.75 JZ	129 Q10	86.6 Q10	224 J
EX-B2-E-34-6	6	02/25/08	0.0331 U	0.0552 U	0.0552 U	0.110 U	0.00923	32.2 JZ	101 Q9	54.2	187 J
EX-B2-E-35-(2)-6	6	02/27/08	0.0349 U	0.0582 U	0.0582 U	0.116 U	0.0702	16.5 JZ	1,950 J	1,490 J	3,460 J
EX-B2-E-35(3)-6	6	03/05/08	0.0370 U	0.0617 U	0.0617 U	0.163	0.0993	79.7 JZ	992 Q4	518 Q4	1,590 J
EX-B2-E-35-6	6	02/22/08	0.0336 U	0.0560 U	0.0560 U	0.176	0.117	66.7 JZ	1,270 Q9	687	2,020 J
EX-B2-E-36-6	6	02/27/08	0.0420 U	0.0700 U	0.0700 U	0.140 U	0.0243	20.0 JZ	402 Q9	155	577 J
EX-B2-E-40-4	4	01/23/08	0.0313 U	0.0522 U	0.0522 U	0.104 U	0.00922	5.22 U	48.9 J	48.5 Q4	100 J
EX-B2-E-41(2)-5	5	02/04/08	0.0289 U	0.0482 U	0.0482 U	0.104	0.0879	7.34 JZ	647 Q4	363 Q4	1,020 J
EX-B2-E-41-4	4	01/23/08	0.0262 U [0.0264 U]	0.0436 U [0.0440 U]	0.0436 U [0.0440 U]	0.0872 U [0.0880 U]	0.0528 [0.120]	13.5 JZ [13.3 JZ]	196 Q4 [208 Q4]	152 Q4 [182 Q4]	362 J [403 J]
EX-B2-F-32-12	12	03/03/08	0.108 U	0.180 U	0.180 U	0.360 U	NA	18.0 U	20.6 U	51.4 U	45.0 UU
EX-B2-F-33-12	12	02/28/08	0.0656 U [0.0670 U]	0.109 U [0.112 U]	0.109 U [0.112 U]	0.219 U [0.223 U]	NA [NA]	10.9 U [11.2 U]	16.0 U [15.6 U]	40.1 U [39.1 U]	33.5 UU [33.0 UU]
EX-B2-F-34-11	11	02/28/08	0.0603 U	0.101 U	0.101 U	0.201 U	NA	10.1 U	15.7 U	39.2 U	32.5 UU
EX-B2-F-35-12	12	02/25/08	0.105 U	0.175 U	0.175 U	0.349 U	NA	17.5 U	16.6 U	41.4 U	37.8 UU
EX-B2-F-36-13	13	02/22/08	0.0790 U	0.132 U	0.132 U	0.263 U	0.0205	13.2 U	331 Q9	105	443
EX-B2-F-36-NSW-6	6	02/22/08	0.0409 U	0.0682 U	0.0682 U	0.136 U	0.0305	69.9 JZ	215 Q9	70.9	356 J
EX-B2-F-37-13	13	02/22/08	0.0705 U	0.118 U	0.118 U	0.235 U	NA	11.8 U	16.9 U	42.2 U	35.5 UU
EX-B2-F-37-NSW-6	6	02/22/08	0.0378 U	0.0631 U	0.0631 U	0.126 U	0.00929	8.43	25.3 Q4	30.7 UQ4	64.4
EX-B2-F-38(2)-14	14	02/06/08	0.0570 U	0.0949 U	0.0949 U	0.190 U	NA	9.49 U	15.3 U	38.2 U	31.5 UU
EX-B2-F-38-8	8	01/31/08	0.0357 U	0.0595 U	0.0595 U	0.119 U	0.111	18.9 JZ	1,450	458	1,930 J
EX-B2-F-38-NSW(2)-5	5	02/06/08	0.0350 J	0.123 J	0.397 J	0.637 J	0.0317	214 JZ	329	137	680 J
EX-B2-F-38-NSW(2)-6	6	03/05/08	0.0307 U	0.0512 U	0.0512 U	0.102 U	0.0339	44.9 JZ	374 Q4	187 Q4	606 J
EX-B2-F-38-NSW-4	4	01/31/08	0.0295 U [0.0212 U]	0.0491 U [0.0354 U]	0.0491 U [0.0354 U]	0.0982 U [0.0708 U]	0.00831 [0.0287]	5.97 JZ [13.4 JZ]	25.0 [33.6 J]	28.0 U [28.0 U]	45.0 J [61.0 J]

TABLE 4
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Gasoline *(mg/kg)*	Diesel *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH *(mg/kg)*
			B	T	E	X					
			REL = 18 mg/kg				*CUL = 0.14 mg/kg*				*REL = 2,975*
EX-B2-F-38-WSW-5	5	01/31/08	0.0291 U	0.0486 U	0.0486 U	0.0971 U	0.00909	19.2 JZ	105	48.8	173 J
EX-B2-F-39(2)-12	12	02/05/08	0.0580 U	0.0966 U	0.0966 U	0.193 U	NA	9.66 U	15.2 U	38.0 U	31.4 UU
EX-B2-F-39-8	8	01/28/08	0.0290 U [0.0287 U]	0.0483 U [0.0478 U]	0.0483 U [0.0478 U]	0.0966 U [0.0955 U]	0.0894 [0.00886]	5.35 JZ [5.58 JZ]	1,010 J [51.5 J]	250 J [28.8 UJ]	1,270 J [71.5 J]
EX-B2-F-39-NSW-4	4	01/28/08	0.0308 U	0.0514 U	0.0514 U	0.103 U	0.00853	5.14 U	39.6	28.2 U	56.3
EX-B2-F-40-8	8	01/25/08	0.170	0.216	0.210	0.696	0.00914	6.90	67.8 Q11	42.5	117
EX-B2-F-41-8	8	01/23/08	0.0288 U	0.0480 U	0.0480 U	0.0960 U	0.00847	19.0 JZ	111 Q4	64.3 Q4	194 J
EX-B2-F-41-ESW(2)-5	5	02/04/08	3.30	0.840	2.95	17.2	0.0753	127	513 Q4	478 Q4	1,120
EX-B2-F-41-ESW-4	4	01/23/08	0.0747	0.0420 U	0.319	0.0841 U	0.359	4.20 U	14.5 Q4	29.5 Q4	46.1
EX-B2-G-32-6	6	02/26/08	0.139 J	0.0781 J	1.02 J	2.09 J	0.00959	1,090	1,230 J	161 U	2,400 J
EX-B2-G-33(2)-6	6	02/28/08	0.0340 U	0.0567 U	0.0567 U	0.113 U	0.00891	13.1 JZ	32.7 Q9	28.9 U	60.3 J
EX-B2-G-33-6	6	02/25/08	0.371 U	0.618 U	0.961	2.88	0.139	1,510 JZ	4,860 J	1,690 J	8,060 J
EX-B2-G-34-10	10	02/25/08	0.0308 U	0.0513 U	0.0513 U	0.103 U	NA	5.13 U	11.0 U	27.6 U	21.9 UU
EX-B2-G-34-SSW-6	6	02/25/08	0.0429 U	0.0716 U	0.0716 U	0.143 U	0.0323	31.1 JZ	28.9	31.8 U	75.9 J
EX-B2-G-35-10	10	02/22/08	0.119 U	0.198 U	0.198 U	0.397 U	NA	19.8 U	22.4 U	56.1 U	49.2 UU
EX-B2-G-35-SSW-6	6	02/22/08	0.0361 U [0.0404 U]	0.0601 U [0.0674 U]	0.0601 UJ [0.245 J]	0.120 UJ [0.403 J]	0.0167 [0.0474]	6.91 JZ [102 JZ]	19.3 Q9 [42.6 Q9]	30.6 U [35.8]	41.5 J [180 J]
EX-B2-G-36-12	12	02/22/08	0.0423 U	0.0705 U	0.0705 U	0.141 U	0.0240	7.05 U	38.1 Q4	32.5 U	57.9
EX-B2-G-37-13	13	02/22/08	0.0414 U	0.0690 U	0.0690 U	0.138 U	NA	6.90 U	12.8 U	32.0 U	25.9 UU
EX-B2-G-38(2)-13	13	02/06/08	0.0332 U	0.0554 U	0.0554 U	0.111 U	NA	5.54 U	11.8 U	29.6 U	23.5 UU
EX-B2-G-38-8	8	01/31/08	0.0279 U	0.0465 U	0.0577	0.243	0.0702	87.0 JZ	1,020	335	1,440 J
EX-B2-G-38-WSW-5	5	01/31/08	0.0305 U	0.0508 U	0.0545	0.185	0.0516	100 JZ	651	317	1,070 J
EX-B2-G-39(2)-11	11	02/05/08	0.0662 U	0.110 U	0.110 U	0.291	NA	13.5	16.3 U	40.7 U	42.0
EX-B2-G-39-8	8	01/28/08	0.323 U	1.37	1.27	2.35	0.197	568 Q10a	3,450	1,140 Q7	5,160
EX-B2-G-39-SSW-4	4	01/28/08	0.0271 U	0.0452 U	0.0452 U	0.0904 U	0.00861	4.52 U	24.5	30.6	57.4
EX-B2-G-40-8	8	01/25/08	0.0317 U	0.0529 U	0.0529 U	0.106 U	0.00883	5.29 U	59.9 Q11	43.0	106
EX-B2-G-40-SSW-4	4	01/25/08	0.0287 U	0.0479 U	0.0479 U	0.0958 U	0.00906	4.79 U	22.3 Q11	32.6	57.3
EX-B2-G-41-8	8	01/24/08	0.0354 U	0.0939	0.0590 U	0.317	0.00891	61.1 JZ	125 J	110 Q4	296 J
EX-B2-G-41-ESW-4	4	01/24/08	0.0356 U	0.0593 U	0.0593 U	0.119 U	0.0415	5.93 U	438 Q4	361 Q4	802
EX-B2-G-41-SSW-4	4	01/24/08	0.0341 U	0.0568 U	0.0568 U	0.114 U	0.00853	5.68 U	20.1 Q4	57.1 Q4	80.0
EX-B2-H-35-6	6	02/27/08	0.0833 U	0.229	0.139 U	0.278 U	0.0123	18.5	41.4 Q4	40.7 UQ4	101
EX-B2-H-36-6	6	02/22/08	0.0426 U	0.0709 U	0.0790	0.363	0.0225	70.4 JZ	453 Q4	248 Q4	771 J
EX-B2-H-37(2)-6	6	03/05/08	0.0349 U	0.0582 U	0.0582 U	0.159	0.00868	75.0 JZ	312 Q4	513 Q4	900 J
EX-B2-H-37-5	5	02/22/08	0.0398 U	0.0663 U	0.0663 U	0.248	0.167	133 JZ	2,690 J	1,550 J	4,370 J
EX-B2-H-38(2)-10	10	02/06/08	0.0293 U	0.0488 U	0.0488 U	0.0976 U	NA	4.88 U	11.2 U	28.1 U	22.1 UU
EX-B2-H-38-5	5	01/31/08	0.0315 U	0.252 J	0.231 J	0.791 J	0.145	316 JZ	2,940	849	4,110 J
EX-B2-H-38-WSW(2)-5	5	02/06/08	0.0329 U	0.0549 U	0.0549 U	0.110 U	0.0160	6.75 JZ	128 Q4	96.1 Q4	231 J
EX-B2-H-38-WSW-5	5	01/31/08	0.292 URL1	0.487 URL1	0.796	1.25	0.186	406 JZ	2,220	667	3,290 J
EX-B3-E-32-6	6	02/26/08	0.0474 U	0.0790 U	0.0790 U	0.158 U	NA	7.90 U	13.2 U	33.1 U	27.1 UU
EX-B3-F-31-12	12	03/10/08	0.0604 U	0.101 U	0.101 U	0.201 U	NA	10.1 U	15.1 U	37.8 U	31.5 UU
EX-B3-F-31-NSW-6	6	03/10/08	0.0306 U	0.0510 U	0.0510 U	0.102 U	0.00891	5.10 U	13.8 Q4	29.7 U	31.2
EX-B3-G-29-5	5	03/11/08	0.0356 U	0.0594 U	0.0594 U	0.119 U	NA	5.94 U	11.5 U	28.8 U	23.1 UU
EX-B3-G-29-NSW-4	4	03/11/08	0.0313 U	0.0522 U	0.0522 U	0.104 U	0.0300	5.22 U	27.1 JY	161	191 J
EX-B3-G-29-SSW-5	5	03/11/08	0.0377 U [0.0345 U]	0.0629 U [0.0575 U]	0.0629 U [0.0575 U]	0.126 U [0.115 U]	NA [NA]	6.29 U [5.75 U]	12.4 U [11.3 U]	30.9 U [28.4 U]	24.8 UU [22.7 UU]
EX-B3-G-30-12	12	03/11/08	0.0352 U	0.0586 U	0.0586 U	0.117 U	NA	5.86 U	11.9 U	29.9 U	23.8 UU
EX-B3-G-30-NSW-6	6	03/11/08	0.108	0.0711 U	0.0711 U	0.142 U	0.0184	12.8 JZ	169 Q4	120 Q4	302 J
EX-B3-G-30-SSW-6	6	03/10/08	0.0322 U	0.0536 U	0.0536 U	0.107 U	NA	5.36 U	11.5 U	28.7 U	22.8 UU
EX-B3-G-31-12	12	03/10/08	0.0368 U	0.0613 U	0.0613 U	0.123 U	NA	6.13 U	12.5 U	31.3 U	25.0 UU
EX-B3-G-31-SSW-6	6	03/10/08	0.0427 U	0.0711 U	0.0711 U	0.224	NA	27.4	12.3 U	30.8 U	49.0
EX-B4-B-23-6	6	02/25/08	0.0297 U [0.0321 U]	0.263 J [0.0679 J]	0.0494 U [0.0535 U]	0.0988 U [0.107 U]	0.0145 [NA]	4.94 U [5.35 U]	15.5 JY [11.2 U]	27.8 U [28.0 U]	31.9 J [22.3 UU]
EX-B4-B-24-6	6	02/25/08	0.0366 U	0.0610 U	0.0610 U	0.122 U	NA	6.10 U	12.1 U	30.3 U	24.3 UU
EX-B5-B-20(2)-4	4	02/28/08	0.0354 U	0.0590 U	0.0590 U	0.118 U	NA	5.90 U	12.1 U	30.3 U	24.2 UU
EX-B5-B-20-4	4	02/22/08	0.0363 U	0.0605 U	0.0605 U	0.121 U	0.111	6.05 U	592 Q4	473 Q4	1,070
EX-B6-C-15-3	3	11/19/07	0.0335 U	0.0559 U	0.0559 U	0.112 U	NA	5.59 U	12.6 U	31.5 U	24.8 UU
EX-B6-D-13-3	3	11/19/07	0.0269 U	0.0448 U	0.0448 U	0.0895 U	0.00846	12.1	61.6	27.7 U	87.6
EX-B6-D-14-10	10	11/19/07	0.0321 U	0.0535 U	0.0535 U	0.107 U	NA	6.31	12.2 U	30.5 U	27.7

TABLE 4
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Gasoline *(mg/kg)*	Diesel *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH *(mg/kg)*
			B	T	E	X					
			REL = 18 mg/kg				***CUL = 0.14 mg/kg***				***REL = 2,975***
EX-B6-D-14-NSW-3	3	11/19/07	0.0369 U	0.0616 U	0.0616 U	0.123 U	NA	6.16 U	15.0 U	37.4 U	29.3 UU
EX-B6-D-15-12	12	11/19/07	0.0332 U [0.0323 U]	0.0554 U [0.0538 U]	0.0554 U [0.0538 U]	0.111 U [0.108 U]	NA [NA]	5.54 U [5.79]	13.2 U [12.6 U]	33.0 U [31.6 U]	25.9 UU [27.9]
EX-B6-E-13-4	4	11/19/07	0.0261 U [0.0270 U]	0.0435 U [0.0449 U]	0.0435 U [0.0449 U]	0.0870 U [0.0899 U]	0.00853 [0.00853]	4.35 U [4.49 U]	146 J [33.6 J]	113 [28.4 U]	261 J [50.0 J]
EX-B6-E-14-10	10	11/19/07	0.0312 U	0.0520 U	0.0520 U	0.104 U	NA	5.20 U	12.1 U	30.2 U	23.8 UU
EX-B6-F-14-10	10	11/19/07	0.0302 U	0.0504 U	0.0504 U	0.101 U	NA	5.04 U	12.6 U	31.5 U	24.6 UU
EX-B6-F-14-WSW-3	3	11/19/07	0.0275 U	0.0459 U	0.0459 U	0.0918 U	0.00846	4.59 U	42.4 Q11	28.0 U	58.7
EX-B8-F-4-4	4	10/01/07	0.0278 U	0.0464 U	0.0464 U	0.0928 U	0.0222	53.6 JZ	1,070 Q4	496 Q4	1,620 J
EX-B8-F-4-9	9	10/22/07	0.224	0.0784	0.0625 U	0.125 U	0.0468	6.25 U	801 Q4	347 Q4	1,150
EX-B8-F-4-NSW-4	4	10/22/07	0.0326 U	0.0543 U	0.0543 U	0.109 U	0.0422	80.7	834 Q4	332 Q4	1,250
EX-B8-F-4-NSW-6	6	10/09/07	0.0318 U [0.0324 U]	0.0531 U [0.0540 U]	0.0531 U [0.0540 U]	0.106 U [0.108 U]	0.0424 [0.0854]	23.5 JZ [52.2 JZ]	1,310 Q4 [2,440 J]	496 Q4 [1,030 J]	1,830 J [3,520 J]
EX-B8-F-4NSW-6	6	10/15/07	0.0428 U	0.0713 U	0.0713 U	0.143 U	0.112	53.2 JZ	3,850 Q4	1,760 Q4	5,660 J
EX-B8-F-4-WSW-4	4	10/01/07	0.0400 U	0.0666 U	0.0666 U	0.133 U	NA	6.66 U	10.9 U	27.3 U	22.4 UU
EX-B8-F-5-4	4	10/01/07	0.0374 U	0.0623 U	0.0623 U	0.125 U	0.0885	94.8 JZ	462 J	424 J	981 J
EX-B8-F-5-NSW-6	6	10/09/07	0.0292 U	0.0487 U	0.0487 U	0.0975 U	0.00909	16.3 JZ	422 Q4	187 Q4	625 J
EX-B8-G-4-9	9	10/01/07	0.0308 U	0.0514 U	0.0514 U	0.103 U	0.00921	5.14 U	18.2	30.5 U	36.0
EX-B8-G-4-WSW-4	4	10/01/07	0.0271 U	0.0452 U	0.0452 U	0.0904 U	0.0808	5.76 JZ	133 J	245 J	384 J
EX-B8-G-5-9	9	10/01/07	0.0319 U	0.0532 U	0.0532 U	0.106 U	NA	5.32 U	13.3 U	33.2 U	25.9 UU
EX-B8-H-4-9	9	10/01/07	0.0324 U	0.0540 U	0.0540 U	0.108 U	NA	5.40 U	11.9 U	29.8 U	23.6 UU
EX-B8-H-4-WSW-4	4	10/01/07	0.0279 U	0.0465 U	0.0465 U	0.0931 U	0.0768	86.7 JZ	2,080 Q4	1,100 Q4	3,270 J
EX-B8-H-5-9	9	10/01/07	0.0353 U	0.0588 U	0.0588 U	0.118 U	NA	5.88 U	12.2 U	30.4 U	24.2 UU
EX-B8-I-4-9	9	10/01/07	0.0817	0.0498 U	0.0498 U	0.0996 U	NA	4.98 U	12.2 U	30.4 U	23.8 UU
EX-B8-I-4-WSW-4	4	10/01/07	0.0323 U [0.0334 U]	0.0539 U [0.0557 U]	0.0539 U [0.0557 U]	0.108 U [0.111 U]	0.0991 [0.0524]	25.4 JZ [34.7 JZ]	3,130 Q4 [1,990 Q4]	1,480 Q4 [1,010 Q4]	4,640 J [3,030 J]
EX-B8-I-5-9	9	10/01/07	0.0292 U	0.0486 U	0.0486 U	0.0972 U	NA	4.86 U	12.1 U	30.2 U	23.6 UU
EX-B8-J-4-4	4	10/01/07	0.0217 U	0.0362 U	0.0362 U	0.0723 U	0.165	80.5 JZ	1,530 Q4	798 Q4	2,410 J
EX-B8-J-4-5	5	10/23/07	0.0251 U	0.0419 U	0.0419 U	0.0838 U	0.0170	4.19 U	146 Q4	167 Q4	315
EX-B8-J-4-SSW-2.5	2.5	10/23/07	0.0331 U	0.0552 U	0.0552 U	0.110 U	NA	5.52 U	10.9 U	27.3 U	21.9 UU
EX-B8-J-5-4	4	10/01/07	0.0272 U	0.0453 U	0.0453 U	0.0907 U	0.00831	4.53 U	35.9 JY	43.8	82.0 J
EX-B8-J-5-9	9	10/01/07	0.0366 U	0.0610 U	0.0610 U	0.122 U	NA	6.10 U	11.3 U	28.4 U	22.9 UU
EX-B9-M-4-11	11	02/20/08	0.0315 U	0.0524 U	0.0524 U	0.105 U	NA	5.24 U	11.6 U	29.1 U	23.0 UU
EX-B9-M-4-NSW-6	6	02/19/08	0.329 U	0.548 U	0.548 U	1.71	0.00907	755 JZ	439 Q4	211 Q4	1,410 J
EX-B9-M-4-WSW-6	6	02/19/08	0.336 U	0.561 U	0.561 U	1.84	0.0173	816 JZ	537 JX	141 U	1,420 J
EX-B9-M-5-11	11	02/19/08	0.0411 U	0.0685 U	0.0685 U	0.137 U	NA	6.85 U	13.0 U	32.5 U	26.2 UU
EX-B9-M-5-NSW-6	6	02/19/08	0.0285 U	0.0475 U	0.0750 J	0.375 J	0.00823	98.5 JZ	40.9 Q4	27.1 UQ4	167 J
EX-B9-M-6-11	11	02/19/08	0.0364 U [0.0453 U]	0.0606 U [0.0755 U]	0.0606 U [0.0755 U]	0.121 U [0.151 U]	NA [NA]	6.06 U [7.55 U]	12.5 U [13.4 U]	31.4 U [33.4 U]	25.0 UU [27.2 UU]
EX-B9-M-6-NSW-6	6	02/19/08	0.0383 U	0.0638 U	0.291	0.426	NA	16.2	13.0 U	32.6 U	39.0
EX-B9-N-4-11	11	02/20/08	0.0349 U	0.0582 U	0.0582 U	0.116 U	NA	5.82 U	12.1 U	30.3 U	24.1 UU
EX-B9-N-4-WSW-6	6	02/20/08	0.0338 U	0.250 J	0.172 J	0.871 J	0.00891	276 JZ	139 Q4	128 Q4	543 J
EX-B9-N-5-12	12	02/13/08	0.0343 U	0.0572 U	0.0572 U	0.114 U	NA	5.72 U	11.8 U	29.6 U	23.6 UU
EX-B9-O-4-12	12	02/20/08	0.0373 U [0.0373 U]	0.0622 U [0.0621 U]	0.0622 U [0.0621 U]	0.128 [0.209]	NA [NA]	20.2 [15.9]	12.3 U [12.5 U]	30.7 U [31.2 U]	41.7 [37.8]
EX-B9-O-4-WSW-6	6	02/20/08	0.0322 U	0.0536 U	0.0536 U	0.107 U	0.00800	50.7 JZ	24.4	26.5 U	88.4 J
EX-B9-O-5-12	12	02/13/08	0.0365 U [0.0354 U]	0.0609 U [0.0591 U]	0.0609 U [0.0591 U]	0.122 U [0.118 U]	NA [NA]	6.09 U [5.91 U]	11.8 U [11.9 U]	29.6 U [29.7 U]	23.7 UU [23.8 UU]
EX-B9-P-4-12	12	02/20/08	0.0396 U	0.0660 U	0.0660 U	0.132 U	NA	8.18	12.6 U	31.5 U	30.2
EX-B9-P-4-SSW(2)-6	6	02/25/08	0.332 U	0.553 U	0.553 U	3.82	0.0194	967 JZ	470 JX	138 U	1,510 J
EX-B9-P-4-SSW-6	6	02/20/08	0.295 U	0.491 U	0.595	3.53	0.0316	898 JZ	1,430 Q4	248 Q4	2,580 J
EX-B9-P-4-WSW-6	6	02/20/08	0.0333 U	0.0556 U	0.0556 U	0.111 U	NA	5.56 U	11.8 U	29.5 U	23.4 UU
EX-B9-P-5-12	12	02/13/08	0.0315 U	0.0525 U	0.0525 U	0.105 U	NA	5.25 U	11.6 U	29.0 U	22.9 UU
EX-B9-Q-5-6	6	02/13/08	0.0175 U	0.0291 U	0.0291 U	0.0582 U	0.0145	2.91 U	56.5 Q4	35.4 Q4	93.4
EX-B10-N-6-10	10	02/08/08	0.0361 U	0.0601 U	0.0601 U	0.120 U	NA	6.01 U	12.4 U	31.1 U	24.8 UU
EX-B10-O-6-10	10	02/08/08	0.0352 U	0.0586 U	0.0586 U	0.117 U	NA	5.86 U	12.3 U	30.8 U	24.5 UU
EX-B10-O-7-12	12	01/16/08	0.0302 U [0.0330 U]	0.0503 U [0.0550 U]	0.0503 U [0.0550 U]	0.101 U [0.110 U]	NA [NA]	5.03 U [5.50 U]	12.2 U [13.3 U]	30.5 U [33.3 U]	23.9 UU [26.1 UU]
EX-B10-O-8-12	12	01/16/08	0.0316 U	0.0527 U	0.0527 U	0.105 U	NA	5.27 U	12.7 U	31.8 U	24.9 UU
EX-B10-P-6-10	10	02/08/08	0.0400 U	0.0666 U	0.0666 U	0.176	NA	8.23	12.6 U	31.6 U	30.3
EX-B10-P-7-15	15	01/30/08	0.0328 U	0.0546 U	0.0546 U	0.109 U	NA	9.68	13.2 U	32.9 U	32.7
EX-B10-P-8-15	15	01/30/08	0.0322 U	0.0536 U	0.0536 U	0.107 U	NA	5.36 U	12.2 U	30.5 U	24.0 UU

TABLE 4
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Gasoline *(mg/kg)*	Diesel *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH *(mg/kg)*
			B	T	E	X					
			REL = 18 mg/kg				***CUL = 0.14 mg/kg***				***REL = 2,975***
EX-B10-Q-6-11	11	02/08/08	0.0343 U	0.0572 U	0.0572 U	0.114 U	NA	5.73	12.8 U	32.1 U	28.2
EX-B10-Q-7-15	15	01/30/08	0.0309 U	0.0516 U	0.0516 U	0.103 U	NA	5.16 U	12.5 U	31.3 U	24.5 UU
EX-B11-Q-8-14	14	01/30/08	0.0306 U [0.0317]	0.0510 U [0.0496 U]	0.0510 U [0.0496 U]	0.102 U [0.0991 U]	0.00891 [NA]	5.80 [4.96 U]	20.1 JY [11.8 U]	29.7 U [29.5 U]	40.8 J [23.1 UU]
EX-B11-R-6-5	5	02/08/08	0.0346 U [0.0340 U]	0.0577 U [0.0566 U]	0.0577 U [0.0566 U]	0.115 U [0.113 U]	0.0224 [0.0258]	56.8 JZ [168 JZ]	1,510 [1,310]	296 [265]	1,860 J [1,740 J]
EX-B11-R-7-12	12	01/22/08	0.0331	0.0688	0.0509 U	0.145	NA	5.09 U	12.0 U	30.0 U	23.5 UU
EX-B11-R-7-WSW-5	5	01/18/08	0.0297 U	0.0495 U	0.0495 U	0.0989 U	0.107	80.4 JZ	7,130	1,360 Q7	8,570 J
EX-B11-R-8-12	12	01/30/08	0.0303	0.0993	0.109	0.565	NA	13.9	11.8 U	29.6 U	34.6
EX-B11-R-9-12	12	02/12/08	0.0612	0.0555 U	0.0555 U	0.111 U	NA	5.55 U	11.7 U	29.3 U	23.3 UU
EX-B11-S-7-12	12	01/22/08	0.0402	0.122	0.0601	0.333	NA	6.08	12.1 U	30.2 U	27.2
EX-B11-S-7-WSW-5	5	01/18/08	0.0290 U	0.0483 U	0.0483 U	0.0966 U	NA	4.83 U	10.9 U	27.2 U	21.5 UU
EX-B11-S-8-12	12	01/30/08	0.0287 U	0.0478 U	0.0478 U	0.0955 U	NA	8.58	12.1 U	30.2 U	29.7
EX-B11-S-9-12	12	02/12/08	0.0413	0.0628 U	0.150	0.457	0.00929	38.7 JZ	67.6	31.1 U	122 J
EX-B11-S-10-2	2	02/15/08	0.0408 U	0.0680 U	0.0680 U	0.136 U	NA	6.80 U	12.7 U	31.8 U	25.7 UU
EX-B11-S-11-12	12	02/14/08	0.0398 U	0.0663 U	0.0663 U	0.133 U	NA	6.63 U	12.3 U	30.7 U	24.8 UU
EX-B11-T-7-12	12	01/22/08	0.0310	0.0851	0.103	0.532	0.00891	48.4 JZ	52.3	29.6 U	116 J
EX-B11-T-7-WSW-5	5	01/18/08	0.0290 U	0.0484 U	0.0484 U	0.0967 U	NA	9.95 JZ	10.9 U	27.2 U	29.0 J
EX-B11-T-8-12	12	01/30/08	0.231	0.561	0.150	0.778	NA	6.50	11.9 U	29.9 U	27.4
EX-B11-T-9-12	12	02/12/08	0.193	0.0636 U	0.0647	0.127 U	NA	6.36 U	12.5 U	31.4 U	25.1 UU
EX-B11-T-10-10	10	02/14/08	0.0342 U	0.0570 U	0.0570 U	0.114 U	NA	5.70 U	12.3 U	30.6 U	24.3 UU
EX-B11-T-11-12	12	02/14/08	0.0306 U	0.0510 U	0.0510 U	0.102 U	NA	5.10 U	11.7 U	29.2 U	23.0 UU
EX-B11-T-11-ESW-6	6	02/15/08	0.0382 U	0.0637 U	0.0637 U	0.127 U	NA	6.37 U	12.5 U	31.4 U	25.1 UU
EX-B11-U-7-5	5	01/18/08	0.0290 U	0.0484 U	0.0484 U	0.0967 U	NA	4.84 U	11.0 U	27.5 U	21.7 UU
EX-B11-U-8-14	14	01/30/08	2.59	3.57	1.59	7.94	NA	48.6	11.9 U	29.7 U	69.4
EX-B11-U-9-12	12	01/31/08	0.461	0.824	0.460	1.71	NA	15.8	12.1 U	30.3 U	37.0
EX-B11-U-10-10	10	02/14/08	1.20	0.0890 U	0.0890 U	0.178 U	NA	8.90 U	14.0 U	34.9 U	28.9 UU
EX-B11-U-10-SSW-5	5	02/12/08	14.9	0.606 U	1.48	1.21 U	0.159	214	957 Q4	639 Q4	1,810
EX-B11-U-11-5	5	02/12/08	0.0429 U	0.0716 U	0.0716 U	0.143 U	0.0260	8.80 JZ	423 Q4	131 Q4	563 J
EX-B11-V-8-5	5	01/31/08	0.127	0.219	0.196	0.218	0.0172	175 JZ	616	28.0 U	805 J
EX-B11-V-9-5	5	01/31/08	0.142 J	0.302 J	1.17 J	2.36 J	0.00872	405 JZ	265	84.4	754 J
EX-B13-AA-2-10	10	09/26/07	0.0346	0.0564 U	0.0564 U	0.113 U	NA	12.8	12.5 U	31.1 U	34.6
EX-B13-AA-2-NSW-4	4	09/19/07	0.0306 U	0.0511 U	0.0511 U	0.102 U	0.0126	5.11 U	35.2	101	139
EX-B13-AA-2-WSW-4	4	09/19/07	0.0303 U	0.0505 U	0.0505 UJ	0.101 U	NA	5.05 U	11.0 U	27.5 U	21.8 UU
EX-B13-AA-3-10	10	09/26/07	0.0322 U	0.0537 U	0.0537 U	0.107 U	NA	5.37 U	12.9 U	32.2 U	25.2 UU
EX-B13-AA-3-NSW-4	4	09/19/07	0.0265 U	0.0441 U	0.0441 U	0.0883 U	NA	4.41 U	10.5 U	26.2 U	20.6 UU
EX-B13-AA-4-10	10	09/26/07	0.0313 U	0.0522 U	0.0522 U	0.104 U	NA	5.22 U	11.7 U	29.2 U	23.1 UU
EX-B13-BB-2-10	10	09/25/07	0.0336 U	0.0560 U	0.0560 U	0.112 U	NA	5.60 U	11.8 U	29.5 U	23.5 UU
EX-B13-BB-2-WSW-4	4	09/19/07	0.476	0.959	0.993	1.12	0.0335	774 JZ	1,030 J	105 J	1,910 J
EX-B13-BB-3-10	10	09/25/07	0.0281 U [0.0319 U]	0.0468 U [0.0532 U]	0.0468 U [0.0532 U]	0.0935 U [0.106 U]	NA [NA]	4.98 U [5.32 U]	10.7 U [11.5 U]	26.7 U [28.8 U]	21.2 UU [22.8 UU]
EX-B13-BB-4-10	10	09/25/07	0.0283 U	0.0472 U	0.0472 U	0.0945 U	NA	4.72 U	12.7 U	31.8 U	24.6 UU
EX-B13-BB-5-10	10	09/27/07	0.0295 U	0.0491 U	0.0491 U	0.0983 U	NA	4.91 U	11.4 U	28.5 U	22.4 UU
EX-B13-CC-1-4	4	10/10/07	0.0432 U	0.104	0.0720 U	0.144 U	NA	20.2	18.4 U	45.9 U	52.4
EX-B13-CC-1-10	10	10/08/07	0.952	3.90	2.99	2.51	0.0881	1,630	3,810 J	656 J	6,100 J
EX-B13-CC-2-4	4	09/25/07	8.83	4.68 U	4.68 U	9.37 U	0.0499	3,020	2,520	582	6,120
EX-B13-CC-2-10	10	10/08/07	0.0278 U	0.0463 U	0.0463 U	0.0926 U	NA	4.63 U	11.3 U	28.1 U	22.0 UU
EX-B13-CC-3-10	10	09/27/07	0.0285 U	0.0475 U	0.0475 U	0.0951 U	NA	4.75 U	12.1 U	30.2 U	23.5 UU
EX-B13-CC-4-10	10	09/27/07	0.0279 U	0.0465 U	0.0465 U	0.0931 U	NA	4.65 U	12.0 U	30.1 U	23.4 UU
EX-B13-CC-5-10	10	09/27/07	0.0299 U	0.0498 U	0.0498 U	0.0997 U	NA	4.98 U	12.5 U	31.2 U	24.3 UU
EX-B13-DD-1-4	4	10/08/07	0.0408 U	0.0679 U	0.0679 U	0.136 U	NA	6.79 U	14.7 U	36.7 U	29.1 UU
EX-B13-DD-2-10	10	10/08/07	0.0291 U	0.0484 U	0.0484 U	0.0968 U	NA	4.84 U	11.8 U	29.5 U	23.1 UU
EX-B13-DD-3-10	10	10/02/07	0.0279 U	0.0465 U	0.0465 U	0.0929 U	NA	4.65 U	11.1 U	27.8 U	21.8 UU
EX-B13-DD-4-10	10	10/02/07	0.173	0.0461 U	0.0461 U	0.0921 U	NA	4.61	11.7 U	29.1 U	25.0
EX-B13-DD-5-10	10	10/02/07	0.0637	0.0451 U	0.0451 U	0.0901 U	NA	4.51 U	11.6 U	28.9 U	22.5 UU
EX-B13-EE-1-4	4	10/08/07	0.0283 U	0.0472 U	0.0472 U	0.0944 U	NA	4.72 U	12.2 U	30.4 U	23.7 UU
EX-B13-EE-2-10	10	10/08/07	0.0272 U	0.0453 U	0.0453 U	0.0905 U	NA	4.53 U	11.6 U	28.9 U	22.5 UU

TABLE 4
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B	T	E	X					
			REL = 18 mg/kg				*CUL = 0.14 mg/kg*				*REL = 2,975*
EX-B13-EE-3-10	10	10/05/07	0.0298 U	0.0496 U	0.0496 U	0.0992 U	NA	4.96 U	11.5 U	28.8 U	22.6 UU
EX-B13-EE-3-SSW-4	4	10/05/07	0.0509	0.0502 U	0.0502 U	0.100 U	NA	6.85	12.2 U	30.6 U	28.3
EX-B13-EE-4-10	10	10/05/07	0.0296 U [0.0292 U]	0.0494 U [0.0487 U]	0.0494 U [0.0487 U]	0.0987 U [0.0974 U]	NA [NA]	4.94 U [4.87 U]	11.7 U [11.1 U]	29.3 U [27.8 U]	23.0 UU [21.9 UU]
EX-B13-EE-4-SSW-4	4	10/05/07	0.0314 U	0.0523 U	0.0523 U	0.105 U	NA	5.23 U	12.6 U	31.5 U	24.7 UU
EX-B13-FF-2-4	4	10/09/07	0.0302 U	0.0504 U	0.0504 U	0.101 U	NA	5.04 U	12.8 U	32.0 U	24.9 UU
EX-B13-FF-3-10	10	10/09/07	0.0447	0.0538 U	0.0538 U	0.108 U	NA	8.17	11.7 U	29.4 U	28.7
EX-B13-FF-3-ESW-4	4	10/09/07	0.0289 U	0.0481 U	0.0481 U	0.0963 U	NA	4.81 U	12.7 U	31.8 U	24.7 UU
EX-B13-GG-3-4	4	10/09/07	0.136	0.0462 U	0.0462 U	0.0925 U	NA	4.62 U	12.9 U	32.2 U	24.9 UU
EX-B14-DD-7-2.5	2.5	08/23/07	1.85	0.0664 U	0.0844	0.133 U	0.0121	70.6	151	82.0	304
EX-B14-DD-7-WSW-2.5	2.5	09/10/07	14.6	2.94	7.66	8.28	0.0111	2,940 J	3,640 J	213	6,790 J
EX-B14-DD-8-5	5	08/23/07	0.0500 [0.0302 U]	0.0519 U [0.0504 U]	0.0519 U [0.0504 U]	0.104 U [0.101 U]	0.226 [0.222]	40.3 JZ [23.3 JZ]	990 Q4 [425 Q4]	861 Q4 [396 Q4]	1,890 J [844 J]
EX-B14-DD-8-6	6	09/04/07	0.0999 [0.0912]	0.0496 U [0.0507 U]	0.0549 [0.0507 U]	0.0993 U [0.101 U]	0.00945 [0.00929]	13.9 [11.9]	70.8 JQ4 [28.3 JQ4]	75.1 JQ4 [30.9 UQ4]	160 J [71.1 J]
EX-B14-DD-NSW-2.5	2.5	08/23/07	0.0885 J [1.32 J]	0.0509 U [0.0687 U]	0.0509 U [0.0768]	0.102 U [0.137 U]	0.0112 [0.0244]	25.0 [72.9 JZ]	157 Q4 [188]	83.6 Q4 [88.7]	266 [350 J]
EX-B14-EE-5-4	4	09/10/07	0.404	0.0701 U	0.662	0.800	NA	445 JZ	12.1 U	30.3 U	466 J
EX-B14-EE-6-8	8	09/10/07	0.239	0.0541 U	0.0541 U	0.108 U	NA	5.41 U	11.7 U	29.2 U	23.2 UU
EX-B14-EE-7-8	8	08/23/07	0.0581 U	0.0968 U	0.0968 U	0.194 U	NA	9.68 U	17.9 U	44.7 U	36.1 UU
EX-B14-EE-8-4	4	08/23/07	0.255	0.0490 U	0.0490 U	0.0980 U	NA	4.90 U	12.7 U	31.7 U	24.7 UU
EX-B14-EE-WSW-4	4	08/23/07	2.30	0.539 U	4.91	7.39	0.224	1,040 JZ	3,290 J	598 UJ	4,630 J
EX-B14-FF-6-4	4	09/07/07	0.213	0.0536 U	0.0536 U	0.107 U	NA	5.57	12.6 U	31.4 U	27.6
EX-B14-FF-7-8	8	08/23/07	0.0763 U	0.127 U	0.127 U	0.254 U	NA	12.7 U	20.1 U	50.3 U	41.6 UU
EX-B14-FF-8-4SW	4	08/22/07	0.0505 U	0.0841 U	0.0841 U	0.168 U	0.0119	8.41 U	523	144	671
EX-B14-FF-WSW-4	4	08/23/07	0.100	0.0489 U	0.0489 U	0.0977 U	0.0107	16.3	64.2	34.6	115
EX-B14-GG-7-8	8	08/23/07	0.0266 U	0.0444 U	0.0444 U	0.0888 U	NA	4.44 U	12.1 U	30.4 U	23.5 UU
EX-B14-GG-WSW-4	4	08/23/07	0.0275 U	0.0458 U	0.0458 U	0.0915 U	0.0218	8.72	428 Q4	138 Q4	575
EX-B14-HH-6-4	4	08/23/07	0.0302 U [0.0285 U]	0.0504 U [0.0475 U]	0.0504 U [0.0475 U]	0.101 U [0.0949 U]	0.0107 [0.0107]	5.04 U [4.75 U]	40.1 Q4 [44.6 Q4]	80.6 Q4 [90.5 Q4]	123 [137]
EX-B14-HH-6F	6	08/23/07	0.0260 U	0.0433 U	0.0433 U	0.0866 U	0.0110	4.33 U	38.3 Q12	29.4 U	55.2
EX-B14-HH-7-4SW	4	08/23/07	0.0277 U	0.0461 U	0.0461 U	0.0923 U	0.0117	9.66 JZ	29.1 JY	29.5 U	53.5 J
EX-B15-HH-2-4	4	08/28/07	0.0901	0.0563 U	0.0563 U	0.184	NA	5.63 U	13.2 U	33.0 U	25.9 UU
EX-B15-HH-3-ESW-4	4	08/28/07	0.0319 U	0.0532 U	0.0532 U	0.106 U	NA	5.32 U	11.9 U	29.8 U	23.5 UU
EX-B15-HH-3-NSW-4	4	08/28/07	0.356	0.0539 U	0.0539 U	0.108 U	NA	5.39 U	13.0 U	32.4 U	25.4 UU
EX-B15-II-2-8	8	08/28/07	0.0571	0.0789 U	0.0789 U	0.158 U	NA	12.6	15.4 U	38.4 U	39.5
EX-B15-II-2-WSW-4	4	08/28/07	1.10	0.0517 U	0.143	0.133	NA	29.2	12.9 U	32.4 U	51.9
EX-B15-II-3-8	8	08/28/07	0.0264 U	0.0440 U	0.0440 U	0.0880 U	NA	4.40 U	11.6 U	29.1 U	22.6 UU
EX-B15-II-4-ESW-4	4	08/28/07	0.0316 U	0.0527 U	0.0527 U	0.169	0.0115	209 JZ	676	153	1,040 J
EX-B16-MM-1-6SW	6	08/20/07	0.305 U	0.508 U	0.807	1.02 U	0.00911	293 JZ	656	78.3 Q7	1,030 J
EX-B17-RR-1-6SW	6	08/20/07	0.0488 U	0.0814 U	0.0814 U	0.163 U	0.0113	8.14 U	51.2 JY	72.5 J	128 J
EX-B17-SS-1-6SW	6	08/20/07	0.0270 U	0.0450 U	0.0450 U	0.0900 U	NA	4.50 U	12.0 U	30.1 U	23.3 UU
EX-B18-UU-1-6SW	6	08/17/07	0.290 U [0.288 U]	0.484 U [0.480 U]	0.691 [0.554]	2.55 [1.94]	0.0435 [0.0103]	693 JZ [611 JZ]	1,140 J [376 J]	146 U [58.5 U]	1,910 J [1,020 J]
EX-B18-VV-1-6SW	6	08/17/07	1.56 U	2.60 U	2.60 U	5.82	0.0457	2,150 JZ	2,670 J	312 U	4,980 J
EX-B20-O-14-12	12	01/18/08	0.0303 U	0.0505 U	0.0505 U	0.101 U	NA	5.05 U	12.1 U	30.1 U	23.6 UU
EX-B20-O-15-12	12	01/18/08	0.0299 U	0.0499 U	0.0499 U	0.0998 U	NA	4.99 U	12.4 U	31.1 U	24.2 UU
EX-B20-F-19-6	6	10/18/07	0.0538	0.0521 U	0.0763	0.320	NA	23.0	12.4 U	31.1 U	44.8
EX-B20-F-19-NSW-3	3	10/26/07	0.0271 U	0.0451 U	0.0451 U	0.0902 U	NA	4.51 U	11.1 U	27.8 U	21.7 UU
EX-B20-F-20-10	10	10/30/07	0.0290 U	0.0484 U	0.0484 U	0.0968 U	0.0230	4.84 U	53.4	31.1 U	71.4
EX-B20-F-20-NSW-4	4	10/30/07	0.0286 U [0.0292 U]	0.0476 U [0.0486 U]	0.0476 U [0.0486 U]	0.0952 U [0.0972 U]	NA [NA]	4.76 U [4.86 U]	11.1 U [11.3 U]	27.8 U [28.3 U]	21.8 UU [22.2 UU]
EX-B20-F-21-4	4	10/17/07	0.0316 U	0.0526 U	0.0526 U	0.105 U	NA	5.26 U	12.0 U	30.0 U	23.6 UU
EX-B20-G-13-12	12	11/26/07	0.0268 U	0.0447 U	0.0447 U	0.0895 U	0.00823	4.47 U	100 J	27.3 U	116 J
EX-B20-G-14-12	12	11/20/07	0.0292 U	0.0486 U	0.0486 U	0.0973 U	NA	4.86 U	12.1 U	30.3 U	23.6 UU
EX-B20-G-14-WSW-4	4	11/20/07	0.0299 U	0.0498 U	0.0498 U	0.0995 U	0.00815	4.98 U	48.5 Q11	32.9	83.9
EX-B20-G-18-15	15	10/18/07	0.0276 U	0.0460 U	0.0460 U	0.0919 U	NA	5.04 U	12.1 U	30.3 U	23.7 UU
EX-B20-G-19-15	15	10/18/07	0.0377 U	0.0628 U	0.0628 U	0.126 U	NA	6.28 U	12.0 U	30.1 U	24.2 UU
EX-B20-G-20-15	15	10/18/07	0.0365	0.0488 U	0.179	0.0976 U	NA	4.88 U	11.8 U	29.4 U	23.0 UU
EX-B20-G-21-10	10	10/17/07	0.271 U	0.792	0.451 U	0.903 U	0.00944	123 JZ	1,020	59.0	1,200 J
EX-B20-G-21-ESW-5	5	10/26/07	0.0273 U	0.0455 U	0.0455 U	0.0910 U	0.00891	4.55 U	36.0 C8	29.3 U	52.9

TABLE 4
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B	T	E	X					
			REL = 18 mg/kg				CUL = 0.14 mg/kg				REL = 2,975
EX-B20-H-10-4	4	11/30/07	0.0291 U	0.0484 U	0.0484 U	0.0968 U	0.00858	4.84 U	148 Q4	195 Q4	345
EX-B20-H-11-4	4	11/29/07	0.0298 U	0.0497 U	0.0497 U	0.0994 U	NA	4.97 U	11.0 U	27.5 U	21.7 UU
EX-B20-H-12-6	6	11/29/07	0.0284 U [0.0291 U]	0.0473 U [0.0485 U]	0.0473 U [0.0485 U]	0.0946 U [0.0970 U]	0.00823 [0.00831]	4.73 U [4.85 U]	28.9 Q11 [35.8 Q11]	27.4 U [27.6 U]	45.0 [52.0]
EX-B20-H-12-NSW-2	2	11/29/07	0.0262 U	0.0437 U	0.0437 U	0.0873 U	NA	4.37 U	11.3 U	28.3 U	22.0 UU
EX-B20-H-13-12	12	11/26/07	0.0330 U	0.0550 U	0.0550 U	0.110 U	NA	5.50 U	12.3 U	30.7 U	24.3 UU
EX-B20-H-14-12	12	11/20/07	0.0319 U	0.0531 U	0.0531 U	0.106 U	0.00959	5.31 U	70.9 Q11	31.6 U	89.4
EX-B20-H-14-WSW-4	4	11/20/07	0.0277 U [0.0306 U]	0.0461 U [0.0510 U]	0.0461 U [0.0510 U]	0.0922 U [0.102 U]	0.00876 [0.00846]	4.61 U [5.10 U]	27.1 Q11 [20.4 Q11]	28.5 U [27.6 U]	43.7 [36.8]
EX-B20-H-18-15	15	10/18/07	0.0299 U [0.0301 U]	0.0498 U [0.0502 U]	0.0498 U [0.0502 U]	0.0997 U [0.100 U]	NA [NA]	4.98 U [5.02 U]	12.0 U [12.2 U]	30.0 U [30.5 U]	23.5 UU [23.9 UU]
EX-B20-H-19-15	15	10/18/07	0.0276 U	0.0460 U	0.0689	0.0920 U	NA	4.60 U	12.1 U	30.2 U	23.5 UU
EX-B20-H-20-15	15	10/18/07	0.107	0.0671 U	0.474	0.378	NA	10.5	13.8 U	34.5 U	34.7
EX-B20-H-21-10	10	10/18/07	0.0683 U	0.114 U	0.114 U	0.228 U	0.0153	11.4 U	506	72.1	584
EX-B20-H-21-ESW-5	5	10/26/07	0.0271 U	0.0452 U	0.0452 U	0.0903 U	0.00891	7.14 JZ	58.7 J	29.1 U	80.4 J
EX-B20-I-9-9	9	10/17/07	0.0440 U	0.0733 U	0.0733 U	0.147 U	NA	7.33 U	15.6 U	39.1 U	31.0 UU
EX-B20-I-10-10	10	11/29/07	0.0308 U	0.0514 U	0.0514 U	0.103 U	NA	5.14 U	12.7 U	31.8 U	24.8 UU
EX-B20-I-11-10	10	11/29/07	0.0329 U	0.0549 U	0.0549 U	0.110 U	NA	7.89	12.2 U	30.6 U	29.3
EX-B20-I-11-NSW-6	6	11/29/07	0.0299 U	0.0499 U	0.0499 U	0.0997 U	0.00815	5.84 JZ	63.6 Q11	26.9 U	82.9 J
EX-B20-I-12-10	10	11/29/07	0.0296 U	0.0493 U	0.0493 U	0.0985 U	NA	5.87	12.4 U	31.0 U	27.6
EX-B20-I-13-12	12	11/26/07	0.0291 U	0.0485 U	0.0485 U	0.0971 U	NA	4.85 U	11.8 U	29.4 U	23.0 UU
EX-B20-I-14-12	12	11/20/07	0.0314 U	0.0524 U	0.0524 U	0.105 U	NA	5.24 U	13.0 U	32.5 U	25.4 UU
EX-B20-I-15-15	15	11/05/07	0.0315 U	0.0525 U	0.0525 U	0.105 U	NA	5.25 U	13.6 U	34.0 U	26.4 UU
EX-B20-I-18-15	15	10/19/07	0.0392	0.0498 U	0.156	0.0997 U	NA	4.98 U	12.6 U	31.6 U	24.6 UU
EX-B20-I-19-15	15	10/18/07	0.0361 U [0.0326 U]	0.0601 U [0.0543 U]	0.0601 U [0.0543 U]	0.120 U [0.109 U]	NA [NA]	6.01 U [5.43 U]	13.3 U [13.1 U]	33.2 U [32.9 U]	26.3 UU [25.7 UU]
EX-B20-I-20-8	8	10/18/07	0.0303 U	0.0505 U	0.0505 U	0.101 U	NA	5.05 U	12.7 U	31.7 U	24.7 UU
EX-B20-I-21-4	4	10/30/07	0.0254 U	0.0423 U	0.0423 U	0.0846 U	0.0231	4.83 JZ	37.8	49.7	92.3 J
EX-B20-J-9-9	9	10/17/07	0.0310 U	0.0517 U	0.0517 U	0.103 U	0.00906	37.0 JZ	12.9	29.8 U	64.8 J
EX-B20-J-10-10	10	11/29/07	0.0340 U	0.0945	0.0567 U	0.123	NA	18.1	12.7 U	31.8 U	40.4
EX-B20-J-11-11	11	12/13/07	0.0301 U	0.0502 U	0.0502 U	0.100 U	NA	5.02 U	12.6 U	31.6 U	24.6 UU
EX-B20-J-12-10	10	11/28/07	0.0329	0.0539 U	0.0539 U	0.108 U	NA	5.39 U	12.3 U	30.8 U	24.2 UU
EX-B20-J-13-12	12	11/26/07	0.0304 U	0.0507 U	0.0507 U	0.101 U	NA	5.07 U	12.2 U	30.4 U	23.8 UU
EX-B20-J-14-12	12	11/20/07	0.0302 U	0.0503 U	0.0503 U	0.101 U	0.00891	5.03 U	29.6 Q11	29.3 U	46.8
EX-B20-J-15-15	15	11/05/07	0.0346 U	0.0577 U	0.0577 U	0.115 U	NA	5.77 U	13.2 U	32.9 U	25.9 UU
EX-B20-J-18-15	15	10/19/07	0.0293 U	0.0489 U	0.0489 U	0.0978 U	NA	4.89 U	12.2 U	30.5 U	23.8 UU
EX-B20-J-20-4	4	10/30/07	0.0355 U	0.0592 U	0.0592 U	0.118 U	NA	5.92 U	13.9 UC	34.8 U	34.3
EX-B20-K-7-5	5	01/10/08	0.0349 U	0.0918	0.0928	0.416	0.00936	65.1 JZ	16.1 JY	41.1	122 J
EX-B20-K-9-9	9	10/16/07	0.0385 U	0.0642 U	0.0642 U	0.128 U	NA	8.19	12.3 U	30.9 U	29.8
EX-B20-K-10-10	10	11/30/07	0.0315 U	0.0525 U	0.0525 U	0.105 U	NA	5.25 U	12.9 U	32.3 U	25.2 UU
EX-B20-K-11-10	10	11/29/07	0.0290 U	0.0483 U	0.0483 U	0.0967 U	NA	4.83 U	12.4 U	31.0 U	24.1 UU
EX-B20-K-12-12	12	11/29/07	0.0310 U	0.0517 U	0.0517 U	0.103 U	NA	5.17 U	12.8 U	32.1 U	25.0 UU
EX-B20-K-13-12	12	11/26/07	0.0305 U	0.0508 U	0.0508 U	0.102 U	NA	5.08 U	13.1 U	32.8 U	25.5 UU
EX-B20-K-14-12	12	11/20/07	0.0283 U	0.0471 U	0.0471 U	0.0943 U	NA	4.71 U	12.3 U	30.8 U	23.9 UU
EX-B20-K-15-15	15	11/05/07	0.0282 U	0.0470 U	0.0470 U	0.0940 U	NA	4.70 U	12.2 U	30.5 U	23.7 UU
EX-B20-K-16-15	15	10/31/07	0.0279 U	0.0466 U	0.0466 U	0.0932 U	NA	4.66 U	12.4 U	31.0 U	24.0 UU
EX-B20-L-7-5	5	02/08/08	0.0256 U	0.0427 U	0.128	0.217	0.00956	41.3 JZ	84.8	64.8	191 J
EX-B20-L-8-10	10	12/11/07	0.0337 U	0.0561 U	0.0561 U	0.112 U	NA	6.07	13.7 U	34.1 U	30.0

TABLE 4
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Gasoline (mg/kg)	Diesel (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B	T	E	X					
			REL = 18 mg/kg				*CUL = 0.14 mg/kg*				*REL = 2,975*
EX-B20-L-8-WSW5	5	01/07/08	0.0410 [0.0430]	0.123 [0.142]	0.0586 U [0.0651]	0.131 [0.110 U]	0.0104 [0.00973]	26.8 JZ [36.4 JZ]	107 Q4 [154 Q4]	81.4 JQ4 [202 JQ4]	215 J [392 J]
EX-B20-L-9-10	10	12/11/07	0.0320 U	0.0534 U	0.0534 U	0.107 U	NA	5.34 U	12.8 U	31.9 U	25.0 UU
EX-B20-L-10-10	10	11/30/07	0.0310 U	0.0516 U	0.0516 U	0.103 U	NA	5.16 U	12.6 U	31.4 U	24.6 UU
EX-B20-L-11-10	10	12/07/07	0.0322 U	0.0537 U	0.0537 U	0.107 U	NA	5.37 U	13.1 U	32.7 U	25.6 UU
EX-B20-L-12-12	12	11/29/07	0.0321 U	0.0536 U	0.0536 U	0.107 U	NA	5.36 U	12.1 U	30.3 U	23.9 UU
EX-B20-L-13-12	12	11/26/07	0.0295 U	0.0492 U	0.0492 U	0.0983 U	NA	4.92 U	12.8 U	32.0 U	24.9 UU
EX-B20-L-14-12	12	11/20/07	0.0292 U	0.0486 U	0.0486 U	0.0972 U	NA	4.86 U	12.2 U	30.5 U	23.8 UU
EX-B20-L-15-15	15	11/05/07	0.0282 U	0.0471 U	0.0471 U	0.0941 U	NA	4.71 U	12.3 U	30.8 U	23.9 UU
EX-B20-L-16-15	15	10/31/07	0.0297 U	0.0496 U	0.0496 U	0.0992 U	NA	4.96 U	12.7 U	31.7 U	24.7 UU
EX-B20-M-6-5	5	02/08/08	0.778 J	0.278 U	13.8 J	40.1 J	0.103	4,630 JZ	5,250 JQ10	7,070 J	17,000 J
EX-B20-M-7-10	10	02/08/08	0.0376 U	0.0627 U	0.0627 U	0.125 U	NA	6.27 U	12.0 U	29.9 U	24.1 UU
EX-B20-M-8-12	12	01/16/08	0.0297 U	0.0495 U	0.0495 U	0.0990 U	NA	9.22	11.9 U	29.8 U	30.1
EX-B20-M-9-12	12	01/16/08	0.0319 U	0.0532 U	0.0532 U	0.106 U	NA	9.88	12.3 U	30.8 U	31.4
EX-B20-M-10-12	12	12/07/07	0.0363	0.0534 U	0.0534 U	0.107 U	NA	8.72	12.5 U	31.2 U	30.6
EX-B20-M-11-12	12	12/07/07	0.0314 U	0.0523 U	0.0523 U	0.105 U	NA	5.23 U	12.7 U	31.7 U	24.8 UU
EX-B20-M-12-12	12	12/07/07	0.0299 U [0.0310 U]	0.0498 U [0.0517 U]	0.0498 U [0.0517 U]	0.0997 U [0.103 U]	NA [NA]	4.98 U [5.17 U]	11.5 U [11.0 U]	28.9 U [27.4 U]	22.7 UU [21.8 UU]
EX-B20-M-13-14	14	12/07/07	0.0332 U	0.0554 U	0.0554 U	0.111 U	NA	5.54 U	13.8 U	34.5 U	26.9 UU
EX-B20-M-14-11	11	12/07/07	0.0306 U	0.0510 U	0.0510 U	0.102 U	NA	5.10 U	11.9 U	29.7 U	23.4 UU
EX-B20-M-15-11	11	12/07/07	0.0316 U	0.0527 U	0.0527 U	0.105 U	NA	5.27 U	11.5 U	28.8 U	22.8 UU
EX-B20-M-16-15	15	11/09/07	0.0302 U	0.0504 U	0.0504 U	0.101 U	NA	5.04 U	11.9 U	29.8 U	23.4 UU
EX-B20-M-16-SSW-12	12	11/09/07	0.0298 U	0.0497 U	0.0497 U	0.0995 U	NA	4.97 U	10.8 U	26.9 U	21.3 UU
EX-B20-M-17-10	10	11/09/07	0.0297 U	0.0495 U	0.0495 U	0.0989 U	NA	4.95 U	12.0 U	30.0 U	23.5 UU
EX-B20-M-17-ESW-5	5	11/09/07	0.0303 U	0.0505 U	0.0505 U	0.101 U	NA	5.05 U	12.4 U	30.9 U	24.2 UU
EX-B20-M-17-SSW-4	4	11/09/07	1.09	0.504 U	0.504 U	1.04	0.412	1,090 JZ	13,000	271 UQ7	14,400 J
EX-B20-M-17-SSW-6	6	01/28/08	0.577	0.529 U	0.529 U	1.21	0.166	1,380 Q10a	13,600 J	1,380 UJ	15,700 J
EX-B20-N-7-8	8	01/16/08	0.0324 U	0.0540 U	0.0540 U	0.108 U	NA	8.29	11.9 U	29.7 U	29.1
EX-B20-N-7-WSW-4	4	01/16/08	0.0293 U	0.0489 U	0.0489 U	0.0978 U	0.0152	33.5 JZ	148 Q4	125 Q4	307 J
EX-B20-N-8-12	12	01/16/08	0.0318 U	0.0530 U	0.0530 U	0.106 U	NA	5.30 U	12.8 U	31.9 U	25.0 UU
EX-B20-N-9-12	12	01/16/08	0.0313 U	0.0521 U	0.0521 U	0.104 U	NA	5.21 U	12.6 U	31.6 U	24.7 UU
EX-B20-N-10-12	12	01/08/08	0.0292 U	0.0487 U	0.0487 U	0.0974 U	NA	4.87 U	11.7 U	29.2 U	22.9 UU
EX-B20-N-11-12	12	01/08/08	0.0292 U	0.0487 U	0.0487 U	0.0975 U	NA	5.56	12.1 U	30.2 U	26.7
EX-B20-N-12-12	12	01/08/08	0.0282 U	0.0470 U	0.0470 U	0.0941 U	NA	4.70 U	11.9 U	29.9 U	23.3 UU
EX-B20-N-13-12	12	01/08/08	0.0310 U	0.0517 U	0.0517 U	0.103 U	NA	5.17 U	12.4 U	31.0 U	24.3 UU
EX-B20-N-14-12	12	12/11/07	0.0308 U	0.0513 U	0.0513 U	0.103 U	NA	5.13 U	12.3 U	30.7 U	24.1 UU
EX-B20-N-15-12	12	12/11/07	0.0338 U	0.0563 U	0.0563 U	0.113 U	NA	5.63 U	13.1 U	32.7 U	25.7 UU
EX-B20-N-16-4	4	11/09/07	2.02	1.74	2.41	2.52	0.409	2,120 JZ	14,700	312 Q7	17,100 J
EX-B20-N-16-12	12	11/13/07	0.0322 U	0.0537 U	0.0537 U	0.107 U	NA	5.37 U	11.6 U	29.1 U	23.0 UU
EX-B21-ESW-2	2	10/11/07	0.0354 U	0.0591 U	0.0591 U	0.118 U	NA	5.91 U	11.0 U	27.5 U	22.2 UU
EX-B21-FLOOR-4	4	10/11/07	0.0303 U	0.0506 U	0.0506 U	0.101 U	NA	5.06 U	11.8 U	29.5 U	23.2 UU
EX-B21-NSW-2	2	10/11/07	0.0300 U	0.0500 U	0.0500 U	0.100 U	0.00883	5.00 U	12.4 JY	44.6	59.5 J
EX-SDTI-5-NSW-4	4	08/22/07	0.0320 U	0.0533 U	0.0533 U	0.107 U	NA	5.33 U	12.8 U	31.9 U	25.0 UU
EX-SDTI-5-SSW-4	4	08/22/07	0.0344 U	0.0574 U	0.0574 U	0.115 U	NA	5.74 U	13.0 U	32.4 U	25.6 UU
EX-SDTI-ESW-4	4	08/22/07	0.0400 U	0.0667 U	0.0667 U	0.133 U	0.0107	6.67 U	30.1 Q11	35.6 U	51.2
EX-SDTI-FF-S-8	8	08/22/07	0.0333 U	0.0556 U	0.0556 U	0.111 U	0.00951	5.56 U	32.3 Q11	64.7	99.8
EX-SDTI-GG-ESW-4	4	08/22/07	0.0304 U	0.0507 U	0.0507 U	0.101 U	NA	5.07 U	12.3 U	30.6 U	24.0 UU
EX-SDTI-GG-S-8	8	08/22/07	0.0286 U	0.0477 U	0.0477 U	0.0953 U	0.00936	4.77 U	12.1 U	42.4	50.8
EX-SDTI-GG-WSW-4	4	08/22/07	0.0322 U	0.0537 U	0.0537 U	0.107 U	0.00929	5.37 U	36.8 Q11	31.5 U	55.2
EX-SDTI-WSW-4	4	08/22/07	0.0757	0.0580 U	0.0580 U	0.116 U	NA	9.40	12.2 U	30.6 U	30.8
EX-WW-G-27-2SW	2	08/07/07	0.0287 U	0.0479 U	0.0479 U	0.0958 U	0.00924	4.79 U	14.9 JY	49.7	67.0 J
EX-WW-G-27-4	4	08/07/07	0.0299 U	0.0498 U	0.0498 U	0.0997 U	NA	4.98 U	10.9 U	27.3 U	21.6 UU
EX-WW-H-27-2.5	2.5	08/07/07	0.0384 U	0.0639 U	0.0639 U	0.128 U	0.0321	6.39 U	16.4 JY	60.0	79.6 J
EX-WW-H-28-2	2	08/07/07	0.0294 U	0.0491 U	0.0491 U	0.0981 U	0.00891	6.07	21.4 JY	68.1	95.6 J
EX-WW-H-29-1	1	08/07/07	0.0335 U	0.0559 U	0.0559 U	0.112 U	0.00808	4.59 U	20.0 JY	78.9	101 J
EX-WW-I-26-1	1	08/07/07	0.0254 U	0.0424 U	0.0424 U	0.0848 U	0.00934	4.24 U	12.3 JY	44.3	58.7 J

TABLE 4
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Gasoline *(mg/kg)*	Diesel *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH *(mg/kg)*
			B	T	E	X					
			REL = 18 mg/kg				***CUL = 0.14 mg/kg***				***REL = 2,975***
P-B15-NE-SW	4	08/16/07	0.598	0.692	2.35	2.87	NA	874 J	763 JX	637	2,270 J
P-B15-NW-SW	4	08/16/07	8.73	5.36 U	63.5	18.5	NA	6,610	1,910 JX	580 UJ	8,810 J

Notes:
BTEX analyzed by EPA Method 8021B.
cPAHs analyzed by EPA Method 8270 SIM.
Gasoline analyzed by method NWTPH-G.
Diesel and Heavy Oil (Lube) analyzed by method NWTPH-D Extended.
Total TPH calculated by summing the concentrations of gasoline, diesel and heavy oil. If one or more TPH constituents were reported as Non-Detect, half of the reporting limit value was added to the total.
cPAHs adjusted for toxicity according to WAC 173-340-708(8) and *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors* . Office of Environmental Health Hazard Assessment, California EPA, May 2005. If one or more adjusted cPAH constituents were reported as Non-Detect, half of the reporting limt was used in calculations.
Highlighted cells indicate concentration exceeds REL or CUL.
[ ] = Bracketed data indicate duplicate sample.

feet bgs = Feet below ground surface
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
mg/kg = Milligrams per kilogram
cPAHs = Carcinogenic polyaromatic hydrocarbons
TPH = Total petroleum hydrocarbons
REL = Remediation level
CUL = Cleanup level
NA = Not analyzed
EPA = Environmental Protection Agency

Lab Qualifiers	Definition
C	Calibration Verification recovery was above the method control limit for this analyte. Analyte not detected, data not impacted.
C8	Calibration Verification recovery was above the method control limit for this analyte. A high bias may be indicated.
D	Compound quantitated using a secondary dilution.
J	Indicates an estimated value.
JX	Results in the diesel organic range are primarily due to overlap from a gasoline range product.
JY	Results in the diesel organics range are primarily due to overlap from a heavy oil range product.
JZ	Detected hydrocarbons in the gasoline range appear to be due to overlap of diesel range hydrocarbons.
Q10	Hydrocarbon pattern most closely resembles a blend of gasoline and diesel range hydrocarbons.
Q10a	Hydrocarbon pattern most closely resembles a blend of gasoline and diesel range hydrocarbons.
Q11	Detected hydrocarbons in the diesel range do not have a distinct diesel pattern and may be due to heavily weathered diesel.
Q12	Detected hydrocarbons in the diesel range do not have a distinct diesel pattern and may be due to heavily weathered diesel or possibly biogenic interference.
Q4	The hydrocarbons present are a complex mixture of diesel range and heavy oil range organics.
Q7	The heavy oil range organics present are due to hydrocarbons eluting primarily in the diesel range.
Q9	Hydrocarbon pattern most closely resembles transformer oil.
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
RL1	Reporting limit raised due to sample matrix effects.
UJ	The compound was analyzed for but not detected. The associated value is the estimated compound quantitation limit.
UU	The constituents making up the total are all non-detects.

TABLE 5
Soil Sample Arsenic Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Date Sampled	Sample Depth (feet bgs)	Arsenic *(mg/kg)*
			CUL = 20 mg/kg
EX-B19-YY-3-1	3/5/2008	1	5.08
EX-B19-YY-2-1	3/5/2008	1	9.84
EX-B19-YY-1-1	3/5/2008	1	5.45
EX-B19-ZZ-1-1	3/5/2008	1	**25.0 [30.9]**
EX-B19-ZZ-2-1	3/5/2008	1	8.56
EX-B19-ZZ-3-1	3/5/2008	1	5.54
EX-B19-ZZ-1-2	3/7/2008	2	**30.7**
EX-B19-ZZ-1-2.5	3/12/2008	2.5	<5.54

Notes:
feet bgs = Feet below ground surface
mg/kg = Milligrams per kilogram.
CUL = Cleanup level
[ ] Indicate Duplicate samplDuplicate samples immediately preceed the parent sample.
Highlighted cells indicate concentration exceeds REL or CUL.

Lab Qualifiers	Definition
<	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

TABLE 8
Confirmation Boring Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Date Sampled	Sample Depth *(feet bgs)*	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Gasoline *(mg/kg)*	Diesel *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH *(mg/kg)*
			B	T	E	X					
			REL = 18 mg/kg				***CUL = 0.14 mg/kg***				***REL = 2,975***
SB-1-11.5	04/03/08	11.5	0.0304 U	0.0507 U	0.0507 U	0.101 U	NA	5.07 U	11.4 U	28.6 U	22.5 UU
SB-2-11	04/03/08	11	0.0609 U	0.102 U	0.102 U	0.203 U	NA	10.2 U	15.6 U	38.9 U	32.4 UU
SB-3-10.5	04/03/08	10.5	0.0335 U	0.0559 U	0.0559 U	0.112 U	NA	5.59 U	12.0 U	30.0 U	23.8 UU
SB-3-12	04/03/08	12	0.0372 U	0.0620 U	0.0620 U	0.124 U	NA	6.20 U	11.9 U	29.7 U	23.9 UU
SB-4-10.5	04/04/08	10.5	0.0307 U	0.0511 U	0.0511 U	0.102 U	NA	5.11 U	11.3 U	28.1 U	22.3 UU
SB-5-11.5	04/04/08	11.5	0.0394	0.0513 U	0.0513 U	0.103 U	NA	5.13 U	10.9 U	27.4 U	21.7 UU
SB-6-11.0	04/04/08	11	0.0356 U	0.0594 U	0.0594 U	0.119 U	NA	5.94 U	11.8 U	29.5 U	23.6 UU
SB-7-11.5	04/04/08	11.5	0.0334 U	0.0556 U	0.0556 U	0.111 U	NA	5.56 U	11.5 U	28.8 U	22.9 UU
SB-8-11.0	04/04/08	11	0.0501	0.0505 U	0.0505 U	0.101 U	NA	5.05 U	11.4 U	28.5 U	22.5 UU
SB-9-11.0	04/04/08	11	0.0401	0.0543 U	0.0543 U	0.109 U	NA	5.43 U	11.5 U	28.7 U	22.8 UU
SB-10-11.0	04/04/08	11	0.0341 U [0.0350 U]	0.0569 U [0.0584 U]	0.0569 U [0.0584 U]	0.114 U [0.117 U]	NA [NA]	5.69 U [5.84 U]	11.8 U [11.6 U]	29.6 U [28.9 U]	23.5 UU [23.2 UU]
SB-11-11.0	04/04/08	11	0.0556 U	0.0927 U	0.0927 U	0.185 U	NA	9.27 U	14.2 U	35.5 U	29.5 UU
SB-12-11.5	04/04/08	11.5	0.0348 U	0.0580 U	0.0580 U	0.116 U	NA	5.80 U	12.1 U	30.2 U	24.1 UU
SB-13-11	04/11/08	11	0.0465 U	0.0776 U	0.0776 U	0.155 U	NA	7.76 U	13.1 U	32.8 U	26.8 UU
SB-14-11	04/11/08	11	0.0385 U	0.0642 U	0.0642 U	0.128 U	NA	6.42 U	12.4 U	31.1 U	25.0 UU
SB-15-10.5	04/14/08	10.5	0.0354 U [0.0366 U]	0.0590 U [0.0611 U]	0.0590 U [0.0611 U]	0.118 U [0.122 U]	NA [NA]	5.90 U [6.11 U]	11.9 U [11.9 U]	29.7 U [29.7 U]	23.8 UU [23.9 UU]
SB-16-9.5	04/14/08	9.5	0.0312 U	0.0519 U	0.0519 U	0.104 U	NA	5.19 U	11.1 U	27.6 U	21.9 UU
SB-17-11.5	04/14/08	11.5	0.0321 U	0.0535 U	0.0535 U	0.107 U	NA	5.35 U	11.8 U	29.4 U	23.3 UU
SB-18-11	04/11/08	11	0.711	5.53	4.20	3.24	0.00842	1,070 JZ	299	45.0	1,410 J
SB-19-12	04/11/08	12	0.0292 U	0.0486 U	0.0486 U	0.0972 U	NA	4.86 U	11.5 U	28.6 U	22.5 UU
SB-20-9.5	04/14/08	9.5	0.0323 U	0.0538 U	0.0538 U	0.108 U	NA	5.38 U	11.8 U	29.5 U	23.3 UU
SB-21-10.5	04/14/08	10.5	0.0348 U	0.0581 U	0.0581 U	0.116 U	NA	5.81 U	12.3 U	30.6 U	24.4 UU
SB-22-10	04/11/08	10	0.0371 U [0.0371 U]	0.0618 U [0.0619 U]	0.0618 U [0.0619 U]	0.124 U [0.124 U]	NA [NA]	6.18 U [6.19 U]	12.8 U [12.3 U]	32.1 U [30.6 U]	25.5 UU [24.5 UU]
SB-23-11	04/11/08	11	0.0357 U	0.0595 U	0.0595 U	0.119 U	NA	5.95 U	12.2 U	30.5 U	24.3 UU
SB-24-10	04/11/08	10	0.0398 U	0.0663 U	0.0663 U	0.133 U	NA	6.63 U	12.9 U	32.3 U	25.9 UU
SB-25-11	04/11/08	11	0.0359 U	0.0598 U	0.0598 U	0.120 U	NA	5.98 U	12.0 U	30.0 U	24.0 UU
SB-26-10.5	04/14/08	10.5	0.0339 U	0.0565 U	0.0565 U	0.113 U	NA	5.65 U	11.6 U	29.1 U	23.2 UU
SB-27-10	04/14/08	10	0.200	0.0537 U	0.0537 U	0.107 U	0.00896	13.8 JZ	279	29.2 U	307 J
SB-28-9	04/11/08	9	0.0313 U	0.0522 U	0.0522 U	0.104 U	0.00838 UU	6.59	11.9	27.7 U	32.3
SB-29-9	04/08/08	9	0.0708	0.0566 U	0.0566 U	0.113 U	NA	10.7	11.4 U	28.4 U	30.6
SB-30-9.5	04/10/08	9.5	0.0343 U	0.0572 U	0.0572 U	0.114 U	NA	5.72 U	11.6 U	29.1 U	23.2 UU
SB-31-9.5	04/10/08	9.5	0.0420 U	0.0699 U	0.0699 U	0.140 U	NA	6.99 U	12.9 U	32.4 U	26.1 UU
SB-32-9.5	04/10/08	9.5	0.0541 U [0.0538 U]	0.0902 U [0.0897 U]	0.0902 U [0.0897 U]	0.180 U [0.179 U]	NA [NA]	9.02 U [8.97 U]	14.4 U [14.4 U]	36.0 U [36.0 U]	29.7 UU [29.7 UU]
SB-33-11	04/10/08	11	0.0471 U	0.0786 U	0.0786 U	0.157 U	NA	7.86 U	13.2 U	32.9 U	27.0 UU
SB-34-11	04/10/08	11	0.0344 U	0.0574 U	0.0574 U	0.115 U	NA	5.74 U	11.8 U	29.5 U	23.5 UU
SB-35-9	04/10/08	9	0.0442 U	0.0736 U	0.0736 U	0.147 U	NA	7.36 U	12.7 U	31.7 U	25.9 UU
SB-36-12	04/10/08	12	0.0252 U	0.0420 U	0.0420 U	0.0839 U	NA	4.20 U	10.9 U	27.2 U	21.2 UU

TABLE 8
Confirmation Boring Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Date Sampled	Sample Depth *(feet bgs)*	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Gasoline *(mg/kg)*	Diesel *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH *(mg/kg)*
			B	T	E	X					
			REL = 18 mg/kg				***CUL = 0.14 mg/kg***				***REL = 2,975***
SB-37-9	04/08/08	9	0.224 [0.225]	0.0566 U [0.0647 U]	0.0566 U [0.0647 U]	0.113 U [0.129 U]	NA [NA]	5.66 U [6.47 U]	12.0 U [12.8 U]	29.9 U [31.9 U]	23.8 UU [25.6 UU]
SB-38-8.5	04/08/08	8.5	0.0749	0.0634 U	0.0634 U	0.127 U	NA	6.34 U	12.0 U	29.9 U	24.1 UU
SB-38-10	04/08/08	10	0.108	0.0585 U	0.0585 U	0.117 U	0.00929 UU	5.85 U	12.3 U	30.8 U	24.5 UU
SB-39-14	04/10/08	14	0.0285 U	0.0475 U	0.0475 U	0.0951 U	NA	4.75 U	11.3 U	28.4 U	22.2 UU
SB-40-11	04/10/08	11	0.0365 U	0.0609 U	0.0609 U	0.122 U	NA	6.09 U	12.1 U	30.1 U	24.1 UU
SB-41-10	04/10/08	10	0.0346 U	0.0576 U	0.0576 U	0.115 U	NA	5.76 U	11.8 U	29.6 U	23.6 UU
SB-42-10	04/09/08	10	0.0464 U [0.0821]	0.0774 U [0.0822 U]	0.166 [0.152]	0.327 [0.231]	NA [NA]	7.74 U [8.22 U]	14.1 U [14.8 U]	35.2 U [37.1 U]	28.5 UU [30.1 UU]
SB-43-11.5	04/09/08	11.5	0.0420 U	0.0699 U	0.0699 U	0.140 U	NA	6.99 U	13.3 U	33.3 U	26.8 UU
SB-44-11	04/09/08	11	0.205	0.0548 U	0.0548 U	0.110 U	NA	5.48 U	11.8 U	29.4 U	23.3 UU
SB-45-10	04/08/08	10	0.206	0.0591 U	0.0591 U	0.118 U	NA	5.91 U	11.4 U	28.4 U	22.9 UU
SB-46-6	04/08/08	6	0.0323 U	0.0538 U	0.0538 U	0.108 U	NA	5.38 U	11.5 U	28.8 U	22.8 UU
SB-46-10.5	04/08/08	10.5	0.0311 U	0.0518 U	0.0518 U	0.104 U	NA	5.18 U	11.4 U	28.5 U	22.5 UU
SB-47-10	04/09/08	10	0.0437 U	0.0729 U	0.0729 U	0.146 U	NA	7.29 U	12.9 U	32.2 U	26.2 UU
SB-48-11.5	04/09/08	11.5	0.0459 U	0.0765 U	0.0765 U	0.153 U	NA	7.65 U	13.6 U	34.1 U	27.7 UU
SB-49-10.5	04/09/08	10.5	0.0333 U	0.0555 U	0.0555 U	0.111 U	NA	5.55 U	11.8 U	29.4 U	23.4 UU
SB-50-10.5	04/09/08	10.5	0.0350 U	0.0583 U	0.0583 U	0.117 U	NA	5.83 U	12.1 U	30.2 U	24.1 UU
SB-51-9.5	04/08/08	9.5	0.0350 U	0.0583 U	0.0583 U	0.117 U	NA	5.83 U	12.1 U	30.3 U	24.1 UU
SB-52-9.5	04/08/08	9.5	0.0317 U	0.0528 U	0.0528 U	0.106 U	NA	5.28 U	11.4 U	28.5 U	22.6 UU
SB-53-10.5	04/09/08	10.5	0.0309 U	0.0515 U	0.0515 U	0.103 U	NA	14.8	10.8 U	27.1 U	33.8
SB-54-10.5	04/09/08	10.5	0.0373 U	0.0622 U	0.0622 U	0.124 U	NA	6.22 U	12.1 U	30.3 U	24.3 UU
SB-55-11.5	04/07/08	11.5	0.0606 U	0.101 U	0.101 U	0.202 U	NA	10.1 U	15.7 U	39.2 U	32.5 UU
SB-56-14.5	04/08/08	14.5	0.0337 U	0.0561 U	0.0561 U	0.112 U	NA	5.61 U	11.7 U	29.3 U	23.3 UU
SB-57-10.5	04/07/08	10.5	0.0307 U	0.0511 U	0.0511 U	0.102 U	NA	5.11 U	11.3 U	28.2 U	22.3 UU
SB-58-11.0	04/07/08	11	0.0359 U	0.0598 U	0.0598 U	0.120 U	NA	5.98 U	11.6 U	29.1 U	23.3 UU
SB-59-5.5	04/08/08	5.5	0.0311 U	0.0518 U	0.0518 U	0.104 U	NA	5.18 U	11.4 U	28.5 U	22.5 UU
SB-60-10.5	04/07/08	10.5	0.0825 [0.0864]	0.0741 U [0.0637 U]	0.0741 U [0.0637 U]	0.148 U [0.127 U]	NA [NA]	7.41 U [6.37 U]	12.3 U [21.7]	30.8 U [29.0 U]	25.3 UU [39.4]
SB-61-10.5	04/07/08	10.5	0.0511 U	0.0852 U	0.0852 U	0.170 U	NA	8.52 U	15.1 U	37.8 U	30.7 UU
SB-62-10.5	04/07/08	10.5	0.0607 U	0.101 U	0.101 U	0.202 U	NA	10.1 U	15.8 U	39.5 U	32.7 UU
SB-63-5.5	04/07/08	5.5	0.327 U	0.577	1.11	6.56	0.107	2,190 JZ	2,970 J	193 J	5,350 J
SB-63-6.0	04/07/08	6	0.157 J	0.194 J	2.16 J	8.43 J	NA	978 JZ	20.2 U	50.4 U	1,010 J
SB-64-2.5	04/07/08	2.5	0.656	2.75	1.72	7.15	0.108	1,540 JZ	5,810 J	362 J	7,710 J
SB-64-5.5	04/07/08	5.5	0.139 J	2.42 J	0.782 J	3.20 J	0.0452 UU	534 JZ	444	32.2	1,010 J
SB-64-7.0	04/07/08	7	0.325	0.157 U	0.157 U	0.730	NA	63.1	19.9 U	49.7 U	97.9

TABLE 8
Confirmation Boring Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase I Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Notes:
BTEX analyzed by EPA Method 8021B.
cPAHs analyzed by EPA Method 8270 SIM.
Gasoline analyzed by method NWTPH-G.
Diesel and Heavy Oil (Lube) analyzed by method NWTPH-D Extended.
Total TPH calculated by summing the concentrations of gasoline, diesel and heavy oil. If one or more TPH constituents were reported as Non-Detect, half of the reporting limit value was added to the total.
cPAHs adjusted for toxicity according to WAC 173-340-708(8) and *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors* .
Highlighted cells indicate concentration exceeds REL or CUL.
[ ] = Bracketed data indicate duplicate sample.

feet bgs = Feet below ground surface
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
mg/kg = Milligrams per kilogram
cPAHs = Carcinogenic polyaromatic hydrocarbons
TPH = Total petroleum hydrocarbons
REL = Remediation level
CUL = Cleanup level
NA = Not analyzed
EPA = Environmental Protection Agency

Lab Qualifiers	Definition
J	Indicates an estimated value.
JZ	Detected hydrocarbons in the gasoline range appear to be due to overlap of diesel range hydrocarbons.
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UJ	The compound was analyzed for but not detected. The associated value is the estimated compound quantitation limit.
UU	The constituents making up the total are all non-detects.

2007-2008 Final Phase II
Remedial Implementation As-Built
Report

TABLE 3
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase II Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Diesel Range Organics *(mg/kg)*	Gasoline Range Organics *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH (mg/kg)
			B	T	E	X					
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			18	--	--	--	0.14	--	--	--	2,975
EX-AW-E-23-5	5	09/11/08	0.0404 U	0.0674 U	0.0674 U	0.135 U	0.278	596	109	410	1,120
EX-AW-E-23-5(2)	5	09/17/08	0.0363 U	0.0605 U	0.0605 U	0.121 U	NA	11.9 U	6.05 U	29.7 U	23.8 UU
EX-AW-E-24-10	10	09/11/08	0.0354 U	0.0590 U	0.0590 U	0.118 U	0.00891	28.1	5.90 U	29.0 U	45.6
EX-AW-E-24-NSW-5	5	09/11/08	0.0363 U	0.0605 U	0.0605 U	0.121 U	0.00892	357	30.0 JZ	134	521 J
EX-AW-E-25-10	10	09/11/08	0.0405 U	0.0675 U	0.0675 U	0.135 U	0.00982	102	6.75 U	32.8 U	122
EX-AW-E-25-ESW-5	5	09/11/08	0.0327 U [0.0339 U]	0.228 J [0.470 J]	0.0545 U [0.0564 U]	0.109 U [0.320 J]	0.00846 [0.00838]	18.4 [24.6]	75.2 JZ [171 JZ]	28.2 U [27.5 U]	108 J [209 J]
EX-AW-E-25-NSW-5	5	09/11/08	0.0373 U	0.0621 U	0.0621 U	0.124 U	0.00898	16.1	6.21 U	29.7 U	34.1
EX-AW-F-23-5	5	09/11/08	0.0359 U	0.0598 U	0.0598 U	0.120 U	0.00950	2,840	5.98 U	692	3,530
EX-AW-F-23-5(2)	5	09/12/08	0.0339 U	0.0565 U	0.0565 U	0.113 U	NA	11.6 U	5.65 U	29.1 U	23.2 UU
EX-AW-F-24-5	5	09/11/08	0.0345 U	0.0575 U	0.0575 U	0.115 U	NA	10.9 U	12.0	27.3 U	31.1
EX-AW-F-25-5	5	09/11/08	0.0277 U	0.0461 U	0.0461 U	0.0923 U	0.0181	58.1	6.68 JZ	71.8	137 J
EX-AW-F-25-ESW-5	5	09/11/08	0.0372 U	0.0620 U	0.0620 U	0.124 U	0.00846	62.6	6.20 U	27.9 U	79.7
EX-B1-C-46-4	4	08/08/08	0.355	1.06	0.294 U	3.20	0.228	2,920	260 JZ	911	4,090 J
EX-B1-C-46-4(2)	4	09/02/08	0.0302 U	0.0503 U	0.0503 U	0.101 U	0.0142	46.8 JY	5.03 U	92.7	142 J
EX-B1-C-47-4	4	08/08/08	0.0309 U	0.0679	0.0515 U	0.166	0.0414 UU	236	51.8 JZ	123	411 J
EX-B1-D-43-4	4	08/19/08	4.39	32.3	22.5	117	NA	11.6 U	2,000 J	29.0 U	2,020 J
EX-B1-D-44-12	12	08/18/08	0.121 U	0.202 U	0.202 U	0.404 U	0.0369 UU	25.6	20.2 U	60.3 U	65.9
EX-B1-D-44-NSW-4	4	08/18/08	1.23	2.68	0.470 U	9.81	0.554	9,620 J	678 JZ	3,350 J	13,600 J
EX-B1-D-44-NSW-4(2)	4	09/02/08	0.0508	0.107	0.0452 U	0.0903 U	0.0188	101	32.6	153	287
EX-B1-D-45-12	12	08/14/08	0.224 [0.0598 U]	0.956 J [0.0996 UJ]	1.41 J [0.0996 UJ]	4.87 J [0.199 UJ]	NA [NA]	14.6 U [15.4 U]	76.1 JZ [9.96 UJ]	36.4 U [38.5 U]	102 J [31.9 UU]
EX-B1-D-45-NSW-4	4	09/02/08	0.0316 U	0.0526 U	0.0526 U	0.105 U	0.0152	28.8 JY	5.26 U	69.0	100 J
EX-B1-D-46-12	12	08/11/08	0.113 U	0.189 U	0.189 U	0.378 U	0.0431	69.6 JY	18.9 U	158	237 J
EX-B1-D-47-4	4	08/08/08	0.0349 U	0.0582 U	0.0582 U	0.116 U	0.123	135	36.6 JZ	105	277 J
EX-B1-E-41-8	8	08/27/08	0.0325 U	0.0542 U	0.0542 U	0.108 U	0.0205	173	9.58	153	336
EX-B1-E-41-NSW-4	4	08/27/08	0.0314 U	0.0524 U	0.0524 U	0.105 U	NA	10.6 U	7.74	26.6 U	26.3
EX-B1-E-42-8	8	08/27/08	0.0327 U	0.0544 U	0.0544 U	0.109 U	0.0172	130	13.0	122	265
EX-B1-E-42-NSW-4	4	08/27/08	0.156	0.283	2.54	5.88	0.0714	76.8	223	83.1	383
EX-B1-E-43-12	12	08/21/08	0.259 U	0.431 U	0.431 U	0.863 U	NA	40.8 U	43.1 U	102 U	93.0 UU

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11720 Unoco Road
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Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Diesel Range Organics *(mg/kg)*	Gasoline Range Organics *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH (mg/kg)
			B	T	E	X					
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			18	--	--	--	0.14	--	--	--	2,975
EX-B1-E-44-12	12	08/19/08	0.143 U	0.239 U	0.239 U	0.477 U	NA	28.0 U	23.9 U	69.9 U	60.9 UU
EX-B1-E-45-12	12	08/14/08	0.106 U	0.177 U	0.177 U	0.354 U	NA	19.8 U	17.7 U	49.6 U	43.6 UU
EX-B1-E-46-12	12	08/13/08	0.133 U	0.221 U	0.221 U	0.442 U	NA	23.0 U	22.1 U	57.6 U	51.4 UU
EX-B1-E-47-4	4	08/08/08	0.0336 U	0.147	0.0561 U	0.116	0.0172	21.1	5.61 U	26.9 U	37.4
EX-B1-E-47-SSW-4	4	08/08/08	0.351 U	0.586 U	0.743	4.44	0.756	11,400 J	493 JZ	3,820 J	15,700 J
EX-B1-E-47-SSW-4(2)	4	09/02/08	0.0280 U	0.0466 U	0.0466 U	0.0932 U	NA	10.8 U	4.66 U	27.0 U	21.2 UU
EX-B1-F-42-8	8	08/27/08	0.0332 U	0.0553 U	0.0553 U	0.111 U	0.0165	144	12.4	114	270
EX-B1-F-42-SSW-4	4	08/27/08	0.0327 U [0.0306 U]	0.0546 U [0.0511 U]	0.0546 U [0.0511 U]	0.109 U [0.102 U]	NA [NA]	10.7 U [10.6 U]	5.46 U [5.11 U]	26.8 U [26.6 U]	21.5 UU [21.2 UU]
EX-B1-F-43-4	4	08/21/08	0.0288 U	0.0481 U	0.0481 U	0.0961 U	0.0184	231	35.6 JZ	275	542 J
EX-B1-F-44-4	4	08/18/08	0.0298 U	0.0497 U	0.0497 U	0.0994 U	0.212	58.3	4.97 U	60.2	121
EX-B1-F-45-10	10	08/15/08	0.0671 U	0.112 U	0.112 U	0.224 U	NA	16.8 U	11.2 U	41.9 U	35.0 UU
EX-B1-F-45-SSW-4	4	08/18/08	0.0296 U	0.0493 U	0.0493 U	0.0986 U	0.0719	95.5	21.4 JZ	115	232 J
EX-B1-F-46-4	4	08/08/08	4.81	9.05	4.52	48.6	1.14	8,430 J	1,650 JZ	2,500 J	12,600 J
EX-B1-F-47-4(2)	4	09/02/08	0.0291 U	0.0486 U	0.0486 U	0.0971 U	NA	10.9 U	4.86 U	27.2 U	21.5 UU
EX-B7-B3-4	4	08/01/08	0.0377 U	0.0628 U	0.0628 U	0.126 U	0.0411	1,990	6.28 U	2,060	4,050
EX-B7-B4-4	4	08/01/08	0.366 U [0.0548 U]	0.610 U [0.0913 U]	0.610 U [0.0913 U]	1.22 U [0.183 U]	0.0488 [0.0517]	1,120 [960]	61.0 U [9.13 U]	629 [544]	1,780 [1,510]
EX-B7-B-4-5	5	09/10/08	0.0383 U	0.0638 U	0.0638 U	0.128 U	0.00944 UU	64.2	20.9	30.7 U	100
EX-B8-H-3-10	10	09/10/08	0.0385 U	0.0642 U	0.0642 U	0.128 U	NA	12.2 U	6.42 U	30.5 U	24.6 UU
EX-B8-H-3-NSW-5	5	09/10/08	0.0322 U	0.0537 U	0.0537 U	0.107 U	0.0266	10.9 U	5.37 U	31.2	39.3
EX-B8-H-3-WSW-5	5	09/10/08	0.0427 U	0.0712 U	0.0712 U	0.142 U	0.0439	58.0 JY	7.12 U	342	404 J
EX-B8-I-3-10	10	09/10/08	0.0412 U	0.0686 U	0.0686 U	0.137 U	NA	12.4 U	6.86 U	31.0 U	25.1 UU
EX-B8-I-3-WSW-5	5	09/10/08	0.0833 U	0.139 U	0.139 U	0.278 U	0.0728	2,740	15.0	2,590	5,350
EX-B8-I-3-WSW-5(2)	5	09/11/08	0.0525 U	0.0875 U	0.0875 U	0.175 U	0.0589	352	8.75 U	354	710
EX-B8-J-3-10	10	09/10/08	0.0369 U	0.0616 U	0.0616 U	0.123 U	NA	11.8 U	6.16 U	29.5 U	23.7 UU
EX-B8-J-3-SSW-5	5	09/10/08	0.0302 U [0.0338 U]	0.0504 U [0.0564 U]	0.0504 U [0.0564 U]	0.101 U [0.113 U]	0.00793 UU [0.00793 UU]	51.5 [335 JY]	9.14 [5.64 U]	41.1 [315]	102 [653 J]
EX-B8-J-3-WSW-5	5	09/10/08	0.0302 U	0.0503 U	0.0503 U	0.101 U	0.00800 UU	270 JY	5.03 U	278	551 J
EX-B9-N-3-5	5	09/09/08	0.0331 U	0.0551 U	0.0551 U	0.110 U	NA	10.8 U	5.51 U	26.9 U	21.6 UU
EX-B9-O-3-10	10	09/09/08	0.0353 U	0.0588 U	0.0588 U	0.118 U	NA	11.7 U	9.57	29.3 U	30.1
EX-B9-O-3-WSW-5	5	09/09/08	0.0322 U	0.0537 U	0.0537 U	0.107 U	NA	10.5 U	5.37 U	26.2 U	21.0 UU
EX-B9-P-3-10	10	09/09/08	0.0360 U	0.0600 U	0.0600 U	0.120 U	NA	12.0 U	11.4	29.9 U	32.4
EX-B9-P-3-SSW-5	5	09/09/08	0.0320 U	0.0533 U	0.0533 U	0.107 U	NA	10.6 U	5.33 U	26.4 U	21.2 UU

TABLE 3
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Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Diesel Range Organics *(mg/kg)*	Gasoline Range Organics *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH (mg/kg)
			B	T	E	X					
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			**18**	--	--	--	**0.14**	--	--	--	**2,975**
EX-B9-P-3-WSW-5	5	09/09/08	0.0327 U	0.0545 U	0.0545 U	0.109 U	NA	10.3 U	5.45 U	25.9 U	20.8 UU
ISP-E-17-2	2	09/17/08	0.0310 U	0.0516 U	0.0516 U	0.103 U	NA	10.4 U	5.16 U	26.1 U	20.8 UU
ISP-E-18-2	2	09/17/08	0.0312 U	0.0519 U	0.0519 U	0.104 U	0.0248	15.2	5.19 U	27.9 U	31.7
ISP-E-19-2	2	09/22/08	0.0337 U	0.0562 U	0.0562 U	0.112 U	0.00868 UU	51.3 J	5.62 U	42.8	96.9 J
ISP-E-20-2	2	09/22/08	0.0333 U	0.0555 U	0.0555 U	0.111 U	0.0212	105	7.17 JZ	67.4	180 J
ISP-E-21-2	2	09/22/08	0.0318 U	0.0530 U	0.0530 U	0.113	0.00850	16.7	25.0 JZ	27.7 U	55.6 J
ISP-F-17-2	2	09/17/08	0.0319 U	0.0532 U	0.0532 U	0.106 U	NA	10.4 U	5.32 U	26.0 U	20.9 UU
ISP-F-18-2	2	09/17/08	0.0267 U	0.0445 U	0.0445 U	0.0890 U	0.0170	29.0	4.45 U	32.9	64.1
ISP-F-19-2	2	09/22/08	0.0329 U	0.0549 U	0.0549 U	0.110 U	0.0523	14.3	5.49 U	27.5 U	30.8
ISP-F-20-2	2	09/22/08	0.0351 U	0.0585 U	0.0585 U	0.117 U	0.0498	11.6	5.85 U	27.1 U	28.1
ISP-F-21-2	2	09/22/08	0.0344 U	0.0574 U	0.0574 U	0.115 U	NA	11.0 U	5.74 U	27.4 U	22.1 UU
ISP-G-17-2	2	09/17/08	0.0314 U	0.0524 U	0.0524 U	0.105 U	NA	10.4 U	5.24 U	26.1 U	20.9 UU
ISP-G-18-2	2	09/17/08	0.0314 U	0.0523 U	0.0523 U	0.105 U	NA	10.6 U	5.23 U	26.4 U	21.1 UU
ISP-G-19-2	2	09/22/08	0.0305 U [0.0301 U]	0.0508 U [0.0502 U]	0.0508 U [0.0502 U]	0.102 U [0.100 U]	0.306 [0.0187]	38.9 [47.5]	5.08 U [5.02 U]	27.5 U [27.5 U]	55.2 [63.8]
ISP-G-19-2(2)	2	09/25/08	0.0344 U	0.0573 U	0.0573 U	0.115 U	0.0161	75.5	5.73 U	57.1	135
ISP-G-20-2	2	09/22/08	0.0328 U	0.0546 U	0.0546 U	0.109 U	0.00823 UU	11.4	5.46 U	27.1 U	27.7
ISP-G-21-2	2	09/22/08	0.0322 U	0.0536 U	0.0536 U	0.107 U	0.0335	74.1	9.03 JZ	35.0	118 J
EX-RRT-ZZ-2-4	4	08/01/08	0.0552 U	0.0920 U	0.0920 U	0.184 U	NA	15.2 U	20.3	38.0 U	46.9
EX-RRT-ZZ-2-ESW-3	3	08/01/08	0.0800 U	0.133 U	0.133 U	0.560 J	NA	18.2 U	46.4 J	45.4 U	78.2 J
RRT-YY-2-6	6	08/04/08	0.105 U	0.376 J	0.174 U	1.61 J	NA	20.8 U	39.9 J	52.0 U	76.3 J
RRT-YY-2-WSW-3	3	08/04/08	0.0397 U [0.0357 U]	0.0661 U [0.0595 U]	0.0661 U [0.0595 U]	0.132 U [0.119 U]	0.00808 UU [0.00808 UU]	27.1 JY [26.8 JY]	6.61 U [5.95 U]	32.9 [31.6]	63.3 J [61.4 J]
RRT-ZZ-2-NSW-3	3	08/04/08	0.0349 U	0.0581 U	0.0581 U	0.116 U	0.00853 UU	30.2 J	5.81 U	60.4	93.5 J
RRT-ZZ-3-NSW-3	3	08/04/08	0.0382 U	0.0637 U	0.0637 U	0.127 U	NA	11.8 U	6.37 U	29.4 U	23.8 UU

TABLE 3
Excavation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
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11720 Unoco Road
Edmonds, Washington

Notes:
BTEX analyzed by EPA Method 8021B.
cPAHs analyzed by EPA Method 8270 SIM.
Gasoline analyzed by method NWTPH-G.
Diesel and Heavy Oil (Lube) analyzed by method NWTPH-D Extended.
Total TPH calculated by summing the concentrations of gasoline, diesel and heavy oil. If one or more TPH constituents were reported as Non-Detect, half of the reporting limit value was added to the total.
cPAHs adjusted for toxicity according to WAC 173-340-708(8) and *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors.* Office of Environmental Health Hazard Assessment, California EPA, May 2005. If one or more adjusted cPAH constituents were reported as Non-Detect, half of the reporting limt was used in calculations.
Highlighted cells indicate concentration exceeds REL or CUL.
NA = Indicates analysis not conducted.
[ ] = Bracketed data indicate duplicate sample.

BTEX = Benzene, toluene, ethylbenzene, and total xylenes
EPA = Environmental Protection Agency
mg/kg = Milligrams per kilogram
cPAHs = Carcinogenic polynuclear aromatic hydrocarbons
REL = Remediation level
CUL = Cleanup level
TPH = Total petroleum hydrocarbons
bgs = below ground surface

Lab Qualifiers	Definition
J	Indicates an estimated value.
JY	Results in the diesel organics range are primarily due to overlap from a heavy oil range product.
JZ	Detected hydrocarbons in the gasoline range appear to be due to overlap of diesel range hydrocarbons.
Q4	The hydrocarbons present are a complex mixture of diesel range and heavy oil range organics.
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UJ	The compound was analyzed for but not detected. The associated value is the estimated compound quantitation limit.
UU	The constituents making up the total are all non-detects.

TABLE 6
Monitoring Well Installation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
Phase II Remedial Implementation As-built Report
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX *(mg/kg)*				Total cPAHs Adjusted for Toxicity *(mg/kg)*	Diesel Range Organics *(mg/kg)*	Gasoline Range Organics *(mg/kg)*	Heavy Oil (Lube) *(mg/kg)*	Total TPH (mg/kg)
			B	T	E	X					
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			**18**	**--**	**--**	**--**	**0.14**	**--**	**--**	**--**	**2,975**
MW-129R-4.5	4.5	10/14/08	0.0303 U	0.0506 U	0.0506 U	0.101 U	0.0439	823	24.4 JZ	178	1,030 J
MW-129R-7.0	7	10/14/08	0.0446 U	0.0743 U	0.0743 U	0.149 U	0.0479 UU	2,690	7.43 U	313	3,010
MW-502-6.0	6	10/14/08	0.0337 U	0.0562 U	0.0562 U	0.112 U	NA	11.6 U	5.62 U	29.0 U	23.1 UU
MW-511-8.5	8.5	10/14/08	0.0378 U [0.0361 U]	0.0630 U [0.0601 U]	0.0630 U [0.0601 U]	0.126 U [0.120 U]	NA [NA]	11.7 U [11.5 U]	6.30 U [6.01 U]	29.2 U [28.8 U]	23.6 UU [23.2 UU]
MW-510-6.5	6.5	10/08/08	0.0462 U	0.0770 U	0.0770 U	0.154 U	0.0200 UU	80.5	7.70 U	33.0 U	101
MW-510-12.5	12.5	10/08/08	0.0345 U	0.0574 U	0.0574 U	0.115 U	NA	11.9 U	5.74 U	29.6 U	23.6 UU

Notes:
BTEX analyzed by EPA Method 8021B.
cPAHs analyzed by EPA Method 8270 SIM.
Gasoline analyzed by method NWTPH-G.
Diesel and Heavy Oil (Lube) analyzed by method NWTPH-D Extended.
Total TPH calculated by summing the concentrations of gasoline, diesel and heavy oil. If one or more TPH constituents were reported as Non-Detect, half of the reporting limit value was added to the total.
cPAHs adjusted for toxicity according to WAC 173-340-708(8) and *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors* .
Office of Environmental Health Hazard Assessment, California EPA, May 2005. If one or more adjusted cPAH constituents were reported as Non-Detect, half of the reporting limt was used in calculations.
Highlighted cells indicate concentration exceeds REL or CUL.
NA = Indicates analysis not conducted.
[ ] = Bracketed data indicate duplicate sample.

BTEX = Benzene, toluene, ethylbenzene, and total xylenes
EPA = Environmental Protection Agency
mg/kg = Milligrams per kilogram
cPAHs = Carcinogenic polynuclear aromatic hydrocarbons
REL = Remediation level
CUL = Cleanup level
TPH = Total petroleum hydrocarbons

Lab Qualifiers	**Definition**
J	Indicates an estimated value.
JZ	Detected hydrocarbons in the gasoline range appear to be due to overlap of diesel range hydrocarbons.
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UU	The constituents making up the total are all non-detects.

2008 Additional Site Investigation and Groundwater Monitoring Report

Table 1

Additional Site Investigation
Soil Analytical Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX[1] (EPA Method 8021B) *(mg/kg)*				Total Adjusted cPAHs[2] (EPA Method 8270 SIM) *(mg/kg)*	NWTPH-G *(mg/kg)*	NWTPH-D Extended *(mg/kg)*		Total TPH[3] *(mg/kg)*
			B	T	E	X		Gasoline	Diesel	Heavy Oil (Lube)	
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			18	--	--	--	0.14	--	--	--	2,975
SB-65-6.5	6.5	06/26/08	35.8 J	47.2 J	3.79 J	4.35 J	1.01	3,820	9,450 J	3,660 J	16,900 J
SB-65-8.0	8	06/26/08	14.5	78.0	2.96 U	48.9	0.0928	2,290	1,910	186	4,390
SB-65-16.0	16	06/26/08	0.0588	0.241	0.0575 U	0.782	0.00883 UU	13.1	176	35.6	225
SB-65-20	20	06/26/08	0.259	1.13	0.0432 U	3.79	0.0161	59.2	136	28.6 U	210
SB-65-23	23	06/26/08	0.275	1.43	0.0677	4.66	0.0158	61.3	85.1	28.8 U	161
SB-66-6.0	6	06/26/08	0.0746	0.281	0.0598 U	2.92	0.209	467 JZ	9,790 J	1,640 J	11,900 J
SB-66-11.5	11.5	06/30/08	0.0381 U	0.0635 U	0.0635 U	0.127 U	0.00914 UU	6.35 U	15.0	30.4 U	33.4
SB-66-15	15	06/30/08	0.0331 U	0.0552 U	0.0552 U	0.110 U	NA	5.52 U	11.6 U	29.1 U	23.1 UU
SB-67-5.5	5.5	06/24/08	0.0398 U	0.0663 U	0.0663 U	0.133 U	NA	6.63 U	11.9 U	29.7 U	24.1 UU
SB-68-4.0	4	06/24/08	0.334 U	29.7	0.653	88.7	0.165	4,090	1,240	141	5,470
SB-68-5.5	5.5	06/24/08	0.350 U	32.9 J	0.583 U	166	0.101	3,960	633	143 U	4,660
SB-68-13.5	13.5	06/25/08	0.0367 U	0.403	0.0612 U	2.65	0.00898 UU	73.7	11.9	29.7 U	100
SB-68-15.0	15	06/25/08	0.0364 U	0.0606 U	0.0606 U	0.121 U	NA	6.06 U	12.0 U	30.1 U	24.1 UU
SB-69-6.0	6	06/26/08	0.149 J	4.34 J	1.07 J	48.3	0.236 UU	1,770	1,870	157 U	3,720
SB-69-12.0	12	06/26/08	0.0385 U	0.0642 U	0.0642 U	0.128 U	NA	6.42 U	11.9 U	29.7 U	24.0 UU
SB-69-15.0	15	06/26/08	0.0393 U [0.0384 U]	0.0654 U [0.0639 U]	0.0654 U [0.0639 U]	0.131 U [0.128 U]	NA	6.54 U [6.39 U]	11.9 U [14.4]	29.7 U [30.1 U]	24.1 UU [32.6]
SB-70-6.0	6	06/24/08	0.0371 U	0.0618 U	0.0618 U	0.124 U	NA	6.18 U	10.9 U	27.2 U	22.1 UU
SB-70-7.0	7	06/25/08	0.0369 U	0.0616 U	0.0616 U	0.123 U	NA	6.16 U	11.5 U	28.8 U	23.2 UU
SB-70-12.5	12.5	06/25/08	0.0366 U	0.0611 U	0.0611 U	0.122 U	NA	6.11 U	11.6 U	29.1 U	23.4 UU
SB-70-20.5	20.5	06/25/08	0.0340 U	0.0567 U	0.0567 U	0.113 U	NA	5.67 U	11.8 U	29.4 U	23.4 UU
SB-71-8.0	8	06/25/08	0.0368 U	0.0614 U	0.0614 U	0.123 U	NA	6.14 U	11.7 U	29.3 U	23.6 UU
SB-71-15.5	15.5	06/25/08	0.0363 U	0.0605 U	0.0605 U	0.121 U	0.00876 UU	6.05 U	11.6 U	42.1	50.9
SB-71-24.0	24	06/25/08	0.0366 U	0.0610 U	0.0610 U	0.122 U	NA	6.10 U	11.8 U	29.4 U	23.7 UU
SB-72-6.5	6.5	06/25/08	0.0371 U	0.0619 U	0.0619 U	0.124 U	NA	6.19 U	11.7 U	29.3 U	23.6 UU
SB-72-15.5	15.5	06/25/08	0.0348 U	0.0581 U	0.0581 U	0.116 U	NA	5.81 U	12.1 U	30.1 U	24.0 UU
SB-72-24.5	24.5	06/25/08	0.0400 U [0.0421 U]	0.0667 U [0.0701 U]	0.0667 U [0.0701 U]	0.133 U [0.140 U]	NA	6.67 U [7.01 U]	12.5 U [12.6 U]	31.2 U [31.5 U]	25.2 UU [25.6 UU]
SB-73-6.0	6	06/26/08	0.0445 U	0.0741 U	0.0741 U	0.148 U	NA	7.41 U	13.0 U	32.6 U	26.5 UU
SB-73-15.0	15	06/26/08	0.0369 U	0.0615 U	0.0615 U	0.123 U	NA	6.15 U	12.0 U	30.1 U	24.1 UU
SB-74-6.0	6	06/26/08	0.0375 U	0.0625 U	0.0625 U	0.125 U	NA	6.25 U	12.2 U	30.4 U	24.4 UU
SB-74-15	15	06/26/08	0.0380 U	0.0634 U	0.0634 U	0.127 U	NA	6.34 U	12.2 U	30.4 U	24.5 UU
SB-75-6.0	6	06/26/08	0.0406 U	0.0677 U	0.0677 U	0.135 U	NA	6.77 U	12.2 U	30.5 U	24.7 UU
SB-75-15.0	15	06/26/08	0.0398 U	0.0663 U	0.0663 U	0.133 U	NA	6.63 U	12.3 U	30.8 U	24.9 UU

Table 1

Additional Site Investigation
Soil Analytical Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX[1] (EPA Method 8021B) *(mg/kg)*				Total Adjusted cPAHs[2] (EPA Method 8270 SIM) *(mg/kg)*	NWTPH-G *(mg/kg)*	NWTPH-D Extended *(mg/kg)*		Total TPH[3] *(mg/kg)*
			B	T	E	X		Gasoline	Diesel	Heavy Oil (Lube)	
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			18	--	--	--	0.14	--	--	--	2,975
SB-76-4.5	4.5	06/30/08	0.0389 U	0.0648 U	0.316	0.130 U	NA	9.14	11.4 U	28.5 U	29.1
SB-76-9	9	06/30/08	0.0436 U	0.0727 U	0.0727 U	0.145 U	0.198	7.66 JZ	14,500 J	2,550 J	17,100 J
SB-76-10.5	10.5	06/30/08	0.0501 U	0.0835 U	0.0835 U	0.167 U	0.190	40.1 JZ	2,090 J	409 J	2,540 J
SB-76-14	14	06/30/08	0.0288 U [0.0355 U]	0.0480 U [0.0591 U]	0.0480 U [0.0591 U]	0.0959 U [0.118 U]	NA	4.80 U [5.91 U]	12.0 U [11.9 U]	30.0 U [29.8 U]	23.4 UU [23.8 UU]
SB-77-6	6	06/30/08	0.0392 U	0.0653 U	0.0653 U	0.131 U	NA	6.53 U	12.0 U	29.9 U	24.2 UU
SB-77-9.5	9.5	06/30/08	0.0439 U	0.0731 U	0.0731 U	0.146 U	0.214	7.31 U	7,120 J	757 J	7,880 J
SB-77-14	14	06/30/08	0.0336 U	0.0561 U	0.0561 U	0.112 U	NA	5.61 U	11.8 U	29.5 U	23.5 UU
SB-78-5.5	5.5	06/30/08	6.57 J	9.74 J	42.4 J	49.6 J	0.0183	693	257	356	1,310
SB-78-8.5	8.5	06/30/08	0.0351 U	0.0585 U	0.0585 U	0.117 U	NA	5.85 U	11.4 U	28.4 U	22.8 UU
SB-78-10	10	06/30/08	0.0325 U	0.0542 U	0.0542 U	0.108 U	NA	15.1 JZ	11.4 U	28.6 U	35.1 J
SB-78-12.5	12.5	06/30/08	0.0353 U	0.0589 U	0.0589 U	0.118 U	NA	5.89 U	12.2 U	30.6 U	24.3 UU
SB-79-5	5	06/30/08	0.0344 U	0.0573 U	0.0573 U	0.115 U	NA	5.73 U	11.0 U	27.5 U	22.1 UU
SB-79-8.5	8.5	06/30/08	0.0348 U	0.0581 U	0.0581 U	0.116 U	0.276	32.5 JZ	2,960 J	964 J	3,960 J
SB-79-10	10	06/30/08	0.0468 U	0.0779 U	0.0779 U	0.156 U	0.0198	19.7 JZ	137	37.0	194 J
SB-79-11.5	11.5	06/30/08	0.0550 U	0.0916 U	0.0916 U	0.183 U	NA	9.16 U	13.1 U	32.7 U	27.5 UU
SB-80-7.5	7.5	06/26/08	0.0392 U	0.0654 U	0.0654 U	0.131 U	0.693	24.5 JZ	1,870	2,770	4,660 J
SB-80-11.0	11	06/26/08	0.0518 U	0.0864 U	0.0864 U	0.173 U	NA	8.64 U	13.6 U	34.0 U	28.1 UU
SB-81-5	5	06/30/08	0.0301 U	0.0501 U	0.0501 U	0.100 U	0.0896	21.1 JZ	34.4	49.4	105 J
SB-81-9.5	9.5	06/30/08	0.0414 U	0.0691 U	0.0691 U	0.138 U	NA	6.91 U	12.6 U	31.4 U	25.5 UU
SB-81-15.5	15.5	06/30/08	0.0333 U	0.0556 U	0.0556 U	0.111 U	NA	5.56 U	11.6 U	29.0 U	23.1 UU
SB-82-7	7	07/01/08	0.0349 U	0.0581 U	0.0581 U	0.116 U	NA	5.81 U	11.9 U	29.7 U	23.7 UU
SB-82-9	9	07/01/08	0.0455 U	0.0758 U	0.0758 U	0.152 U	NA	7.58 U	13.6 U	33.9 U	27.5 UU
SB-83-7	7	07/01/08	0.0333 U	0.0555 U	0.0555 U	0.111 U	0.00891	5.55 U	16.8	29.6 U	34.4
SB-83-8.5	8.5	07/01/08	0.0502 U	0.0837 U	0.0837 U	0.167 U	0.0108	8.37 U	18.7	35.6 U	40.7
SB-84-6	6	07/01/08	0.0610 U	0.102 U	0.102 U	0.203 U	0.0119	10.2 U	20.7	43.3	69.1
SB-84-8	8	07/01/08	0.0745 U	0.124 U	0.124 U	0.248 U	NA	12.4 U	17.6 U	44.0 U	37.0 UU
SB-85-5.5	5.5	07/02/08	0.0357 U	0.0596 U	0.0596 U	0.119 U	0.0225	5.96 U	75.4	28.2 U	92.5
SB-85-7.5	7.5	07/02/08	0.114 U	0.218 J	0.189 U	1.09 J	NA	177 J	21.2 U	52.9 U	214 J
SB-86-4.5	4.5	07/02/08	0.0324 U	0.0540 U	0.0540 U	0.108 U	0.0182	5.40 U	31.1 JY	77.9	112 J
SB-86-6.5	6.5	07/02/08	0.0513 U	0.0856 U	0.0856 U	0.171 U	NA	8.56 U	14.2 U	35.4 U	29.1 UU
SB-87-6.0	6	07/25/08	0.0600	0.0825	0.0464 U	0.153	0.0535	74.2 JZ	79.8	88.6	243 J
SB-87-14.0	14	07/25/08	0.0477	0.0686 U	0.0686 U	0.137 U	NA	6.86 U	12.2 U	30.4 U	24.7 UU
SB-88-8.0	8	07/25/08	0.0145 U	0.0242 U	0.0242 U	0.0484 U	0.0167	2.59	35.9	98.5	137

Table 1

Additional Site Investigation
Soil Analytical Data
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX[1] (EPA Method 8021B) *(mg/kg)*				Total Adjusted cPAHs[2] (EPA Method 8270 SIM) *(mg/kg)*	NWTPH-G *(mg/kg)*	NWTPH-D Extended *(mg/kg)*		Total TPH[3] *(mg/kg)*
			B	T	E	X		Gasoline	Diesel	Heavy Oil (Lube)	
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			**18**	**--**	**--**	**--**	**0.14**	**--**	**--**	**--**	**2,975**

Notes
Shaded data indicates concentrations greater than the applicable site Remedial Action Levels.
(mg/kg)= milligram per kilogram (parts per million)
bgs= below ground surface
[1] B= Benzene, T= Toluene, E= Ethylebenzene, X= Total Xylenes
[2] Carcinogenic Polynuclear Aromatic Hydrocarbons (cPAHs). cPAHs adjusted for toxicity according to WAC 173-340-708(8) and Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors. Office of Environmental Health Hazard Assessment, California EPA. May 2005. If one or more adjusted cPAH constituents were reported as Non-Detect, half of the reporting limt was used in calculations.
[3]Total TPH calculated by summing the concentrations of gasoline, diesel and heavy oil. If any TPH constituents were reported as Non-Detect, half of the reporting limit value was used.
NA = Indicates analysis not conducted.
[ ] = Bracketed data indicate duplicate sample.

Lab Qualifiers Definition

J	Indicates an estimated value.
JY	Results in the diesel organics range are primarily due to overlap from a heavy oil range
JZ	Detected hydrocarbons in the gasoline range appear to be due to overlap of diesel range hydrocarbons
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit
UU	The constituents making up the total are all non-detects.

2011 Final Site Investigation
Completion Report

TABLE 1
Tidal Study Results Summary
Former Unocal Terminal
11720 Unoco Road
Edmonds, Washington

Well ID	GWE (feet)		Depth (feet)		Salinity (PSU)			Amplitude (feet)	
	Max	Min	Max	Min	Max	Min	Avg	Max	Min
LM-2	6.68	6.50	5.34	5.16	12.32	8.94	11.07	--	--
MW-8R	6.42	5.77	4.60	3.95	0.22	0.18	0.19	0.31	0.02
MW-104	5.42	4.53	8.34	7.45	0.14	0.11	0.12	0.53	0.03
MW-122	-1.06	-1.39	8.40	8.07	0.39	0.38	0.38	0.33	0.02
MW-129R	7.28	6.76	6.99	6.47	0.69	0.63	0.67	0.37	0.03
MW-149R	6.10	4.59	5.92	4.41	0.34	0.23	0.29	1.15	0.07
MW-500	13.35	12.63	8.46	7.74	0.44	0.30	0.37	--	--
MW-501	12.98	12.60	9.74	9.36	0.17	0.15	0.17	--	--
MW-502	8.92	8.66	8.02	7.76	0.17	0.14	0.17	--	--
MW-515	7.47	7.21	7.57	7.31	0.21	0.18	0.19	--	--
MW-518	6.98	6.19	4.88	4.09	0.32	0.27	0.30	0.56	0.02
Staff Gauge ID	**GWE (feet)**		**Depth (feet)**		**Salinity (PSU)**			**Amplitude (feet)**	
	Max	**Min**	**Max**	**Min**	**Max**	**Min**	**Avg**	**Max**	**Min**
D-1	8.20	5.95	2.53	0.28	27.76	0.22	10.72	1.96	0.02
D-2	8.13	5.63	2.11	-0.39	27.56	0.10	10.68	1.84	0.04
D-3	8.11	5.59	2.37	-0.15	27.96	0.00	9.73	2.12	0.02
D-5	8.76	4.81	2.65	-1.30	27.76	0.00	11.55	3.73	0.19
D-6	6.84	5.54	2.43	2.43	1.80	1.47	1.68	--	--
TB	5.56	3.06	3.36	0.86	30.08	0.31	12.91	2.22	0.04

Notes:
GWE = Groundwater Elevations in feet above mean sea level
PSU = Practical Salinity Units

TABLE 2
Well Construction Details Summary
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Well ID	Date Installed	Top of Casing (feet amsl) [a]	Well Diameter (inches)	Well Material	Pipe Schedule	Slotted Screen Size (inches)	Borehole Diameter (inches)	Top of Screen (feet bgs)	Bottom of Screen (feet bgs)	Well Depth (feet bgs)	Borehole Depth (feet bgs)	Top of Filter Pack (feet bgs)	Bottom of Filter Pack (feet bgs)	Depth to Bottom - 2008 (feet btoc) [b]
LM-2	4/18/1989	8.14	2	PVC	40	0.02	--	2.5	8	8	9.1	2	9	7.8
MW-8R	10/9/2008	13.82	2	PVC	40	0.01	8	3	13	13	13	2	13	13
MW-104	12/22/1992	14.08	2	PVC	40	0.02	10	5	15	15	16.5	7	15	18.2
MW-122	9/27/1995	15.54	2	PVC	40	0.01	--	30	40	40	41.5	27.66	41.5	42.65
MW-129R	10/14/2008	12.92	2	PVC	40	0.01	8	3	13	13	13.5	2	13.5	12.9
MW-149R	10/8/2008	12.18	2	PVC	40	0.01	8	3	13	13	13.5	2	13	13
MW-500	10/14/2008	16.64	2	PVC	40	0.01	8	3	13	13	13	2	13	12.75
MW-501	10/14/2008	15.24	2	PVC	40	0.01	8	3	13	13	13	2	13	13
MW-502	10/14/2008	13.00	2	PVC	40	0.01	8	3	13	13	13	2	13	13.1
MW-515	10/10/2008	11.60	2	PVC	40	0.01	8	3	13	13	13	2	13	12.7
MW-518	10/8/2008	14.60	2	PVC	40	0.01	8	3.5	13.5	13.5	13.5	2	13.5	13.5
MW-521	10/9/2008	12.18	2	PVC	40	0.01	8	3	13	13	13	2	13	12.7
MW-522	10/9/2008	13.82	2	PVC	40	0.01	8	3	13	13	13	2	13	12.7
MW-523	10/8/2008	13.53	2	PVC	40	0.01	8	3	13	13	13	2	13	12.7

Notes:
(a) Vertical Datum: N.A.V.D. 88
(b) Depth to bottom was gauged on October 20, 2008, following well development activities.
amsl = above mean sea level
-- = Data not available
bgs = below ground surface
btoc = below top of casing

TABLE 3
Hydraulic Conductivity Step Test Data Summary
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Well ID	Date	Pump Used	Initial DTW (feet)	Flow Rate (GPM)	Maximum Drawdown (feet)	Notes
MW-104	5/11/2011	2" Submersible Pump	7.90	0.50	0.45	Test terminated due to pump failure.
				1.0	1.37	
				1.5	2.80	
MW-129R	5/12/2011	2" Submersible Pump	5.35	0.50	5.84	Well pumped dry at 0.5 GPM.
				0.25	5.65	
MW-149R	5/11/2011	2" Submersible Pump	6.63	0.50	1.07	
				1.0	1.98	
				1.5	2.96	
MW-500	5/10/2011	Peristaltic Pump	3.81	0.10	1.30	Test terminated after 109 minutes. Stabilized drawdown not achieved.
				0.19	5.55	
	5/12/2011	2" Submersible Pump	3.80	0.25	3.30	Test terminated due to well pumping dry at 0.5 GPM flow rate.
				0.50	7.61	
MW-518	5/11/2011	2" Submersible Pump	8.01	0.25	0.36	Test terminated after 60 minutes.
				1.0	1.39	
				1.5	1.90	
MW-8R	5/12/2011	2" Submersible Pump	8.03	0.25	0.11	Test terminated due to pump tubing failure.
				0.50	0.12	
				1.5	1.26	
	5/18/2011	2" Submersible Pump	7.50	2.0	0.17	
				4.0	0.46	
				5.0	0.59	
LM-2	5/11/2011	2" Submersible Pump	1.48	0.25	4.59	Well pumped dry.
	5/13/2011	Peristaltic Pump	1.47	0.10	1.80	
				0.15	2.18	
				0.18	3.43	

Notes:
DTW: Depth to water
btoc: below top of casing
GPM: Gallons per minute

TABLE 4
Short Duration Hydraulic Conductivity Test Data Summary
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Well ID	Date	Pump Used	Initial DTW (feet)	Flow Rate (GPM)	Maximum Drawdown (feet)	Notes
MW-104	5/16/2011	2" Submersible Pump	7.73	3.0	5.18	Test terminated after 88 minutes.
MW-129R	5/17/2011	2" Submersible Pump	5.10	0.30	4.39	Test terminated after 60 minutes.
MW-149R	5/16/2011	2" Submersible Pump	6.45	2.0	4.24	Test terminated after 60 minutes.
MW-500	5/13/2011	2" Submersible Pump	3.79	0.30	7.32	Well pumped dry.
	5/13/2011	2" Submersible Pump	3.79	0.25	7.75	Well pumped dry.
LM-2	5/17/2011	2" Submersible Pump	1.20	0.30	5.40	Well pumped dry.
	5/17/2011	2" Submersible Pump	1.20	0.20	5.44	Well pumped dry.
MW-518	5/17/2011	2" Submersible Pump	8.71	2.5	3.28	Test terminated after 90 minutes.
MW-8R	5/16/2011	2" Submersible Pump	7.70	5	0.62	Test terminated after 60 minutes.

Notes:
DTW: Depth to water
btoc: below top of casing
GPM: Gallons per minute

TABLE 5
Long Term Hydraulic Conductivity Test Data Summary
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Well ID	Date	Pump Used	Initial DTW (feet)	Flow Rate (GPM)	Maximum Drawdown (feet)	Notes
MW-8R	5/19/11 - 5/20/11	2" Submersible Pump	7.65	5.0	0.88	Test conducted for 24hrs, with no stoppages. Flow rate was confirmed every hour.
MW-521	5/19/11 - 5/20/11	NA	6.01	NA	no measurable drawdown	observation well
MW-522	5/19/11 - 5/20/11	NA	7.69	NA	no measurable drawdown	observation well
MW-523	5/19/11 - 5/20/11	NA	7.38	NA	no measurable drawdown	observation well

Notes:
DTW: Depth to water
btoc: below top of casing
GPM: Gallons per minute
NA: Not Applicable

TABLE 7
Detention Basin No.2 Investigation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Diesel Range Organics (mg/kg)	Gasoline Range Organics (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B	T	E	X					
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			18	--	--	--	0.14	--	--	--	2975
B1-4.5-5	4.5-5	08/22/11	0.0022 U	NA	NA	NA	0.00052	3.1 U X	1.1 U	14 X	16
B1-9.5-10	9.5-10	08/22/11	0.23 W	NA	NA	NA	0.0082	5.3	25 W	42	72
B1-14-14.5	14-14.5	08/22/11	0.17	NA	NA	NA	N/A	4.8 U	2.1 U	16 U	11 UU
B2-4-4.5	4-4.5	08/22/11	0.018 UW	NA	NA	NA	0.051	620	9.2 U W	720	1,345
B2-7-7.5	7-7.5	08/22/11	0.0020 U	NA	NA	NA	0.00073	30	1 U	37	68
B2-9.5-10	9.5-10	08/22/11	0.0019 U	NA	NA	NA	0.002	100	16	100	216
B2-12-12.5	12-12.5	08/22/11	0.0020 U	NA	NA	NA	0.00088	130	2	530	662
B2-14.5-15	14.5-15	08/22/11	0.0024 U	NA	NA	NA	N/A	3.4 U	1.2 U	11 U	8 UU
B3-4.5-5	4.5-5	08/22/11	0.0022 U	NA	NA	NA	N/A	3.2 U	1.1 U	11 U	8 UU
B3-7-7.5	7-7.5	08/22/11	0.0021 U	NA	NA	NA	0.00076	110 X	1.1 U	70 X	181
B3-12-12.5	12-12.5	08/22/11	0.0020 U	NA	NA	NA	0.00077	43 X	6.8	46 X	96
B3-14-14.5	14-14.5	08/22/11	0.0040	NA	NA	NA	N/A	3.3 U	1.3	11 U	8
B4-4.5-5	4.5-5	08/22/11	0.0020 U	NA	NA	NA	0.00053 UU	160	1 U	53 U	187
B4-9.5-10	9.5-10	08/22/11	0.024 W	NA	NA	NA	0.0075	2,900	13 W	1,500	**4,413**
B4-13-13.5	13-13.5	08/22/11	0.010	NA	NA	NA	0.0006	4.2	1.8	12 U	12
B4-14.5-15	14.5-15	08/22/11	0.021 U W	NA	NA	NA	N/A	3.6 U	11 U W	12 U	13 UU
B5-4.5-5	4.5-5	08/22/11	0.0022 U	NA	NA	NA	N/A	3.5 U	1.1 U	12 U	8 UU
B5-9-9.5	9-9.5	08/22/11	0.083 U W	NA	NA	NA	0.0138	16,000	42 U W	11,000	**27,021**
B5-11.5-12	11.5-12	08/22/11	0.0023 U	NA	NA	NA	N/A	3.8 U	1.2 U	13 U	9 UU
B5-13.5-14	13.5-14	08/22/11	0.0024 U	NA	NA	NA	N/A	3.7 U	1.2 U	12 U	8 UU
B6-4.5-5	4.5-5	08/22/11	0.021 U W	NA	NA	NA	0.09	470	190 W	310	970
B6-7-7.5	7-7.5	08/22/11	0.55 U	NA	NA	NA	**0.36**	16,000 Y	720	4,900 Y	**21,620**
B6-9-9.5	9-9.5	08/22/11	0.97	NA	NA	NA	**3.2 T**	170,000 Y	2,400	48,000 Y	**220,400**
B6-11-11.5	11-11.5	08/22/11	0.023 U W	NA	NA	NA	0.012	230 Z	30 W	57 Z	317
B6-13-13.5	13-13.5	08/22/11	0.0028 U	NA	NA	NA	N/A	3.5 U	1.4 U	12 U	8 UU

TABLE 7
Detention Basin No.2 Investigation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Diesel Range Organics (mg/kg)	Gasoline Range Organics (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B	T	E	X					
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			18	--	--	--	0.14	--	--	--	2975
B7-4.5-5	4.5-5	08/22/11	0.083 U W	NA	NA	NA	0.071	260	230 W	210	700
B7-8-8.5	8-8.5	08/22/11	1.5 U W	NA	NA	NA	**2.8 T**	72,000	1,400 W	38,000	**111,400**
B7-9.5-10	9.5-10	08/22/11	0.030 U W	NA	NA	NA	0.037 T	4,200	47 W	1700	**5947**
B7-14-14.5	14-14.5	08/22/11	0.0021 U	NA	NA	NA	N/A	3.6 U	1 U	12 U	8 UU
B8-4.5-5	4.5-5	08/23/11	0.24 U T	NA	NA	NA	0.114	11,000	1,000	4,500	**16,500**
B8-7.5-8	7.5-8	08/23/11	0.0029	NA	NA	NA	0.077	6,800	260	2,300	**9,360**
B8-9.5-10	9.5-10	08/23/11	3.2	NA	NA	NA	**0.5 T**	50,000	730	25,000	**75,730**
B8-11-11.5	11-11.5	08/23/11	0.51 W	NA	NA	NA	0.09	4,900	300 W	3,000	**8,200**
B8-13.5-14	13.5-14	08/23/11	0.0073	NA	NA	NA	**0.1**	40	1.2 U	14	55
B8-14.5-15	14.5-15	08/23/11	0.0056	NA	NA	NA	N/A	3.5 U	1.2 U	12 U	8 UU
B9-4.5-5	4.5-5	08/23/11	0.0022 U	NA	NA	NA	N/A	3.2 U	1.1 U	27	29
B9-8.5-9	8.5-9	08/23/11	0.023 U W	NA	NA	NA	**0.29**	14,000	270 W	6,700	**20,970**
B9-9.5-10	9.5-10	08/23/11	0.0025 U	NA	NA	NA	0.0024	23	1.2 U	12 U	30
B9-10.5-11	10.5-11	08/23/11	0.0030 U	NA	NA	NA	0.025	640	1.5 U	280	921
B9-11-11.5	11-11.5	08/23/11	1.1 W	NA	NA	NA	**0.15 T**	11,000	950 W	4,300	**16,250**
B9-12.5-13	12.5-13	08/23/11	0.0026 U V	NA	NA	NA	0.00065	8.3	1.3 U	13 U	15
B10-0.5-1	0.5-1	08/25/11	0.030 U W	NA	NA	NA	**0.2**	360	15 U W	390	758
B10-1.5-2	1.5-2	08/25/11	0.046 U W	NA	NA	NA	0.018	12	23 U W	62	86
B10-2.5-3	2.5-3	08/25/11	0.030 U W	NA	NA	NA	0.00068 UU	4.1 U	15 U W	27	37
B10-3.5-4	3.5-4	08/25/11	0.0037 U V	NA	NA	NA	0.00072	15	1.8 U V	41	57
B11-4.5-5	4.5-5	08/23/11	0.0027 U	NA	NA	NA	**0.24**	360	1.3 U U	650	1,011
B11-7.5-8	7.5-8	08/23/11	0.25 U W	NA	NA	NA	0.012	24,000 S	240 W	11,000	**35,240**
B11-8.5-9	8.5-9	08/23/11	0.15 U W	NA	NA	NA	0.012	7.5	75 U W	15 U	53
B11-9.5-10	9.5-10	08/23/11	0.0034	NA	NA	NA	**1.6 T**	5.3	1.3 U	12 U	12
B11-10-10.5	10-10.5	08/23/11	0.1 U W	NA	NA	NA	**3.4**	25,000	150 W	12,000	**37,150**
B11-11-11.5	11-11.5	08/23/11	0.0042 U V	NA	NA	NA	0.01	310	2.1 U	150	461
B11-13.5-14	13.5-14	08/23/11	0.002 U	NA	NA	NA	N/A	3.5 U	1 U	12 U	8 UU

TABLE 7
Detention Basin No.2 Investigation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Diesel Range Organics (mg/kg)	Gasoline Range Organics (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B	T	E	X					
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			18	--	--	--	0.14	--	--	--	2975
B12-0.5-1	0.5-1	08/24/11	0.033 U W	NA	NA	NA	0.0117	140	17 U W	150	299
B12-1-1.5	1-1.5	08/24/11	0.038 U W	NA	NA	NA	0.00072 UU	120	34 W	100	254
B12-2.5-3	2.5-3	08/24/11	0.051 U W	NA	NA	NA	0.079	160	25 U W	75	248
B12-3.5-4	3.5-4	08/24/11	0.0028 U	NA	NA	NA	0.00063	4.1	1.4 U	28	33
B13-4.5-5	4.5-5	08/23/11	0.025 U W	NA	NA	NA	0.0046	11	12 U W	64	81
B13-6-6.5	6-6.5	08/23/11	0.031 U W	NA	NA	NA	0.036	110	15 U W	250	368
B13-7-7.5	7-7.5	08/23/11	0.16 U W	NA	NA	NA	0.054 R	12,000	200 W	7,400 U	**15,900**
B13-9-9.5	9-9.5	08/23/11	0.018	NA	NA	NA	N/A	3.7 U	1.3 U	12 U	9 UU
B13-10-10.5	10-10.5	08/23/11	0.071 U W	NA	NA	NA	0.026	1,300	110 W	740	2,150
B13-11.5-12	11.5-12	08/23/11	0.0056	NA	NA	NA	N/A	4 U	1.4 U	13 U	9 UU
B14-0.5-1	0.5-1	08/25/11	0.11 U W	NA	NA	NA	0.029	16	57 U W	110	155
B14-1.5-2	1.5-2	08/25/11	0.023 U W	NA	NA	NA	N/A	NA	11 U W	NA	6 UU
B14-2.5-3	2.5-3	08/25/11	0.051 U W	NA	NA	NA	N/A	5 U	25 U W	17 U	24 UU
B14-3.5-4	3.5-4	08/25/11	0.058 U W	NA	NA	NA	0.0009	7.4	29 U W	76	98
B15-4.5-5	4.5-5	08/23/11	0.0025 U	NA	NA	NA	0.0005	4.5	1.3 U	17	22
B15-6.5-7	6.5-7	08/23/11	0.0026 U V	NA	NA	NA	N/A	3.6 U	1.3 U	18	20
B15-8.5-9	8.5-9	08/23/11	0.0048 U V	NA	NA	NA	0.0008	7.8	2.4 U	54	63
B15-11-11.5	11-11.5	08/23/11	0.029 U W	NA	NA	NA	N/A	4 U	15 U W	13 U	16 UU
B16-3.5-4	3.5-4	08/24/11	0.023 U W	NA	NA	NA	0.018	100	11 U W	280	386
B16-4-4.5	4-4.5	08/24/11	0.27 U W	NA	NA	NA	**0.1**	280	140 U W	940	1,290
B16-4.5-5	4.5-5	08/24/11	0.0024 U	NA	NA	NA	0.00123	4	1.2 U	12 U	11
B16-6-6.5	6-6.5	08/24/11	0.0031 U	NA	NA	NA	N/A	3.9 U	1.5 U	13 U	9 UU
B17-3.5-4	3.5-4	08/24/11	0.025 U W	NA	NA	NA	0.00109	550	12 U W	1,200	1,756
B17-4-4.5	4-4.5	08/24/11	0.0066	NA	NA	NA	0.0008 UU	14,000	2.3 U	8,200	**22,201**
B17-4.5-5	4.5-5	08/24/11	0.34 U W	NA	NA	NA	**116 R**	55	170	43	268
B17-5.5-6	5.5-6	08/24/11	0.033 U W	NA	NA	NA	N/A	4.3 U	17 U W	14 U	18 UU

TABLE 7
Detention Basin No.2 Investigation Soil Sample Analytical Results
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Sample ID	Sample Depth (feet bgs)	Date Sampled	BTEX (mg/kg)				Total cPAHs Adjusted for Toxicity (mg/kg)	Diesel Range Organics (mg/kg)	Gasoline Range Organics (mg/kg)	Heavy Oil (Lube) (mg/kg)	Total TPH (mg/kg)
			B	T	E	X					
Site Soil Remediation Level (REL)/Cleanup Level (CUL) (mg/kg)			18	--	--	--	0.14	--	--	--	2975

Notes:
BTEX analyzed by EPA Method 8021B.
cPAHs analyzed by EPA Method 8270 SIM.
Gasoline analyzed by method NWTPH-G.
Diesel and Heavy Oil (Lube) analyzed by method NWTPH-D Extended.
Total TPH calculated by summing the concentrations of gasoline, diesel and heavy oil. If one or more TPH constituents were reported as Non-Detect, half of the reporting limit value was added to the total.

cPAHs adjusted for toxicity according to WAC 173-340-708(8) and *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part II Technical Support Document for Describing Available Cancer Potency Factors* .
Office of Environmental Health Hazard Assessment, California EPA, May 2005. If one or more adjusted cPAH constituents were reported as Non-Detect, half of the reporting limt was used in calculations.
Highlighted cells indicate concentration exceeds REL or CUL.
NA = Indicates analysis not conducted.
[ ] = Bracketed data indicate duplicate sample.

BTEX = Benzene, toluene, ethylbenzene, and total xylenes
EPA = Environmental Protection Agency
mg/kg = Milligrams per kilogram
cPAHs = Carcinogenic polynuclear aromatic hydrocarbons
REL = Remediation level
CUL = Cleanup level
TPH = Total petroleum hydrocarbons

Lab Qualifiers	Definition
J	Indicates an estimated value.
JZ	Detected hydrocarbons in the gasoline range appear to be due to overlap of diesel range hydrocarbons.
R	The GC/MS semivolatile internal standard peak areas were outside of the QC limits for both the initial injection and the re-injection. The values here are from the initial injection of the sample
S	Due to the nature of the sample extrac matrix, the extract could only be concentrated to a final volume of 10ml instead of the usual volume of 5ml. The reporting limits were raised accordingly
T	Reporting limits were raised due to interference from the sample matrix
U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UU	The constituents making up the total are all non-detects.
V	The recovery for the sample surrogate is outside the QC acceptance limits as noted on the QC Summary. A reanalysis was not performed to confirm a matrix effect
W	Reporting limits were raised due to sample foaming
X	The LCS recovery is outside the QC limits. Results from the re-extraction are within the limits. The hold time had expired prior to the re-extraction; therefore, all results are reported from the original extraction. Similar results were obtained in both extracts.
Y	Due to dilution of the sample extract, capric acid recovery could not be determined.
Z	The caprice acid reverse surrogate recovery is 0%

TABLE 8
LNAPL Baildown Test Log
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Site Name	Edmonds Terminal	**Test Well ID**	MW-510
Date and Time In	8/24/11 7:30 AM	**Date and Time Out**	8/24/11 3:00 PM
Personnel	Scott Zorn/Seamas McGuire	**Weather**	Sun
Well Construction Details			
Top of Casing Elevation (ft amsl)	12.53	**Screen Slot Size (in)**	0.01
Total Well Depth (ft)	13	**Filter Pack Type**	#2/12 silica
Depth to Top of Screen (ft)	3	**Depth to Bottom of Screen (ft)**	13
Well Casing Diameter (in)	2	**Borehole Diameter (in)**	8
Initial Test Conditions			
Static Depth to LNAPL (ft)	7.06	**Test Date**	8/24/2011
Static Depth to Water (ft)	7.07	**Start Time**	7:45 AM
LNAPL Thickness (ft)	0.01	**Initial LNAPL Volume in Well (gal)**	0.0016
LNAPL Removal Information			
LNAPL Removal Method/Equipment	Bailer	**Time LNAPL Removal Begins**	7:53 AM
Volume of LNAPL Removed (gal)	0.0016	**Time LNAPL Removal is Completed**	7:53 AM
Volume of Groundwater Removed (gal)	0.0044		

Baildown Test Data

Elapsed Time (min)	Time	Depth to LNAPL (ft)	Depth to Water (ft)	Ground Water Elevation (ft)	Tide Elevation (Ft above Mean Lower Low Water)	Observations
2	7:55 AM	7.1	7.1	5.43	0.4264	LNAPL appears to have a darker color and lower viscocity
3	7:56 AM	7.11	7.11	5.42	0.4264	
5	7:58 AM	7.1	7.1	5.43	0.4592	Much darker in color
7	8:00 AM	7.09	7.09	5.44	0.4592	
9	8:02 AM	7.09	7.09	5.44	0.492	
11	8:04 AM	7.09	7.09	5.44	0.492	
13	8:06 AM	7.1	7.1	5.43	0.5248	
15	8:08 AM	7.1	7.1	5.43	0.5248	
22	8:15 AM	7.1	7.1	5.43	0.5904	
25	8:28 AM	7.1	7.11	5.42	0.7544	
30	8:33 AM	--	7.12	5.41	0.8528	
35	8:38 AM	--	7.12	5.41	0.9184	LNAPL on probe - DTP not measured
45	8:48 AM	7.13	7.13	5.4	1.0824	
55	8:58 AM	7.13	7.13	5.4	1.2464	
65	9:08 AM	7.15	7.15	5.38	1.4432	LNAPL on probe - DTP not measured
75	9:18 AM	--	7.15	5.38	1.6728	
85	9:28 AM	--	7.16	5.37	1.9024	Very small amount of LNAPL on probe
95	9:38 AM	--	7.18	5.35	2.1648	No LNAPL on probe
105	9:48 AM	--	7.16	5.37	2.3944	Very small amount on probe
115	9:58 AM	--	7.17	5.36	2.6568	very small amount of LNAPL
125	10:08 AM	--	7.17	5.36	2.9848	Very small amount of LNAPL
135	10:18 AM	--	7.17	5.36	3.2472	Very small amount of LNAPL
145	10:28 AM	--	7.17	5.36	3.5424	Very small amount of LNAPL
155	10:38 AM	--	7.17	5.36	3.8704	Very small amount of LNAPL
165	10:48 AM	--	7.17	5.36	4.1656	Very small amount of LNAPL
175	10:58 AM	7.17	7.17	5.36	4.4936	LNAPL on probe - sheen
185	11:08 AM	--	7.16	5.37	4.7888	Small LNAPL on probe
300	1:03 PM	--	7.05	5.48	8.0688	very small amount on tip
389	2:22 PM	--	6.86	5.67	9.348	very small amount on tip
423	3:14 PM	--	6.79	5.74	9.7088	very small amount on tip

2012 Final Conceptual Site Model

TABLE 7
Sediment Sample Analytical Results - June 2012
Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

				Sample ID	US-100		DUP-1		US-101		US-102	
				Sample Date	7/30/2012		7/30/2012		7/30/2012		7/30/2012	
Chemical	**Units**	**SQS[1]**	**CSL[1]**	**LAET[2]**								
Volatile Organic Compounds												
Benzene	mg/kg	NA	NA	NA	0.002	U	0.001	U	0.004	U	0.003	U
Ethylbenzene	mg/kg	NA	NA	NE	0.004	U	0.003	U	0.009	U	0.005	U
Toluene	mg/kg	NA	NA	NA	0.004	U	0.003	U	0.009	U	0.005	U
Xylene (Total)	mg/kg	NA	NA	NE	0.004	U	0.003	U	0.009	U	0.005	U
Petroleum Hydrocarbons												
GRO	mg/kg	NA	NA	NA	45	U	41	U	140	U	100	U
DRO	mg/kg	NA	NA	NA	7.7	U	11		29		17	
HO	mg/kg	NA	NA	NA	26	U	59		170		110	
Metals												
Arsenic	mg/kg	57	93	130	8.53		6.87		29.1		20.2	
Copper	mg/kg	390	390	390	5.7		5.05		43.6		21.6	
Lead	mg/kg	450	530	430	11.2		10		107		60.6	
Zinc	mg/kg	410	960	460	51.5		41.4		319		144	
Conventionals												
TOC	mg/kg	NA	NA	NA	19200		18800		64700		65200	
TOC	%	NA	NA	NA	2		2		6		7	
Moisture	%	NA	NA	NA	60.8		60.2		83.6		77.5	
Ammonia-Nitrogen	mg/kg	NA	NA	NA	148		163		863		402	
PAHs[3]												
Acenaphthene	mg/kg	16	57	0.13	0.27	U	0.27	U	0.012	U	0.0089	U
Acenaphthylene	mg/kg	66	66	0.07	0.57		0.34		0.014		0.013	
Anthracene	mg/kg	220	1200	0.28	0.45		0.39		0.034		0.023	
Benzo(a)anthracene	mg/kg	110	270	0.96	0.63		0.64		0.16		0.061	
Benzo(a)pyrene	mg/kg	99	210	1.10	0.68		0.69		0.22		0.084	
Benzo(b)fluoranthene	mg/kg	NA	NA	NA	1.15		1.22		0.42		0.15	
Benzo(g,h,i)perylene	mg/kg	31	78	0.67	0.89		0.69		0.19		0.067	
Benzo(k)fluoranthene	mg/kg	NA	NA	NA	0.36		0.44		0.14		0.06	
Chrysene	mg/kg	110	460	0.95	0.94		1.01		0.28		0.11	
Dibenz(a,h)anthracene	mg/kg	12	33	0.23	0.27	U	0.27	U	0.042		0.015	
Fluoranthene	mg/kg	160	1200	1.30	2.40		2.29		0.46		0.21	
Fluorene	mg/kg	23	79	0.12	0.45		0.53		0.059		0.028	
Indeno(1,2,3-cd)pyrene	mg/kg	34	88	0.60	0.68		0.53		0.17		0.057	
Naphthalene	mg/kg	99	170	0.23	2.92		1.38		0.052		0.059	
Phenanthrene	mg/kg	100	480	0.66	2.29		1.91		0.18		0.11	
Pyrene	mg/kg	1000	1400	2.40	2.34		2.18		0.44		0.19	
Total LPAH[4]	mg/kg	370	780	1200	6.68		4.55		0.34		0.23	
Total HPAH[5]	mg/kg	960	5300	7900	10.05		9.69		2.52		1.00	

Notes:
PAH = Polycyclic aromatic hydrocarbons
LPAH = low molecular weight PAH
HPAH = high molecular weight PAH
SQS = Sediment Quality Standards
CSL = Cleanup Screening Levels
NA = Not applicable
NE= Not evaluated because these analytes do not have SQS or CSL.
U = Indicates the value was below the Method Detection Limit.

1. SQS and CSL from Chapter 173-204 WAC Sediment Management Standards. PAH results for US-100 and DUP-1 are organic carbon normalized.
2. LAET from Puget Sound Dredged Disposal Analysis. 1996. Progress Re-evaluation Puget Sound Apparent Effects Thresholds (AETs). LAET value is the lowest concentration of the echinoderm, microtox, and oyster AETs from Table 9.
3. Samples US-100 and DUP-1 required normalization as TOC fell in the range of 0.2 to 4%. PAH values were normalized by dividing the original concentration by the TOC percentage expressed as a decimal.
4. Total LPAH is the sum of naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene. Non-detect values are treated as zero in the summation.
5. Total HPAH is the sum of fluoranthene, pyrene, benz(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene. Non-detect values are treated as zero in the
6. US-100 and DUP-1 were compared to SQS and CSL screening criteria and US-101 and US-102 were compared to LAET based on TOC concentrations and Ecology guidance (Washington Department of Ecology. 1992 and 1993. Organic Carbon Normalization of Sediment Data)
7. All results are reported on a dry weight basis except as indicated in footnote 3.

APPENDIX B

Applicable or Relevant and Appropriate Requirements

SUMMARY OF POTENTIALLY APPLICABLE REQUIREMENTS

According to WAC 173-340-360(2), all cleanup actions under the Model Toxics Control Act (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 Lower Yard are discussed below:

Summary of Generally Applicable or Relevant and Appropriate Regulations

Clean Water Act (CWA)

Provisions set forth in the Federal Water Pollution Control Act (FWPCA), commonly referred to as the CWA, require the development of regulations to protect the nation's waters. Requirements of the CWA have been delegated to the State of Washington which has corresponding rules and regulations, encompassing all of those stated in the CWA. Therefore, potential discharges to surface water will be managed under the State program.

Resource Conservation and Recovery Act (RCRA)

Investigation –derived waste (IDW), soil, water or other substances removed from the site during the implementation of remedial activities will be handled per RCRA regulations and implemented according to WAC 173-303.

The Endangered Species Act

The only threatened or endangered species identified in the vicinity of the Terminal is the bald eagle. Bald eagles are frequently observed in flight over the Lower Yard, and they may perch in trees of the Upper Yard. Implementation of the remedial action in conformance with MTCA will result in the protection of wildlife, including any threatened and endangered species.

Migratory Bird Treaty Act

A great blue heron colony is found in the southeast Lower Yard. In 2007, testing was conducted to evaluate the level of disturbance in the areas adjacent to the great blue heron nests. The testing determined that the heron would not disturbed by site remediation activities conducted greater than 150 feet away from the nests. Site remedial activities will not be conducted less than 150 feet from the colony. Additionally, implementation of the remedial action in conformance with MTCA, will provide that wildlife, including migratory birds, will be protected.

The Safe Drinking Water Act

The groundwater CULs for the Lower Yard were established based on protection of surface water, since a determination was made that the groundwater beneath the Lower Yard is non-potable.

Natural Resource Damages

Remedial design and implementation will establish means and methods to ensure that the remedial action minimizes risks that could potentially damage natural resources, such as surface-water resources, groundwater resources, air resources, geologic resources, and biological resources. Damages to natural resource caused by remedial action implementation will be avoided, and are not expected to occur.

U.S. Department of Transportation Hazardous Materials Regulations

The U.S. Department of Transportation has published regulations, including communications and emergency response requirements, shipping, and packaging requirements (49 CFR 107, 171)), that govern the transportation of hazardous materials to or from the site. Hazardous waste generated at the site will be appropriately characterized to determine package, transportation and transportation requirements prior to implementing remedial action.

National Ambient Air Quality Standards Attainment Area

Air emissions generated by the remedial implementation at the site are subject to applicable air-quality standards in order to control or prevent the emission of air contaminants. The applicable pollutants at the site would be particulate matter (dust) and carbon monoxide. Degradation of ambient air quality caused by remedial action implementation at the site will be avoided, and is not expected to occur.

Occupational Safety and Health Administration (OSHA)

Site activities will be conducted in a manner compliant with OSHA standards and regulations (29 CFR 1910).

Model Toxics Control Act

All elements of the remedial design and site activities will occur in accordance with MTCA statutes and regulations.

National Pollutant Discharge Elimination System Stormwater Permit Program

A NPDES permit modification will be needed for discharge of treated water to Willow Creek. Effluent limitations, sampling parameters and discharge quality standards will be defined in this permit, which will affect the treatment technologies used in the treatment system. Consequently, design and operation of the system will conform to applicable regulations.

Air Quality Standards

During remedial implementation, engineering controls will be necessary to control particulate emissions. Air testing may be required to show that emissions meet the substantive requirements of applicable air quality permits and rules, as administered by the Puget Sound Clean Air Agency.

Noise Regulations

Site activities will be conducted at appropriate noise levels, according to the City of Edmonds Municipal Code. Noise production during remedial activities may limit operating hours of project work.

State Environmental Policy Act

The State Environmental Policy Act (SEPA) provides the framework for agencies to consider the environmental consequences of a proposed land use action. SEPA requires the preparation of an environmental checklist and review of the potential environmental impacts and mitigation measures used to protect the environment. A SEPA checklist will be prepared with the permitting of the remedial action to be conducted at the site.

Spill Prevention, Preparedness, and Response

A spill prevention, control, and countermeasures plan will be developed for the storage and handling of these materials. This will include potential groundwater treatment system facilities and heavy equipment used onsite, as well as any stored materials.

Minimum Standards for Construction and Maintenance of Wells, Regulation and Licensing of Well Contractors and Operators

Resource protection wells will be decommissioned, constructed and maintained according to the appropriate regulations

Washington Industrial Safety and Health Act

Site activities will be conducted in a manner compliant with Washington Industrial Safety and Health Act (WISHA) standards and regulations.

City of Edmonds Permits

The City of Edmonds requires permits for grading, excavation, and fill activities. All required permits needed from the City of Edmonds will be obtained during the design phase of the remedial action and will apply to all of the remedial activities.

APPENDIX C

MTCATPH11.1 Worksheet and Calculation Summary

MTCATPH 11.1 Calculation Worksheet

Fraction/Constituent (mg/kg)		SB-183-2.5	SB-183-5.5	SB-184-2.5	SB-184-4.0	SB-185-4.0	SB-185-5.5	DB1-A-26wall1-4	DB1-A-1wall-2.5	DB1-A-21wall-2.5	DB1-A-25wall-3.5	SWLY-A-5wall-3.75	SWLY-A-14wall-3.75	SWLY-C-21wall-3.75	SWLY-D-3wall-3.75
Aliphatic	EC>5-6	4.95	2.45	44.85	22.84	37.3	31.3	2.25	2.25	2.4	9.89	4.75	9.75	45.49	68.7
	EC>6-8	5	2.5	350	83.8	178	199	2.5	2.5	2.5	10	5	10	312	826
	EC>8-10	5	24.9	530	166	137	94.9	2.5	2.5	19.5	41.7	277	66.5	287	19.6
	EC>10-12	80.7	111	649	342	287	249	2.5	2.5	81.8	80	908	173	353	16.3
	EC>12-16	641	558	1020	581	717	840	12.3	291	481	269	2500	431	732	39.1
	EC>16-21	1770	785	1270	717	858	1080	23.7	1030	973	438	1720	310	528	32.6
	EC>21-34	1400	443	500	245	306	395	51	1060	575	564	817	98.4	742	12.8
Aromatic	EC>8-10	16.49	10.38	617.5	241.38	338.9	333.1	2.43	2.43	2.43	54.34	26.36	21.46	299.51	280.1
	EC>10-12	102.79	85.4	1571.22	714.39	641.3	899.97	2.43	2.2	2.16	228.77	214.58	63.86	416.87	2.79
	EC>12-16	340	309	1420	624	325	978	19	22.5	92.5	483	1080	65.9	308	303
	EC>16-21	930.02	539.64	518.63	332.69	326.61	477.59	18.27	450.4	547.41	355.49	1679.85	158.38	326.32	28.84
	EC>21-34	698.95	452.95	345.95	212.95	215.95	294.95	82.25	642.8	337.9	565.9	886.99	67.45	573.8	7.55
	Benzene	0.015	0.015	0.554	0.15	1.15	1.15	0.015	0.015	0.015	0.046	0.032	0.06	2.42	4.47
	Toluene	0.025	0.025	4.09	1.16	2.42	3.33	0.025	0.025	0.025	0.095	0.11	0.1	1.43	6.25
	Ethylbenzene	0.171	0.086	4.19	1.49	27.1	43.9	0.025	0.025	0.025	0.572	0.298	0.523	6.39	17.9
	Xylenes	0.444	0.336	15.3	6.13	72	25	0.05	0.05	0.05	1.99	0.438	1.32	25.1	35
	Naphthalene	0.597	0.4	7	4.5	22	6.4	0.025	0.1	0.025	0.18	1	1.4	2.7	0.94
	1-methylnaphthalene	3.84	2	4.1	3	11	7.3	0.025	0.1	0.22	0.49	15	2.1	6.3	1.3
	2-methylnaphthalene	3.77	1.6	7.7	5.1	21	15	0.025	0.1	0.096	0.57	20	2.4	11	1.7
	n-Hexane	0.05	0.05	5.15	2.16	12.7	18.7	0.25	0.25	0.0965	0.113	0.25	0.25	4.51	17.9
	MTBE	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EDB	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EDC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Benzo(a)anthrancene	0.234	0.0949	0.0976	0.0845	0.109	0.116	0.0776	0.1	0.152	0.131	0.0307	0.102	0.1	0.005
	Benzo(b)fluoranthene	0.0779	0.025	0.025	0.025	0.0617	0.0713	0.0893	0.1	0.108	0.12	0.005	0.115	0.1	0.005
	Benzo(k)fluoranthene	0	0	0	0	0	0	0.025	0.1	0.0721	0.0733	0.0166	0.124	0.1	0.005
	Benzo(a)pyrene	0.163	0.025	0.025	0.025	0.0545	0.0601	0.501	0.1	0.025	0.025	0.0108	0.0767	0.1	0.0264
	Chrysene	0.501	0.211	0.222	0.173	0.167	0.165	0.136	0.205	0.232	0.162	0.088	0.2	0.285	0.0154
	Dibenzo(a,h)anthracene	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.1	0.0721	0.0733	0.005	0.025	0.1	0.005
	Indeno(1,2,3-cd)pyrene	0.025	0.025	0.025	0.025	0.025	0.025	0.025	0.1	0.025	0.025	0.005	0.025	0.1	0.005
		6004.8379	3329.1379	8885.6536	4307.0975	4537.8722	5994.0524	222.4489	3512.55	3118.8387	3104.7556	10156.8191	1484.5207	4984.725	1722.9068

	SB-183-2.5	SB-183-5.5	SB-184-2.5	SB-184-4.0	SB-185-4.0	SB-185-5.5	DB1-A-26wall1-4	DB1-A-1wall-2.5	DB1-A-21wall-2.5	DB1-A-25wall-3.5	SWLY-A-5wall-3.75	SWLY-A-14wall-3.75	SWLY-C-21wall-3.75	SWLY-D-3wall-3.75
Method B Direct Contact CUL	3,049	2,996	2,673	2,617	2,789	2,761	44	2,395	3,608	3,009	2,495	1,306	2,967	6,148
Method B PoSW CUL	100% NAPL	100% NAPL	246	466	113	187	100% NAPL	100% NAPL	100% NAPL	100% NAPL	100% NAPL	100% NAPL	504	42
100% NAPL =	76,000	77,000					84,000	76,000	75,000	79,000	75,000	71,000		

Median Method B Direct Contact CUL	**2,775**
Median Method B PoSW using MTCATPH 100% NAPL values	**73,000**

Notes

"100% NAPL" = Occasionally, for the evaluation of the soil-to-groundwater exposure pathway, TPH soil CUL exceeds the theoretical maximum TPH that would be reached if all of the air space in the porous medium is filled with petroleum product. It means the risk is acceptable even at this high soil TPH concentration. In this case, the soil-to-groundwater is not a critical pathway and "100% NAPL" will appear in the protective soil TPH concentration box.

APPENDIX D

2007 TEE

TERRESTRIAL ECOLOGICAL EVALUATION

INTRODUCTION

This appendix presents the terrestrial ecological evaluation (TEE) for the lower yard of the Unocal Edmonds Bulk Fuel Terminal (Terminal), as required by WAC 173-340-7490. It is formatted consistent with the documentation forms provided by the Department of Ecology (Ecology) on its interactive website.

Site background and history are summarized in Section 2 of this report. Soils on site are mainly contaminated with petroleum, primarily in the diesel and oil range, from fuel storage and transfer activities. Union Oil Company (Union Oil) has performed interim actions to remove free product and soils in the areas of highest soil contamination. The completed interim actions, the planned interim action, and the nature of the future development of the lower yard minimize potential exposures to terrestrial receptors by reducing contaminant levels and controlling exposure pathways. Substantial amounts of contaminated soils have been removed, significantly reducing both the spatial extent of contamination and the concentrations of remaining contaminants.

Soils containing significant TPH concentrations remain in areas of the lower yard. Union Oil intends to complete remediation of the lower yard prior to redevelopment as a multi-modal transportation facility. After development, a large portion of the site will be covered with buildings and pavement. In covered areas, terrestrial receptors will be unable to contact soil contaminants.

RI/FS activities included sediment sampling for chemical analyses and bioassays in Willow Creek, adjacent to the lower yard. The RI also included whole effluent toxicity (WET) testing of groundwater beneath the lower yard. These data are discussed in Section 5 of this report. This appendix focuses on ecological issues related to the terrestrial environment only.

Environmental studies of the Edmonds Marsh, which is located on the opposite side of Willow Creek from the lower yard, were conducted in conjunction with the Final Environmental Impact Statement (EIS) conducted for the SR104 Edmonds Crossing Project (CH_2M Hill, 2004). Information from these studies was used in this TEE.

PRIMARY EXCLUSIONS

An answer of "Yes" to any one question in this section excludes the site from further TEE [WAC 173-340-7491(1)].

1a) Will soil contamination be located at least 6 feet beneath the ground surface and less than 15 feet [WAC 173-340-7491(1)(a)]?

No. Detectable concentrations of TPH will likely be present within 6 feet of ground surface following remediation.

1b) Will soil contamination be located at least 15 feet beneath the ground surface [WAC 173-340-7491(1)(a)]?

No. As noted above, detectable concentrations of TPH will likely be present within 15 feet of ground surface following remediation.

1c) Will soil contamination be located below the conditional point of compliance [WAC 173-340-7491(1)(a)]?

No. Union Oil does not plan to propose a conditional point of compliance.

2) Will soil contamination be covered by buildings, paved roads, pavement, or other physical barriers that will prevent plants or wildlife from being exposed [WAC 173-340-7491(1)(b)]?

No. After redevelopment as a multi-modal transportation terminal, there may be some uncapped areas that contain detectable concentrations of the IHSs.

3a) Is there less than 1.5 acres of contiguous undeveloped land on the site, or within 500 feet of any area of the site affected by hazardous substances (other than those substances listed in WAC 173-340-7491(1)(c)(ii)) [WAC 173-340-7491(1)(c)(i)]?

No. There are more than 1.5 acres of contiguous undeveloped land in a wooded area adjacent to the southwest portion of the lower yard.

3b) Is there less than 0.25 acres of contiguous undeveloped land on or within 500 feet of any area of the site affected by hazardous substances listed in WAC 173-340-7491(1)(c)(ii) [WAC 173-340-7491(1)(c)(ii)]?

Not applicable. The site is not contaminated with any of the listed substances.

4) Are concentrations of hazardous substances in the soil less than or equal to natural background concentrations of those substances at the point of compliance [WAC 173-340-7491(1)(d)]?

No. Ecology does not recognize natural background concentrations of petroleum hydrocarbons.

EXCLUSIONS CONCLUSION: The lower yard does not qualify for exclusion from the TEE.

SIMPLIFIED OR SITE-SPECIFIC EVALUATION

An answer of "Yes" to any one question below means the lower yard is required to undergo a site-specific TEE [WAC 173-340-7491(2)]. Otherwise, a simplified evaluation is allowed.

1) Is the site located on or directly adjacent to an area where management or land use plans will maintain or restore native or semi-native vegetation [WAC 173-340-7491(2)(a)(i)]?

Yes. Edmonds Marsh is directly adjacent to the eastern portion of the lower yard. According to the Final EIS for the Edmonds Crossing project [CH_2M Hill, 2004 (p. 3-41)], Edmonds Marsh has been rated by the City of Edmonds as a Category 1 (high quality) wetland based on its uniqueness, large size, and habitat for a state monitor species (great blue heron). It is designated by the city as a Wildlife Sanctuary on the City of Edmonds Environmentally Sensitive Areas map and as a Priority Habitat in the WDFW Priority Habitat and Species database. Category I wetlands are considered the most valuable, and their disturbance is rarely permitted.

2a) Is the site used by a threatened or endangered species [WAC 173-340-7491(2)(a)(ii)]? For animals, "used" means that individuals of a species have been observed to live, feed or breed at the site. For plants, "used" means that a plant species grows at the site or has been found growing at the site.

No. A Wildlife Habitat Study was performed in 1996 as part of the remedial investigation of the Terminal (Adolfson, 1996). Specific to threatened and endangered species, the study findings were as follows:

> Bald eagles are reported as nesting approximately one mile south of the Terminal. Bald eagle nests are not known to exist on the Terminal property or within one mile of the property boundary. During field surveys in 1995, bald eagles were observed perched in large deciduous trees located along the bluff to the south of the Terminal's pier.

No other threatened or endangered animal species were identified. Although bald eagles have been removed from the endangered list, they are still listed as threatened (www.wa.gov/wdfw/wlm/diversty/soc/threaten.htm). Observations by former site personnel indicate that bald eagle do not live at the Terminal, nor have bald eagles been seen perching in trees at the Terminal. As bald eagles are primarily fish eaters, the lower yard does not provide suitable foraging habitat. Bald eagles are seen in flight above the Terminal, but this behavior does not meet the definition of "use" (live, feed, or breed).

The Washington Department of Fish and Wildlife (WDFW) was contacted in the spring of 2002 for additional information. The Priority Habitats and Species Database and Wildlife Heritage Database show the Terminal to be in an area where priority habitats and species are unknown, or the area was not mapped. The area to the south of the Terminal is identified as a bald eagle use area (breeding occurrence).

2b) Is the site used by a wildlife species classified by the Washington State Department of Fish and Wildlife as a "priority species" or "species of concern" under Title 77 RCW [WAC 173-340-7491(2)(a)(ii)]?

No. The WDFW database (www.wa.gov/wdfw/wlm/diversty/soc/threaten.htm) was searched for mammalian, avian, reptilian, and amphibian species listed as expected to occur at the Terminal per the Wildlife Habitat Study. None of the species identified in the Wildlife Habitat Study is listed in the WDFW database as a "priority species" or "species of concern."

2c) Is the site used by a plant species classified by the Washington State Department of Natural Resources Natural Heritage Program as "endangered," "threatened," or "sensitive" under Title 79 RCW [WAC 173-340-7491(2)(a)(ii)]?

No. A review of the Washington State Department of Natural Resources' Natural Heritage Information System (www.wa.gov/htdocs/fr/nhp/refdesk/fsrefix.htm) was performed as part of the 1996 Wildlife Habitat Study. There are no records of significant natural features, rare plants, high quality native wetlands, or high quality native plant communities within the vicinity of the project area.

Additional studies have been performed for purposes of the Edmonds Crossing EIS. No endangered, threatened, or sensitive species were identified in studies performed in 2000 and 2001 (personal communication between Cathy Conolly of Adolfson Associates and Linda Dawson of Maul Foster & Alongi, Inc. on November 30, 2001).

3) Is the area of contamination located on a property that contains at least 10 acres of native vegetation within 500 feet of the area of contamination [WAC 173-340-7491(2)(a)(iii)]?

No. The lower yard (23 acres in area) was an active industrial site that has recently been subject to intensive remedial activity including excavation, backfilling, and grading, and it contains limited vegetation. A small area (approximately 2 acres) located in the southeast corner of the lower yard contains native vegetation. The lower yard will be redeveloped as a multi-modal transportation facility, so it will be primarily covered by buildings and pavement. At present, the lower yard offers limited, disturbed terrestrial habitat. The sparse vegetative cover, low species diversity, and amount of human disturbance in this area limit wildlife use of this habitat [Adolfson Associates, Inc., 1996 (p. 9)].

4) Has the department determined that the site may present a risk to significant wildlife populations [WAC 173-340-7491(2)(a)(iv)]?

No. Ecology has not determined that the lower yard may present a significant risk to wildlife populations.

SIMPLIFIED OR SITE-SPECIFIC EVALUATION CONCLUSION: A site-specific TEE is required because of the site's location next to Edmonds Marsh.

SIMPLIFIED EVALUATION

A simplified TEE is not allowed because a site-specific evaluation is required.

SITE-SPECIFIC EVALUATION

A site-specific TEE consists of two elements: problem formulation and the actual evaluation. After reviewing the problem formulation, Ecology may determine that additional evaluation is not necessary [WAC 173-340-7493(1)(d)].

Problem Formulation

Problem formulation involves identifying the following components of the site-specific TEE:

- Chemicals of ecological concern
- Exposure pathways
- Terrestrial ecological receptors of concern
- Toxicological assessment

The indicator hazardous substances (IHSs) chosen for the TEE are the following (see Section 5.1.3 of this report):

- GRO
- DRO
- HO
- Benzene
- CPAHs
- Arsenic

Following remediation, if the maximum or the upper 95 percent confidence limit concentrations of the IHSs do not exceed the ecological indicator concentrations in MTCA Table 749-3, they may be eliminated from further consideration [WAC 173-340-7493(2)(a)(i)]. Since the site will be used for commercial purposes, only the values in the wildlife column of the table are applicable [WAC 173-340-7493(2)(a)(i)]. The ecological indicator concentrations are 5,000 mg/kg for GRO, 6,000 mg/kg for DRO, 12 mg/kg for cPAHs (benzo(a)pyrene is used as a surrogate), and 132 mg/kg for arsenic in unsaturated soil. There are no table values for HO and benzene.

The petroleum indicator concentrations note that soil concentrations may not exceed residual saturation values. However, the TPH cleanup level (CUL) for the site (2,975 mg/kg; based on direct contact) exceeds the default residual saturation concentration. This higher CUL can be applied because an empirical demonstration (free product does not occur on the groundwater) will be used to show that post-remediation soil concentrations do not exceed residual saturation. The residual saturation requirements will be met at the conclusion of the remediation.

Institutional controls, in the form of deed restrictions, will be used to ensure that any soils exceeding the ecological indicator soil concentrations are capped, that the caps are maintained, and that if the coverings are disturbed, contaminated soils are handled appropriately [WAC 173-340-7493(2)(a)(ii)]. This will ensure there are no complete exposure pathways to soil concentrations of IHSs exceeding the ecological indicator soil concentrations. If there are no complete exposure pathways, no further evaluation is necessary [WAC 173-340-7493(2)(a)(ii)].

The combination of remedial actions, planned development, and institutional controls will minimize wildlife exposure to site-related contaminants. Evaluation of the first two components of problem formulation finds that additional evaluation is not necessary. Capping the soil with IHS concentrations exceeding those listed in MTCA Table 749-3 (wildlife column only) will allow the site-specific TEE to be ended.

APPENDIX E

Statistical Analysis – Lower Yard Soil Samples

MEMO

To:

Scott Zorn

Copies:

1

Arcadis U.S., Inc.
114 Lovell Rd, Suite 202
Knoxville, TN, 37934
USA

From:

Jeanine Smith

Ophelie Encelle

Date:

June 12, 2017

Arcadis Project No.:

B0045362.0009

Subject:

Statistical Analysis – Lower Yard Soil Samples

Former Unocal Edmonds Bulk Fuel Terminal Edmonds, Washington

This memo presents the 95 percent (%) upper confidence limits on the mean (95% UCL) for constituents of concern (COCs) in soil, for the Lower Yard at the Former Unocal Edmonds Bulk Fuel Terminal Edmonds, Washington.

Approach

Per Washington Administrative Code (WAC) 173-340-740(7), because the cleanup levels (CULs) and remediation level (REL) for the COCs are based on chronic and carcinogenic effects, compliance with the CULs and REL were evaluated by comparison with the 95% UCL for the COCs, or the maximum detected concentration if the recommended 95% UCL was greater than the maximum detected concentration. The 95% UCLs were calculated using the United States Environmental Protection Agency's (USEPA's) ProUCL software (version 5.1.002; USEPA 2016) for datasets with at least eight samples and five detections. Although there are greater than 50% non-detects, the datasets for the Lower Yard are robust, with a very large number of samples that have been collected (575 for carcinogenic polycyclic aromatic hydrocarbons [cPAHs] and 988 samples for benzene and total petroleum hydrocarbons [TPH]) and a large number of detected values (between 100 and 348 samples). Because of the robust nature of the datasets, the non-detects were replaced with a value of one-half of the reporting limit and treated as detections. In addition, as a conservative alternative method, the 95% UCLs were also calculated using only the detected concentrations.

The COCs and their relative CUL and REL are provided in Table 1 below.

Table 1. Soil Cleanup Levels and Remediation Level for the Site Constituents of Concern

COC	Soil CULs and REL
TPH, sum of: • gasoline range organics (GRO), • diesel range organics (DRO), • and heavy oil range organics (HO)	2,775 milligrams per kilogram (mg/kg)
Benzene	18 mg/kg
Total cPAHs adjusted for toxicity (TEQ), sum of: • benzo(a)anthracene, • benzo(a)pyrene, • benzo(b)fluoranthene, • benzo(k)fluoranthene, • chrysene, • dibenzo(a,h)anthracene, and • indeno(1,2,3-cd)pyrene Concentrations are adjusted using toxic equivalency factors to represent a total benzo(a)pyrene concentration (WAC 173-340-900).	0.14 mg/kg

Criteria for soil compliance are as follow:

- The 95% UCL for TPH are below the soil REL.
- The 95% UCL for total cPAHs TEQ and benzene are below the soil CULs.
- Less than 10 percent of the samples contain COC concentrations that exceed the REL or CULs.
- Any single sample contains a COC concentration that is lower than twice the REL or CULs.

<u>Soil Datasets</u>

Soil datasets are presented in Table 2.

Soil datasets include samples from:

- 2003 excavations soil samples from the interim actions conducted under Agreed Order (AO) No. DE92TC-N328 that were not over excavated in later interim actions conducted in 2007 and 2008 (Maul, Foster, and Alongi 2004).
- 2007 excavation soil samples from interim action conducted during Phase I, in accordance with AO No. DE 4460 that were not over excavated in later interim actions conducted during Phase II (Arcadis 2009).
- 2008 soil samples from the 2008 soil investigation activities that were not over excavated in later interim actions conducted during Phase II (Arcadis 2010b).
- 2008 excavation soil samples from interim action conducted during Phase II, in accordance with AO No. DE 4460 (Arcadis 2010a).
- 2011 soil samples from the 2011 soil investigation activities (Arcadis 2012).
- 2012 soil samples from the 2012 soil investigation activities (Arcadis 2013).

Soil samples located in the areas of future remedial actions in the central and west/northwest Lower Yard near the Detention Basin 2 (DB-2) and the Washington State Department of Transportation (WSDOT) stormwater line areas were removed from the datasets. The samples not considered in the datasets are listed in Table 3 and their locations are presented on Figure 1. This resulted in a dataset consisting of 988 soil samples with benzene and TPH data, and a dataset of 575 soil samples with cPAHs data. (Only samples with detectable DRO and/or HO concentrations were also analyzed for cPAHs).

Soil samples that were disposed of during excavation activities and samples that were over excavated, and therefore not onsite anymore, have also been removed from the dataset.

Data Processing

Laboratory results. Analytical results were obtained from a Washington State certified laboratory using USEPA Method 8021B for benzene, USEPA Method 8270 SIM for cPAHs, Washington State Department of Ecology (Ecology) method NWTPH-Gx for GRO, and Ecology method NWTPH-Dx for DRO and HO.

Field duplicate samples. Laboratory results from field duplicate samples were combined into one result to represent each field duplicate pair as follows:

- If both results were non-detects, the lowest reporting limit was used,
- If both results were detects, the highest detected value was used, and
- If there was a detect and a non-detect, the detected value was used.

Non-detect results. Because greater than 50% of the results were non-detects for the COCs, the non-detect results were treated as detections at one-half of the reporting limit. For individual non-detect cPAHs, one-half of the reporting limit was used in the calculation of the cPAH TEQ value. For individual non-detect TPH fractions, one-half of the reporting limit was used to calculate the TPH.

Statistical Methods for Calculating 95 Percent Upper Confidence Limits on the Mean

USEPA's ProUCL version 5.1.002 (USEPA 2016) was used to calculate 95% UCLs for the COCs. Because the datasets are large with many detects, but more than 50% non-detects, 95% UCLs were calculated treating non-detects as detections at one-half of the reporting limit. As a conservative alternative approach, the 95% UCLs were also calculated using only detected concentrations. UCLs calculated following this alternative approach provides a conservative high-biased result, as it disregards the many sample results that were non-detected.

The distributions for all six datasets (three COCs using either one-half of the reporting limit or only detected results) were non-parametric. Because the datasets were not lognormal, the recommended 95% UCLs from ProUCL were used for comparison to the REL and CULs. The ProUCL output file is provided in Attachment 1.

Results and Compliance

A data summary for each of the datasets evaluated and the calculated 95% UCLs are presented in Table 4. As shown in Table 4, remaining concentrations of COCs in soil are compliant with the CULs and REL based on the following:

Benzene. None of the dataset of 988 soil samples exceeded the CUL or two times the CUL. The maximum detected concentration of benzene in the remaining samples (6.57 mg/kg) and the calculated 95% UCLs (0.104 mg/kg and 0.824 mg/kg [conservative high-biased result]) did not exceed the CUL of 18 mg/kg.

cPAH TEQ. One out of the dataset of 575 soil samples, or 0.2%, exceeded the CUL of 0.14 mg/kg, and the maximum detected concentration (0.19 mg/kg) did not exceed two times the CUL. The 95% UCLs (0.0181 mg/kg and 0.0321 mg/kg [conservative high-biased result]) did not exceed the CUL.

TPH. Three out of the dataset of 988 soil samples, or 0.3%, exceeded the REL of 2,775 mg/kg, and the maximum detected concentration (4,980 mg/kg) did not exceed two times the REL. The 95% UCLs (188 mg/kg and 478 mg/kg [conservative high-biased result]) did not exceed the REL.

Conclusions and Recommendations

The statistical analyses show that the Lower Yard datasets for benzene, TPH, and cPAH TEQ fall well within the established limits of compliance outlined above, using either method for calculating 95% UCLs. Additional statistical analyses will be conducted upon the completion of the planned remedial activities and receipt of laboratory analytical reports for confirmation samples. Due to the large nature of the datasets and the conclusions of the statistical analyses completed in this memo, Arcadis proposes that for future statistical analyses, non-detects be replaced with one-half of the reporting limit and be treated as detects.

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Enclosures

Tables

Table 1 (imbedded): Soil Cleanup Levels and Remediation Level for the Site Constituents of Concern

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Mean

Table 3: Samples Located in the Areas of Future Remedial Actions

Table 4: Data Summary and 95 Percent Upper Confidence Levels on the Mean

Figure

Figure 1: Samples Located in the Areas of Future Remedial Actions

Attachment

Attachment 1. ProUCL Output

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
B1-14-14.5	14-14.5	8/22/2011	11.45 U	0.17	NA
B12-0.5-1	0.5-1	8/24/2011	298.5	0.033 U W	0.01167
B12-1-1.5	1-1.5	8/24/2011	254	0.038 U W	0.0007224 U
B12-2.5-3	2.5-3	8/24/2011	247.5	0.051 U W	0.07917
B12-3.5-4	3.5-4	8/24/2011	32.8	0.0028 U	0.0006283
B1-4.5-5	4.5-5	8/22/2011	16.1	0.0022 U	0.0005213
B14-0.5-1	0.5-1	8/25/2011	154.5	0.11 U W	0.02947
B14-1.5-2	1.5-2	8/25/2011	5.5 U	0.023 U W	NA
B14-2.5-3	2.5-3	8/25/2011	23.5 U	0.051 U W	NA
B14-3.5-4	3.5-4	8/25/2011	97.9	0.058 U W	0.0009003
B15-11-11.5	11-11.5	8/23/2011	16 U	0.029 U W	NA
B15-4.5-5	4.5-5	8/23/2011	22.15	0.0025 U	0.0005311
B15-6.5-7	6.5-7	8/23/2011	20.45	0.0026 U V	NA
B15-8.5-9	8.5-9	8/23/2011	63	0.0048 U V	0.0008315
B1-9.5-10	9.5-10	8/22/2011	72.3	0.23 W	0.008175
B2-12-12.5	12-12.5	8/22/2011	662	0.0020 U	0.000881
B2-14.5-15	14.5-15	8/22/2011	7.8 U	0.0024 U	NA
B2-4-4.5	4-4.5	8/22/2011	1344.6	0.018 UW	0.05368
B2-7-7.5	7-7.5	8/22/2011	67.5	0.0020 U	0.000727
B2-9.5-10	9.5-10	8/22/2011	216	0.0019 U	0.002005
B3-12-12.5	12-12.5	8/22/2011	95.8	0.0020 U	0.0005765
B3-14-14.5	14-14.5	8/22/2011	8.45	0.0040	NA
B3-4.5-5	4.5-5	8/22/2011	7.65 U	0.0022 U	NA
B3-7-7.5	7-7.5	8/22/2011	180.55	0.0021 U	0.0007175
DB1-A-10-4	4	10/8/2003	20 U	0.03 U	0.00755 U
DB1-A-10wall-2	2	10/8/2003	20 U	0.03 U	0.00755 U
DB1-A-11-4	4	10/8/2003	20 U	0.03 U	0.00755 U
DB1-A-11wall-2	2	10/8/2003	20 U	0.03 U	0.00755 U
DB1-A-12-4	4	10/8/2003	20 U	0.03 U	0.00755 U
DB1-A-12wall-2	2	10/8/2003	20 U	0.03 U	0.00755 U
DB1-A-13-4	4	10/8/2003	20 U	0.03 U	0.00755 U
DB1-A-13wall-2	2	10/8/2003	20 U	0.03 U	0.00755 U
DB1-A-14-3	3	10/9/2003	20 U	0.03 U	0.00755 U
DB1-A-1-5	5	9/16/2003	26.7	0.03 U	0.00755 U
DB1-A-15-3	3	10/9/2003	20 U	0.03 U	0.00755 U
DB1-A-16-3	3	10/9/2003	30.4	0.03 U	0.00755 U
DB1-A-17-5	5	10/9/2003	20 U	0.03 U	0.00755 U
DB1-A-17Wall-2	2	10/9/2003	20 U	0.03 U	0.00755 U
DB1-A-18-5	5	10/9/2003	20 U	0.03 U	0.00755 U
DB1-A-18Wall-2	2	10/9/2003	167.7	0.26	0.00755 U
DB1-A-19-5	5	10/9/2003	20 U	0.03 U	0.00755 U
DB1-A-19Wall-2.5	2.5	10/9/2003	30.49	0.03 U	0.00755 U
DB1-A-20-5	5	10/10/2003	20 U	0.03 U	0.00755 U
DB1-A-20wall-2	2	10/10/2003	28.9	0.03 U	0.00755 U
DB1-A-21-5	5	10/10/2003	20 U	0.03 U	0.01001
DB1-A-22-8	8	9/8/2003	20 U	0.03 U	0.00755 U
DB1-A-22wall-4	4	9/8/2003	625.5 D	0.03 U	0.0911 U

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
DB1-A-23-6	6	10/10/2003	20 U	0.03 U	0.00755 U
DB1-A-23wall-3	3	10/10/2003	1303.5 D	0.03 U	0.03775 U
DB1-A-24-6	6	10/10/2003	20 U	0.03 U	0.00755 U
DB1-A-24wall-3	3	10/10/2003	20 U	0.03 U	0.00755 U
DB1-A-25-7	7	10/10/2003	20 U	0.03 U	0.00755 U
DB1-A-25wall-3	3	10/10/2003	2644 D	0.05	0.06873
DB1-A-2-6	6	9/12/2003	20 U	0.03 U	0.00755 U
DB1-A-26-11	1	9/5/2003	20 U	0.03 U	0.00755 U
DB1-A-27-10	10	9/3/2003	20 U	0.03 U	0.00755 U
DB1-A-27wall1-3	3	9/3/2003	20 U	0.03 U	0.00755 U
DB1-A-27wall2-7	7	9/3/2003	20 U	0.03 U	0.00755 U
DB1-A-28-7	7	9/3/2003	20 U	0.03 U	0.00755 U
DB1-A-28wall-3	3	9/3/2003	386.3	0.03 U	0.00755 U
DB1-A-29-9	9	9/2/2003	20 U	0.03 U	0.00755 U
DB1-A-29wall1-2	2	9/2/2003	25.4 U	0.03 U	0.00755 U
DB1-A-29wall2-5	5	9/2/2003	20 U	0.03 U	0.00755 U
DB1-A-2wall-3	3	9/12/2003	64.07	0.04	0.00755 U
DB1-A-30-7	7	9/3/2003	20 U	0.03 U	0.00755 U
DB1-A-30wall-3	3	9/3/2003	122.7	0.03 U	0.02413
DB1-A-31-10	0	9/3/2003	20 U	0.03 U	0.00755 U
DB1-A-31wall1-3	3	9/3/2003	506.5 D	0.03 U	0.02186
DB1-A-31wall2-7	7	9/3/2003	20 U	0.03 U	0.00755 U
DB1-A-3-4	4	9/19/2003	20 U	0.03 U	0.00755 U
DB1-A-3wall2-2.5	2.5	9/23/2003	1202.6 D	0.03 U	0.05025
DB1-A-4-4	4	9/19/2003	20 U	0.03 U	0.00755 U
DB1-A-4wall-2.5	2.5	9/22/2003	435.46 D	0.03 U	0.05075
DB1-A-5-5	5	9/22/2003	20 U	0.03 U	0.00755 U
DB1-A-5wall-2	2	10/6/2003	32.6	0.03 U	0.00755 U
DB1-A-6-5	5	9/24/2003	20 U	0.03 U	0.00755 U
DB1-A-6wall-2.5	2.5	9/24/2003	875.5 D	0.03 U	0.00755 U
DB1-A-7-5	5	9/24/2003	38.7	0.03 U	0.00755 U
DB1-A-7wall-2.5	2.5	9/24/2003	75.4	0.03 U	0.00755 U
DB1-A-8-5	5	10/6/2003	41.8	0.03 U	0.00755 U
DB1-A-8wall-2.5	2.5	10/6/2003	20 U	0.03 U	0.00755 U
DB1-A-9-5	5	10/6/2003	20 U	0.03 U	0.00755 U
DB1-A-9wall-2.5	2.5	10/6/2003	20 U	0.03 U	0.00755 U
DB1-B-10-4	4	9/26/2003	20 U	0.03 U	0.00755 U
DB1-B-11-4	4	9/29/2003	20 U	0.03 U	0.00755 U
DB1-B-1-2	2	9/12/2003	89	0.03 U	0.00755 U
DB1-B-12-4	4	10/3/2003	20 U	0.03 U	0.00755 U
DB1-B-13-4	4	10/6/2003	20 U	0.03 U	0.00755 U
DB1-B-14-3	3	10/6/2003	20 U	0.03 U	0.00755 U
DB1-B-15-3	3	10/6/2003	20 U	0.03 U	0.00755 U
DB1-B-16-3.5	3.5	10/8/2003	20 U	0.03 U	0.00755 U
DB1-B-17-4.5	4.5	10/9/2003	20 U	0.03 U	0.00755 U
DB1-B-18-3	3	9/15/2003	25.8	0.03 U	0.00755 U
DB1-B-19-3	3	9/15/2003	20 U	0.03 U	0.00755 U

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
DB1-B-20-4	4	9/8/2003	20 U	0.03 U	0.00755 U
DB1-B-21-4	4	9/8/2003	20 U	0.03 U	0.00755 U
DB1-B-22-4	4	9/8/2003	20 U	0.03 U	0.00755 U
DB1-B-2-3	3	9/12/2003	20 U	0.03 U	0.00755 U
DB1-B-23-0.5	0.5	8/29/2003	106.5	0.37	0.00755 U
DB1-B-24-1	1	8/29/2003	20 U	0.03 U	0.00755 U
DB1-B-25-1.5	1.5	9/5/2003	43.3	0.03 U	0.00755 U
DB1-B-26-1	1	8/28/2003	20 U	0.03 U	0.00755 U
DB1-B-27-1	1	8/27/2003	72.4	0.03 U	0.00755 U
DB1-B-28-1	1	8/27/2003	20 U	0.03 U	0.00755 U
DB1-B-29-1.5	1.5	8/25/2003	20 U	0.03 U	0.00755 U
DB1-B-30-4	4	8/25/2003	20 U	0.03 U	0.00755 U
DB1-B-31-6	6	9/4/2003	20 U	0.03 U	0.00755 U
DB1-B-31wall-3	3	9/4/2003	20 U	0.03 U	0.00755 U
DB1-B-3-3.5	3.5	9/19/2003	20 U	0.03 U	0.00755 U
DB1-B-4-4	4	9/19/2003	20 U	0.03 U	0.00755 U
DB1-B-5-4	4	9/22/2003	20 U	0.03 U	0.02743
DB1-B-6-4	4	9/24/2003	20 U	0.03 U	0.00755 U
DB1-B-7-4	4	9/24/2003	20 U	0.03 U	0.00755 U
DB1-B-8-4	4	9/25/2003	20 U	0.03 U	0.00755 U
DB1-B-9-4	4	9/25/2003	20 U	0.03 U	0.00755 U
DB1-C-10-4	4	9/26/2003	20 U	0.03 U	0.00755 U
DB1-C-11-4	4	9/29/2003	20 U	0.03 U	0.00755 U
DB1-C-1-2	2	9/12/2003	20 U	0.03 U	0.00755 U
DB1-C-12-3	3	10/3/2003	20 U	0.03 U	0.00755 U
DB1-C-13-3	3	10/3/2003	20 U	0.03 U	0.00755 U
DB1-C-14-3	3	10/3/2003	20 U	0.03 U	0.00755 U
DB1-C-15-3	3	10/3/2003	20 U	0.03 U	0.00755 U
DB1-C-16-2	2	9/16/2003	20 U	0.03 U	0.00755 U
DB1-C-17-5	5	9/16/2003	20 U	0.03 U	0.00755 U
DB1-C-17wall-2	2	9/16/2003	20 U	0.03 U	0.00755 U
DB1-C-18-2.5	2.5	9/17/2003	20 U	0.03 U	0.00755 U
DB1-C-19-1.5	1.5	9/15/2003	20 U	0.03 U	0.00755 U
DB1-C-20-4	4	9/8/2003	20 U	0.03 U	0.00755 U
DB1-C-21-5	5	9/12/2003	20 U	0.03 U	0.00755 U
DB1-C-22-4	4	9/12/2003	20 U	0.03 U	0.00755 U
DB1-C-23-1.5	1.5	9/5/2003	20 U	0.03 U	0.00755 U
DB1-C-2-4	4	9/12/2003	20 U	0.03 U	0.00755 U
DB1-C-24-1	1	8/29/2003	20 U	0.03 U	0.00755 U
DB1-C-25-1	1	8/28/2003	27.8	0.03 U	0.00766
DB1-C-26-1	1	8/28/2003	20 U	0.03 U	0.00755 U
DB1-C-27-1	1	8/27/2003	20 U	0.03 U	0.00755 U
DB1-C-28-1	1	8/27/2003	20 U	0.03 U	0.00755 U
DB1-C-29-4	4	8/25/2003	20 U	0.03 U	0.00755 U
DB1-C-30-4	4	8/25/2003	20 U	0.03 U	0.00755 U
DB1-C-31-4	4	8/25/2003	20 U	0.03 U	0.00755 U
DB1-C-31wall-2	2	8/25/2003	20 U	0.03 U	0.00755 U

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FINAL FEASABILITY STUDY REPORT - APPENDIX E

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
DB1-C-3-4	4	9/19/2003	20 U	0.03 U	0.00755 U
DB1-C-4-4	4	9/19/2003	20 U	0.03 U	0.00755 U
DB1-C-5-4	4	9/22/2003	20 U	0.03 U	0.00755 U
DB1-C-6-4	4	9/24/2003	20 U	0.03 U	0.00755 U
DB1-C-7-4	4	9/24/2003	20 U	0.03 U	0.00755 U
DB1-C-8-4	4	9/25/2003	20 U	0.03 U	0.00755 U
DB1-C-9-4	4	9/26/2003	20 U	0.03 U	0.00755 U
DB1-D-10-4	4	9/26/2003	20 U	0.03 U	0.00755 U
DB1-D-11-4	4	9/29/2003	20 U	0.03 U	0.00755 U
DB1-D-12-3	3	10/1/2003	20 U	0.03 U	0.00755 U
DB1-D-1-3	3	9/12/2003	20 U	0.03 U	0.00755 U
DB1-D-13-3	3	10/1/2003	20 U	0.03 U	0.00755 U
DB1-D-14-3	3	10/1/2003	20 U	0.03 U	0.00755 U
DB1-D-15-2	2	10/1/2003	20 U	0.03 U	0.00755 U
DB1-D-16-1.5	1.5	9/16/2003	20 U	0.03 U	0.00755 U
DB1-D-17-1	1	9/16/2003	20 U	0.03 U	0.00755 U
DB1-D-18-1	1	9/15/2003	46.25 U	0.07 U	0.017375 U
DB1-D-19-1	1	9/15/2003	20 U	0.03 U	0.00755 U
DB1-D-20-3	3	9/8/2003	20 U	0.03 U	0.00755 U
DB1-D-21-3	3	9/8/2003	20 U	0.03 U	0.00755 U
DB1-D-22-2	2	9/8/2003	20 U	0.03 U	0.00755 U
DB1-D-23-1	1	8/29/2003	20 U	0.03 U	0.00755 U
DB1-D-2-4	4	9/12/2003	20 U	0.03 U	0.00755 U
DB1-D-24-1	1	8/29/2003	133.3	0.03 U	0.00755 U
DB1-D-25-1.5	1.5	8/28/2003	20 U	0.03 U	0.00755 U
DB1-D-26-1.5	1.5	8/28/2003	20 U	0.03 U	0.00755 U
DB1-D-27-1	1	8/27/2003	20 U	0.03 U	0.00755 U
DB1-D-28-1	1	8/27/2003	20 U	0.03 U	0.00755 U
DB1-D-29-2	2	8/26/2003	139.7	0.04	0.00868
DB1-D-30-3	3	8/25/2003	20 U	0.03 U	0.00805
DB1-D-31-1	1	9/3/2003	20 U	0.03 U	0.00755 U
DB1-D-3-3.5	3.5	9/19/2003	20 U	0.03 U	0.00755 U
DB1-D-4-4	4	9/19/2003	29.3	0.03 U	0.00755 U
DB1-D-5-4	4	9/22/2003	68.3	0.06 U	0.0151 U
DB1-D-6-4	4	9/24/2003	20 U	0.03 U	0.00755 U
DB1-D-7-4	4	9/24/2003	20 U	0.03 U	0.00755 U
DB1-D-8-4	4	9/25/2003	20 U	0.03 U	0.00755 U
DB1-D-9-4	4	10/3/2003	20 U	0.03 U	0.00755 U
DB1-D-9-7	7	9/25/2003	20 U	0.03 U	0.00755 U
DB1-E-10-2.5	2.5	9/19/2003	56.65 U	0.09 U	0.02117 U
DB1-E-11-2	2	9/19/2003	43.55 U	0.07 U	0.01659 U
DB1-E-12-2	2	9/19/2003	42.95 U	0.06 U	0.01656 U
DB1-E-13-2	2	9/19/2003	20 U	0.03 U	0.00755 U
DB1-E-1-4	4	9/16/2003	28.3	0.03 U	0.00755 U
DB1-E-14-1	1	9/16/2003	31.9	0.03 U	0.00755 U
DB1-E-15-1.5	1.5	9/16/2003	20 U	0.03 U	0.00755 U
DB1-E-16-1	1	9/16/2003	20 U	0.03 U	0.00755 U

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
DB1-E-17-1	1	9/16/2003	40.75 U	0.06 U	0.01529 U
DB1-E-18-1	1	9/15/2003	20 U	0.03 U	0.00755 U
DB1-E-19-1	1	9/15/2003	20 U	0.03 U	0.00755 U
DB1-E-20-3	3	9/8/2003	20 U	0.03 U	0.00755 U
DB1-E-21-2	2	9/8/2003	20 U	0.03 U	0.00755 U
DB1-E-22-1	1	9/8/2003	20 U	0.03 U	0.00755 U
DB1-E-2-3	3	9/12/2003	20 U	0.03 U	0.00755 U
DB1-E-23-2.5	2.5	8/29/2003	20 U	0.03 U	0.00766
DB1-E-24-1.5	1.5	8/29/2003	20 U	0.03 U	0.00755 U
DB1-E-25-1.5	1.5	8/28/2003	20 U	0.03 U	0.00755 U
DB1-E-26-1.5	1.5	8/28/2003	20 U	0.03 U	0.00755 U
DB1-E-27-1	1	8/27/2003	29.4	0.03 U	0.00755 U
DB1-E-28-1	1	8/27/2003	37.6	0.03 U	0.00778
DB1-E-29-4	4	8/26/2003	20 U	0.03 U	0.00755 U
DB1-E-30-3	3	8/26/2003	20 U	0.03 U	0.00755 U
DB1-E-3-3.5	3.5	9/19/2003	20 U	0.03 U	0.00755 U
DB1-E-4-3	3	9/19/2003	20 U	0.03 U	0.00755 U
DB1-E-5-3	3	9/19/2003	43.35 U	0.07 U	0.01658 U
DB1-E-6-3	3	9/19/2003	20 U	0.03 U	0.00755 U
DB1-E-7-2.5	2.5	9/19/2003	20 U	0.03 U	0.00755 U
DB1-E-8-2.5	2.5	9/19/2003	20 U	0.03 U	0.00755 U
DB1-E-9-2.5	2.5	9/19/2003	20 U	0.03 U	0.00755 U
DB1-F-10-2	2	9/17/2003	20 U	0.03 U	0.00755 U
DB1-F-11-2	2	9/17/2003	44.65 U	0.07 U	0.01664 U
DB1-F-12-2	2	9/17/2003	20 U	0.03 U	0.00755 U
DB1-F-13-2	2	9/17/2003	20 U	0.03 U	0.00755 U
DB1-F-14-1.5	1.5	9/16/2003	20 U	0.03 U	0.00755 U
DB1-F-1-5	5	9/16/2003	20 U	0.03 U	0.00755 U
DB1-F-15-1.5	1.5	9/18/2003	20 U	0.03 U	0.00755 U
DB1-F-16-1.5	1.5	9/18/2003	20 U	0.03 U	0.00755 U
DB1-F-17-1	1	9/16/2003	20 U	0.03 U	0.00755 U
DB1-F-18-1.5	1.5	9/15/2003	20 U	0.03 U	0.00755 U
DB1-F-19-1	1	9/15/2003	30.9	0.03 U	0.00755 U
DB1-F-1wall-2.5	2.5	9/16/2003	20 U	0.03 U	0.00755 U
DB1-F-20-1	1	9/8/2003	26.6	0.03 U	0.00755 U
DB1-F-21-1.5	1.5	9/15/2003	20 U	0.03 U	0.00755 U
DB1-F-22-1	1	9/8/2003	29.1	0.03 U	0.00755 U
DB1-F-2-3	3	9/16/2003	20	0.03 U	0.00755 U
DB1-F-23-1	1	8/29/2003	20 U	0.03 U	0.00755 U
DB1-F-24-1	1	8/29/2003	20 U	0.03 U	0.00755 U
DB1-F-25-1.5	1.5	8/28/2003	174.2	0.03 U	0.00767
DB1-F-26-1.5	1.5	9/5/2003	20 U	0.03 U	0.00755 U
DB1-F-27-1.5	1.5	9/5/2003	20 U	0.03 U	0.00755 U
DB1-F-28-1	1	8/27/2003	20 U	0.03 U	0.00755 U
DB1-F-29-0.5	0.5	8/26/2003	20 U	0.03 U	0.00755 U
DB1-F-30-1	1	8/26/2003	24.42	0.03	0.00755 U
DB1-F-3-2.5	2.5	9/18/2003	20 U	0.03 U	0.00755 U

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
DB1-F-4-2	2	9/18/2003	20 U	0.03 U	0.00755 U
DB1-F-5-2	2	9/18/2003	20 U	0.03 U	0.00755 U
DB1-F-6-1.5	1.5	9/18/2003	20 U	0.03 U	0.00755 U
DB1-F-7-2	2	9/18/2003	20 U	0.03 U	0.00755 U
DB1-F-8-2	2	9/18/2003	20 U	0.03 U	0.00755 U
DB1-F-9-2	2	9/18/2003	20 U	0.03 U	0.00755 U
DB1-G-10-2	2	9/17/2003	50.05 U	0.08 U	0.018875 U
DB1-G-11-2	2	9/17/2003	47.05 U	0.07 U	0.01807 U
DB1-G-12-2	2	9/17/2003	20 U	0.03 U	0.00755 U
DB1-G-13-2	2	9/17/2003	79.8	0.09 U	0.02266 U
DB1-G-14-1	1	9/16/2003	60.75 U	0.09 U	0.02269 U
DB1-G-1-5	5	9/12/2003	20 U	0.03 U	0.00755 U
DB1-G-15-1	1	9/16/2003	40.55 U	0.06 U	0.01513 U
DB1-G-16-1	1	9/16/2003	64.5	0.07 U	0.017395 U
DB1-G-17-1	1	9/16/2003	20 U	0.06 U	0.01465 U
DB1-G-18-1	1	9/15/2003	20 U	0.03 U	0.00755 U
DB1-G-19-1.5	1.5	9/17/2003	203.4	0.03 U	0.00755 U
DB1-G-1wall-2.5	2.5	9/12/2003	20 U	0.03 U	0.00755 U
DB1-G-20-1	1	9/8/2003	62.2	0.03 U	0.00775
DB1-G-21-0.5	0.5	9/8/2003	58.3	0.03 U	0.03828
DB1-G-22-1	1	9/15/2003	20 U	0.03 U	0.00755 U
DB1-G-2-3	3	9/12/2003	20 U	0.03 U	0.00755 U
DB1-G-23-0.5	0.5	8/29/2003	20 U	0.03 U	0.00755 U
DB1-G-24-1	1	8/29/2003	20 U	0.03 U	0.00755 U
DB1-G-25-1.5	1.5	8/28/2003	36.08	0.03 U	0.00768
DB1-G-26-1.5	1.5	8/28/2003	41.15 U	0.06 U	0.015815 U
DB1-G-27-1	1	8/27/2003	96.2	0.03 U	0.00767
DB1-G-28-1	1	8/27/2003	56.4 U	0.09 U	0.02116 U
DB1-G-29-2.5	2.5	8/26/2003	20 U	0.03 U	0.00755 U
DB1-G-30-0.5	0.5	8/26/2003	20 U	0.03 U	0.00755 U
DB1-G-3-2	2	9/12/2003	20 U	0.03 U	0.00755 U
DB1-G-4-2.5	2.5	9/17/2003	20 U	0.03 U	0.00755 U
DB1-G-5-3	3	9/17/2003	20 U	0.03 U	0.00755 U
DB1-G-6-3	3	9/17/2003	20 U	0.03 U	0.00755 U
DB1-G-7-3	3	9/17/2003	48.65 U	0.07 U	0.01815 U
DB1-G-8-3	3	9/17/2003	46.15 U	0.07 U	0.017375 U
DB1-G-9-2	2	9/17/2003	20 U	0.03 U	0.00755 U
DB1-H-10-4	4	9/8/2003	20 U	0.03 U	0.00755 U
DB1-H-11-4.5	4.5	9/12/2003	20 U	0.03 U	0.00755 U
DB1-H-12-4	4	9/8/2003	28.9	0.03 U	0.00755 U
DB1-H-13-4	4	9/8/2003	20 U	0.03 U	0.00755 U
DB1-H-14-3	3	9/5/2003	20 U	0.03 U	0.00755 U
DB1-H-15-2	2	9/5/2003	42.7	0.03 U	0.00755 U
DB1-H-16-2	2	9/5/2003	25.8	0.03 U	0.00755 U
DB1-H-17-4	4	9/5/2003	20 U	0.03 U	0.00755 U
DB1-H-18-5	5	9/5/2003	42.3 U	0.06 U	0.015865 U
DB1-H-18wall-2	2	9/5/2003	20 U	0.03 U	0.00755 U

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
DB1-H-19-2	2	9/4/2003	20 U	0.03 U	0.00755 U
DB1-H-20-1.5	1.5	9/10/2003	20 U	0.03 U	0.00755 U
DB1-H-20wall-3	3	9/4/2003	20 U	0.03 U	0.00755 U
DB1-H-21-2	2	9/2/2003	20 U	0.03 U	0.00755 U
DB1-H-22-5	5	9/2/2003	20 U	0.03 U	0.00755 U
DB1-H-22wall-2	2	9/2/2003	20 U	0.03 U	0.00755 U
DB1-H-23-4	4	8/29/2003	26.8	0.03 U	0.00755 U
DB1-H-24-4	4	8/29/2003	31.7	0.03 U	0.00755 U
DB1-H-25-3	3	8/29/2003	20 U	0.03 U	0.00755 U
DB1-H-26-3	3	8/29/2003	20 U	0.03 U	0.00755 U
DB1-H-2-7	7	9/11/2003	20 U	0.03 U	0.00755 U
DB1-H-27-1.5	1.5	9/5/2003	20 U	0.03 U	0.00755 U
DB1-H-28-1	1	8/27/2003	20 U	0.03 U	0.00755 U
DB1-H-29-5	5	8/25/2003	20 U	0.03 U	0.00755 U
DB1-H-2wall-3	3	9/11/2003	20 U	0.03 U	0.00755 U
DB1-H-30-5	5	8/25/2003	20 U	0.03 U	0.00755 U
DB1-H-30wall-1	1	9/3/2003	44	0.03 U	0.00755 U
DB1-H-3-5	5	9/11/2003	20 U	0.03 U	0.00755 U
DB1-H-4-4	4	9/11/2003	20 U	0.03 U	0.00755 U
DB1-H-5-3	3	9/11/2003	20 U	0.03 U	0.00755 U
DB1-H-6-3	3	9/11/2003	20 U	0.03 U	0.00755 U
DB1-H-7-4	4	9/11/2003	20 U	0.03 U	0.00755 U
DB1-H-8-4	4	9/11/2003	20 U	0.03 U	0.00755 U
DB1-H-9-4	4	9/8/2003	20 U	0.03 U	0.00755 U
DB1-I-10-5	5	9/8/2003	20 U	0.03 U	0.00755 U
DB1-I-10wall-2	2	9/8/2003	46.55 U	0.07 U	0.017395 U
DB1-I-11-5	5	9/8/2003	20 U	0.03 U	0.00755 U
DB1-I-11wall-2	2	9/8/2003	20 U	0.03 U	0.00755 U
DB1-I-12-3	3	9/8/2003	26.4	0.03 U	0.00755 U
DB1-I-13-5	5	9/8/2003	20 U	0.03 U	0.00755 U
DB1-I-13wall-2	2	9/12/2003	20 U	0.03 U	0.00755 U
DB1-I-14-3	3	9/5/2003	20 U	0.03 U	0.0151 U
DB1-I-15-5	5	9/5/2003	20 U	0.03 U	0.00755 U
DB1-I-15wall-2	2	9/10/2003	20 U	0.03 U	0.00755 U
DB1-I-16-5	5	9/5/2003	20 U	0.03 U	0.00755 U
DB1-I-16wall-3	3	9/10/2003	20 U	0.03 U	0.00755 U
DB1-I-17-4	4	9/5/2003	20 U	0.03 U	0.00755 U
DB1-I-18-5	5	9/4/2003	20 U	0.03 U	0.00755 U
DB1-I-18wall-3	3	9/10/2003	25.4	0.03 U	0.00755 U
DB1-I-19-5	5	9/4/2003	20 U	0.03 U	0.00755 U
DB1-I-19wall-2	2	9/4/2003	20 U	0.03 U	0.00755 U
DB1-I-20-5	5	9/4/2003	20 U	0.03 U	0.00755 U
DB1-I-20wall-2	2	9/4/2003	45.1	0.03 U	0.00755 U
DB1-I-21-3	3	9/2/2003	20 U	0.03 U	0.00755 U
DB1-I-22-3	3	9/2/2003	20 U	0.03 U	0.00755 U
DB1-I-23-2	2	8/29/2003	20 U	0.03 U	0.00755 U
DB1-I-24-3	3	8/29/2003	20 U	0.03 U	0.00755 U

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
DB1-I-25-3	3	8/29/2003	20 U	0.03 U	0.00755 U
DB1-I-26-1	1	8/29/2003	20 U	0.03 U	0.00755 U
DB1-I-2-7	7	9/11/2003	20 U	0.03 U	0.00755 U
DB1-I-27-1	1	8/27/2003	20 U	0.03 U	0.00755 U
DB1-I-28-1	1	8/27/2003	20 U	0.03 U	0.00755 U
DB1-I-29-5	5	8/25/2003	20 U	0.03 U	0.00755 U
DB1-I-2wall-3	3	9/11/2003	20 U	0.03 U	0.00755 U
DB1-I-30-5	5	8/25/2003	20 U	0.03 U	0.00755 U
DB1-I-30wall-1	1	9/3/2003	20 U	0.03 U	0.00755 U
DB1-I-3-5	5	9/11/2003	20 U	0.03 U	0.00755 U
DB1-I-3wall-2	2	9/11/2003	54.4	0.03 U	0.00755 U
DB1-I-4-5	5	9/11/2003	20 U	0.03 U	0.00755 U
DB1-I-4wall-2	2	9/11/2003	20 U	0.03 U	0.00755 U
DB1-I-5-4	4	9/11/2003	20 U	0.03 U	0.00755 U
DB1-I-6-5	5	9/11/2003	20 U	0.03 U	0.00755 U
DB1-I-6wall-2	2	9/11/2003	20 U	0.03 U	0.00755 U
DB1-I-7-5	5	9/16/2003	20 U	0.03 U	0.00755 U
DB1-I-7wall-2.5	2.5	9/16/2003	38.5	0.03 U	0.00755 U
DB1-I-8-1	1	9/11/2003	86.2	0.03 U	0.00755 U
DB1-I-8wall-3	3	9/11/2003	20 U	0.03 U	0.00755 U
DB1-I-9-0.5	0.5	9/8/2003	105.5	0.09 U	0.02268 U
EX-A1-C-16-7	7	11/15/2007	23.3 U	0.0303 U	NA
EX-A1-C-16-NSW-3	3	11/15/2007	261	0.0301 U	0.00892
EX-A1-C-17-3	3	11/15/2007	213	0.06	0.0154
EX-A1-D-16-12	12	11/19/2007	23.6 U	0.0299 U	NA
EX-A1-D-17-12	12	11/15/2007	24.5 U	0.0294 U	NA
EX-A1-D-17-ESW-10	10	11/15/2007	22.8 U	0.0272 U	NA
EX-A1-D-17-ESW-5	5	11/15/2007	23 U	0.0316 U	NA
EX-A1-E-15-15	15	11/8/2007	24 U	0.0299 U	NA
EX-A1-E-16-15	15	11/8/2007	22.6 U	0.0279 U [0.0311 U]	NA [NA]
EX-A1-E-17-12	12	11/14/2007	23.7 U	0.0291 U	NA
EX-A1-E-17-ESW-4	4	11/15/2007	24 U	0.06	NA
EX-A1-F-15-15	15	11/8/2007	23.6 U	0.0270 U	NA
EX-A1-F-16-15	15	11/8/2007	23.3 U	0.14	NA
EX-A1-F-17-12	12	11/14/2007	24.1 U	0.0301 U	NA
EX-A1-F-17-3	3	10/29/2007	21.8 U	0.0267 U	NA
EX-A1-F-18-4	4	10/29/2007	1500 J	0.0979 [0.0591]	0.0432 [0.0441]
EX-A1-F-18-5	5	11/5/2007	22 U	0.0273 U [0.0291 U]	NA [NA]
EX-A1-G-15-15	15	11/8/2007	22.9 U	0.0289 U	NA
EX-A1-G-16-15	15	10/31/2007	23 U	0.04	NA
EX-A1-G-17-15	15	10/29/2007	23.5 U	0.0291 U	NA
EX-A1-H-15-15	15	11/8/2007	24.8 U	0.0291 U	NA
EX-A1-H-16-15	15	10/31/2007	23.1 U	0.0303 U	NA
EX-A1-H-17-15	15	10/29/2007	24.6 U	0.0298 U [0.0282 U]	NA [NA]
EX-A1-I-16-15	15	10/31/2007	24.2 U	0.0285 U	NA
EX-A1-I-17-15	15	10/29/2007	24.9 U	0.0317 U	NA
EX-A1-J-16-15	15	10/31/2007	24.8 U	0.0306 U	NA

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
EX-A1-J-17-15	15	10/29/2007	26.4 U	0.0316 U	NA
EX-A1-J-19-8	8	10/23/2007	24.6 U	0.0312 U	NA
EX-A1-K-17-15	15	10/30/2007	24.8 U	0.0308 U	NA
EX-A1-K-18-12	12	10/23/2007	22.8 U	0.0278 U	NA
EX-A1-K-18-SSW-3	3	10/30/2007	20.7 U	0.0282 U	NA
EX-A1-K-18-SSW-8	8	10/30/2007	22.3 U	0.0291 U	NA
EX-A1-K-19-3	3	10/30/2007	23 U	0.0322 U	NA
EX-A1-L-17-12	12	11/8/2007	22.9 U	0.12	NA
EX-A2-O-10-10	10	1/28/2008	119 J	0.0299 U	0.0239
EX-A2-O-11-10	10	1/28/2008	23 U	0.0270 U	NA
EX-A2-O-12-10	10	1/28/2008	25.3 U	0.0305 U	NA
EX-A2-O-13-10	10	1/28/2008	25.5 U	0.0351 U	NA
EX-A2-O-9-10	10	1/28/2008	852 J	0.369 U [0.344 U]	0.0515 [0.0484]
EX-A2-P-10-11	11	1/30/2008	25.2 U	0.0350 U	NA
EX-A2-P-11-11	11	1/30/2008	22.3 U	0.0301 U	NA
EX-A2-P-12-10	10	1/30/2008	62.7 J	0.0275 U	0.00921
EX-A2-P-13-10	10	1/30/2008	25.3 U	0.0318 U	NA
EX-A2-P-9-15	15	1/30/2008	23.5 U	0.0289 U	NA
EX-A2-Q-10-12	12	2/1/2008	23.9 U	0.0364 U	NA
EX-A2-Q-11-12	12	2/1/2008	24.4 U	0.0366 U	NA
EX-A2-Q-12-13	13	2/1/2008	24.1 U	0.0324 U	NA
EX-A2-Q-9-12	12	2/1/2008	23.4 U	0.0333 U	NA
EX-A2-R-10-12	12	2/15/2008	24.3 U	0.0422 U [0.0375 U]	NA [NA]
EX-A2-R-11-12	12	2/15/2008	28.2 U	0.0484 U	NA
EX-A2-R-12-12	12	2/15/2008	24.5 U	0.0380 U	NA
EX-A2-R-13-12	12	2/22/2008	26.7 U	0.0433 U	NA
EX-A2-S-12-12	12	2/22/2008	25.8 U	0.0406 U	NA
EX-A2-S-13-6	6	2/15/2008	932 J	0.0356 U	0.00861
EX-A3-AA-5-10	10	9/26/2007	23.9 U	0.0290 U	NA
EX-A3-AA-6-10	10	9/21/2007	21.6 U	0.0309 U	NA
EX-A3-AA-7-10	10	9/21/2007	24.7 U	0.0333 U	NA
EX-A3-AA-7-ESW-4	4	9/20/2007	24.8 U	0.0307 U	NA
EX-A3-BB-6-10	10	9/21/2007	24.7 U	0.0296 U [0.0299 U]	NA [NA]
EX-A3-BB-7-10	10	9/21/2007	23.4 U	0.07	NA
EX-A3-BB-7-ESW-4	4	9/21/2007	123	0.16	0.00997
EX-A3-CC-6-10	10	10/1/2007	28.7 J	2.76	NA
EX-A3-CC-7-10	10	10/1/2007	27.1	1.21 [1.73]	NA [NA]
EX-A3-CC-7-ESW-4	4	10/2/2007	156	0.11	0.00876
EX-A3-DD-6-10	10	10/2/2007	23.4 U	0.09	NA
EX-A3-Y-4-8	8	9/21/2007	19.9 U	0.0214 U	NA
EX-A3-Y-4-NSW-4	4	9/20/2007	317 J	0.0267 U	0.00868
EX-A3-Y-4-WSW-4	4	9/20/2007	19.1 U	0.0114 U	NA
EX-A3-Y-5-8	8	9/21/2007	20.4 U	0.0275 U	NA
EX-A3-Y-5-NSW-4	4	9/20/2007	252 J	0.0498 U	0.00880
EX-A3-Y-6-10	10	9/25/2007	26.6	0.39	NA
EX-A3-Y-6-NSW-4	4	9/20/2007	106 J	0.0232 U	0.00793
EX-A3-Z-4-10	10	9/21/2007	25.7	0.03	NA

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
EX-A3-Z-5-10	10	9/21/2007	22.6 U	0.0275 U	NA
EX-A3-Z-6-10	10	9/21/2007	37.4	0.19	0.00944
EX-A3-Z-7-10	10	9/21/2007	21.7 U	0.05	NA
EX-A3-Z-7-ESW-4	4	9/20/2007	20.2 U	0.0207 U	NA
EX-A4-F-9-9	9	10/17/2007	40.9	0.06	NA
EX-A4-F-9-ESW-4	4	10/17/2007	36.9	0.0349 U	0.0100
EX-A4-G-6-9	9	10/1/2007	24.8 U	0.0307 U	NA
EX-A4-G-7-9	9	9/27/2007	24.7 U	0.0295 U	NA
EX-A4-G-8-9	9	9/27/2007	23 U	0.0311 U	NA
EX-A4-G-9-9	9	10/17/2007	24.3 U	0.0295 U	NA
EX-A4-G-9-ESW-4	4	10/17/2007	87 J	0.0290 U [0.0283 U]	0.00853 [0.00868]
EX-A4-H-6-9	9	9/27/2007	24.2 U	0.0269 U [0.0295 U]	NA [NA]
EX-A4-H-7-9	9	9/27/2007	25.3 U	0.0318 U	NA
EX-A4-H-8-4	4	9/12/2007	2060 J	0.0286 U	0.0858
EX-A4-H-8-9	9	9/27/2007	24 U	0.09	NA
EX-A4-H-9-9	9	10/17/2007	33.1 U	0.32	NA
EX-A4-H-9-ESW-4	4	10/17/2007	256	0.0273 U	0.00861
EX-A4-I-6-9	9	9/21/2007	39.5 U	0.0565 U	NA
EX-A4-I-7-9	9	10/16/2007	24.3 U	0.0372 U	NA
EX-A4-I-8-9	9	10/16/2007	24.5 U	0.0396 U	NA
EX-A4-J-6-9	9	9/21/2007	23.6 U	0.0288 U	NA
EX-A4-J-6-SSW-9	9	9/21/2007	238	0.0304 U	0.0383
EX-A4-J-7-9	9	9/21/2007	23.8 U	0.0299 U	NA
EX-A4-J-7-SSW-4	4	9/21/2007	241	0.0342 U	0.0388
EX-A4-J-8-9	9	10/16/2007	23.7 U	0.0340 U	NA
EX-A4-K-8-9	9	10/16/2007	24.6 U	0.0367 U	NA
EX-AW-E-23-5(2)	5	9/17/2008	23.8 U	0.0363 U	NA
EX-AW-E-24-10	10	9/11/2008	45.6	0.0354 U	0.00891
EX-AW-E-24-NSW-5	5	9/11/2008	521 J	0.0363 U	0.00892
EX-AW-E-25-10	10	9/11/2008	122	0.0405 U	0.00982
EX-AW-E-25-ESW-5	5	9/11/2008	209 J	0.0327 U [0.0339 U]	0.00846 [0.00838]
EX-AW-E-25-NSW-5	5	9/11/2008	34.1	0.0373 U	0.00898
EX-AW-F-23-5(2)	5	9/12/2008	23.2 U	0.0339 U	NA
EX-AW-F-24-5	5	9/11/2008	31.1	0.0345 U	NA
EX-AW-F-25-5	5	9/11/2008	137 J	0.0277 U	0.0181
EX-AW-F-25-ESW-5	5	9/11/2008	79.7	0.0372 U	0.00846
EX-B10-N-6-10	10	2/8/2008	24.8 U	0.0361 U	NA
EX-B10-O-6-10	10	2/8/2008	24.5 U	0.0352 U	NA
EX-B10-O-7-12	12	1/16/2008	23.9 U	0.0302 U [0.0330 U]	NA [NA]
EX-B10-O-8-12	12	1/16/2008	24.9 U	0.0316 U	NA
EX-B10-P-6-10	10	2/8/2008	30.3	0.0400 U	NA
EX-B10-P-7-15	15	1/30/2008	32.7	0.0328 U	NA
EX-B10-P-8-15	15	1/30/2008	24 U	0.0322 U	NA
EX-B10-Q-6-11	11	2/8/2008	28.2	0.0343 U	NA
EX-B10-Q-7-15	15	1/30/2008	24.5 U	0.0309 U	NA
EX-B11-Q-8-14	14	1/30/2008	40.8 J	0.0306 U [0.0317]	0.00891 [NA]
EX-B11-R-6-5	5	2/8/2008	1860 J	0.0346 U [0.0340 U]	0.0224 [0.0258]

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
EX-B11-R-7-12	12	1/22/2008	23.5 U	0.03	NA
EX-B11-R-8-12	12	1/30/2008	34.6	0.03	NA
EX-B11-R-9-12	12	2/12/2008	23.3 U	0.06	NA
EX-B11-S-10-2	2	2/15/2008	25.7 U	0.0408 U	NA
EX-B11-S-11-12	12	2/14/2008	24.8 U	0.0398 U	NA
EX-B11-S-7-12	12	1/22/2008	27.2	0.04	NA
EX-B11-S-7-WSW-5	5	1/18/2008	21.5 U	0.0290 U	NA
EX-B11-S-8-12	12	1/30/2008	29.7	0.0287 U	NA
EX-B11-S-9-12	12	2/12/2008	122 J	0.04	0.00929
EX-B11-T-10-10	10	2/14/2008	24.3 U	0.0342 U	NA
EX-B11-T-11-12	12	2/14/2008	23 U	0.0306 U	NA
EX-B11-T-11-ESW-6	6	2/15/2008	25.1 U	0.0382 U	NA
EX-B11-T-7-12	12	1/22/2008	116 J	0.03	0.00891
EX-B11-T-7-WSW-5	5	1/18/2008	29 J	0.0290 U	NA
EX-B11-T-8-12	12	1/30/2008	27.4	0.23	NA
EX-B11-T-9-12	12	2/12/2008	25.1 U	0.19	NA
EX-B11-U-11-5	5	2/12/2008	563 J	0.0429 U	0.0260
EX-B11-U-7-5	5	1/18/2008	21.7 U	0.0290 U	NA
EX-B13-AA-2-10	10	9/26/2007	34.6	0.03	NA
EX-B13-AA-2-NSW-4	4	9/19/2007	139	0.0306 U	0.0126
EX-B13-AA-2-WSW-4	4	9/19/2007	21.8 U	0.0303 U	NA
EX-B13-AA-3-10	10	9/26/2007	25.2 U	0.0322 U	NA
EX-B13-AA-3-NSW-4	4	9/19/2007	20.6 U	0.0265 U	NA
EX-B13-AA-4-10	10	9/26/2007	23.1 U	0.0313 U	NA
EX-B13-BB-2-10	10	9/25/2007	23.5 U	0.0336 U	NA
EX-B13-BB-2-WSW-4	4	9/19/2007	1910 J	0.48	0.0335
EX-B13-BB-3-10	10	9/25/2007	21.2 U	0.0281 U [0.0319 U]	NA [NA]
EX-B13-BB-4-10	10	9/25/2007	24.6 U	0.0283 U	NA
EX-B13-BB-5-10	10	9/27/2007	22.4 U	0.0295 U	NA
EX-B13-CC-1-4	4	10/10/2007	52.4	0.0432 U	NA
EX-B13-CC-2-10	10	10/8/2007	22 U	0.0278 U	NA
EX-B13-CC-3-10	10	9/27/2007	23.5 U	0.0285 U	NA
EX-B13-CC-4-10	10	9/27/2007	23.4 U	0.0279 U	NA
EX-B13-CC-5-10	10	9/27/2007	24.3 U	0.0299 U	NA
EX-B13-DD-1-4	4	10/8/2007	29.1 U	0.0408 U	NA
EX-B13-DD-2-10	10	10/8/2007	23.1 U	0.0291 U	NA
EX-B13-DD-3-10	10	10/2/2007	21.8 U	0.0279 U	NA
EX-B13-DD-4-10	10	10/2/2007	25	0.17	NA
EX-B13-DD-5-10	10	10/2/2007	22.5 U	0.06	NA
EX-B13-EE-1-4	4	10/8/2007	23.7 U	0.0283 U	NA
EX-B13-EE-2-10	10	10/8/2007	22.5 U	0.0272 U	NA
EX-B13-EE-3-10	10	10/5/2007	22.6 U	0.0298 U	NA
EX-B13-EE-3-SSW-4	4	10/5/2007	28.3	0.05	NA
EX-B13-EE-4-10	10	10/5/2007	21.9 U	0.0296 U [0.0292 U]	NA [NA]
EX-B13-EE-4-SSW-4	4	10/5/2007	24.7 U	0.0314 U	NA
EX-B13-FF-2-4	4	10/9/2007	24.9 U	0.0302 U	NA
EX-B13-FF-3-10	10	10/9/2007	28.7	0.04	NA

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
EX-B13-FF-3-ESW-4	4	10/9/2007	24.7 U	0.0289 U	NA
EX-B13-GG-3-4	4	10/9/2007	24.9 U	0.14	NA
EX-B14-DD-7-2.5	2.5	8/23/2007	304	1.85	0.0121
EX-B14-DD-8-6	6	9/4/2007	160 J	0.0999 [0.0912]	0.00945 [0.00929]
EX-B14-DD-NSW-2.5	2.5	8/23/2007	350 J	0.0885 J [1.32 J]	0.0112 [0.0244]
EX-B14-EE-5-4	4	9/10/2007	466 J	0.40	NA
EX-B14-EE-6-8	8	9/10/2007	23.2 U	0.24	NA
EX-B14-EE-7-8	8	8/23/2007	36.1 U	0.0581 U	NA
EX-B14-EE-8-4	4	8/23/2007	24.7 U	0.26	NA
EX-B14-FF-6-4	4	9/7/2007	27.6	0.21	NA
EX-B14-FF-7-8	8	8/23/2007	41.6 U	0.0763 U	NA
EX-B14-FF-8-4SW	4	8/22/2007	671	0.0505 U	0.0119
EX-B14-FF-WSW-4	4	8/23/2007	115	0.10	0.0107
EX-B14-GG-7-8	8	8/23/2007	23.5 U	0.0266 U	NA
EX-B14-GG-WSW-4	4	8/23/2007	575	0.0275 U	0.0218
EX-B14-HH-6-4	4	8/23/2007	137	0.0302 U [0.0285 U]	0.0107 [0.0107]
EX-B14-HH-6F	6	8/23/2007	55.2	0.0260 U	0.0110
EX-B14-HH-7-4SW	4	8/23/2007	53.5 J	0.0277 U	0.0117
EX-B15-HH-2-4	4	8/28/2007	25.9 U	0.09	NA
EX-B15-HH-3-ESW-4	4	8/28/2007	23.5 U	0.0319 U	NA
EX-B15-HH-3-NSW-4	4	8/28/2007	25.4 U	0.36	NA
EX-B15-II-2-8	8	8/28/2007	39.5	0.06	NA
EX-B15-II-2-WSW-4	4	8/28/2007	51.9	1.10	NA
EX-B15-II-3-8	8	8/28/2007	22.6 U	0.0264 U	NA
EX-B15-II-4-ESW-4	4	8/28/2007	1040 J	0.0316 U	0.0115
EX-B16-MM-1-6SW	6	8/20/2007	1030 J	0.305 U	0.00911
EX-B17-RR-1-6SW	6	8/20/2007	128 J	0.0488 U	0.0113
EX-B17-SS-1-6SW	6	8/20/2007	23.3 U	0.0270 U	NA
EX-B18-UU-1-6SW	6	8/17/2007	1910 J	0.290 U [0.288 U]	0.0435 [0.0103]
EX-B18-VV-1-6SW	6	8/17/2007	4980 J	1.56 U	0.0457
EX-B1-C-46-4(2)	4	9/2/2008	142 J	0.0302 U	NA
EX-B1-C-47-4	4	8/8/2008	411 J	0.0309 U	0.0414 U
EX-B1-D-43-4	4	8/19/2008	2020 J	4.39	NA
EX-B1-D-44-12	12	8/18/2008	65.9	0.121 U	0.0369 U
EX-B1-D-44-NSW-4(2)	4	9/2/2008	287	0.05	0.0188
EX-B1-D-45-12	12	8/14/2008	102 J	0.224 [0.0598 U]	NA [NA]
EX-B1-D-45-NSW-4	4	9/2/2008	100 J	0.0316 U	0.0152
EX-B1-D-46-12	12	8/11/2008	237 J	0.113 U	0.0431
EX-B1-D-47-4	4	8/8/2008	277 J	0.0349 U	0.123
EX-B1-E-41-8	8	8/27/2008	336	0.0325 U	0.0205
EX-B1-E-41-NSW-4	4	8/27/2008	26.3	0.0314 U	NA
EX-B1-E-42-8	8	8/27/2008	265	0.0327 U	0.0172
EX-B1-E-42-NSW-4	4	8/27/2008	383	0.16	0.0714
EX-B1-E-43-12	12	8/21/2008	93 U	0.259 U	NA
EX-B1-E-44-12	12	8/19/2008	60.9 U	0.143 U	NA
EX-B1-E-45-12	12	8/14/2008	43.6 U	0.106 U	NA
EX-B1-E-46-12	12	8/13/2008	51.4 U	0.133 U	NA

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
EX-B1-E-47-4	4	8/8/2008	37.4	0.0336 U	0.0172
EX-B1-E-47-SSW-4(2)	4	9/2/2008	21.2 U	0.0280 U	NA
EX-B1-F-42-8	8	8/27/2008	270	0.0332 U	0.0165
EX-B1-F-42-SSW-4	4	8/27/2008	21.2 U	0.0327 U [0.0306 U]	NA [NA]
EX-B1-F-43-4	4	8/21/2008	542 J	0.0288 U	0.0184
EX-B1-F-45-10	10	8/15/2008	35 U	0.0671 U	NA
EX-B1-F-45-SSW-4	4	8/18/2008	232 J	0.0296 U	0.0719
EX-B1-F-47-4(2)	4	9/2/2008	21.5 U	0.0291 U	NA
EX-B20-F-19-6	6	10/18/2007	44.8	0.05	NA
EX-B20-F-19-NSW-3	3	10/26/2007	21.7 U	0.0271 U	NA
EX-B20-F-20-10	10	10/30/2007	71.4	0.0290 U	0.0230
EX-B20-F-20-NSW-4	4	10/30/2007	21.8 U	0.0286 U [0.0292 U]	NA [NA]
EX-B20-F-21-4	4	10/17/2007	23.6 U	0.0316 U	NA
EX-B20-G-13-12	12	11/26/2007	116 J	0.0268 U	0.00823
EX-B20-G-14-12	12	11/20/2007	23.6 U	0.0292 U	NA
EX-B20-G-14-WSW-4	4	11/20/2007	83.9	0.0299 U	0.00815
EX-B20-G-18-15	15	10/18/2007	23.7 U	0.0276 U	NA
EX-B20-G-19-15	15	10/18/2007	24.2 U	0.0377 U	NA
EX-B20-G-20-15	15	10/18/2007	23 U	0.04	NA
EX-B20-G-21-10	10	10/17/2007	1200 J	0.271 U	0.00944
EX-B20-G-21-ESW-5	5	10/26/2007	52.9	0.0273 U	0.00891
EX-B20-H-10-4	4	11/30/2007	345	0.0291 U	0.00858
EX-B20-H-11-4	4	11/29/2007	21.7 U	0.0298 U	NA
EX-B20-H-12-6	6	11/29/2007	52	0.0284 U [0.0291 U]	0.00823 [0.00831]
EX-B20-H-12-NSW-2	2	11/29/2007	22 U	0.0262 U	NA
EX-B20-H-13-12	12	11/26/2007	24.3 U	0.0330 U	NA
EX-B20-H-14-12	12	11/20/2007	89.4	0.0319 U	0.00959
EX-B20-H-14-WSW-4	4	11/20/2007	43.7	0.0277 U [0.0306 U]	0.00876 [0.00846]
EX-B20-H-18-15	15	10/18/2007	23.9 U	0.0299 U [0.0301 U]	NA [NA]
EX-B20-H-19-15	15	10/18/2007	23.5 U	0.0276 U	NA
EX-B20-H-20-15	15	10/18/2007	34.7	0.11	NA
EX-B20-H-21-10	10	10/18/2007	584	0.0683 U	0.0153
EX-B20-H-21-ESW-5	5	10/26/2007	80.4 J	0.0271 U	0.00891
EX-B20-I-10-10	10	11/29/2007	24.8 U	0.0308 U	NA
EX-B20-I-11-10	10	11/29/2007	29.3	0.0329 U	NA
EX-B20-I-11-NSW-6	6	11/29/2007	82.9 J	0.0299 U	0.00815
EX-B20-I-12-10	10	11/29/2007	27.6	0.0296 U	NA
EX-B20-I-13-12	12	11/26/2007	23 U	0.0291 U	NA
EX-B20-I-14-12	12	11/20/2007	25.4 U	0.0314 U	NA
EX-B20-I-15-15	15	11/5/2007	26.4 U	0.0315 U	NA
EX-B20-I-18-15	15	10/19/2007	24.6 U	0.04	NA
EX-B20-I-19-15	15	10/18/2007	26.3 U	0.0361 U [0.0326 U]	NA [NA]
EX-B20-I-20-8	8	10/18/2007	24.7 U	0.0303 U	NA
EX-B20-I-21-4	4	10/30/2007	92.3 J	0.0254 U	0.0231
EX-B20-I-9-9	9	10/17/2007	31 U	0.0440 U	NA
EX-B20-J-10-10	10	11/29/2007	40.4	0.0340 U	NA
EX-B20-J-11-11	11	12/13/2007	24.6 U	0.0301 U	NA

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
EX-B20-J-12-10	10	11/28/2007	24.2 U	0.03	NA
EX-B20-J-13-12	12	11/26/2007	23.8 U	0.0304 U	NA
EX-B20-J-14-12	12	11/20/2007	46.8	0.0302 U	0.00891
EX-B20-J-15-15	15	11/5/2007	25.9 U	0.0346 U	NA
EX-B20-J-18-15	15	10/19/2007	23.8 U	0.0293 U	NA
EX-B20-J-20-4	4	10/30/2007	34.3	0.0355 U	NA
EX-B20-J-9-9	9	10/17/2007	64.8 J	0.0310 U	0.00906
EX-B20-K-10-10	10	11/30/2007	25.2 U	0.0315 U	NA
EX-B20-K-11-10	10	11/29/2007	24.1 U	0.0290 U	NA
EX-B20-K-12-12	12	11/29/2007	25 U	0.0310 U	NA
EX-B20-K-13-12	12	11/26/2007	25.5 U	0.0305 U	NA
EX-B20-K-14-12	12	11/20/2007	23.9 U	0.0283 U	NA
EX-B20-K-15-15	15	11/5/2007	23.7 U	0.0282 U	NA
EX-B20-K-16-15	15	10/31/2007	24 U	0.0279 U	NA
EX-B20-K-7-5	5	1/10/2008	122 J	0.0349 U	0.00936
EX-B20-K-9-9	9	10/16/2007	29.8	0.0385 U	NA
EX-B20-L-10-10	10	11/30/2007	24.6 U	0.0310 U	NA
EX-B20-L-11-10	10	12/7/2007	25.6 U	0.0322 U	NA
EX-B20-L-12-12	12	11/29/2007	23.9 U	0.0321 U	NA
EX-B20-L-13-12	12	11/26/2007	24.9 U	0.0295 U	NA
EX-B20-L-14-12	12	11/20/2007	23.8 U	0.0292 U	NA
EX-B20-L-15-15	15	11/5/2007	23.9 U	0.0282 U	NA
EX-B20-L-16-15	15	10/31/2007	24.7 U	0.0297 U	NA
EX-B20-L-7-5	5	2/8/2008	191 J	0.0256 U	0.00956
EX-B20-L-8-10	10	12/11/2007	30	0.0337 U	NA
EX-B20-L-8-WSW5	5	1/7/2008	392 J	0.0410 [0.0430]	0.0104 [0.00973]
EX-B20-L-9-10	10	12/11/2007	25 U	0.0320 U	NA
EX-B20-M-10-12	12	12/7/2007	30.6	0.04	NA
EX-B20-M-11-12	12	12/7/2007	24.8 U	0.0314 U	NA
EX-B20-M-12-12	12	12/7/2007	21.8 U	0.0299 U [0.0310 U]	NA [NA]
EX-B20-M-13-14	14	12/7/2007	26.9 U	0.0332 U	NA
EX-B20-M-14-11	11	12/7/2007	23.4 U	0.0306 U	NA
EX-B20-M-15-11	11	12/7/2007	22.8 U	0.0316 U	NA
EX-B20-M-7-10	10	2/8/2008	24.1 U	0.0376 U	NA
EX-B20-M-8-12	12	1/16/2008	30.1	0.0297 U	NA
EX-B20-M-9-12	12	1/16/2008	31.4	0.0319 U	NA
EX-B20-N-10-12	12	1/8/2008	22.9 U	0.0292 U	NA
EX-B20-N-11-12	12	1/8/2008	26.7	0.0292 U	NA
EX-B20-N-12-12	12	1/8/2008	23.3 U	0.0282 U	NA
EX-B20-N-13-12	12	1/8/2008	24.3 U	0.0310 U	NA
EX-B20-N-14-12	12	12/11/2007	24.1 U	0.0308 U	NA
EX-B20-N-7-8	8	1/16/2008	29.1	0.0324 U	NA
EX-B20-N-7-WSW-4	4	1/16/2008	307 J	0.0293 U	0.0152
EX-B20-N-8-12	12	1/16/2008	25 U	0.0318 U	NA
EX-B20-N-9-12	12	1/16/2008	24.7 U	0.0313 U	NA
EX-B21-ESW-2	2	10/11/2007	22.2 U	0.0354 U	NA
EX-B21-FLOOR-4	4	10/11/2007	23.2 U	0.0303 U	NA

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
EX-B21-NSW-2	2	10/11/2007	59.5 J	0.0300 U	0.00883
EX-B2-E-33(2)-6	6	2/27/2008	354 J	0.0345 U	0.00872
EX-B2-E-33-6	6	2/25/2008	224 J	0.0326 U	0.00883
EX-B2-E-34-6	6	2/25/2008	187 J	0.0331 U	0.00923
EX-B2-E-35(3)-6	6	3/5/2008	1590 J	0.0370 U	0.0993
EX-B2-E-35-6	6	2/22/2008	2020 J	0.0336 U	0.117
EX-B2-E-36-6	6	2/27/2008	577 J	0.0420 U	0.0243
EX-B2-E-40-4	4	1/23/2008	100 J	0.0313 U	0.00922
EX-B2-E-41(2)-5	5	2/4/2008	1020 J	0.0289 U	0.0879
EX-B2-E-41-4	4	1/23/2008	403 J	0.0262 U [0.0264 U]	0.0528 [0.120]
EX-B2-F-32-12	12	3/3/2008	45 U	0.108 U	NA
EX-B2-F-33-12	12	2/28/2008	33 U	0.0656 U [0.0670 U]	NA [NA]
EX-B2-F-34-11	11	2/28/2008	32.5 U	0.0603 U	NA
EX-B2-F-35-12	12	2/25/2008	37.8 U	0.105 U	NA
EX-B2-F-36-13	13	2/22/2008	443	0.0790 U	0.0205
EX-B2-F-36-NSW-6	6	2/22/2008	356 J	0.0409 U	0.0305
EX-B2-F-37-13	13	2/22/2008	35.5 U	0.0705 U	NA
EX-B2-F-37-NSW-6	6	2/22/2008	64.4	0.0378 U	0.00929
EX-B2-F-38(2)-14	14	2/6/2008	31.5 U	0.0570 U	NA
EX-B2-F-38-8	8	1/31/2008	1930 J	0.0357 U	0.111
EX-B2-F-38-NSW(2)-5	5	2/6/2008	680 J	0.0350 J	0.0317
EX-B2-F-38-NSW(2)-6	6	3/5/2008	606 J	0.0307 U	0.0339
EX-B2-F-38-NSW-4	4	1/31/2008	61 J	0.0295 U [0.0212 U]	0.00831 [0.0287]
EX-B2-F-38-WSW-5	5	1/31/2008	173 J	0.0291 U	0.00909
EX-B2-F-39(2)-12	12	2/5/2008	31.4 U	0.0580 U	NA
EX-B2-F-39-8	8	1/28/2008	1270 J	0.0290 U [0.0287 U]	0.0894 [0.00886]
EX-B2-F-39-NSW-4	4	1/28/2008	56.3	0.0308 U	0.00853
EX-B2-F-40-8	8	1/25/2008	117	0.17	0.00914
EX-B2-F-41-8	8	1/23/2008	194 J	0.0288 U	0.00847
EX-B2-F-41-ESW(2)-5	5	2/4/2008	1120	3.30	0.0753
EX-B2-G-32-6	6	2/26/2008	2400 J	0.139 J	0.00959
EX-B2-G-33(2)-6	6	2/28/2008	60.3 J	0.0340 U	0.00891
EX-B2-G-34-10	10	2/25/2008	21.9 U	0.0308 U	NA
EX-B2-G-34-SSW-6	6	2/25/2008	75.9 J	0.0429 U	0.0323
EX-B2-G-35-10	10	2/22/2008	49.2 U	0.119 U	NA
EX-B2-G-35-SSW-6	6	2/22/2008	180 J	0.0361 U [0.0404 U]	0.0167 [0.0474]
EX-B2-G-36-12	12	2/22/2008	57.9	0.0423 U	0.0240
EX-B2-G-37-13	13	2/22/2008	25.9 U	0.0414 U	NA
EX-B2-G-38(2)-13	13	2/6/2008	23.5 U	0.0332 U	NA
EX-B2-G-38-8	8	1/31/2008	1440 J	0.0279 U	0.0702
EX-B2-G-38-WSW-5	5	1/31/2008	1070 J	0.0305 U	0.0516
EX-B2-G-39(2)-11	11	2/5/2008	42	0.0662 U	NA
EX-B2-G-39-SSW-4	4	1/28/2008	57.4	0.0271 U	0.00861
EX-B2-G-40-8	8	1/25/2008	106	0.0317 U	0.00883
EX-B2-G-40-SSW-4	4	1/25/2008	57.3	0.0287 U	0.00906
EX-B2-G-41-8	8	1/24/2008	296 J	0.0354 U	0.00891
EX-B2-G-41-ESW-4	4	1/24/2008	802	0.0356 U	0.0415

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
EX-B2-G-41-SSW-4	4	1/24/2008	80	0.0341 U	0.00853
EX-B2-H-35-6	6	2/27/2008	101	0.0833 U	0.0123
EX-B2-H-36-6	6	2/22/2008	771 J	0.0426 U	0.0225
EX-B2-H-37(2)-6	6	3/5/2008	900 J	0.0349 U	0.00868
EX-B2-H-38(2)-10	10	2/6/2008	22.1 U	0.0293 U	NA
EX-B2-H-38-WSW(2)-5	5	2/6/2008	231 J	0.0329 U	0.0160
EX-B3-E-32-6	6	2/26/2008	27.1 U	0.0474 U	NA
EX-B3-F-31-12	12	3/10/2008	31.5 U	0.0604 U	NA
EX-B3-F-31-NSW-6	6	3/10/2008	31.2	0.0306 U	0.00891
EX-B3-G-29-5	5	3/11/2008	23.1 U	0.0356 U	NA
EX-B3-G-29-NSW-4	4	3/11/2008	191 J	0.0313 U	0.0300
EX-B3-G-29-SSW-5	5	3/11/2008	22.7 U	0.0377 U [0.0345 U]	NA [NA]
EX-B3-G-30-12	12	3/11/2008	23.8 U	0.0352 U	NA
EX-B3-G-30-NSW-6	6	3/11/2008	302 J	0.11	0.0184
EX-B3-G-30-SSW-6	6	3/10/2008	22.8 U	0.0322 U	NA
EX-B3-G-31-12	12	3/10/2008	25 U	0.0368 U	NA
EX-B3-G-31-SSW-6	6	3/10/2008	49	0.0427 U	NA
EX-B4-B-23-6	6	2/25/2008	31.9 J	0.0297 U [0.0321 U]	0.0145 [NA]
EX-B4-B-24-6	6	2/25/2008	24.3 U	0.0366 U	NA
EX-B5-B-20(2)-4	4	2/28/2008	24.2 U	0.0354 U	NA
EX-B5-B-20-4	4	2/22/2008	1070	0.0363 U	0.111
EX-B6-C-15-3	3	11/19/2007	24.8 U	0.0335 U	NA
EX-B6-D-13-3	3	11/19/2007	87.6	0.0269 U	0.00846
EX-B6-D-14-10	10	11/19/2007	27.7	0.0321 U	NA
EX-B6-D-14-NSW-3	3	11/19/2007	29.3 U	0.0369 U	NA
EX-B6-D-15-12	12	11/19/2007	27.9	0.0332 U [0.0323 U]	NA [NA]
EX-B6-E-13-4	4	11/19/2007	261 J	0.0261 U [0.0270 U]	0.00853 [0.00853]
EX-B6-E-14-10	10	11/19/2007	23.8 U	0.0312 U	NA
EX-B6-F-14-10	10	11/19/2007	24.6 U	0.0302 U	NA
EX-B6-F-14-WSW-3	3	11/19/2007	58.7	0.0275 U	0.00846
EX-B8-G-4-9	9	10/1/2007	36	0.0308 U	0.00921
EX-B8-G-4-WSW-4	4	10/1/2007	384 J	0.0271 U	0.0808
EX-B8-G-5-9	9	10/1/2007	25.9 U	0.0319 U	NA
EX-B8-H-3-10	10	9/10/2008	24.6 U	0.0385 U	NA
EX-B8-H-3-NSW-5	5	9/10/2008	39.3	0.0322 U	0.0266
EX-B8-H-3-WSW-5	5	9/10/2008	404 J	0.0427 U	0.0439
EX-B8-H-4-9	9	10/1/2007	23.6 U	0.0324 U	NA
EX-B8-H-5-9	9	10/1/2007	24.2 U	0.0353 U	NA
EX-B8-I-3-10	10	9/10/2008	25.1 U	0.0412 U	NA
EX-B8-I-3-WSW-5(2)	5	9/11/2008	710	0.0525 U	0.0589
EX-B8-I-4-9	9	10/1/2007	23.8 U	0.08	NA
EX-B8-I-5-9	9	10/1/2007	23.6 U	0.0292 U	NA
EX-B8-J-3-10	10	9/10/2008	23.7 U	0.0369 U	NA
EX-B8-J-3-SSW-5	5	9/10/2008	653 J	0.0302 U [0.0338 U]	0.00793 U [0.00793 U]
EX-B8-J-3-WSW-5	5	9/10/2008	551 J	0.0302 U	0.00800 U

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Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
EX-B8-J-4-5	5	10/23/2007	315	0.0251 U	0.0170
EX-B8-J-4-SSW-2.5	2.5	10/23/2007	21.9 U	0.0331 U	NA
EX-B8-J-5-4	4	10/1/2007	82 J	0.0272 U	0.00831
EX-B8-J-5-9	9	10/1/2007	22.9 U	0.0366 U	NA
EX-B9-M-4-11	11	2/20/2008	23 U	0.0315 U	NA
EX-B9-M-4-NSW-6	6	2/19/2008	1410 J	0.329 U	0.00907
EX-B9-M-4-WSW-6	6	2/19/2008	1420 J	0.336 U	0.0173
EX-B9-M-5-11	11	2/19/2008	26.2 U	0.0411 U	NA
EX-B9-M-5-NSW-6	6	2/19/2008	167 J	0.0285 U	0.00823
EX-B9-M-6-11	11	2/19/2008	25 U	0.0364 U [0.0453 U]	NA [NA]
EX-B9-M-6-NSW-6	6	2/19/2008	39	0.0383 U	NA
EX-B9-N-3-5	5	9/9/2008	21.6 U	0.0331 U	NA
EX-B9-N-4-11	11	2/20/2008	24.1 U	0.0349 U	NA
EX-B9-N-4-WSW-6	6	2/20/2008	543 J	0.0338 U	0.00891
EX-B9-N-5-12	12	2/13/2008	23.6 U	0.0343 U	NA
EX-B9-O-3-10	10	9/9/2008	30.1	0.0353 U	NA
EX-B9-O-3-WSW-5	5	9/9/2008	21 U	0.0322 U	NA
EX-B9-O-4-12	12	2/20/2008	41.7	0.0373 U [0.0373 U]	NA [NA]
EX-B9-O-4-WSW-6	6	2/20/2008	88.4 J	0.0322 U	0.00800
EX-B9-O-5-12	12	2/13/2008	23.8 U	0.0365 U [0.0354 U]	NA [NA]
EX-B9-P-3-10	10	9/9/2008	32.4	0.0360 U	NA
EX-B9-P-3-SSW-5	5	9/9/2008	21.2 U	0.0320 U	NA
EX-B9-P-3-WSW-5	5	9/9/2008	20.8 U	0.0327 U	NA
EX-B9-P-4-12	12	2/20/2008	30.2	0.0396 U	NA
EX-B9-P-4-SSW(2)-6	6	2/25/2008	1510 J	0.332 U	0.0194
EX-B9-P-4-SSW-6	6	2/20/2008	2580 J	0.295 U	0.0316
EX-B9-P-4-WSW-6	6	2/20/2008	23.4 U	0.0333 U	NA
EX-B9-P-5-12	12	2/13/2008	22.9 U	0.0315 U	NA
EX-B9-Q-5-6	6	2/13/2008	93.4	0.0175 U	0.0145
EX-RRT-ZZ-2-4	4	8/1/2008	46.9	0.0552 U	NA
EX-RRT-ZZ-2-ESW-3	3	8/1/2008	78.2 J	0.0800 U	NA
EX-SDTI-5-NSW-4	4	8/22/2007	25 U	0.0320 U	NA
EX-SDTI-5-SSW-4	4	8/22/2007	25.6 U	0.0344 U	NA
EX-SDTI-ESW-4	4	8/22/2007	51.2	0.0400 U	0.0107
EX-SDTI-FF-S-8	8	8/22/2007	99.8	0.0333 U	0.00951
EX-SDTI-GG-ESW-4	4	8/22/2007	24 U	0.0304 U	NA
EX-SDTI-GG-S-8	8	8/22/2007	50.8	0.0286 U	0.00936
EX-SDTI-GG-WSW-4	4	8/22/2007	55.2	0.0322 U	0.00929
EX-SDTI-WSW-4	4	8/22/2007	30.8	0.08	NA
EX-WW-G-27-2SW	2	8/7/2007	67 J	0.0287 U	0.00924
EX-WW-G-27-4	4	8/7/2007	21.6 U	0.0299 U	NA
EX-WW-H-27-2.5	2.5	8/7/2007	79.6 J	0.0384 U	0.0321
EX-WW-H-28-2	2	8/7/2007	95.6 J	0.0294 U	0.00891
EX-WW-H-29-1	1	8/7/2007	101 J	0.0335 U	0.00808
EX-WW-I-26-1	1	8/7/2007	58.7 J	0.0254 U	0.00934
ISP-E-17-2	2	9/17/2008	20.8 U	0.0310 U	NA
ISP-E-18-2	2	9/17/2008	31.7	0.0312 U	0.0248

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Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
ISP-E-19-2	2	9/22/2008	96.9 J	0.0337 U	0.00868 U
ISP-E-20-2	2	9/22/2008	180 J	0.0333 U	0.0212
ISP-E-21-2	2	9/22/2008	55.6 J	0.0318 U	0.00850
ISP-F-17-2	2	9/17/2008	20.9 U	0.0319 U	NA
ISP-F-18-2	2	9/17/2008	64.1	0.0267 U	0.0170
ISP-F-19-2	2	9/22/2008	30.8	0.0329 U	0.0523
ISP-F-20-2	2	9/22/2008	28.1	0.0351 U	0.0498
ISP-F-21-2	2	9/22/2008	22.1 U	0.0344 U	NA
ISP-G-17-2	2	9/17/2008	20.9 U	0.0314 U	NA
ISP-G-18-2	2	9/17/2008	21.1 U	0.0314 U	NA
ISP-G-19-2(2)	2	9/25/2008	135	0.0344 U	0.0161
ISP-G-20-2	2	9/22/2008	27.7	0.0328 U	0.00823 U
ISP-G-21-2	2	9/22/2008	118 J	0.0322 U	0.0335
MW-129R-4.5	4.5	10/14/2008	1030 J	0.0303 U	0.0439
MW-129R-7.0	7	10/14/2008	3010	0.0446 U	0.0479 U
MW-502-6.0	6	10/14/2008	23.1 U	0.0337 U	NA
MW-511-8.5	8.5	10/14/2008	23.2 U	0.0378 U [0.0361 U]	NA [NA]
MW-527-12	12	6/22/2012	716	0.11 U W	NA
MW-527-13.5	13.5	6/22/2012	1620.5	0.11 U W	NA
MW-527-17	17	6/22/2012	15.45 U	0.068 U W	NA
MW-527-8	8	6/14/2012	352.4	0.02	NA
MW-527-9	9	6/22/2012	635.5	0.053 U W	NA
MW-528-15	15	6/22/2012	440	0.025 U W	NA
MW-528-17	17	6/22/2012	11.4 U	0.08	NA
MW-528-8	8	6/14/2012	26.55	0.02	NA
RRT-YY-2-6	6	8/4/2008	76.3 J	0.105 U	NA
RRT-YY-2-WSW-3	3	8/4/2008	63.3 J	0.0397 U [0.0357 U]	0.00808 U [0.00808 U]
RRT-ZZ-2-NSW-3	3	8/4/2008	93.5 J	0.0349 U	0.00853 U
RRT-ZZ-3-NSW-3	3	8/4/2008	23.8 U	0.0382 U	NA
SB-10-11.0	11	4/4/2008	23.2 U	0.0341 U [0.0350 U]	NA [NA]
SB-1-11.5	11.5	4/3/2008	22.5 U	0.0304 U	NA
SB-11-11.0	11	4/4/2008	29.5 U	0.0556 U	NA
SB-12-11.5	11.5	4/4/2008	24.1 U	0.0348 U	NA
SB-13-11	11	4/11/2008	26.8 U	0.0465 U	NA
SB-14-11	11	4/11/2008	25 U	0.0385 U	NA
SB-15-10.5	10.5	4/14/2008	23.9 U	0.0354 U [0.0366 U]	NA [NA]
SB-16-9.5	9.5	4/14/2008	21.9 U	0.0312 U	NA
SB-17-11.5	11.5	4/14/2008	23.3 U	0.0321 U	NA
SB-18-11	11	4/11/2008	1410 J	0.71	0.00842
SB-19-12	12	4/11/2008	22.5 U	0.0292 U	NA
SB-20-9.5	9.5	4/14/2008	23.3 U	0.0323 U	NA
SB-2-11	11	4/3/2008	32.4 U	0.0609 U	NA
SB-21-10.5	10.5	4/14/2008	24.4 U	0.0348 U	NA
SB-22-10	10	4/11/2008	24.5 U	0.0371 U [0.0371 U]	NA [NA]
SB-23-11	11	4/11/2008	24.3 U	0.0357 U	NA

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Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
SB-24-10	10	4/11/2008	25.9 U	0.0398 U	NA
SB-25-11	11	4/11/2008	24 U	0.0359 U	NA
SB-26-10.5	10.5	4/14/2008	23.2 U	0.0339 U	NA
SB-27-10	10	4/14/2008	307 J	0.20	0.00896
SB-28-9	9	4/11/2008	32.3	0.0313 U	0.00838 U
SB-29-9	9	4/8/2008	30.6	0.07	NA
SB-30-9.5	9.5	4/10/2008	23.2 U	0.0343 U	NA
SB-3-10.5	10.5	4/3/2008	23.8 U	0.0335 U	NA
SB-3-12	12	4/3/2008	23.9 U	0.0372 U	NA
SB-31-9.5	9.5	4/10/2008	26.1 U	0.0420 U	NA
SB-32-9.5	9.5	4/10/2008	29.7 U	0.0541 U [0.0538 U]	NA [NA]
SB-33-11	11	4/10/2008	27 U	0.0471 U	NA
SB-34-11	11	4/10/2008	23.5 U	0.0344 U	NA
SB-35-9	9	4/10/2008	25.9 U	0.0442 U	NA
SB-36-12	12	4/10/2008	21.2 U	0.0252 U	NA
SB-37-9	9	4/8/2008	23.8 U	0.224 [0.225]	NA [NA]
SB-38-10	10	4/8/2008	24.5 U	0.11	0.00929 U
SB-38-8.5	8.5	4/8/2008	24.1 U	0.07	NA
SB-39-14	14	4/10/2008	22.2 U	0.0285 U	NA
SB-40-11	11	4/10/2008	24.1 U	0.0365 U	NA
SB-4-10.5	10.5	4/4/2008	22.3 U	0.0307 U	NA
SB-41-10	10	4/10/2008	23.6 U	0.0346 U	NA
SB-42-10	10	4/9/2008	28.5 U	0.0464 U [0.0821]	NA [NA]
SB-43-11.5	11.5	4/9/2008	26.8 U	0.0420 U	NA
SB-44-11	11	4/9/2008	23.3 U	0.21	NA
SB-45-10	10	4/8/2008	22.9 U	0.21	NA
SB-46-10.5	10.5	4/8/2008	22.5 U	0.0311 U	NA
SB-46-6	6	4/8/2008	22.8 U	0.0323 U	NA
SB-47-10	10	4/9/2008	26.2 U	0.0437 U	NA
SB-48-11.5	11.5	4/9/2008	27.7 U	0.0459 U	NA
SB-49-10.5	10.5	4/9/2008	23.4 U	0.0333 U	NA
SB-50-10.5	10.5	4/9/2008	24.1 U	0.0350 U	NA
SB-5-11.5	11.5	4/4/2008	21.7 U	0.04	NA
SB-51-9.5	9.5	4/8/2008	24.1 U	0.0350 U	NA
SB-52-9.5	9.5	4/8/2008	22.6 U	0.0317 U	NA
SB-53-10.5	10.5	4/9/2008	33.8	0.0309 U	NA
SB-54-10.5	10.5	4/9/2008	24.3 U	0.0373 U	NA
SB-55-11.5	11.5	4/7/2008	32.5 U	0.0606 U	NA
SB-56-14.5	14.5	4/8/2008	23.3 U	0.0337 U	NA
SB-57-10.5	10.5	4/7/2008	22.3 U	0.0307 U	NA
SB-58-11.0	11	4/7/2008	23.3 U	0.0359 U	NA
SB-59-5.5	5.5	4/8/2008	22.5 U	0.0311 U	NA
SB-60-10.5	10.5	4/7/2008	39.4	0.0825 [0.0864]	NA [NA]
SB-6-11.0	11	4/4/2008	23.6 U	0.0356 U	NA
SB-61-10.5	10.5	4/7/2008	30.7 U	0.0511 U	NA
SB-62-10.5	10.5	4/7/2008	32.7 U	0.0607 U	NA
SB-63-6.0	6	4/7/2008	1010 J	0.157 J	NA

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
SB-64-5.5	5.5	4/7/2008	1010 J	0.139 J	0.0452 U
SB-64-7.0	7	4/7/2008	97.9	0.33	NA
SB-67-5.5	5.5	6/24/2008	24.1 U	0.0398 U	NA
SB-70-12.5	12.5	6/25/2008	23.4 U	0.0366 U	NA
SB-70-20.5	20.5	6/25/2008	23.4 U	0.0340 U	NA
SB-70-6.0	6	6/24/2008	22.1 U	0.0371 U	NA
SB-70-7.0	7	6/25/2008	23.2 U	0.0369 U	NA
SB-7-11.5	11.5	4/4/2008	22.9 U	0.0334 U	NA
SB-71-15.5	15.5	6/25/2008	50.9	0.0363 U	0.00876 U
SB-71-24.0	24	6/25/2008	23.7 U	0.0366 U	NA
SB-71-8.0	8	6/25/2008	23.6 U	0.0368 U	NA
SB-72-15.5	15.5	6/25/2008	24 U	0.0348 U	NA
SB-72-24.5	24.5	6/25/2008	25.2 U	0.0400 U [0.0421 U]	NA
SB-72-6.5	6.5	6/25/2008	23.6 U	0.0371 U	NA
SB-73-15.0	15	6/26/2008	24.1 U	0.0369 U	NA
SB-73-6.0	6	6/26/2008	26.5 U	0.0445 U	NA
SB-74-15	15	6/26/2008	24.5 U	0.0380 U	NA
SB-74-6.0	6	6/26/2008	24.4 U	0.0375 U	NA
SB-75-15.0	15	6/26/2008	24.9 U	0.0398 U	NA
SB-75-6.0	6	6/26/2008	24.7 U	0.0406 U	NA
SB-76-10.5	10.5	6/30/2008	2540 J	0.0501 U	0.190
SB-76-14	14	6/30/2008	23.4 U	0.0288 U [0.0355 U]	NA
SB-76-4.5	4.5	6/30/2008	29.1	0.0389 U	NA
SB-77-14	14	6/30/2008	23.5 U	0.0336 U	NA
SB-77-6	6	6/30/2008	24.2 U	0.0392 U	NA
SB-78-10	10	6/30/2008	35.1 J	0.0325 U	NA
SB-78-12.5	12.5	6/30/2008	24.3 U	0.0353 U	NA
SB-78-5.5	5.5	6/30/2008	1310	6.57 J	0.0183
SB-78-8.5	8.5	6/30/2008	22.8 U	0.0351 U	NA
SB-79-11.5	11.5	6/30/2008	27.5 U	0.0550 U	NA
SB-79-5	5	6/30/2008	22.1 U	0.0344 U	NA
SB-8-11.0	11	4/4/2008	22.5 U	0.05	NA
SB-81-15.5	15.5	6/30/2008	23.1 U	0.0333 U	NA
SB-81-5	5	6/30/2008	105 J	0.0301 U	0.0896
SB-81-9.5	9.5	6/30/2008	25.5 U	0.0414 U	NA
SB-82-7	7	7/1/2008	23.7 U	0.0349 U	NA
SB-82-9	9	7/1/2008	27.5 U	0.0455 U	NA
SB-83-7	7	7/1/2008	34.4	0.0333 U	0.00891
SB-83-8.5	8.5	7/1/2008	40.7	0.0502 U	0.0108
SB-84-6	6	7/1/2008	69.1	0.0610 U	0.0119
SB-84-8	8	7/1/2008	37 U	0.0745 U	NA
SB-85-5.5	5.5	7/2/2008	92.5	0.0357 U	0.0225
SB-85-7.5	7.5	7/2/2008	214 J	0.114 U	NA
SB-86-4.5	4.5	7/2/2008	112 J	0.0324 U	0.0182
SB-86-6.5	6.5	7/2/2008	29.1 U	0.0513 U	NA
SB-87-14.0	14	7/25/2008	24.7 U	0.05	NA
SB-87-6.0	6	7/25/2008	243 J	0.06	0.0535

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
SB-88-8.0	8	7/25/2008	137	0.0145 U	0.0167
SB-9-11.0	11	4/4/2008	22.8 U	0.04	NA
STRM-1floor-8	8	10/24/2003	20 U	0.03 U	0.00755 U
STRM-1wall-4	4	10/24/2003	20 U	0.03 U	0.00755 U
STRM-2Floor-6	6	10/28/2003	20 U	0.03 U	0.00755 U
STRM-2wallW-3	3	10/28/2003	1542.5 D	0.03 U	0.02155
STRM-3WallW-3	3	10/27/2003	20 U	0.03 U	0.00755 U
STRM-4wallW-3	3	10/24/2003	20 U	0.03 U	0.00755 U
SWLY-A-10wall-3.75	3.75	11/11/2003	20 U	0.03 U	0.00755 U
SWLY-A-11WALL-3.75	3.75	11/25/2003	35.84	0.03 U	0.00755 U
SWLY-A-12WALL-3.75	3.75	11/25/2003	1285.6 D	0.06 U	0.0906
SWLY-A-13WALL-3.75	3.75	11/25/2003	34.5	0.03 U	0.00755 U
SWLY-A-15wall-3.75	3.75	12/1/2003	111.6	0.03 U	0.03775 U
SWLY-A-17wall-3.75	3.75	12/1/2003	1779 D	0.12 U	0.0461
SWLY-A-18wall-3.75	3.75	12/2/2003	20 U	0.03 U	0.00755 U
SWLY-A-19wall-3.75	3.75	12/2/2003	131.5	0.11	0.00755 U
SWLY-A-1Wall-3.75	3.75	10/14/2003	20 U	0.03 U	0.03755
SWLY-A-20WALL-3.75	3.75	12/4/2003	43.5	0.03 U	0.02855
SWLY-A-21WALL-3.75	3.75	12/4/2003	59	0.13	0.00755 U
SWLY-A-2Wall-3.75	3.75	10/14/2003	20 U	0.03 U	0.00755 U
SWLY-A-3Wall-3.75	3.75	10/14/2003	222.4	0.03 U	0.03797
SWLY-A-4Wall-3.75	3.75	10/16/2003	555.5 D	0.03 U	0.02108
SWLY-A-7WALL-3.75	3.75	11/6/2003	1178 D	0.30 U	0.00763
SWLY-A-8WALL-3.75	3.75	11/6/2003	724 D	0.06 U	0.00755 U
SWLY-C-1Wall-3.75	3.75	10/16/2003	20 U	0.03 U	0.00755 U
SWLY-D-1Wall-3.75	3.75	10/16/2003	20 U	0.03 U	0.00755 U
SWLY-D-21wall-3.75	3.75	12/5/2003	163.6	0.03 U	0.00834
SWLY-D-2Wall-3.75	3.75	10/16/2003	120.4	0.03 U	0.00755 U
SWLY-D-3 Wall-3.75	3.75	10/17/2003	2923.2 D	4.47 D	0.02865
SWLY-D-4Wall-3.75	3.75	10/21/2003	20 U	0.03 U	0.00755 U
SWLY-D-5WALL-3.75	3.75	11/6/2003	109.4	0.03 U	0.00755 U
SWLY-D-6WALL-3.75	3.75	11/6/2003	20 U	0.03 U	0.00755 U
SWLY-D-7Wall-3.75	3.75	11/10/2003	20 U	0.03 U	0.00755 U
SWLY-D-7-Wall-3.75	3.75	11/7/2003	20 U	0.03 U	0.00755 U
SWLY-E-10-3.75	3.75	11/12/2003	93.1	0.03 U	0.00755 U
SWLY-E-11-3.75	3.75	11/13/2003	20 U	0.03 U	0.00755 U
SWLY-E-21wall-3.75	3.75	12/5/2003	162.5	0.03 U	0.00773
SWLY-E-8wall-3.75	3.75	11/11/2003	20 U	0.03 U	0.00755 U
SWLY-E-9wall-3.75	3.75	11/11/2003	20 U	0.03 U	0.00755 U
SWLY-F-12-3.75	3.75	11/14/2003	25.8	0.03 U	0.00755 U
SWLY-F-13-3.75	3.75	11/14/2003	20 U	0.03 U	0.00755 U
SWLY-F-21wall-3.75	3.75	11/24/2003	20 U	0.03 U	0.00755 U
SWLY-G-14-3.75	3.75	11/17/2003	20 U	0.30	0.00755 U
SWLY-G-15-3.75	3.75	11/20/2003	20 U	0.03 U	0.00782
SWLY-G-16-3.75	3.75	11/20/2003	36.9	0.03 U	0.00755 U
SWLY-G-17-3.75	3.75	11/20/2003	20 U	0.03 U	0.00755 U
SWLY-G-21wall-3.75	3.75	11/24/2003	20 U	0.03 U	0.00755 U

Table 2: Samples Used to Calculate 95 Percent Upper Confidence Limits on the Means

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	TPH (mg/kg)[1]	Benzene (mg/kg)[2]	Total cPAHs TEQ (mg/kg)[3]
SWLY-H-18-3.75	3.75	11/21/2003	20 U	0.03 U	0.00755 U
SWLY-H-19-3.75	3.75	11/21/2003	20 U	0.03 U	0.00755 U
SWLY-H-21wall-3.75	3.75	11/24/2003	20 U	0.03 U	0.00755 U
SWLY-I-20wall-3.75	3.75	11/24/2003	20 U	0.03 U	0.00755 U
SWLY-I-21wall-3.75	3.75	11/24/2003	1255.9 D	0.03 U	0.03775 U

Notes:
Benzene analyzed by Environmental Protection Agency (EPA) Method 8021B.
cPAHs analyzed by EPA Method 8270 SIM.
Gasoline analyzed by method NWTPH-G.
Diesel and Heavy Oil (Lube) analyzed by method NWTPH-D Extended.
[1]Total petroleum hydrocarbons (TPH) calculated by summing the concentrations of gasoline, diesel and heavy oil. If one or more TPH constituents were reported as Non-Detect, half of the reporting limit value was added to the total.
[2]If benzene was reported as non-detect, the value shown is the reporting limit. Half of the reporting limit value shown in this table was used in the statistical analysis.

[3] Total carcinogenic polynuclear aromatic hydrocarbons (cPAHs) adjusted for toxicity (TEQ) according to WAC 173-340-708(8). If one or more adjusted cPAH constituents were reported as Non-Detect, half of the reporting limit was used in calculations.
NA = indicates analysis not conducted.
[ ] = bracketed data indicate duplicate sample.
D: sample was diluted
U: not detected
J: indicates an estimated value.
W: reporting limits were raised due to sample foaming
mg/kg = milligrams per kilogram

Table 3: Samples Located in the Areas of Future Remedial Actions

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	Sample Location
B10-0.5-1	0.5-1	8/25/2011	Within planned excavation area near Detention Basin No 2 (DB-2)
B10-1.5-2	1.5-2	8/25/2011	
B10-2.5-3	2.5-3	8/25/2011	
B10-3.5-4	3.5-4	8/25/2011	
B11-10-10.5	10-10.5	8/23/2011	
B11-11-11.5	11-11.5	8/23/2011	
B11-13.5-14	13.5-14	8/23/2011	
B11-4.5-5	4.5-5	8/23/2011	
B11-7.5-8	7.5-8	8/23/2011	
B11-8.5-9	8.5-9	8/23/2011	
B11-9.5-10	9.5-10	8/23/2011	
B13-10-10.5	10-10.5	8/23/2011	
B13-11.5-12	11.5-12	8/23/2011	
B13-4.5-5	4.5-5	8/23/2011	
B13-6-6.5	6-6.5	8/23/2011	
B13-7-7.5	7-7.5	8/23/2011	
B13-9-9.5	9-9.5	8/23/2011	
B16-3.5-4	3.5-4	8/24/2011	
B16-4.5-5	4.5-5	8/24/2011	
B16-4-4.5	4-4.5	8/24/2011	
B16-6-6.5	6-6.5	8/24/2011	
B17-3.5-4	3.5-4	8/24/2011	
B17-4.5-5	4.5-5	8/24/2011	
B17-4-4.5	4-4.5	8/24/2011	
B17-5.5-6	5.5-6	8/24/2011	
B4-13-13.5	13-13.5	8/22/2011	
B4-14.5-15	14.5-15	8/22/2011	
B4-4.5-5	4.5-5	8/22/2011	
B4-9.5-10	9.5-10	8/22/2011	
B5-11.5-12	11.5-12	8/22/2011	
B5-13.5-14	13.5-14	8/22/2011	
B5-4.5-5	4.5-5	8/22/2011	
B5-9-9.5	9-9.5	8/22/2011	
B6-11-11.5	11-11.5	8/22/2011	
B6-13-13.5	13-13.5	8/22/2011	
B6-4.5-5	4.5-5	8/22/2011	
B6-7-7.5	7-7.5	8/22/2011	
B6-9-9.5	9-9.5	8/22/2011	
B7-14-14.5	14-14.5	8/22/2011	

Table 3: Samples Located in the Areas of Future Remedial Actions

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	Sample Location
B7-4.5-5	4.5-5	8/22/2011	Within planned excavation area near Detention Basin No 2 (DB-2)
B7-8-8.5	8-8.5	8/22/2011	
B7-9.5-10	9.5-10	8/22/2011	
B8-11-11.5	11-11.5	8/23/2011	
B8-13.5-14	13.5-14	8/23/2011	
B8-14.5-15	14.5-15	8/23/2011	
B8-4.5-5	4.5-5	8/23/2011	
B8-7.5-8	7.5-8	8/23/2011	
B8-9.5-10	9.5-10	8/23/2011	
B9-10.5-11	10.5-11	8/23/2011	
B9-11-11.5	11-11.5	8/23/2011	
B9-12.5-13	12.5-13	8/23/2011	
B9-4.5-5	4.5-5	8/23/2011	
B9-8.5-9	8.5-9	8/23/2011	
B9-9.5-10	9.5-10	8/23/2011	
EX-A4-F-6-4	4	9/12/2007	
EX-A4-F-7-4	4	9/12/2007	
EX-A4-F-8-6	6	10/17/2007	
EX-A4-F-8-7	7	11/7/2007	
EX-A4-F-8-NSW-3.5	3.5	11/13/2007	
EX-A4-F-8-NSW-4	4	11/7/2007	
EX-A4-F-9-NSW-3.5	3.5	11/7/2007	
EX-A4-F-9-NSW-4	4	10/17/2007	
EX-B7-B4-4	4	8/1/2008	
EX-B7-B-4-5	5	9/10/2008	
EX-B8-F-4-4	4	10/1/2007	
EX-B8-F-4-9	9	10/22/2007	
EX-B8-F-4-NSW-4	4	10/22/2007	
EX-B8-F-4-WSW-4	4	10/1/2007	
EX-B8-F-5-4	4	10/1/2007	
EX-B8-F-5-NSW-6	6	10/9/2007	
MW-510-12.5	12.5	10/8/2008	
MW-510-6.5	6.5	10/8/2008	

Table 3: Samples Located in the Areas of Future Remedial Actions

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	Sample Location
EX-A2-N-16-SSW-6	6	2/20/2008	Within radius of influence (ROI) of the dual-phase extraction (DPE) system near the Washington State Department of Transportation (WSDOT) stormwater line
EX-A2-O-15-SSW-6	6	2/20/2008	
EX-A2-P-14-12	12	2/22/2008	
EX-A2-Q-13-12	12	2/22/2008	
EX-A2-Q-14-6	6	2/20/2008	
EX-A2-R-14-6	6	2/20/2008	
EX-A2-S-12-SSW-6	6	2/15/2008	
EX-A3-Y-7-10	10	9/25/2007	
EX-A3-Y-7-ESW-4	4	9/20/2007	
EX-A3-Y-7-NSW-4	4	9/20/2007	
EX-B11-U-10-10	10	2/14/2008	
EX-B11-U-10-SSW-5	5	2/12/2008	
EX-B11-U-8-14	14	1/30/2008	
EX-B11-U-9-12	12	1/31/2008	
EX-B11-V-8-5	5	1/31/2008	
EX-B11-V-9-5	5	1/31/2008	
EX-B20-M-16-15	15	11/9/2007	
EX-B20-M-16-SSW-12	12	11/9/2007	
EX-B20-M-17-10	10	11/9/2007	
EX-B20-M-17-ESW-5	5	11/9/2007	
EX-B20-M-17-SSW-6	6	1/28/2008	
EX-B20-N-15-12	12	12/11/2007	
EX-B20-N-16-12	12	11/13/2007	
EX-B20-O-14-12	12	1/18/2008	
EX-B20-O-15-12	12	1/18/2008	
MW-525-10.5	10.5	6/18/2012	
MW-525-12.5	12.5	6/18/2012	
MW-525-4	4	6/14/2012	
MW-525-6	6	6/14/2012	
MW-526-12.5	12.5	6/18/2012	
MW-526-4	4	6/14/2012	
MW-531-12	12	6/18/2012	
MW-531-6	6	6/14/2012	
MW-532-10	10	6/18/2012	
MW-532-13.5	13.5	6/18/2012	
MW-532-6	6	6/18/2012	
MW-532-7	7	6/18/2012	
SB-65-16.0	16	6/26/2008	
SB-65-20	20	6/26/2008	

Table 3: Samples Located in the Areas of Future Remedial Actions

Sample Identification (ID)	Sample Depth (feet bgs)	Sample Date	Sample Location
SB-65-23	23	6/26/2008	Within radius of influence (ROI) of the dual-phase extraction (DPE) system near the Washington State Department of Transportation (WSDOT) stormwater line
SB-65-6.5	6.5	6/26/2008	
SB-65-8.0	8	6/26/2008	
SB-66-11.5	11.5	6/30/2008	
SB-66-15	15	6/30/2008	
SB-66-6.0	6	6/26/2008	
SB-68-13.5	13.5	6/25/2008	
SB-68-15.0	15	6/25/2008	
SB-68-4.0	4	6/24/2008	
SB-68-5.5	5.5	6/24/2008	
SB-69-12.0	12	6/26/2008	
SB-69-15.0	15	6/26/2008	
SB-69-6.0	6	6/26/2008	
SB-80-11.0	11	6/26/2008	
SB-80-7.5	7.5	6/26/2008	

feet bgs: feet below ground surface

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASABILITY STUDY REPORT - APPENDIX E

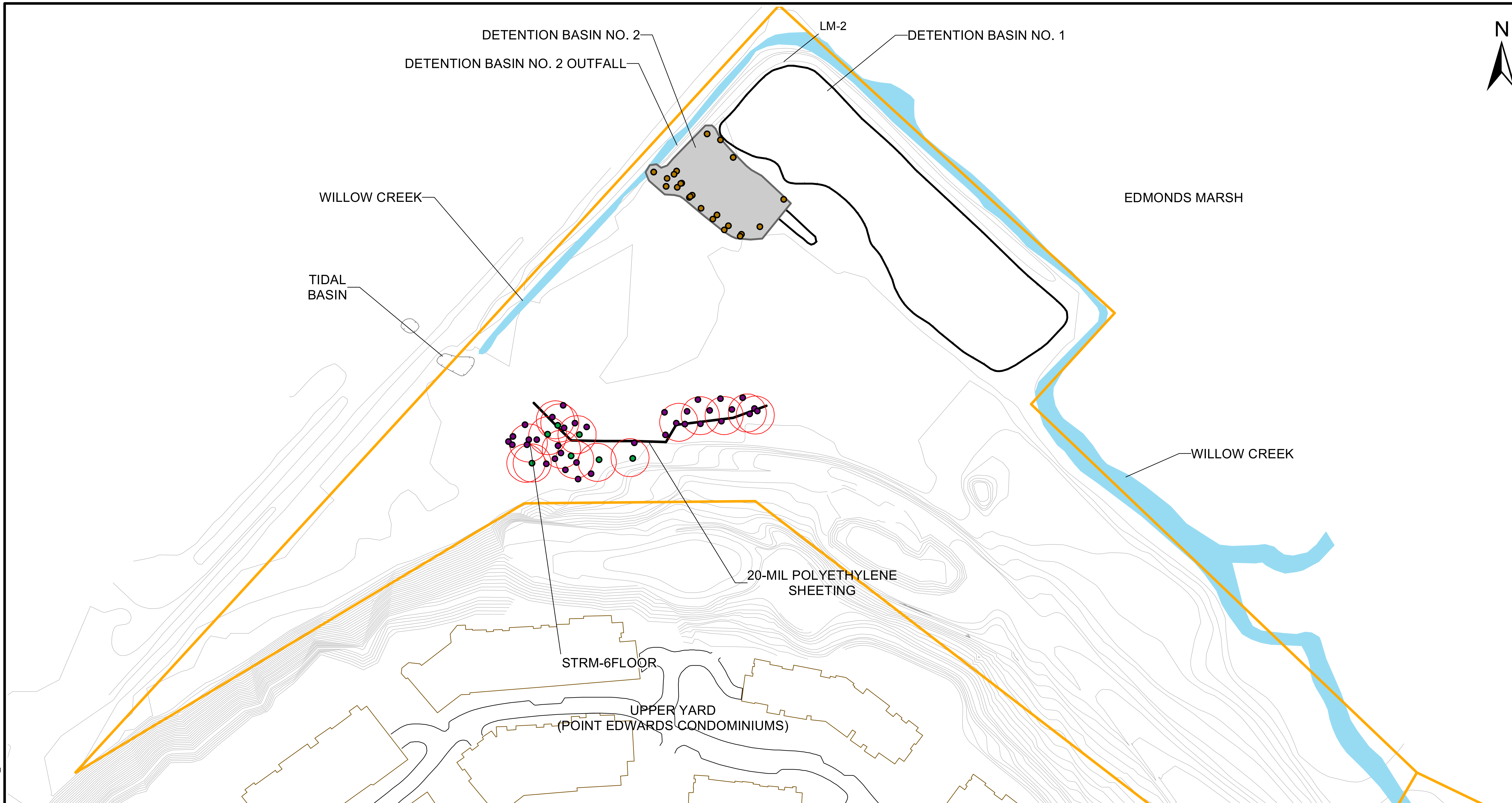
Table 4: Data Summary and 95 Percent Upper Confidence Levels on the Mean

Constituent	Total Number of Samples	Detection Frequency (%) [a]	Minimum (mg/kg)	Maximum (mg/kg)	Mean of Detects (mg/kg)	95% UCL (mg/kg)	95% UCL Method	EPC [b] (mg/kg)	Basis for EPC	REL or CUL (mg/kg)	Does EPC Exceed REL or CUL?
Benzene	988	10%	0.00095	6.57	0.0573	0.104	95% Chebyshev (Mean, Sd) UCL	0.104	95% UCL	18	No
Benzene - detects only	100	100%	0.004	6.57	0.391	0.824	95% Chebyshev (Mean, Sd) UCL	0.824	95% UCL	18	No
cPAH TEQ	575	37%	0.0005213	0.19	0.0146	0.0181	95% Chebyshev (Mean, Sd) UCL	0.0181	95% UCL	0.14	No
cPAH TEQ - detects only	214	100%	0.0005213	0.19	0.024	0.0321	95% Chebyshev (Mean, Sd) UCL	0.0321	95% UCL	0.14	No
TPH	988	35%	5.5	4980	135	188	95% Chebyshev (Mean, Sd) UCL	188	95% UCL	2,775	No
TPH - detects only	348	100%	8.45	4980	340	478	95% Chebyshev (Mean, Sd) UCL	478	95% UCL	2,775	No

Notes:
[a] The detection frequency represents the detection frequency of the raw data set (i.e., before non-detects were treated as detects at one-half the reporting limit.
[b] The exposure point concentration (EPC) is the lower of the 95% UCL (USEPA 2016) or the maximum detected concentration. A minimum of eight samples and five detections is required to calculate a 95% UCL. When these criteria are not met, the maximum detected concentration is selected as the EPC.

Abbreviations:
% = percent
cPAH TEQ = carcinogenic polycyclic aromatic hydrocarbons adjusted for toxicity
CUL = cleanup level
mg/kg = milligram per kilogram
REL = remediation level
Sd = standard deviation
TPH = total petroleum hydrocarbons
UCL = upper confidence limit

References:
USEPA. 2016. ProUCL Statistical Program—Version 5.1.002. May. Available at: https://www.epa.gov/land-research/proucl-software.



0 150 300

SCALE IN FEET

LEGEND

- ESTIMATED DPE ROI - 30 FOOT RADIUS OF INFLUENCE
- EXCAVATION BOUNDARY
- LOWER YARD PROPERTY BOUNDARY

NOTES:
1. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL.
2. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.

TPH - TOTAL PETROLEUM HYDROCARBONS
MG/KG - MILLIGRAMS PER KILOGRAM
CPAH - CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS, ADJUSTED FOR TOXICITY
CUL - CLEANUP LEVEL

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
FINAL FEASABILITY STUDY REPORT - APPENDIX E

Samples Located in the Areas of Future Remedial Actions

ARCADIS

FIGURE
1

Attachment 1: ProUCL Output

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.15/3/2017 11:06:42 AM
From File	Updated B_TPH_cPAH for ProUCL.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (benzene - detects only)

General Statistics

Total Number of Observations	100	Number of Distinct Observations	94
		Number of Missing Observations	0
Minimum	0.004	Mean	0.391
Maximum	6.57	Median	0.0989
SD	0.994	Std. Error of Mean	0.0994
Coefficient of Variation	2.54	Skewness	4.307

Normal GOF Test

Shapiro Wilk Test Statistic	0.401	Shapiro Wilk GOF Test
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.385	Lilliefors GOF Test
5% Lilliefors Critical Value	0.0889	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.556	95% Adjusted-CLT UCL (Chen-1995)	0.6
		95% Modified-t UCL (Johnson-1978)	0.563

Gamma GOF Test

A-D Test Statistic	9.974	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.815	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.244	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.0944	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.533	k star (bias corrected MLE)	0.523
Theta hat (MLE)	0.734	Theta star (bias corrected MLE)	0.747
nu hat (MLE)	106.5	nu star (bias corrected)	104.7
MLE Mean (bias corrected)	0.391	MLE Sd (bias corrected)	0.541
		Approximate Chi Square Value (0.05)	82.06
Adjusted Level of Significance	0.0476	Adjusted Chi Square Value	81.77

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.499	95% Adjusted Gamma UCL (use when n<50)	0.501

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.921	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk P Value	2.1045E-6	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.109	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.0889	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.521	Mean of logged Data	-2.12
Maximum of Logged Data	1.883	SD of logged Data	1.298

Assuming Lognormal Distribution

95% H-UCL	0.39	90% Chebyshev (MVUE) UCL	0.415
95% Chebyshev (MVUE) UCL	0.478	97.5% Chebyshev (MVUE) UCL	0.566
99% Chebyshev (MVUE) UCL	0.739		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Attachment 1: ProUCL Output

Nonparametric Distribution Free UCLs

95% CLT UCL	0.555	95% Jackknife UCL	0.556
95% Standard Bootstrap UCL	0.554	95% Bootstrap-t UCL	0.648
95% Hall's Bootstrap UCL	0.599	95% Percentile Bootstrap UCL	0.563
95% BCA Bootstrap UCL	0.614		
90% Chebyshev(Mean, Sd) UCL	0.689	95% Chebyshev(Mean, Sd) UCL	0.824
97.5% Chebyshev(Mean, Sd) UCL	1.012	99% Chebyshev(Mean, Sd) UCL	1.38

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL 0.824

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (benzene)

General Statistics

Total Number of Observations	988	Number of Distinct Observations	317
		Number of Missing Observations	0
Minimum	9.5000E-4	Mean	0.0573
Maximum	6.57	Median	0.015
SD	0.335	Std. Error of Mean	0.0107
Coefficient of Variation	5.851	Skewness	13.79

Normal GOF Test

Shapiro Wilk Test Statistic	0.126	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.433	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0285	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0749	95% Adjusted-CLT UCL (Chen-1995)	0.0799
		95% Modified-t UCL (Johnson-1978)	0.0756

Gamma GOF Test

A-D Test Statistic	1.012E+28	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.814	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.38	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.0304	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.596	k star (bias corrected MLE)	0.595
Theta hat (MLE)	0.0961	Theta star (bias corrected MLE)	0.0963
nu hat (MLE)	1179	nu star (bias corrected)	1176
MLE Mean (bias corrected)	0.0573	MLE Sd (bias corrected)	0.0743
		Approximate Chi Square Value (0.05)	1098
Adjusted Level of Significance	0.0498	Adjusted Chi Square Value	1098

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0614	95% Adjusted Gamma UCL (use when n<50)	0.0614

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.613	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.295	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.0285	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.959	Mean of logged Data	-3.896
Maximum of Logged Data	1.883	SD of logged Data	0.86

Attachment 1: ProUCL Output

Assuming Lognormal Distribution

95% H-UCL	0.0311	90% Chebyshev (MVUE) UCL	0.0322
95% Chebyshev (MVUE) UCL	0.0335	97.5% Chebyshev (MVUE) UCL	0.0353
99% Chebyshev (MVUE) UCL	0.0387		

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0749	95% Jackknife UCL	0.0749
95% Standard Bootstrap UCL	0.0748	95% Bootstrap-t UCL	0.0848
95% Hall's Bootstrap UCL	0.0807	95% Percentile Bootstrap UCL	0.0762
95% BCA Bootstrap UCL	0.0807		
90% Chebyshev(Mean, Sd) UCL	0.0893	95% Chebyshev(Mean, Sd) UCL	0.104
97.5% Chebyshev(Mean, Sd) UCL	0.124	99% Chebyshev(Mean, Sd) UCL	0.163

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	0.104

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cPAH TEQ - detects only)

General Statistics

Total Number of Observations	214	Number of Distinct Observations	164
		Number of Missing Observations	0
Minimum	5.2130E-4	Mean	0.024
Maximum	0.19	Median	0.0112
SD	0.0272	Std. Error of Mean	0.00186
Coefficient of Variation	1.133	Skewness	2.602

Normal GOF Test

Shapiro Wilk Test Statistic	0.69	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.227	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.061	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0271	95% Adjusted-CLT UCL (Chen-1995)	0.0274
		95% Modified-t UCL (Johnson-1978)	0.0271

Gamma GOF Test

A-D Test Statistic	9.967	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.779	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.189	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.0636	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.186	k star (bias corrected MLE)	1.173
Theta hat (MLE)	0.0202	Theta star (bias corrected MLE)	0.0205
nu hat (MLE)	507.8	nu star (bias corrected)	502
MLE Mean (bias corrected)	0.024	MLE Sd (bias corrected)	0.0222
		Approximate Chi Square Value (0.05)	451
Adjusted Level of Significance	0.0489	Adjusted Chi Square Value	450.7

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0267	95% Adjusted Gamma UCL (use when n<50)	0.0267

Attachment 1: ProUCL Output

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.21	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.061	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.559	Mean of logged Data	-4.207
Maximum of Logged Data	-1.661	SD of logged Data	1.024

Assuming Lognormal Distribution

95% H-UCL	0.0293	90% Chebyshev (MVUE) UCL	0.0315
95% Chebyshev (MVUE) UCL	0.0344	97.5% Chebyshev (MVUE) UCL	0.0384
99% Chebyshev (MVUE) UCL	0.0464		

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0271	95% Jackknife UCL	0.0271
95% Standard Bootstrap UCL	0.0271	95% Bootstrap-t UCL	0.0274
95% Hall's Bootstrap UCL	0.0275	95% Percentile Bootstrap UCL	0.0272
95% BCA Bootstrap UCL	0.0275		
90% Chebyshev(Mean, Sd) UCL	0.0296	95% Chebyshev(Mean, Sd) UCL	0.0321
97.5% Chebyshev(Mean, Sd) UCL	0.0356	99% Chebyshev(Mean, Sd) UCL	0.0425

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	0.0321

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (cPAH TEQ)

General Statistics

Total Number of Observations	575	Number of Distinct Observations	193
		Number of Missing Observations	0
Minimum	5.2130E-4	Mean	0.0146
Maximum	0.19	Median	0.00755
SD	0.0189	Std. Error of Mean	7.8620E-4
Coefficient of Variation	1.288	Skewness	4.204

Normal GOF Test

Shapiro Wilk Test Statistic	0.477	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.348	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.0373	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0159	95% Adjusted-CLT UCL (Chen-1995)	0.0161
		95% Modified-t UCL (Johnson-1978)	0.0159

Gamma GOF Test

A-D Test Statistic	90.64	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.771	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.328	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.0394	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Attachment 1: ProUCL Output

Gamma Statistics

k hat (MLE)	1.564	k star (bias corrected MLE)	1.557
Theta hat (MLE)	0.00936	Theta star (bias corrected MLE)	0.0094
nu hat (MLE)	1798	nu star (bias corrected)	1790
MLE Mean (bias corrected)	0.0146	MLE Sd (bias corrected)	0.0117
		Approximate Chi Square Value (0.05)	1693
Adjusted Level of Significance	0.0496	Adjusted Chi Square Value	1693

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	0.0155	95% Adjusted Gamma UCL (use when n<50)	0.0155

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.698	**Shapiro Wilk Lognormal GOF Test**
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.319	**Lilliefors Lognormal GOF Test**
5% Lilliefors Critical Value	0.0373	Data Not Lognormal at 5% Significance Level

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	-7.559	Mean of logged Data	-4.577
Maximum of Logged Data	-1.661	SD of logged Data	0.742

Assuming Lognormal Distribution

95% H-UCL	0.0144	90% Chebyshev (MVUE) UCL	0.0149
95% Chebyshev (MVUE) UCL	0.0156	97.5% Chebyshev (MVUE) UCL	0.0165
99% Chebyshev (MVUE) UCL	0.0182		

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0159	95% Jackknife UCL	0.0159
95% Standard Bootstrap UCL	0.0159	95% Bootstrap-t UCL	0.0161
95% Hall's Bootstrap UCL	0.0161	95% Percentile Bootstrap UCL	0.016
95% BCA Bootstrap UCL	0.0161		
90% Chebyshev(Mean, Sd) UCL	0.017	95% Chebyshev(Mean, Sd) UCL	0.0181
97.5% Chebyshev(Mean, Sd) UCL	0.0195	99% Chebyshev(Mean, Sd) UCL	0.0225

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	0.0181

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (TPH - detects only)

General Statistics

Total Number of Observations	348	Number of Distinct Observations	307
		Number of Missing Observations	0
Minimum	8.45	Mean	339.9
Maximum	4980	Median	94.55
SD	589.4	Std. Error of Mean	31.59
Coefficient of Variation	1.734	Skewness	3.29

Normal GOF Test

Shapiro Wilk Test Statistic	0.592	**Shapiro Wilk GOF Test**
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.0479	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	392	95% Adjusted-CLT UCL (Chen-1995)	397.9
		95% Modified-t UCL (Johnson-1978)	393

Attachment 1: ProUCL Output

Gamma GOF Test

A-D Test Statistic	19.7	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.811	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.184	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.0512	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.617	k star (bias corrected MLE)	0.613
Theta hat (MLE)	551.1	Theta star (bias corrected MLE)	554.2
nu hat (MLE)	429.3	nu star (bias corrected)	427
MLE Mean (bias corrected)	339.9	MLE Sd (bias corrected)	434
		Approximate Chi Square Value (0.05)	380.1
Adjusted Level of Significance	0.0493	Adjusted Chi Square Value	379.9

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	381.9	95% Adjusted Gamma UCL (use when n<50)	382.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0988	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.0479	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.134	Mean of logged Data	4.831
Maximum of Logged Data	8.513	SD of logged Data	1.347

Assuming Lognormal Distribution

95% H-UCL	370.2	90% Chebyshev (MVUE) UCL	400.4
95% Chebyshev (MVUE) UCL	441.8	97.5% Chebyshev (MVUE) UCL	499.2
99% Chebyshev (MVUE) UCL	612.1		

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	391.9	95% Jackknife UCL	392
95% Standard Bootstrap UCL	391.2	95% Bootstrap-t UCL	401.5
95% Hall's Bootstrap UCL	400.5	95% Percentile Bootstrap UCL	397
95% BCA Bootstrap UCL	397.2		
90% Chebyshev(Mean, Sd) UCL	434.7	95% Chebyshev(Mean, Sd) UCL	477.7
97.5% Chebyshev(Mean, Sd) UCL	537.2	99% Chebyshev(Mean, Sd) UCL	654.3

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	477.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (TPH)

General Statistics

Total Number of Observations	988	Number of Distinct Observations	409
		Number of Missing Observations	0
Minimum	5.5	Mean	134.8
Maximum	4980	Median	24.3
SD	380.9	Std. Error of Mean	12.12
Coefficient of Variation	2.825	Skewness	5.672

Attachment 1: ProUCL Output

Normal GOF Test

Shapiro Wilk Test Statistic	0.352	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.372	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.0285	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	154.8	95% Adjusted-CLT UCL (Chen-1995)	157.1
		95% Modified-t UCL (Johnson-1978)	155.1

Gamma GOF Test

A-D Test Statistic	180.2	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.821	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.324	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.0306	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.533	k star (bias corrected MLE)	0.532
Theta hat (MLE)	253	Theta star (bias corrected MLE)	253.5
nu hat (MLE)	1053	nu star (bias corrected)	1051
MLE Mean (bias corrected)	134.8	MLE Sd (bias corrected)	184.8
		Approximate Chi Square Value (0.05)	976.7
Adjusted Level of Significance	0.0498	Adjusted Chi Square Value	976.6

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	145	95% Adjusted Gamma UCL (use when n<50)	145.1

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.686	**Shapiro Wilk Lognormal GOF Test**	
5% Shapiro Wilk P Value	0	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.267	**Lilliefors Lognormal GOF Test**	
5% Lilliefors Critical Value	0.0285	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.705	Mean of logged Data	3.723
Maximum of Logged Data	8.513	SD of logged Data	1.156

Assuming Lognormal Distribution

95% H-UCL	87.62	90% Chebyshev (MVUE) UCL	92.09
95% Chebyshev (MVUE) UCL	97.28	97.5% Chebyshev (MVUE) UCL	104.5
99% Chebyshev (MVUE) UCL	118.6		

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	154.7	95% Jackknife UCL	154.8
95% Standard Bootstrap UCL	154.7	95% Bootstrap-t UCL	156.8
95% Hall's Bootstrap UCL	157.3	95% Percentile Bootstrap UCL	155.5
95% BCA Bootstrap UCL	155.9		
90% Chebyshev(Mean, Sd) UCL	171.2	95% Chebyshev(Mean, Sd) UCL	187.6
97.5% Chebyshev(Mean, Sd) UCL	210.5	99% Chebyshev(Mean, Sd) UCL	255.4

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	187.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

APPENDIX F

Groundwater Flow Model

Imagine the result

Chevron Environmental Management Company

Groundwater Flow Model for the Former Unocal Edmonds Bulk Fuel Terminal

November 8, 2013

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Senior Hydrogeologist

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Senior Vice President

Former Unocal Edmonds Bulk Fuel Terminal,
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Groundwater Flow Model for the Former Unocal Edmonds Bulk Fuel Terminal

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Table of Contents

1. Introduction **1**

1.1 Background 1

1.2 Site Description 2

1.3 Scope and Objectives 3

2. Conceptual Site Model **3**

2.1 Local and Site Geology 4

2.2 Site Hydrogeology 6

2.3 2013 Pumping Tests 7

2.3.1 Short-term, single-well constant-rate pumping tests 7

2.3.2 Slug Tests 8

3. Groundwater Flow Model Construction **9**

3.1 Code Selection and Description 9

3.2 Model Discretization 10

3.3 Boundary Conditions 11

3.4 Hydraulic Parameters 13

3.5 Calibration Targets 14

4. Groundwater Flow Model Calibration **15**

4.1 Calibration Procedure 15

4.2 Calibration Results 15

4.2.1 Simulated Hydraulic Head Distributions 16

4.2.2 Analysis of Residuals 16

5. Evaluation of Potential Groundwater Remediation Scenarios **17**

5.1 Remediation Scenario 1 – Hydraulic Containment Using Extraction Wells 18

5.2 Remediation Scenario 2 – Hydraulic Containment Using an Interceptor Trench 19

5.3 Remediation Scenario 3 – Soil Excavation near DB-1 and DB-2 20

5.4 Remediation Scenario 4 – Soil Excavation near the WSDOT storm drain 20

6. Summary **21**

7. References 23

Tables

Table 1 Constant-Rate Pumping Test Results

Table 2 Slug Test Results

Table 3 Groundwater Flow Model Parameters

Table 4 Calibration Targets and Residuals

Table 5 Summary of Calibration Statistics

Figures

Figure 1 Site Location

Figure 2 Site Map with Groundwater Contours, Cross Sections, and Potential Remediation Areas

Figure 3 Cross-Section A-A’

Figure 4 Cross-Section B-B’

Figure 5 Model Grid

Figure 7 Boundary Conditions

Figure 8 Hydraulic Conductivity Distribution Layer 1

Figure 9 Hydraulic Conductivity Distribution Layer 2

Figure 10 Hydraulic Conductivity Distribution Layer 3

Figure 11 Hydraulic Conductivity Distribution Layer 4

Figure 12 Calibration Scatter Plot

Figure 13 Simulated Potentiometric Surface Calibrated Condition

Figure 14 Remediation Scenario 1 6 Extraction Wells (3 to 5 GPM)

Figure 15 Remediation Scenario 2 Groundwater Interceptor Trench (4 to 7 GPM)

Figure 16 Remediation Scenario 3 Soil Excavation Near DB-1 and DB-2

Figure 17 Remediation Scenario 4 Soil Excavation Near Storm Drain

Attachments

Attachment 1 Constant-Rate Pumping Test Plots

Attachment 2 Slug Test Plots

Attachment 3 Memorandum: Analysis of Site Geologic Data Using Mining Visulization Software (MVS)

1. Introduction

Chevron Environmental Management Company (Chevron) retained ARCADIS, Inc. (ARCADIS) to develop a three-dimensional numerical groundwater flow model for the Former Unocal Edmonds Bulk Fuel Terminal (Site) located at 11720 Unoco Road, Edmonds, Washington (Figure 1). The purpose of the groundwater flow model is to simulate groundwater flow conditions at the Site, predict the hydraulic performance and effectiveness of four alternative groundwater remedial scenarios, and overall support the completion of the Site feasibility study (FS). Existing Site-related information, including hydrogeologic data collected by ARCADIS were utilized in developing the groundwater flow model.

This Report is being submitted under Agreed Order (No.DE 4460) which requires the Union Oil Company of California (Unocal), a wholly owned indirect subsidiary of the Chevron Corporation, to conduct an interim action to remediate soil, groundwater and sediments, and to monitor groundwater in the Lower Yard.

1.1 Background

Unocal operated the Terminal from 1923 to 1991. Fuel was brought to the Terminal on ships, pumped to the storage tanks in the Upper Yard, and loaded from the tanks into rail cars and trucks for delivery to customers. In addition, an asphalt plant operated at the Terminal from 1953 to the late 1970s.

Impacted media at the Site have been extensively characterized and remediated through numerous phases of site investigation and remedial activities which are documented in the FS. Previous remedial actions conducted between 2001 and 2008 have addressed potential impacts in the Upper Yard, Lower Yard and in the sediments of Willow Creek. Site-specific data and documents regarding historical Site operations, environmental investigations, and remediation are provided in the FS.

This analysis is focused on areas with remaining impacts as described in the FS. The areas with remaining impacts that are addressed in this groundwater modeling report are shown on Figure 2.

1.2 Site Description

The Site is located in Edmonds, Washington, adjacent to Puget Sound (Figure 1). As defined in the Agreed Order, the Site consists of three areas, the Upper Yard, Lower Yard and the Willow Creek Fish Hatchery (fish hatchery). Each area is currently a separate property but was once owned by Unocal. The Upper and Lower Yards were areas of operation for the former terminal. Although the fish hatchery was included in the Agreed Order, it was not used for operations or storage at the facility and is currently owned by the City of Edmonds. The Upper Yard was remediated to cleanup standards in 2003 and is now the location of a condominium complex. As part of the Agreed Order, monitoring is ongoing at the Lower Yard, which is the focus of this groundwater model.

The Lower Yard is approximately 22 acres in area, located north of the Upper Yard (Figure 2). The western boundary of the Lower Yard is the BNSF Railway (BNSF) property, and the northwestern boundary is Willow Creek and the BNSF railway. Further west of the Lower Yard is the Port of Edmonds Marina and Puget Sound. North and northeast of the Lower Yard are the Edmonds Marsh (also known as the Union Oil Marsh) and Willow Creek. East of the Lower Yard is the Edmonds Marsh and Willow Creek, and southeast is the Willow Creek Fish Hatchery. At its nearest point (the southwest corner of the Lower Yard), the Lower Yard boundary is approximately 160 feet from the Puget Sound shoreline.

A Site storm water conveyance system consisting of 12 storm drains collects surface water runoff from the Lower Yard and discharges into two storm-water detention basins designated as Detention Basin No.1 (DB-1) and DB-2 (Figure 2). Site storm-water is conveyed directly to DB-2 via gravity flow, and then is pumped from DB-2 to Willow Creek under Industrial Stormwater General Permit No. SO3-002953C. DB-1 acts as a retention pond for overflow from DB-2 during storm events. DB-1 is bounded to the northwest, northeast, and southeast by a manmade berm. The berm runs along the eastern property boundary, adjacent to Willow Creek. DB-1 is an un-lined pond with one above-ground pump and a piping system to the DB-2 outfall on the bank of Willow Creek. DB-2 has an impermeable liner, and two submersible pumps and a piping system to the DB-2 outfall.

Willow Creek runs along the northern portion of the western boundary and the entirety of the eastern boundary of the Lower Yard. Willow Creek is approximately 10 feet wide and is underlain by silt and sand material. The creek banks on the Site property boundary are steeply sloped and vegetated with native and non-native vegetation. Water depths in Willow Creek vary from 0 to 4 feet deep, depending on season and tidal cycles (ARCADIS, 2012a).

1.3 Scope and Objectives

The scope of the groundwater flow modeling tasks included:

- Reviewing historical data and refining the CSM;
- Developing, constructing, and calibrating the Site groundwater flow model; and
- Using the calibrated Site groundwater flow model to simulate and predict the performance of four potential groundwater remedial scenarios.

The objectives of the Site groundwater flow model are to:

- Develop a steady-state groundwater flow model calibrated for average flow conditions to support feasibility screening of alternative groundwater remedial scenarios;
- Develop conceptual-level design parameters for the four groundwater remedial scenarios, such as:
    - Number, location, and pumping rates of hypothetical extraction wells necessary for hydraulic containment
    - Location, dimensions, and pumping rate of a hypothetical groundwater interceptor trench for hydraulic containment
    - Construction dewatering rates during hypothetical soil excavation activities below the water table
- Simulate the four alternative remedial scenarios and perform predictive analyses to evaluate effectiveness.

2. Conceptual Site Model

A conceptual site model (CSM) is a narrative description of the principle components of a groundwater flow system and is developed from regional, local, and site-specific data. The primary components of a groundwater flow system include: (1) areal extent, configuration, and type of aquifers and aquitards; (2) hydraulic properties of aquifers and aquitards; (3) natural groundwater recharge and discharge zones; (4) anthropogenic influence on groundwater (sources and sinks); and, (5) areal and vertical distribution of groundwater hydraulic head potential. These aquifer system components serve as the framework for the construction of a numerical groundwater flow model. A comprehensive CSM was developed in 2013 (ARCADIS, 2013) and was the basis for developing the Site groundwater flow model. Following the development of the CSM, additional groundwater parameter data collection activities (i.e., pumping and slug tests) were completed to support development of the Site groundwater flow model. The CSM will not be reiterated herein; however a discussion of the data collection activities and results is presented below.

The CSM (ARCADIS 2013) summarized information from historical Site documents including facility history reports, subsurface investigations, groundwater investigations, interim action activities, and feasibility studies. Specific data and documents often referred to in the CSM report are the:

- Final compliance soil samples collected in 2007/2008 during remedial excavation activities and documented in the Phase I Remedial Implementation As-Built Report (ARCADIS, 2009);
- FINAL Phase II Remedial Implementation As-Built Report (ARCADIS, 2010a);
- 2008 site investigation work that was conducted in the vicinity of the Washington State Department of Transportation (WSDOT) stormwater line and the former asphalt warehouse (ARCADIS, 2010b);
- 2011 site investigation work that incorporated a tidal study, pumping tests and investigated soil conditions in the vicinity of Detention Pond No.2 (DB-2) (ARCADIS, 2012a); and
- Summary of the investigation activities conducted as part of the Revised Feasibility Study Work Plan (ARCADIS, 2012b) in August of 2012 which included additional groundwater monitoring well installation, additional groundwater sampling and sediment sampling.

Please refer to the historical documents for the historical data, tables, figures, and laboratory reports.

2.1 Local and Site Geology

Local and Site geology are thoroughly described in the CSM (ARCADIS, 2013) and FS and are shown on Figures 3 and 4 herein.

As shown on Figures 3 and 4, five hydrostratigraphic units have been identified in the Lower Yard and are discussed in detail below:

1. *2008 Fill* (Figures 3 and 4). The 2007-2008 Interim Action excavations were backfilled to 6 to 12 inches above the observed groundwater table in the open excavations with poorly graded coarse gravel (⅜ to 1 inch) with little to no fines. Backfill material above the coarse gravel to ground surface was a mixture of very fine to medium sand, trace silt, and fine to medium gravel materials.

2. *1929 Fill* (Figures 3 and 4). This unit consists of silty sands with gravel and sandy silts with gravel. During the 2007-2008 Interim Action excavations, subsurface materials encountered from ground surface to a depth of 8 to 15 feet below ground surface (bgs) were mostly fill material placed circa 1929 or later, during the creation of the Lower Yard facility.

3. *Marsh Deposits* (Figure 4). In many areas of the Lower Yard, beneath the 1929 Fill, there is a layer ranging from 1 foot to 15 feet thick composed of silt and sandy silt with large amounts of organic matter such as peat, and wood debris. This layer is encountered at depths ranging from 8 to 14 feet bgs, directly below the 1929 Fill material, and is interpreted to be representative of the former marsh horizon beneath the Lower Yard. This layer is typically demarcated by a 6 to 12 inch thick layer of decomposing vegetation.

4. *Beach Deposits* (Figures 3 and 4). Below the 1929 Fill and Marsh Deposits, a poorly graded sand formation of very fine to medium sand with fine gravel is present, containing organic material such as driftwood and seashells. This layer is interpreted to be representative of the former beach environment in the area prior to creation of the Lower Yard.

5. *Whidbey Formation* (Figures 3 and 4). This material is a poorly graded sand layer consisting of very fine to medium sand with fine gravel and is distinct from the overlying materials in the Lower Yard. It is present to the maximum explored depth of 41.8 feet bgs by Unocal. This unit contains interbedded sand with silt, and interbedded silt and sandy silt are also present. The interbeds range in thickness from less than 1 inch to several feet, and appear to be laterally discontinuous. This unit is interpreted to be alluvium, and is likely part of the Whidbey Formation.

2.2 Site Hydrogeology

Groundwater in the Lower Yard occurs under unconfined conditions and is typically first encountered at depths varying between approximately 5 and 10 feet below ground (Figures 3 and 4). Based on the results of high-resolution water level measurements obtained during a four-week tidal study performed at the Site in 2011, groundwater at the Site is influenced by daily tidal cycles in Puget Sound, which was found to have a tidal range of approximately 14 feet adjacent to the Site (ARCADIS, 2013). Results of the tidal study and routine groundwater monitoring data indicated the following:

- Shallow groundwater levels at the Site fluctuated on the order of approximately 0.1 to 1.2 feet in response to tidal fluctuations in Puget Sound;
- Groundwater levels in monitoring wells screened in the Whidbey Formation fluctuated on the order of approximately 0.02 to 0.3 feet in response to tidal fluctuations in Puget Sound;
- Surface water elevations in Willow Creek and in Edmonds Marsh north of the Site fluctuated on the order of approximately 0.02 to 3.7 feet;
- Groundwater level fluctuations were correlated with surface water level fluctuations, which indicates that groundwater at the Site is hydraulically connected to and interacts with surface water in Puget Sound, Willow Creek, and Edmonds Marsh;
- Groundwater elevations are higher than elevations in DB-1;
- Groundwater at the Site is not hydraulically connected with DB-2, except under high water level conditions;
- Conductivity of Site groundwater exceeds 1,000 microsiemens per centimeter (µs/cm) in many locations along the perimeter of the Site, indicating that groundwater at the Site is naturally subject to salt water intrusion due to tidal fluctuations at Puget Sound.

A groundwater elevation contour map based on data collected during the third quarter of 2013 is presented as Figure 2. As shown, groundwater elevations in the third quarter of 2013 varied between approximately 5.5 and 10.5 feet above mean sea level (ft amsl). The direction of the Site hydraulic gradient was oriented north toward Edmonds Marsh and northwest toward Puget Sound, and the magnitude of the hydraulic gradient averaged approximately 0.002 feet per foot (ft/ft; Figure 2).

Also as shown on Figure 2, there is a potentiometric mound located in the southeast Lower Yard area which is discussed further in the CSM (ARCADIS 2013). This potentiometric mound occurs in a topographically low area of the Site that is also located at the base of a steep hill. The potentiometric mound is associated with localized increased recharge to the water table (i.e., surface water infiltration) due primarily to topography.

Results of hydraulic conductivity tests conducted at Site monitoring wells in 2011 indicate that hydraulic conductivity values vary over approximately three to four orders of magnitude, depending on location, throughout the Lower Yard (ARCADIS, 2012a). Specifically, the 2011 hydraulic conductivity test results varied between approximately 0.06 feet per day (ft/day) and 345 ft/day. This information indicates that subsurface materials at the Site are highly heterogeneous. Furthermore, it was found that the 1929 Fill has a much lower permeability than the 2008 Fill. Particularly, hydraulic conductivity of the 1929 Fill ranged from approximately 0.2 to 15 ft/day and hydraulic conductivity of the 2008 Fill ranged from approximately 2.5 to 345 ft/day (ARCADIS, 2012a).

2.3 2013 Pumping Tests

2.3.1 Short-term, single-well constant-rate pumping tests

To support development of the Site groundwater flow model, short-term, single-well pumping tests were conducted at six monitoring wells (MW-122, MW-147, MW-510, MW-203, MW-511, and MW-522). During testing, these wells were pumped at a relatively constant rate, and changes in water levels were recorded using submerged pressure transducers equipped with a data logger and confirmed with manual depth-to-water measurements. Test durations varied between approximately 30 and 45 minutes. Appropriate flow rates for test analyses were identified based on periodic flow rate measurements and total pumping volumes recorded by site personnel during each test.

Drawdown and recovery data measured at each test well were analyzed using the AQTESOLV for Windows® software (Duffield, 2007). Two analytical models were used to analyze test data; drawdown data were evaluated using the Cooper-Jacob (1946) straight-line approximation of the Theis solution, and recovery data were analyzed using the Theis residual-drawdown method (Theis 1935) for several tests. Applicability of the Cooper-Jacob solution to drawdown data was assessed using test diagnostics (radial flow plots and derivative analysis). Time-drawdown data for several of the tests indicated variations in the flow rate; for these tests, an approximate fit was obtained to provide a general estimate of transmissivity and hydraulic conductivity. A summary of the analytical solutions applied to drawdown and/or recovery data for each test, and resultant hydraulic conductivity estimates, are presented in Table 1. The data and analyses are provided in Attachment 1. As shown, estimated hydraulic conductivity values measured in 2013 were found to vary between approximately 0.36 ft/day and 51 ft/day.

2.3.2 Slug Tests

A series of slug tests were conducted at five monitoring wells (MW-108, MW-109, MW-126, MW-522, MW-530) and three piezometers (P-4, P-8, P-16). Each series consisted of one to three slug tests at each well. Slug tests were performed on each monitoring well by submerging a disposable bailer below the water table, waiting until water levels returned to static conditions, and then removing the bailer from the well (i.e., slug out test or rising-head test) while measuring the water-level response until static conditions were again reached. Use of empty disposable bailers to create displacement instead of solid slugs precludes analysis of falling-head test data (slug-in) because it violates the assumption of instantaneous slug introduction. A pressure transducer equipped with a data logger was used to record changes in water level within the well during each test.

Response data (i.e., elapsed time and corresponding changes in water levels) collected during each test were converted to displacement data and analyzed using AQTESOLV for Windows® (Duffield, 2007) to obtain near-well hydraulic conductivity estimates (Table 2). Appropriate and applicable analytical solutions available in AQTESOLV were applied following the guidelines presented in *The Design, Performance, and Analysis of Slug Tests (*Butler, 1998). The Bouwer and Rice (1976) straight-line solution was selected for test data which exhibited the double-straight line pattern associated with filter pack drainage for wells screened across the water table. The Bouwer-Rice recommended head range for the best curve fit was employed for tests which did not exhibit effects of filter pack drainage. Test data collected at MW-530, P-4, and P-8 displayed a concave-upward shape on a semi-log (log-linear) plot, which is associated with horizontal flow conditions; consequently, the rising-head tests conducted at these wells were analyzed using the Cooper et al. (1967) model for fully-transient conditions. Water level responses to both tests conducted at MW-510 were coincident (very similar), therefore analysis of the second test was not necessary. Three tests were conducted at MW-530; the first test conducted at this well was not analyzed due to excessive noise in test data. AQTESOLV solution plots are provided in Attachment 2.

As shown in Table 2, estimated near-well hydraulic conductivities for site wells varied from 0.02 ft/day to 17.3 ft/day. Note that slug test results can be significantly impacted by drilling-induced disturbances (e.g., well skin effects and/or borehole damage) and insufficient well development. The impacts and effects caused by these near-well disturbances are difficult to avoid when performing slug tests and analyzing results. As such, hydraulic conductivity estimates derived from slug tests should be considered to be the lower bound of the hydraulic conductivity of the formation in the vicinity of the well (Butler, 1998). An example of this effect is shown by comparison of hydraulic conductivities estimated for well MW-522 from pumping test data (24 ft/day) and slug test data (17.3 ft/day).

The results from these tests were compiled with hydraulic conductivity estimates from previous investigations and used in parameterization of the groundwater flow model.

3. Groundwater Flow Model Construction

The primary phases in the development of the Site groundwater flow model included construction of a finite-difference grid for the model area, specification of model structure, assignment of boundary conditions, specification of hydraulic parameter values and zones, and selection of appropriate water-level measurements for calibration of the model. These elements form the hydrogeologic conceptual site model, which serves as the basis for the construction and subsequent calibration of the numerical model to observed groundwater flow conditions at the Site.

3.1 Code Selection and Description

For the construction and calibration of the numerical groundwater flow model at the Site, ARCADIS selected the simulation program MODFLOW, a publicly-available groundwater flow simulation program developed by the U.S. Geological Survey (USGS) (McDonald and Harbaugh, 1988). MODFLOW is thoroughly documented, widely used by consultants, government agencies and researchers, and is consistently accepted in regulatory and litigation proceedings. In addition, ARCADIS has developed utilities for use with MODFLOW to ease in the construction and calibration of groundwater models.

MODFLOW can simulate transient or steady-state saturated groundwater flow in one, two, or three dimensions and offers a variety of boundary conditions including specified head, areal recharge, injection or extraction wells, evapotranspiration, horizontal flow barriers (HFB), drains, and rivers or streams. Aquifers simulated by MODFLOW can be confined or unconfined, or convertible between confined and unconfined conditions. For the Site, which consists of a heterogeneous geologic system with variable unit thicknesses and boundary conditions, MODFLOW's three-dimensional capability and boundary condition versatility are essential for the proper simulation of groundwater flow conditions.

3.2 Model Discretization

The finite-difference technique employed in MODFLOW to simulate hydraulic head distributions in multi-aquifer systems requires horizontal and vertical discretization, or subdivision of the continuous aquifer system into a set of discrete blocks that form a three-dimensional model grid. Water levels computed for each block represent an average water level over the volume of the block. Thus, adequate discretization (i.e., a sufficiently fine grid) is required to resolve features of interest, and yet not be computationally burdensome. MODFLOW allows the use of variable grid spacing such that a model may have a finer grid in areas of interest where greater accuracy is required and a coarser grid in areas requiring less detail.

The Site groundwater model grid is shown on Figure 5. As shown, the model grid covers approximately 1.5 square miles. The boundaries of the model grid were specified to coincide with surface water bodies where present. Assigned head boundaries were selected based on estimated regional water level contours. The finite-difference grid is composed of 207 rows, 211 columns, and 4 layers for a total of 142,280 active nodes (Figure 5). The model grid was constructed using a variably spaced grid; in the area where groundwater remediation alternatives are being considered the grid cell size is 10 feet by 10 feet. At the perimeter of the model grid the largest cell size increases to a maximum of 100 feet by 200 feet.

CTECH Development Corporation’s Mining Visualization System (MVS) was utilized as part of the model development using lithologic information available from site monitoring wells and piezometers and limited, available information from soil borings completed in the surrounding area (off-site). This MVS-based representation of hydrostratigraphy was imported in the Groundwater Vistas (Rumbaugh and Rumbaugh, 2007) groundwater flow model interface and formed the basis for vertical discretization. A memorandum discussing the analysis of Site geologic data using MVS and additional figures produced through MVS is presented in Attachment 3.

The Site groundwater model layers are shown on Figure 6. The four model layers were defined to provide an approximate vertical profile of the Site hydrostratigraphy and also to allow for simulation of partially-penetrating extraction wells or interceptor trenches. Vertical discretization was also accomplished by assigning different hydraulic conductivity zones throughout the various layers as shown in Figure 6, to account for vertical heterogeneity.

Outside the vicinity of the Site, model layer elevations and trends were extended to the model boundaries.

3.3 Boundary Conditions

External boundary conditions must be imposed to define the spatial boundaries of the model on all sides of the model grid. In addition to these external boundary conditions, internal boundary conditions such as sources and sinks of groundwater including wells, drains, and rivers can be included within the model's boundaries. A boundary condition can represent different types of physical boundaries, depending on the rules that govern groundwater flow across the boundary.

The Site groundwater flow model boundary conditions are shown on Figure 7. As shown, there are five types of boundary conditions used in the Site groundwater flow model:

1. Constant head boundaries are used to represent relatively constant sources or sinks of groundwater, including large surface water features such as Puget Sound, and either provide or remove groundwater depending on the hydraulic gradient direction near the boundary;

2. River-type boundaries are used to represent rivers and streams which may either be sources of sinks of groundwater;

3. General head boundaries are used to represent constant fluxes of groundwater to or from a model;

4. Drains, which remove groundwater; and

5. Inactive or no-flow boundaries.

As shown on Figure 7, the western and northern model boundaries are coincident with the Puget Sound and were represented in the Site groundwater flow model using constant-head cells with surface water elevations derived from gauging data provided by NOAA. The constant head boundaries at Puget Sound were specified at the average surface water elevation in Puget Sound during model calibration, and adjusted to account for high-tide scenarios during predictive simulations. Puget Sound is assumed to fully penetrate the full thickness of the model domain and therefore constant head cells were applied to model layers 1 through 4.

Also as shown on Figure 7, the southern, northern, and eastern model boundaries were selected to be coincident with physically-based features, Deer Creek on the south and Shelleberger Creek on the north and east. These creeks were simulated in the Site groundwater flow model as river boundaries. Surface water elevations along Deer and Shelleberger Creeks were derived from the USGS topographic map and were used to specify the water levels in the river boundaries. Willow Creek was simulated as an internal river boundary. Surface water elevations along Willow Creek were derived from the USGS topographic map.

The southeastern perimeter of the Site groundwater flow model was assigned as a general head boundary through all model layers, representing regional groundwater flow entering the model domain from upland portions of the groundwater system. Data from the USGS were used to specify the general head boundaries.

DB-1 was simulated as an internal drain-type boundary which removes groundwater from the model because surface water elevations in DB-1 are lower than groundwater elevations measured in nearby monitoring wells. Furthermore, DB-1 is unlined and surface water is pumped out of DB-1 and into Willow Creek.

Precipitation infiltration, also known as recharge, is also considered a boundary condition because recharge can add water to the top of the model at the water table. Recharge reaching the water table was simulated using three zones in model layer 1 and was specified using knowledge of ground surface cover, topography, and annual precipitation rates. The off-site areas of the model, and portion of the site were assigned an initial recharge rate of 3.6 inches per year (in/yr), which is approximately 10% of annual recharge. Locally, higher precipitation rates were assigned. On the east side of the Lower Yard, a groundwater mound is regularly observed at the site. This mound was replicated in the model through the assignment of an area of elevated recharge representing run-off from the adjacent Upper Yard; a recharge rate of approximately 15 in/yr, which is approximately 40% of annual recharge. On the north side of the Lower Yard, an elevated recharge rate of 24 in/yr (approximately 60% of annual recharge) was applied to the gravel covered areas of the site. (*NOAA Online Weather Data, NOWData, Daily Climate Normals, 1981-2010, Precipitation, Seattle Tacoma Intl Ap* (NOAA, 2013). Recharge rates were also adjusted during calibration.

The bottom of the Site groundwater flow model was assigned as a no-flow boundary condition.

3.4 Hydraulic Parameters

The main hydraulic parameter that had to be specified in the Site groundwater flow model is soil hydraulic conductivity, because hydraulic conductivity governs groundwater flow rates and patterns under steady-state flow conditions. Specific yield and storativity are also important aquifer characteristics, but these storage parameters govern groundwater flow under transient conditions and were therefore not utilized.

The Site groundwater flow model was initialized using hydraulic conductivity values based on Site-specific hydraulic conductivity testing data, where available. For areas of the model domain without hydraulic conductivity testing data, hydraulic conductivity values were specified based on literature values associated with known soil types. During calibration, hydraulic conductivity zones were added and parameter values were adjusted within reasonable ranges to minimize the difference between observed and simulated groundwater elevations.

The final, calibrated hydraulic conductivity distributions for model layers 1 through 4 are shown on Figures 8 through 11, respectively. The hydraulic conductivity zones assigned in the model are summarized in Table 3.

As shown on Figure 8, model layer 1 is the most heterogeneous layer due to the presence of multiple soil types and excavated areas containing backfill. The hydraulic conductivity zones shown on Figure 8 represent 1929 fill materials, 2008 fill materials, off-shore gravel deposits, and the Whidbey formation and associated glacial deposits. The remainder of the hydraulic conductivity zones in layer 1 was specified during calibration. Hydraulic conductivity values used in layer 1 varied between 0.1 and 75 ft/day.

As shown on Figure 9, model layer 2 contained five hydraulic conductivity zones representing fill materials, marsh deposits, beach deposits, off-shore gravel deposits, and the Whidbey formation. Hydraulic conductivity values used in layer 2 varied between 0.25 and 75 ft/day.

As shown on Figure 10, model layer 3 contained three hydraulic conductivity zones representing marsh deposits, off-shore gravel deposits, and the Whidbey formation. Hydraulic conductivity values used in layer 3 varied between 1.5 and 75 ft/day.

As shown on Figure 11, model layer 4 consisted of the Whidbey formation with a hydraulic conductivity of 1.5 ft/day.

3.5 Calibration Targets

Calibration targets are a set of field measurements, typically groundwater elevations, used to test the ability of the groundwater flow model to reproduce observed conditions within a groundwater flow system. For the calibration of a steady-state (time-invariant) model, the goal in selecting calibration targets is to define a set of water-level measurements that represent the average elevation of the water table or potentiometric surface at locations throughout the Site.

Table 4 presents the monitoring wells and water-level elevations selected for the calibration of the Site groundwater flow model. As shown, calibration targets selected for the Site groundwater flow model are the average water-level elevations calculated from quarterly groundwater-level measurements collected in 2013 that comprise a total of 69 monitoring wells located throughout the site. This calibration target set was selected because it represents average groundwater elevation conditions.

4. Groundwater Flow Model Calibration

Calibration of a groundwater flow model refers to the process of estimating unknown model parameters, for example at un-sampled locations, by adjusting parameters within reasonable ranges until simulated groundwater levels are consistent with measured groundwater levels. Model calibration is typically an iterative procedure that involves adjustment of hydraulic properties or boundary conditions to achieve the best match between simulated and measured groundwater levels. Boundary condition values and hydraulic conductivity values at un-sampled locations were adjusted during calibration of the Site groundwater flow model.

4.1 Calibration Procedure

As discussed above, the Site groundwater flow model was calibrated using average groundwater levels measured at 69 Site monitoring wells in 2013 (Table 4). A representative groundwater contour map of the water table (i.e., layer 1) is shown on Figure 2.

Calibration of the Site groundwater flow model required numerous individual computer simulations. The parameter values and shapes of the hydraulic conductivity zones in the model were gradually varied within reason until an acceptable match was achieved with the CSM. Calibration was achieved using MODFLOW and parameter estimation techniques designed for use with MODFLOW.

4.2 Calibration Results

Calibration results for the final, calibrated Site groundwater flow model are shown visually as a scatter-plot on Figure 12. As shown, simulated groundwater levels were consistent with measured groundwater levels as indicated by a Pearson correlation coefficient of approximately 0.85. This result shows that the model is reasonably calibrated for the intended purpose. The scatter in the simulated and measured datasets is due primarily to the fact that groundwater at the Site is tidally influenced and groundwater levels fluctuate daily, which introduces uncertainty in groundwater level measurements. The scatter in the simulated and measured datasets is also due to the heterogeneity of soils at the Site.

Model calibration was also evaluated by analyzing simulated hydraulic head distributions across the Site and residual statistics, as described below.

4.2.1 Simulated Hydraulic Head Distributions

Another way to evaluate model calibration is by comparing contour maps of simulated and measured groundwater elevations to ensure that the Site groundwater flow model is capable of simulating actual hydraulic gradient patterns.

A contour map of simulated groundwater elevations at the water table (i.e., in layer 1) is presented as Figure 13. A visual comparison of Figure 13 (simulated groundwater elevations) and Figure 2 (measured groundwater elevations) shows that the Site groundwater flow model accurately simulates hydraulic gradient patterns present at the Site. Specifically, Figure 13 shows that the direction of the simulated hydraulic gradient is oriented north toward Edmonds Marsh and northwest toward Puget Sound, and the magnitude of the simulated hydraulic gradient averages approximately 0.002 ft/ft. Furthermore, the Site groundwater flow model accurately predicts the location and magnitude of the potentiometric mound located in the southeast Lower Yard area.

4.2.2 Analysis of Residuals

A “residual” is defined as the mathematical difference between a simulated and measured value, and the goal of model calibration is to minimize the sum of all residuals within a model. Therefore, analyzing residuals is another method for evaluating the robustness of model calibration.

Table 4 shows the residuals for each of the calibration targets in the calibrated Site groundwater flow model. These residuals were calculated by subtracting simulated groundwater elevations from observed groundwater elevations at the target locations. Thus, a negative residual indicates a location where the model has over-predicted the measured groundwater elevation and a positive residual indicates a location where the model has under-predicted the measured groundwater elevation.

As shown in Table 4, the Site groundwater model residuals are within approximately 10% of the observed head range (i.e., plus or minus 0.75 feet) and 90% of the calibration targets have residuals less than or equal to 1 foot, which indicates the model is well calibrated for its intended purpose. A summary of the residual statistics is shown below:

Table 5. Summary of Calibration Statistics

Model Calibration Statistic	Value
Number of Calibration Targets	69
Range in Measured Values	7.37 feet
Minimum Residual	-2.82 ft msl
Maximum Residual	2.06 ft msl
Residual Mean	0.01 ft msl
Residual Standard Deviation	0.75 ft
Residual Standard Deviation / Range	0.10

As shown, model residuals varied between approximately -2.82 and 2.06 ft msl which is consistent with the calibration scatter plot shown on Figure 13**.** This result indicates that simulated groundwater elevations were within approximately two to three feet of measured average groundwater elevations, which is considered acceptable given the tidally influenced nature of the groundwater system at the Site and the high degree of heterogeneity. The residual mean of 0.01 ft indicates that there is very little to negligible bias in the model predictions; in other words under-predicted values balanced out over-predicted values. The residual standard deviation of 0.75 feet also indicates that the Site groundwater flow model is well-calibrated. Importantly, the value of residual standard deviation divided by total range of measured values was 0.10 (i.e., 10%), which is generally considered to be an indication of a well-calibrated model (Anderson and Woessner, 1992).

These results indicate that a high degree of calibration has been achieved for the Site groundwater flow model. Overall the model shows a good match between simulated and measured groundwater elevations and is suitable for its intended purpose.

5. Evaluation of Potential Groundwater Remediation Scenarios

The calibrated Site groundwater flow model was used to evaluate four potential groundwater remediation scenarios as follows:

1. Hydraulic containment using a series of groundwater extraction wells.

2. Hydraulic containment using a groundwater interceptor trench.

3. Soil excavation near DB-1 and DB-2.

4. Soil excavation near the WSDOT owned storm drain line (south side of Lower Yard).

To accomplish this, internal boundary conditions such as extraction wells, high hydraulic conductivity zones, or vertical flow barriers were added to the Site groundwater flow model as necessary to simulate each scenario. After the internal boundary conditions were added, the Site groundwater flow model was run at steady-state conditions to estimate average flow rates and predict resulting changes in groundwater flow patterns. External boundary conditions were also modified during evaluation of the potential remediation scenarios to predict potential groundwater flow rates and patterns that may occur under high tide conditions and extreme rainfall events. High tides were simulated by raising the assigned constant head elevation by 5 ft. The extreme rainfall event incorporated both a high tide condition and a doubling of assigned recharge rates.

To evaluate the effectiveness of the hydraulic containment scenarios (i.e., Scenarios 1 and 2), the Site groundwater flow model was used to estimate the extent of the capture zone resulting from hypothetical groundwater extraction. A “capture zone” is defined as the spatial area that contributes groundwater to the pumping system; in other words, a capture zone is an area of hydraulic containment. The objective of these simulations was to adjust the locations of the simulated extraction wells or interceptor trenches, and to adjust the simulated groundwater extraction rates, until the shape of the predicted capture zone fully encompassed the target remediation area.

For the soil excavation area scenarios (i.e., Scenarios 3 and 4), the Site groundwater flow model was used to estimate the construction dewatering rates that would be required during remediation.

The following subsections describe the evaluation of these potential remediation scenarios.

5.1 Remediation Scenario 1 – Hydraulic Containment Using Extraction Wells

Remediation scenario 1 involves hydraulic containment of remaining impacts near DB-1 and DB-2 as shown on Figure 14 using a series of six groundwater extraction wells. A conceptual layout of the six groundwater extraction wells and the resulting predicted capture zone is shown on Figure 14. As shown, it is theoretically possible to hydraulically contain the remaining impacts near DB-1 and DB-2 using groundwater extraction wells pumping at a long-term average combined rate of approximately 3 to 5 gallons per minute, which would include both high-tide conditions and short-duration rainfall events.

This scenario is based on the following assumptions and limitations:

- The extraction wells would need to be installed to total depths of approximately 15 to 20 feet below ground;
- The intake portion of the extraction wells would need to extend to an elevation of approximately 0.25 ft msl or lower (i.e., drain elevation);
- The extraction wells are 100% efficient; and,
- The potential exists for pumping-induced salt-water intrusion to further degrade groundwater quality.

5.2 Remediation Scenario 2 – Hydraulic Containment Using an Interceptor Trench

Remediation scenario 2 involves hydraulic containment of remaining impacts near DB-1 and DB-2 as shown on Figure 15 using a groundwater interceptor trench. A conceptual layout of the groundwater interceptor trench and the resulting predicted capture zone is shown on Figure 15. As shown, it is theoretically possible to hydraulically contain the remaining impacts near DB-1 and DB-2 using a groundwater interceptor trench pumping at a long-term average rate of approximately 4 to 7 gallons per minute, which would include both high-tide conditions and short-duration rainfall events.

This scenario is based on the following assumptions and limitations:

- The interceptor trench would be installed to a total depth of approximately 15 to 20 feet below ground;
- The intake portion of the interceptor trench would need to extend to an elevation of approximately 0.25 ft msl or lower (i.e., drain elevation);

- The backfill of the interceptor trench would need to have a hydraulic conductivity of 1,000 feet per day; and,
- The potential exists for pumping-induced salt-water intrusion to further degrade groundwater quality.

5.3 Remediation Scenario 3 – Soil Excavation near DB-1 and DB-2

Remediation scenario 3 involves excavating remaining impacts below the water table near DB-1 and DB-2 from the approximate area shown on Figure 16 using conventional soil excavation and construction dewatering equipment. A conceptual layout of the excavation and the resulting predicted changes in groundwater flow patterns are shown on Figure 16. As shown, it is theoretically possible to excavate the remaining impacts near DB-1 and DB-2 using a construction dewatering strategy that would require an average pumping rate of approximately 10 gallons per minute. High tide or short-duration rainfall events may result in the need for excavation dewatering at an average rate of 23 gallons per minute.

This scenario is based on the following assumptions and limitations:

- The total depth of the construction dewatering system would need to be approximately 15 to 20 feet below ground;

- The intake portion of the construction dewatering system would need to extend to an elevation of approximately 0.25 ft msl or lower (i.e., drain elevation);

- Faster dewatering rates during the initial phase of excavation may be required; and,

- The potential exists for pumping-induced salt-water intrusion to further degrade groundwater quality.

5.4 Remediation Scenario 4 – Soil Excavation near the WSDOT storm drain

Remediation scenario 4 involves excavating remaining impacts below the water table near the WSDOT storm drain from the approximate area shown on Figure 17 using conventional sheet pile walls, soil excavation and construction dewatering equipment. A conceptual layout of the excavation and the resulting predicted changes in groundwater flow patterns are shown on Figure 17. As shown, it is theoretically possible to excavate the remaining impacts near the WSDOT storm drain using sheet pile walls and a construction dewatering strategy that would require an average pumping rate of approximately 60 gallons per minute. High tide or short-duration rainfall events may result in the need for excavation dewatering at an average rate of 75 gallons per minute.

This scenario is based on the following assumptions and limitations:

- The total depth of the construction dewatering system would need to be approximately 30 feet below ground;
- The intake portion of the construction dewatering system would need to extend to an elevation of approximately -15 ft msl or lower (i.e., drain elevation);
- The excavation may encounter fill materials, beach deposits, and marsh deposits, and would terminate at the top of the Whidbey Formation;
- The hydraulic conductivity of the sheet pile walls is 0.003 feet per day.
- Faster dewatering rates during the initial phase of excavation may be required; and,
- The potential exists for pumping-induced salt-water intrusion to further degrade groundwater quality.

6. Summary

Historic and recent hydrogeologic data collected at the Former Unocal Edmonds Bulk Fuel Terminal Site in Edmonds, Washington, and additional regional information found in the literature were used to construct and calibrate a three-dimensional groundwater flow model for the Site. The model was constructed to support the evaluation of four potential remediation scenarios. The model was used to evaluate groundwater flow under both existing (present day) conditions and the various remediation scenarios.

Results of the work provided conceptual design layouts and estimated groundwater extraction rates, and demonstrate that the four remediation scenarios are theoretically possible. However, the assumptions and limitations associated with each scenario should be carefully evaluated during completion of the feasibility study.

7. References

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Table 1
Constant-Rate Pumping Test Results

Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Well ID	Date	Static Depth-to-Water (ft bTOC)	Calculated Water Column in well (ft)	Pumping Duration (min)	Pumping Rate (gpm)	Maximum Drawdown (ft)	Method of Analysis	Estimated Transmissivity (ft^2/day)	Calculated Hydraulic Conductivity (ft/day)
MW-122	3/5/2013	7.26	35.36	44.94	3.36	3.28	Cooper-Jacob	165	17
							Theis Recovery	188	19
MW-147	3/5/2013	5.29	8.11	29.95	3.67	1.69	Cooper-Jacob	360	47
							Theis Recovery	396	51
MW-510	3/6/2013	6.11	6.59	39.88	0.22	3.35	Cooper-Jacob	6.4	0.93
							Theis Recovery	2.5	0.36
MW-203	3/4/2013	22.23	8.37	29.87	2.50	0.94	Cooper-Jacob	191	21
MW-511	3/4/2013	7.16	7.84	29.90	3.50	2.54	Cooper-Jacob	97	12
MW-522	3/5/2013	8.20	5.05	29.83	0.55	0.62	Cooper-Jacob	117	24

Notes:

1. bTOC = below the top of casing

2. Cooper-Jacob modification of the Theis method. Cooper, H.H. and C.E. Jacob, 1946. A generalized graphical method for evaluating formation constants and summarizing well field history, Am. Geophys. Union Trans., vol. 27, pp. 526-534.

3. Theis method for analysis of residual drawdown (recovery data). Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, Am. Geophys. Union Trans., vol. 16, pp. 519-524.

4. Hydraulic conductivity was calculated by dividing estimated transmissivity results by the saturated screen length for each well.

Table 2
Slug Testing Results

Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Well ID	Test ID	Date	Static Depth-to-Water (ft bTOC)	Calculated In-Well Water Column (ft)	Initial Displacement (Ho, ft)	Screened across the Water Table?	Method of Analysis	Estimated Hydraulic Conductivity (ft/day)
MW-108	1	3/6/2013	5.45	9.67	1.50	YES	Bouwer-Rice (6.11b)[1]	0.02
MW-109	1	3/7/2013	6.88	8.22	1.68	YES	Bouwer-Rice (6.11b)	0.091
MW-126	1	3/6/2013	4.05	9.75	1.62	YES	Bouwer-Rice (6.11b)	0.23
	2	3/7/2013	3.90	9.90	1.63	YES	Bouwer-Rice (6.11b)	0.21
MW-522	1	3/7/2013	8.09	5.16	1.67	YES	Bouwer-Rice (6.11b)	17.3
	2	3/7/2013	8.09	5.16	1.68	YES	NA[2]	NA
MW-530	1	3/6/2013	4.58	6.39	1.34	NO	NA[3]	NA
	2	3/7/2013	4.56	6.59	1.10	NO	Cooper-Bredehoeft-Papadopulos[4]	1.2
	3	3/7/2013	4.56	6.59	1.29	NO	Cooper-Bredehoeft-Papadopulos	0.88
P-16	1	3/6/2013	2.44	10.71	1.33	NO	Bouwer-Rice (3.1)[5]	0.85
P-4	1	3/7/2013	7.50	14.55	1.49	NO	Cooper-Bredehoeft-Papadopulos	0.34
P-8	1	3/7/2013	7.49	16.89	1.50	NO	Cooper-Bredehoeft-Papadopulos	0.3
	2	3/7/2013	7.49	16.89	0.62	NO	Cooper-Bredehoeft-Papadopulos	0.34

Notes:

1. Bouwer-Rice (1976) method, unconfined solution, with the Butler (6.11b) effective casing correction for wells screened across the water table (Butler, 1998).

2. Analysis of test not performed due to coincidence of repeat test data

3. Analysis of test not performed due to high levels of noise in test results

4. Hydraulic conductivity calculated by dividing estimated transmissivity by the saturated screen length for tests analyzed using the CBP solution.

Table 3.
Groundwater Flow Model Parameters

Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Model Parameter	Model Layer	Modeled Range		Notes / Boundary Location / Unit Description
Areal Recharge (in/yr)	1	3.6, 15, and 24		model wide, east Lower Yard and North Lower Yard
Shelleberger Creek Stage (ft absl)	1	180 to 0		eastern model boundary
Deer Creek Stage (ft absl)	1	238 to 0		southern model boundary
Willow Creek Stage (ft absl)	1	145 to 0		internal boundary
Puget Sound Elevation (ft absl)	1 - 4	0		northern and western model boundary
Drain Elevation (DB-1)	1	6		on-site retention basin
General Head Boundary Elevation (ft absl)	1 - 4	290		southeastern model boundary
Hydraulic Conductivity (ft/d)		**Horizontal**	**Vertical**	
2008 Fill	1	25	1.5e-1	Coarse Sand, Gravel
1929 Fill	1	0.75	0.75	Silty Soil, Debris
Marsh Deposits	1, 2	0.85	8.5e-4	Silt
Beach Deposits	3	45	4.0e-1	Sand
Off-shore Gravel	1, 2, 3	75	75	Gravel
Whidbey Formation	1, 2, 3, 4	1.5	5e-1	Sand to Semi-Consolidated Sand

notes:
in/yr inches per year.
ft absl feet above sea level.
ft/d feet per day.

Table 4.
Calibration Targets and Residuals

Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Well ID	Model Layer	Model Row	Model Column	Simulated Heads (ft msl)	Observed Heads (ft msl)	Residual[1] (ft)
LM-2	1	56	91	5.06	6.17	1.11
MW-8R	1	84	62	6.05	6.04	-0.01
MW-13U	1	90	98	8.17	8.76	0.59
MW-20R	1	81	67	6.20	5.87	-0.33
MW-101	1	75	72	6.25	6.44	0.19
MW-104	1	78	70	5.85	6.21	0.36
MW-108	1	60	99	6.17	6.35	0.18
MW-109	1	68	107	6.31	6.51	0.20
MW-122	4	82	108	7.59	8.02	0.43
MW-126	1	89	73	6.17	8.23	2.06
MW-129R	1	82	106	7.56	7.14	-0.42
MW-131	1	74	98	7.31	6.92	-0.39
MW-135	1	93	119	10.02	7.46	-2.56
MW-136	1	99	125	8.73	8.41	-0.32
MW-139R	1	68	80	6.45	7.04	0.59
MW-143	1	88	70	6.18	7.88	1.70
MW-147	1	89	57	6.04	5.94	-0.10
MW-149R	1	98	49	6.45	5.75	-0.70
MW-151	1	94	57	6.17	6.49	0.32
MW-203	1	100	109	11.49	8.66	-2.83
MW-500	1	92	113	12.44	12.62	0.18
MW-501	1	88	109	12.27	12.16	-0.11
MW-502	1	85	92	7.74	7.99	0.25
MW-503	1	82	93	7.61	7.34	-0.27
MW-504	1	77	94	7.50	7.04	-0.46
MW-505	1	76	90	7.30	7.06	-0.24
MW-506	1	73	95	7.37	7.07	-0.30
MW-507	1	71	92	7.11	6.95	-0.16
MW-508	1	70	88	6.38	6.99	0.61
MW-509	1	70	84	6.65	7.07	0.42
MW-510	1	64	83	6.40	6.29	-0.11
MW-511	1	87	83	7.67	8.12	0.45
MW-512	1	82	82	7.12	7.05	-0.07
MW-513	1	78	80	6.94	7.06	0.12
MW-514	1	80	79	6.92	7.05	0.13
MW-515	1	74	78	6.66	7.05	0.39

Table 4.
Calibration Targets and Residuals

Unocal Edmonds Bulk Fuel Terminal Lower Yard
11720 Unoco Road
Edmonds, Washington

Well ID	Model Layer	Model Row	Model Column	Simulated Heads (ft msl)	Observed Heads (ft msl)	Residual[(1)] (ft)
MW-516	1	76	77	6.62	7.05	0.43
MW-517	1	77	76	6.58	7.04	0.46
MW-518	1	71	76	6.31	6.48	0.17
MW-519	1	87	68	6.25	6.04	-0.21
MW-520	1	85	66	6.24	6.06	-0.18
MW-521	1	87	65	6.25	6.03	-0.22
MW-522	1	83	63	6.13	6.02	-0.11
MW-523	1	86	60	6.05	6.03	-0.02
MW-524	1	93	54	6.17	6.08	-0.09
MW-525	1	84	73	6.39	6.62	0.23
MW-526	1	84	83	7.24	7.99	0.75
MW-527	1	98	117	10.82	10.08	-0.74
MW-528	1	100	121	10.78	10.27	-0.51
MW-529	1	64	82	6.15	5.86	-0.29
MW-530	1	54	91	5.96	5.78	-0.18
MW-531	1	84	71	6.20	5.89	-0.31
MW-532	1	86	73	6.32	6.80	0.48
P-1	1	86	107	11.42	12.82	1.40
P-2	3	88	108	8.78	8.42	-0.36
P-3	1	89	109	12.78	12.10	-0.68
P-4	3	92	113	9.82	8.55	-1.27
P-5	1	93	113	13.13	12.24	-0.89
P-6	1	94	116	11.94	13.12	1.18
P-7	3	94	116	10.34	8.74	-1.60
P-8	3	86	107	8.25	8.35	0.10
P-9	1	73	96	7.39	7.04	-0.35
P-10	1	69	89	6.19	6.93	0.74
P-11	1	69	88	6.33	7.04	0.71
P-12	1	66	84	6.55	6.55	0.00
P-13	1	65	82	6.52	7.32	0.80
P-14	1	64	83	6.38	6.13	-0.25
P-15	1	61	85	6.26	5.95	-0.31
P-16	1	63	87	6.09	6.28	0.19

notes:

(1) Residuals are computed by subtracting observed water levels from simulated water levels.

ft : feet.

ft msl : feet above mean sea level.

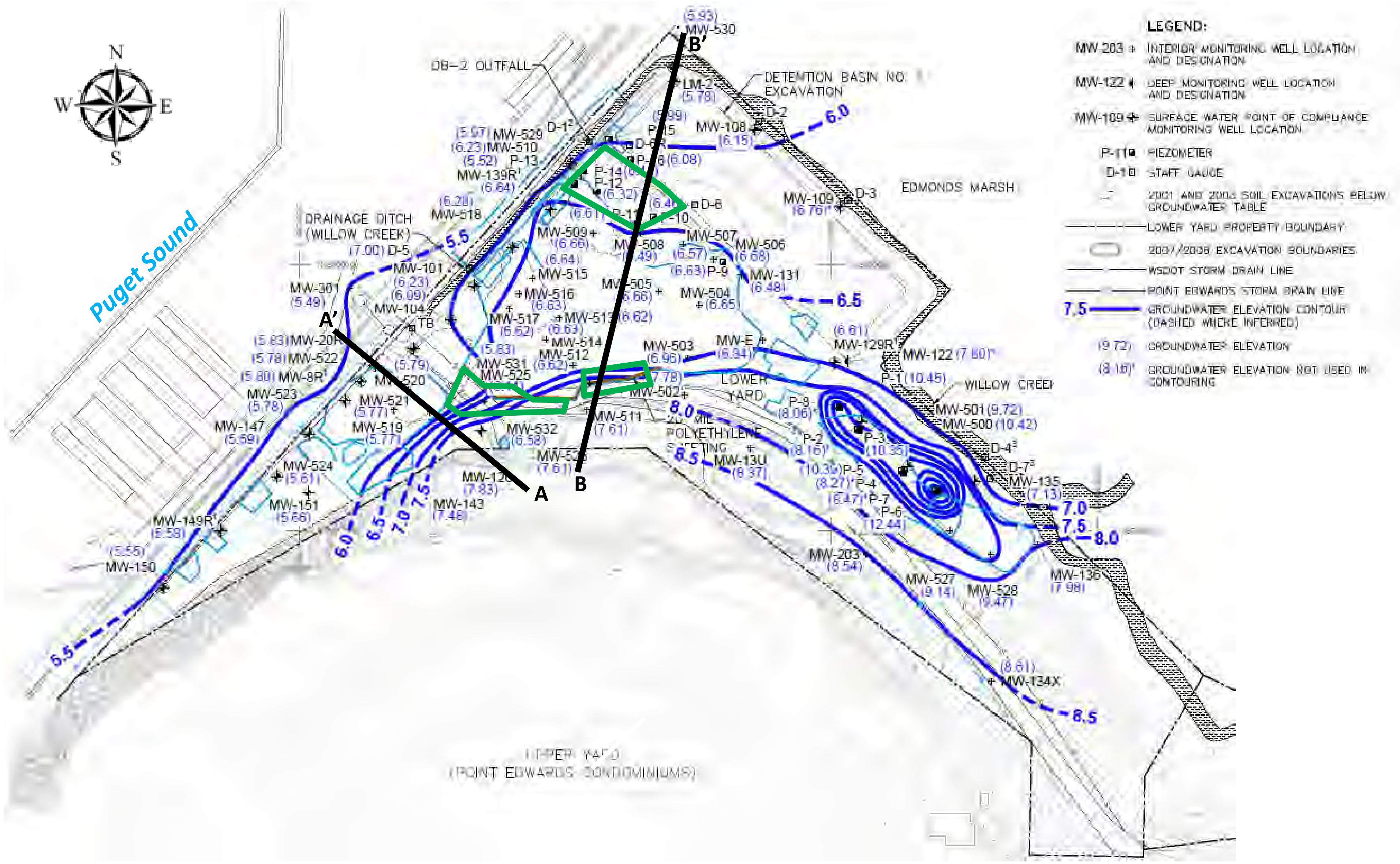
Source: USGS Quads., 7.5 Min. Series (Topographic) – Edmonds East, Wash., and Edmonds West, Wash.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Site Location

ARCADIS

FIGURE
1



0 100 200 300 400

Feet

Potential Remediation Area (Approx)

Cross Section Location

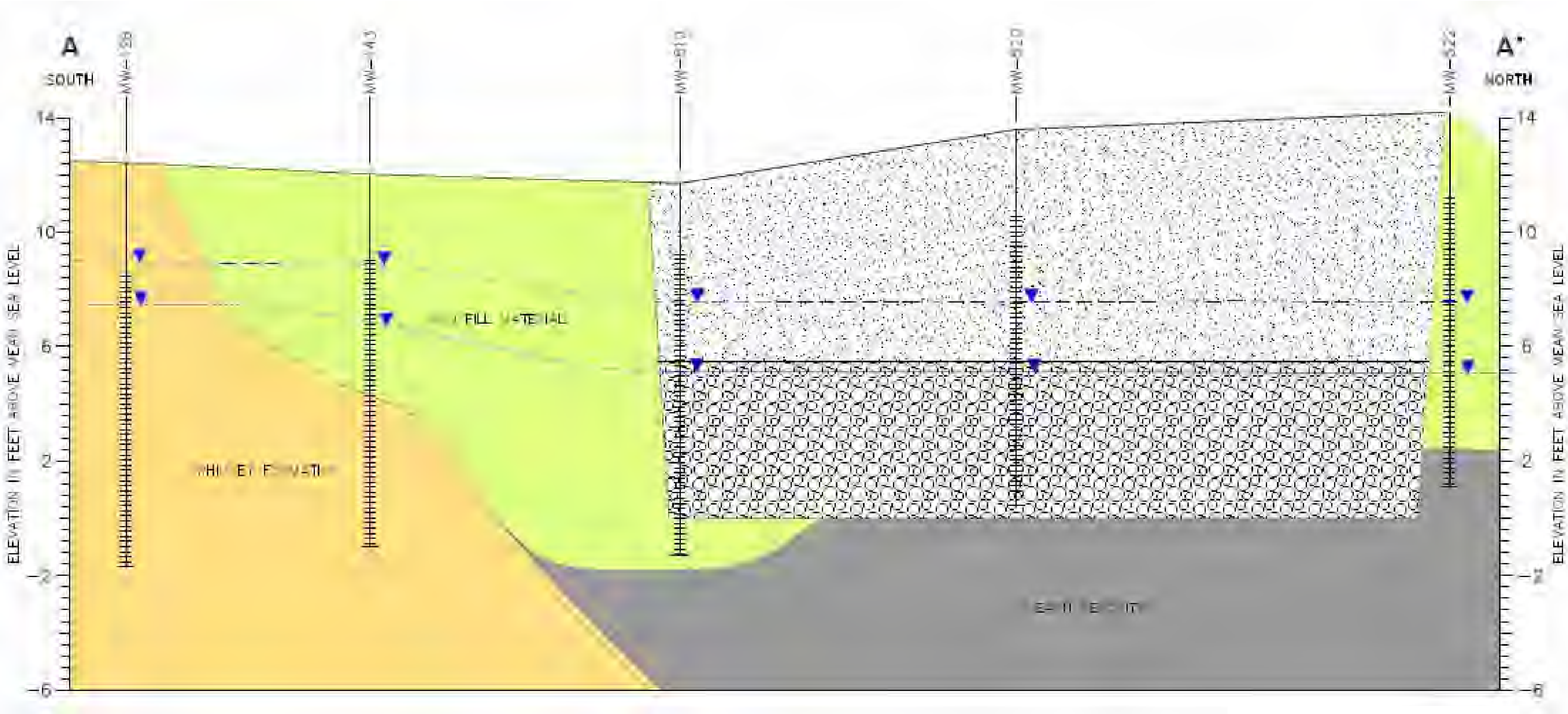
Source: Third Quarter 2013 Groundwater Monitoring Report.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Site Map with Groundwater Contours, Cross Sections, and Potential Remediation Areas

ARCADIS

FIGURE
2



VERTICAL EXAGGERATION: 5x

0 4' 8'

VERTICAL SCALE

0 20' 40'

HORIZONTAL SCALE

LEGEND:

MW-126 WELL OR BORING ID

GROUND SURFACE

HISTORIC HIGH WATER LEVEL

HISTORIC LOW WATER LEVEL

LITHOLOGIC CONTACT (DASHED WHERE INFERRED)

SCREENED INTERVAL

BOTTOM OF BORING

1929 FILL MATERIAL

BEACH DEPOSITS

TRANSITIONAL SILT BED

WHIDBEY FORMATION

MARSH DEPOSITS

2007/2008 FILL (GRAVEL)

2007/2008 FILL (SILT, SAND AND GRAVEL)

(35' SE)– OFFSET DISTANCE FROM CROSS SECTION PROFILE

NOTES:

- HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
- VERTICAL DATUM: N.A.V.D. 88
- UNITS: U.S. SURVEY FEET
- HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).

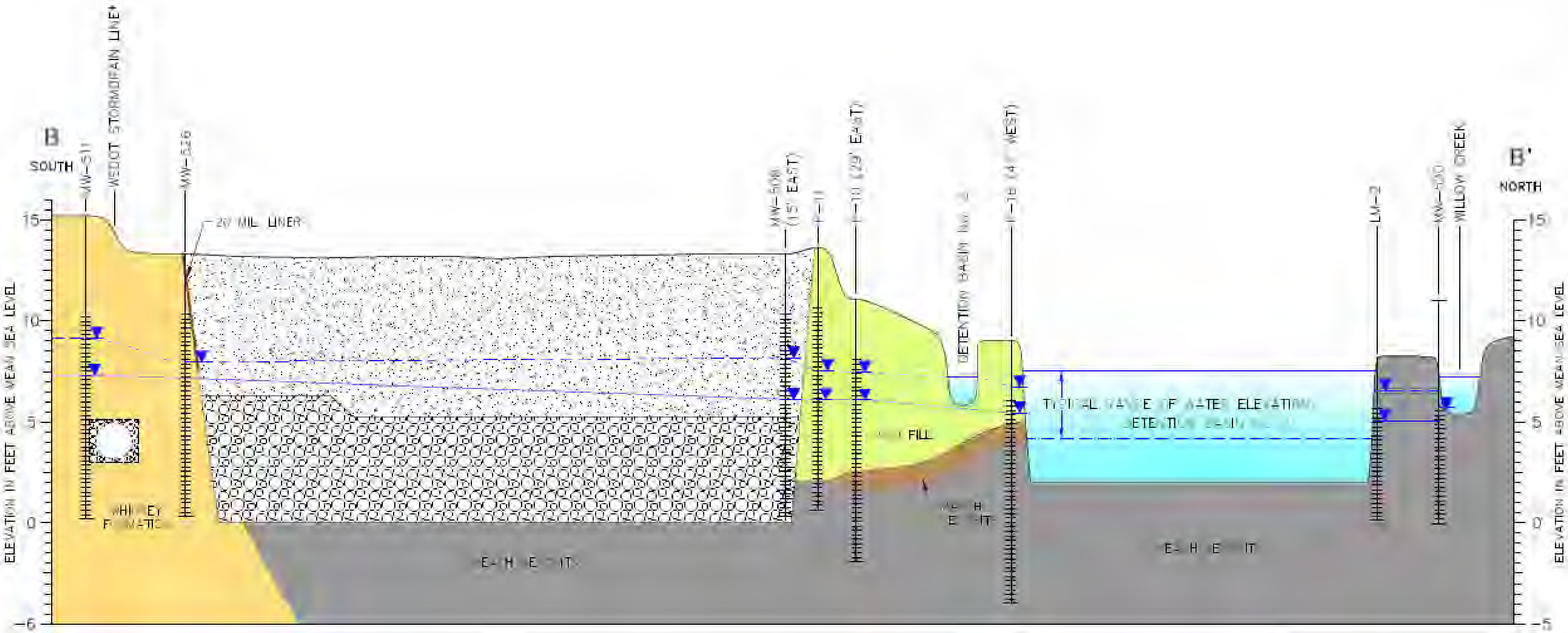
Source: Site Conceptual Model.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Cross Section A – A'

ARCADIS

FIGURE
3



LEGEND:

MW-511	WELL OR BORING ID
	GROUND SURFACE
	HISTORIC HIGH WATER LEVEL
	HISTORIC LOW WATER LEVEL
	LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
	SCREENED INTERVAL
	BOTTOM OF BORING

- 1929 FILL MATERIAL
- BEACH DEPOSITS
- WHIDBEY FORMATION
- MARSH DEPOSITS
- 2007/2008 FILL (GRAVEL)
- 2007/2008 FILL (SILT, SAND AND GRAVEL)
- (29' E)=OFFSET DISTANCE FROM CROSS SECTION PROFILE

VERTICAL EXAGGERATION: 10x

0 5' 10'
VERTICAL SCALE

0 50' 100'
HORIZONTAL SCALE

NOTES:

1. WSDOT STORMDRAIN LINE LOCATION IS APPROXIMATE AND DRAWN TO A NON EXAGGERATED SCALE FOR CLARITY.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98). VERTICAL DATUM: N.A.V.D. 88 UNITS: U.S. SURVEY FEET HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).

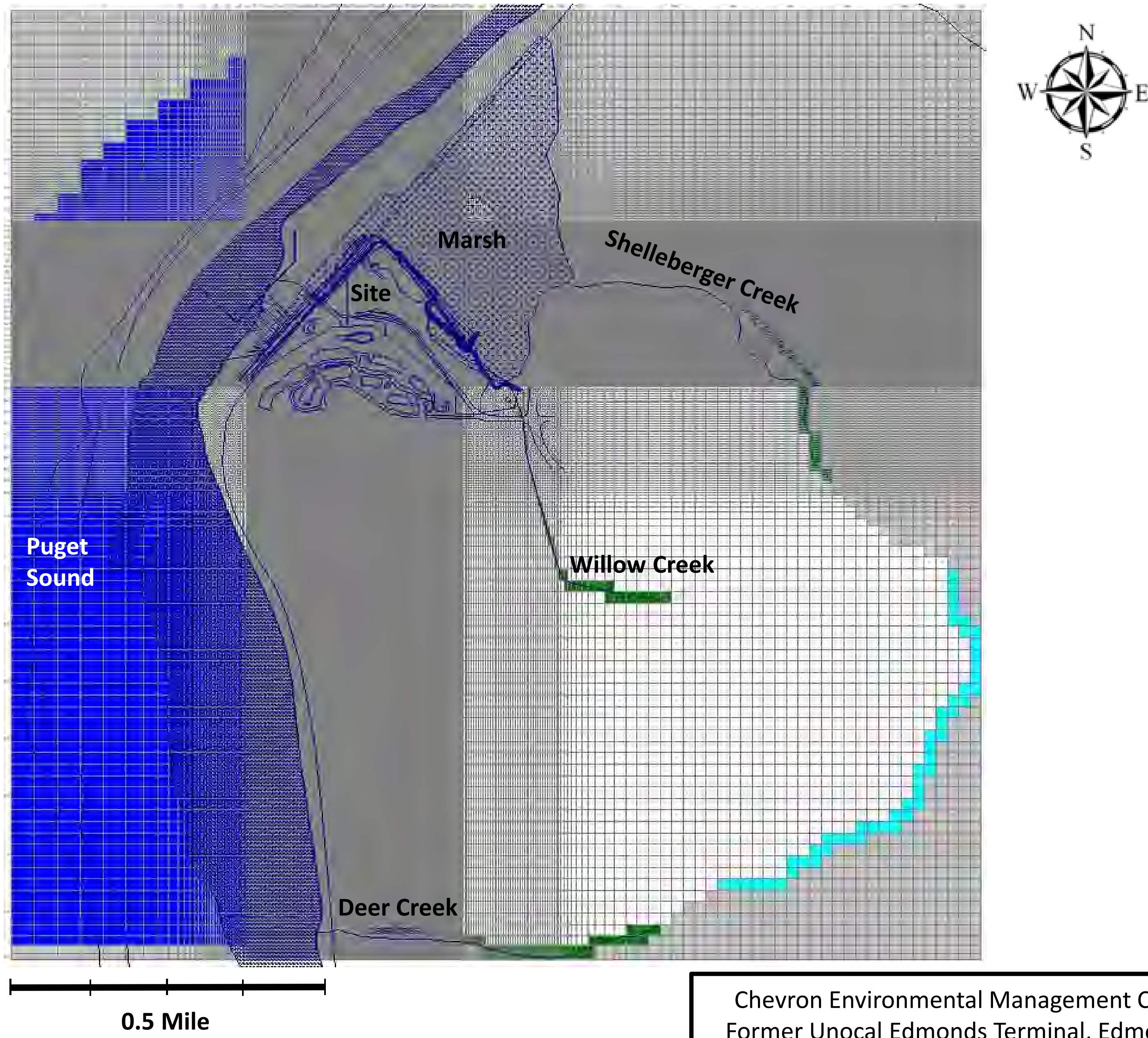
Source: Site Conceptual Model.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Cross Section B – B'

ARCADIS

FIGURE
4



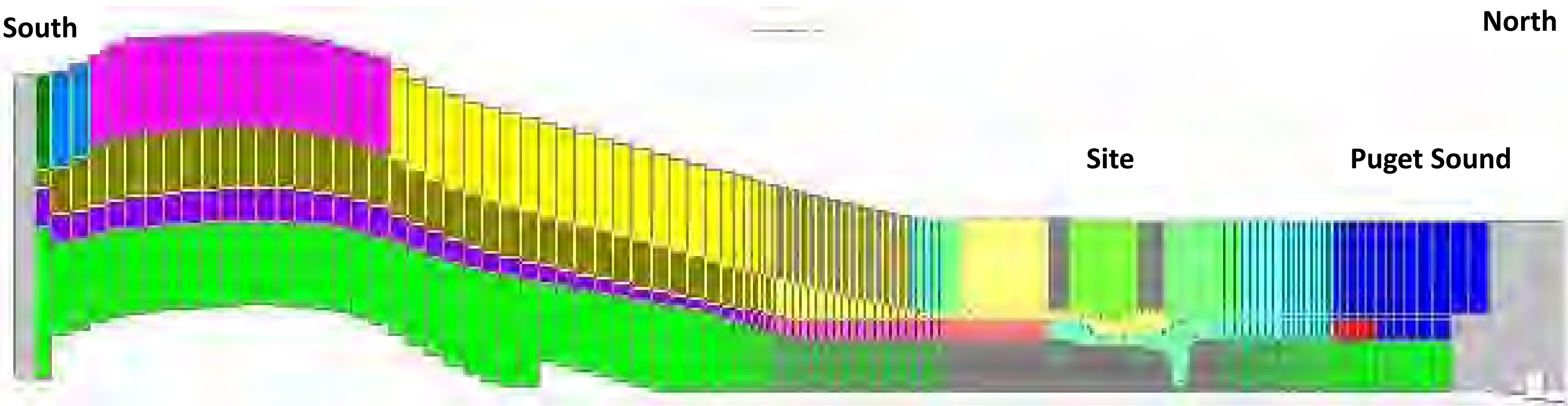
Notes:
Total number of grid blocks = 142,280
Smallest grid block = 10’ x 10’ at Site
Largest grid blocks = 100’ x 200’ at Model Perimeter

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

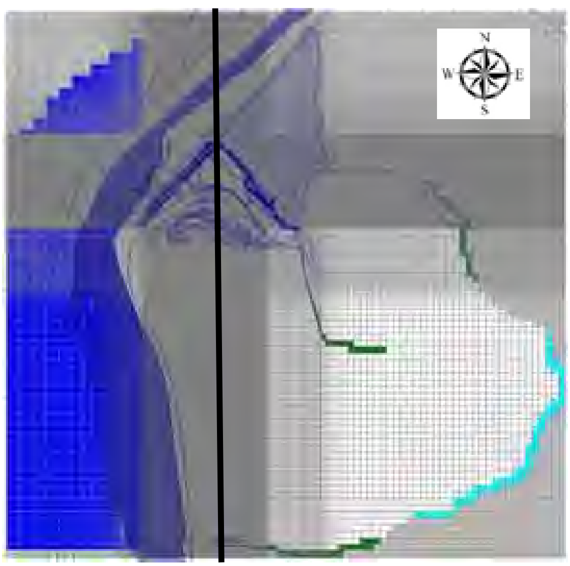
Model Grid

ARCADIS

FIGURE
5



Cross Section Location



Note: Colors Represent Hydraulic Conductivity Values (Feet/Day)

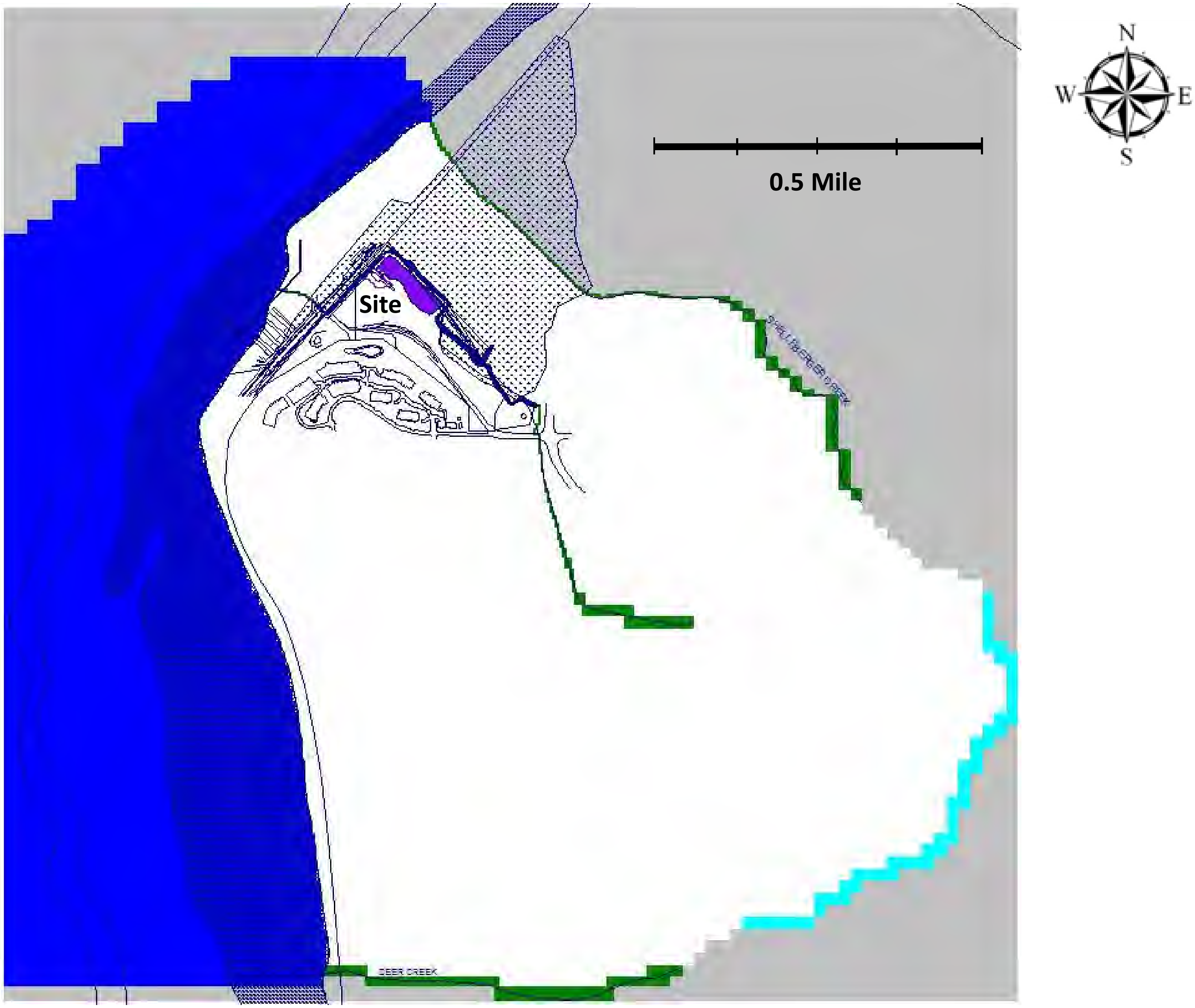
Cyan	0.75	Green	0.25	Dark red	0.1
Teal	5	Yellow	0.5		
Magenta	40	Red	75		
Olive	0.75	Blue	75		

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Model Layers

ARCADIS

FIGURE
6



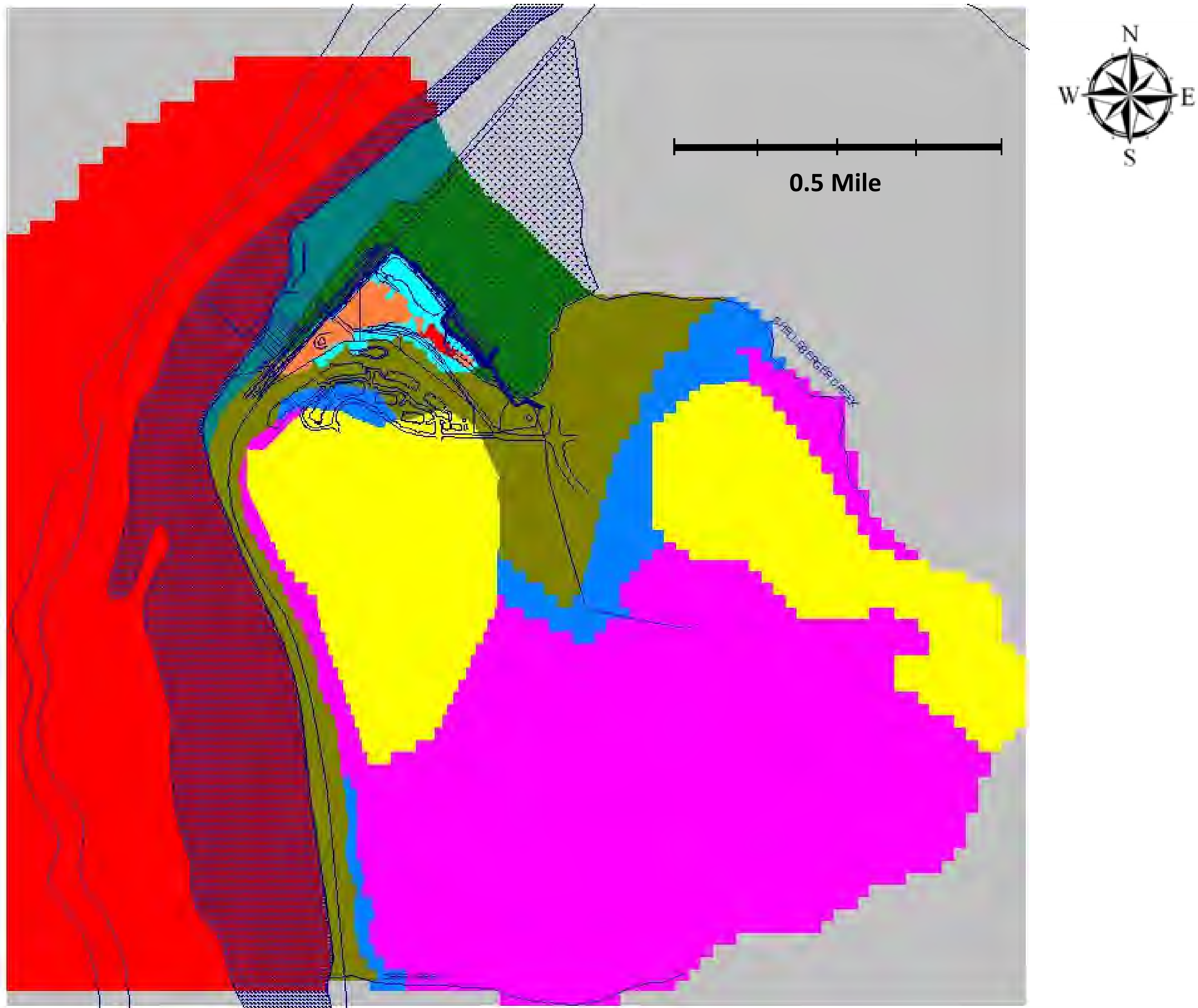
- Constant Head Boundary (Puget Sound)
- River-Type Boundary
- General Head Boundary
- Drain
- Inactive (No-Flow)

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Boundary Conditions

ARCADIS

FIGURE
7



Hydraulic Conductivity (Feet/Day)

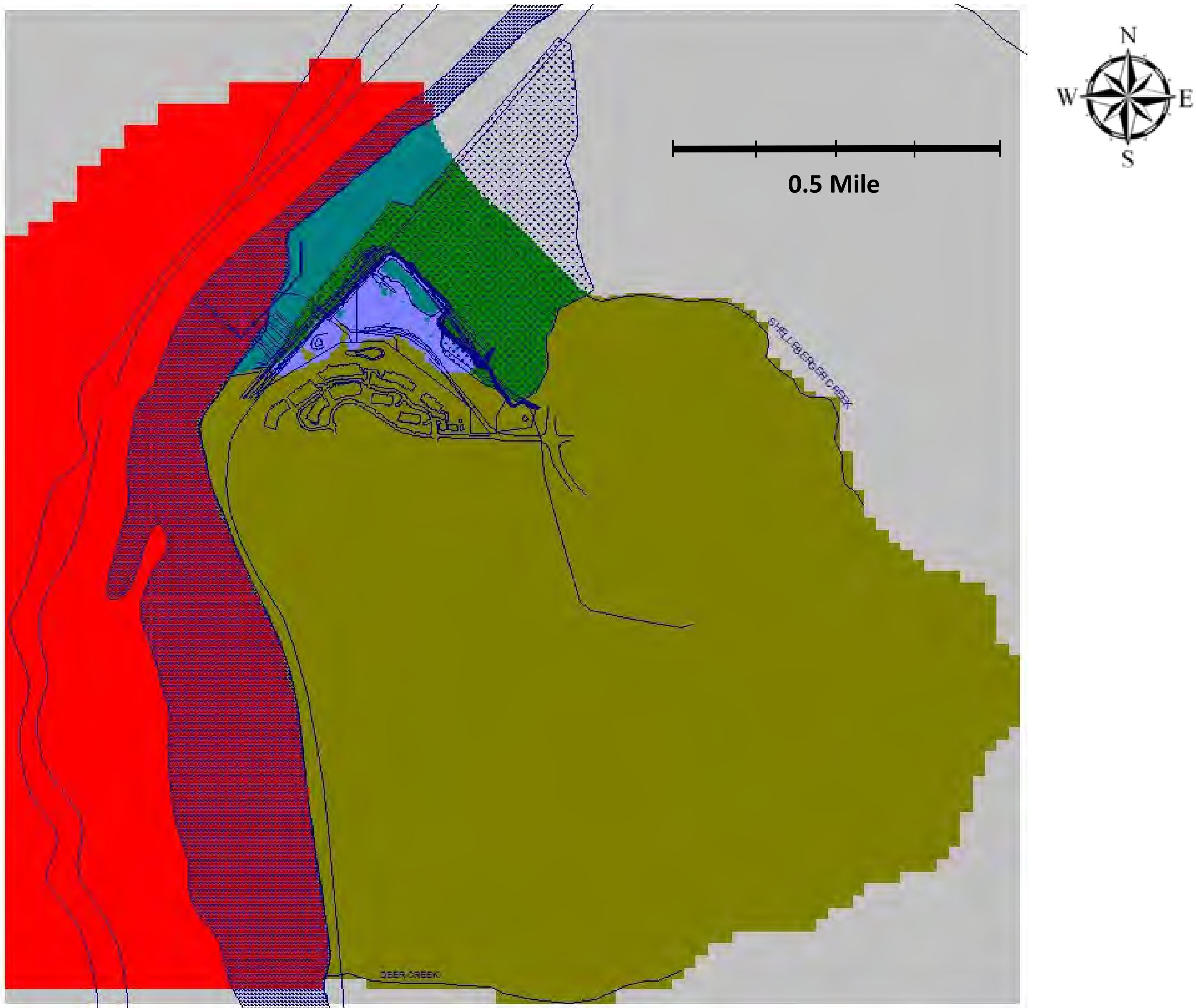
0.75	0.25	0.1
5	0.5	
40	75	
0.75	75	

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Hydraulic Conductivity Distribution – Layer 1

ARCADIS

FIGURE
8



Hydraulic Conductivity (Feet/Day)

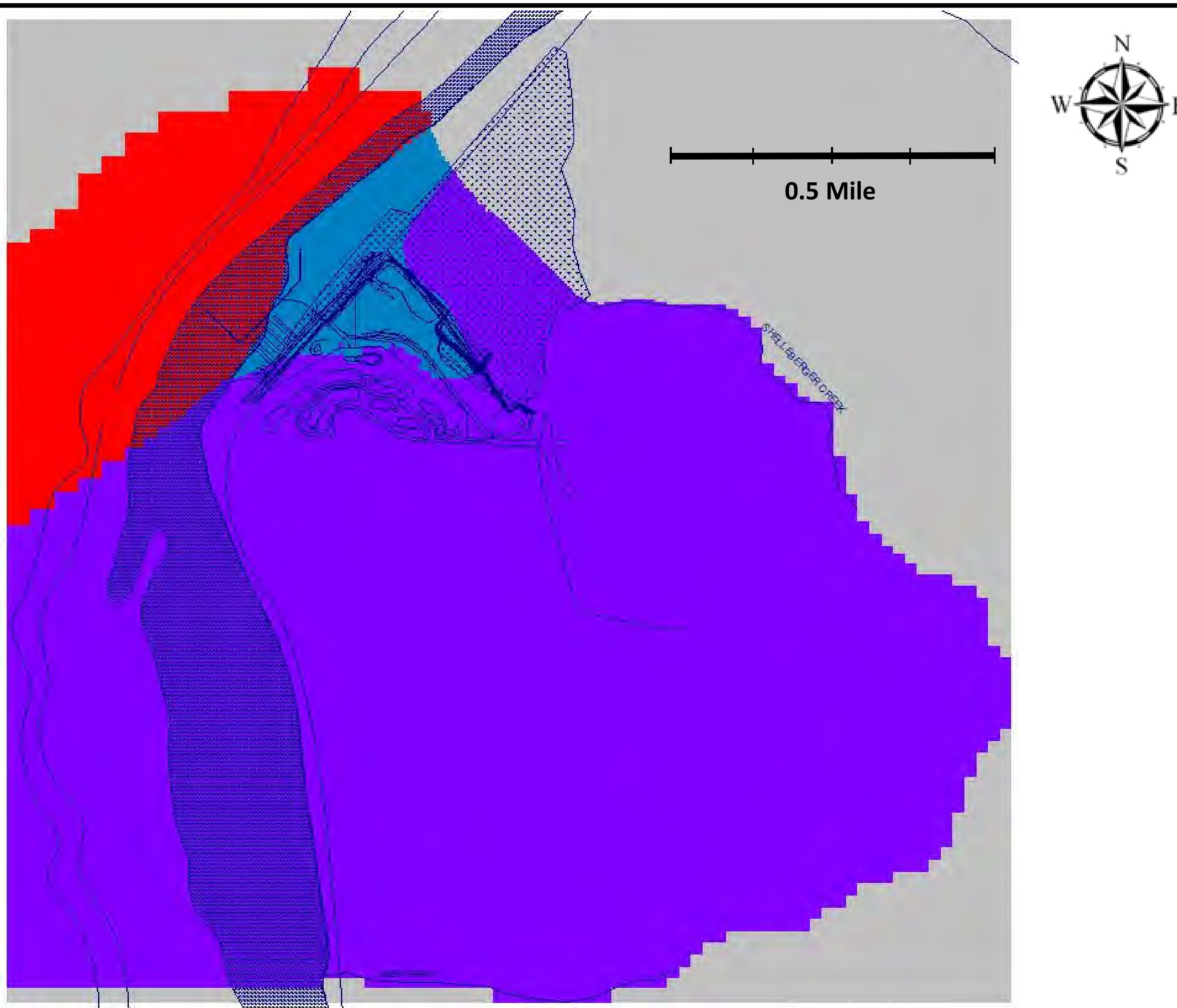
- 5
- 0.75
- 0.25
- 0.85
- 75

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Hydraulic Conductivity Distribution – Layer 2

ARCADIS

FIGURE
9



Hydraulic Conductivity (Feet/Day)

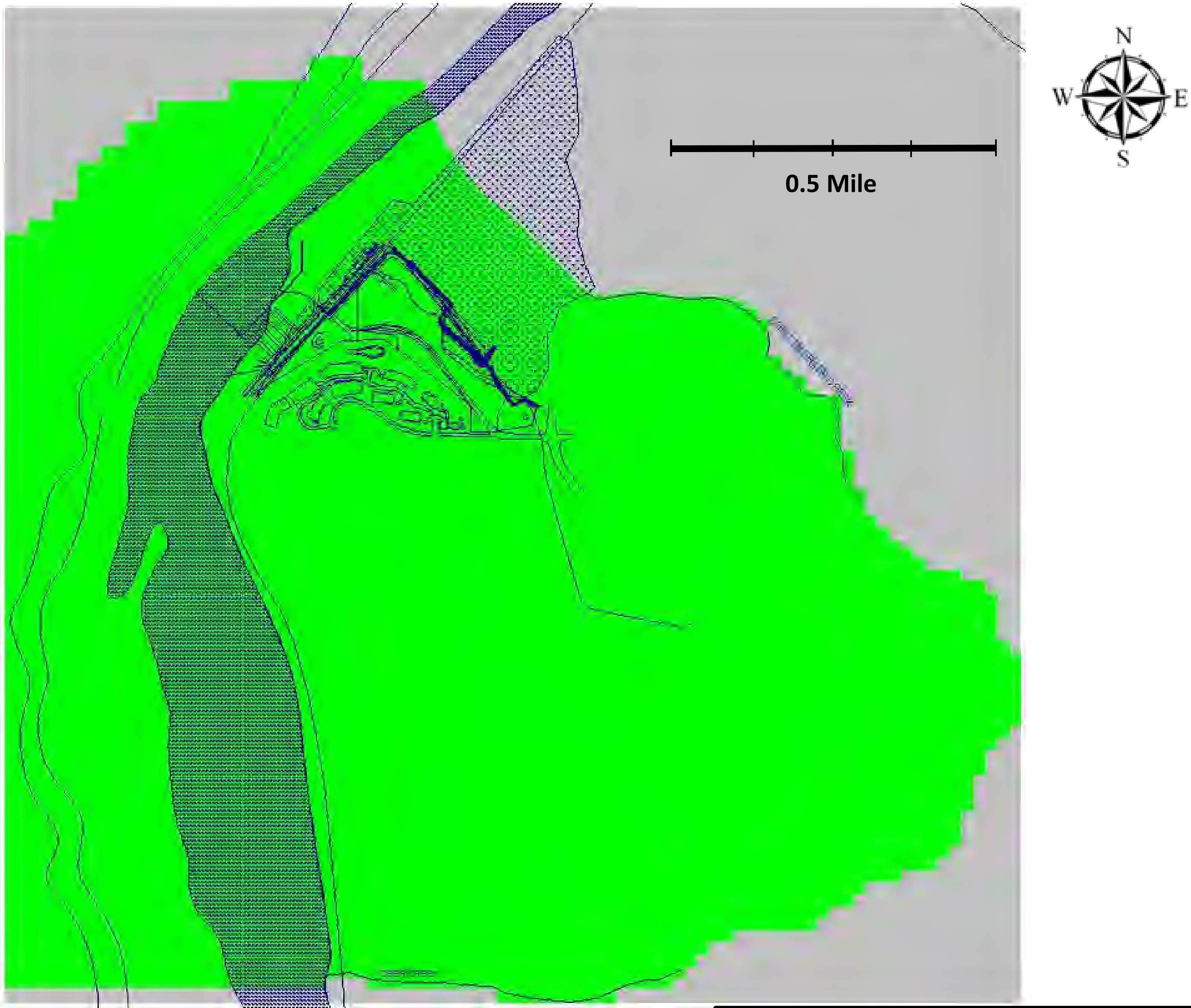
- 1.5
- 75
- 45

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Hydraulic Conductivity Distribution – Layer 3

ARCADIS

FIGURE
10



Hydraulic Conductivity (Feet/Day)

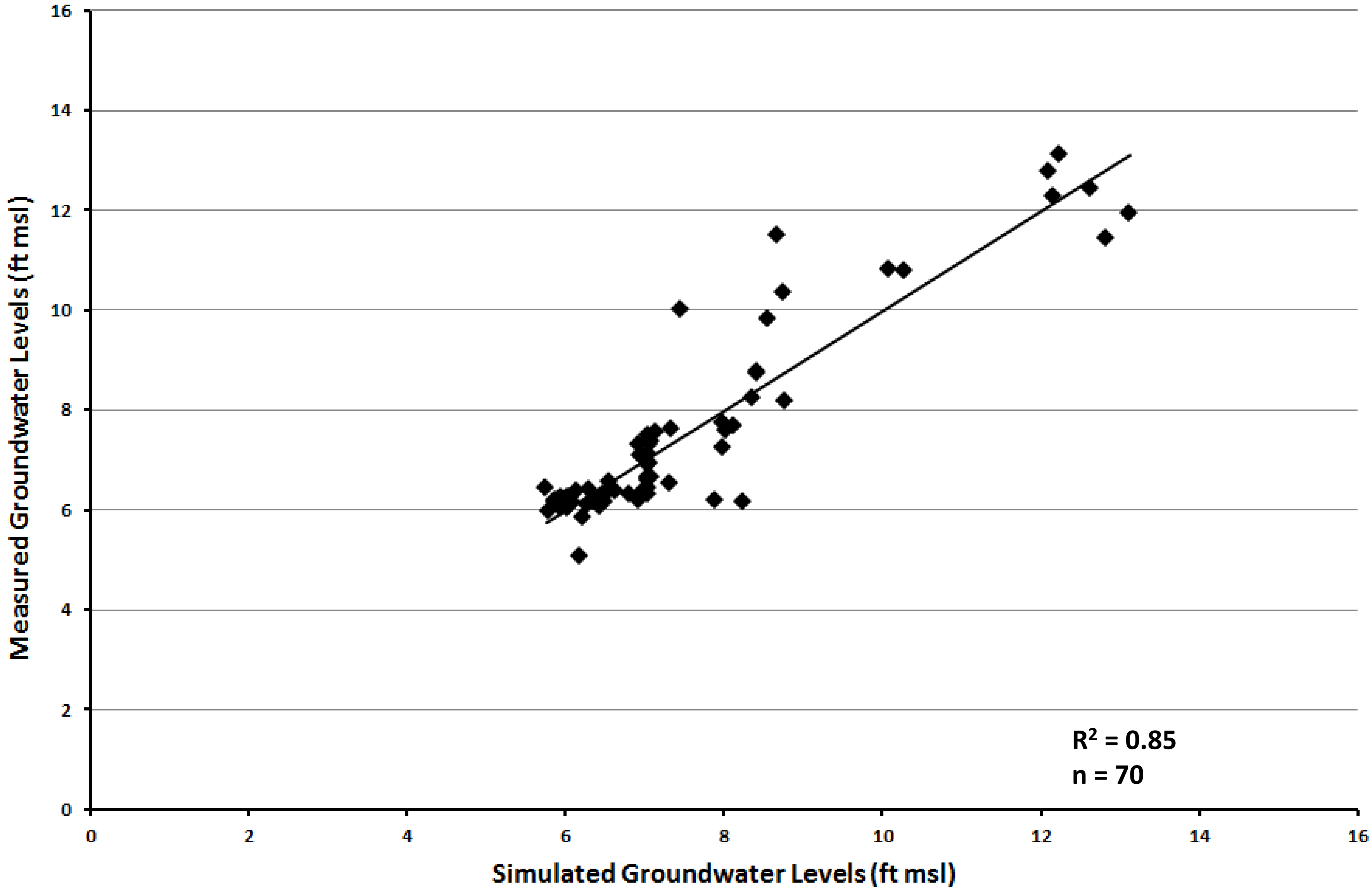
1.5

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Hydraulic Conductivity Distribution – Layer 4

ARCADIS

FIGURE
11

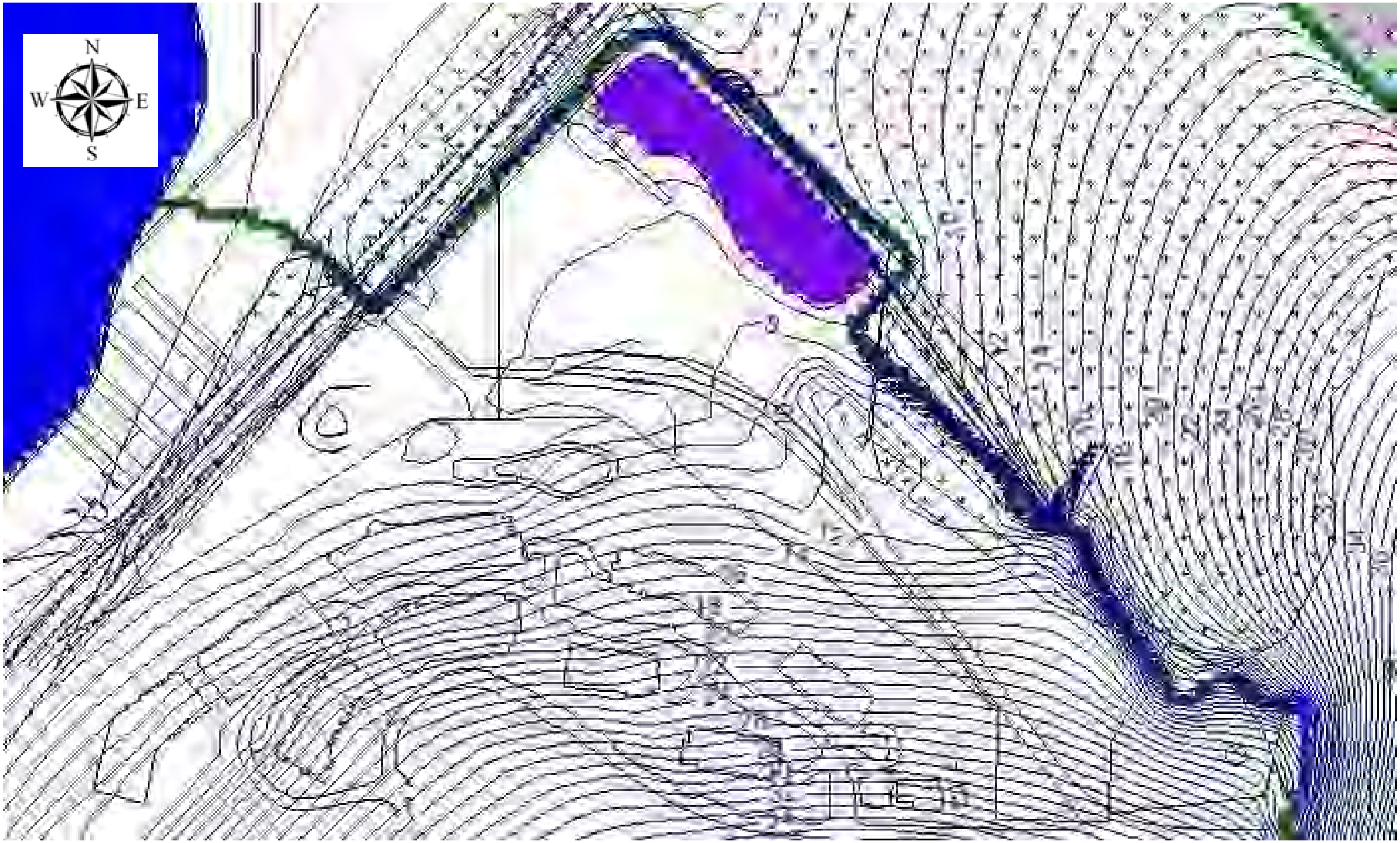


Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Calibration Scatter Plot

ARCADIS

FIGURE
12



Legend

- Puget Sound
- Detention Basin #1
- Creek/River
- Simulated Potentiometric Contour (ft msl)

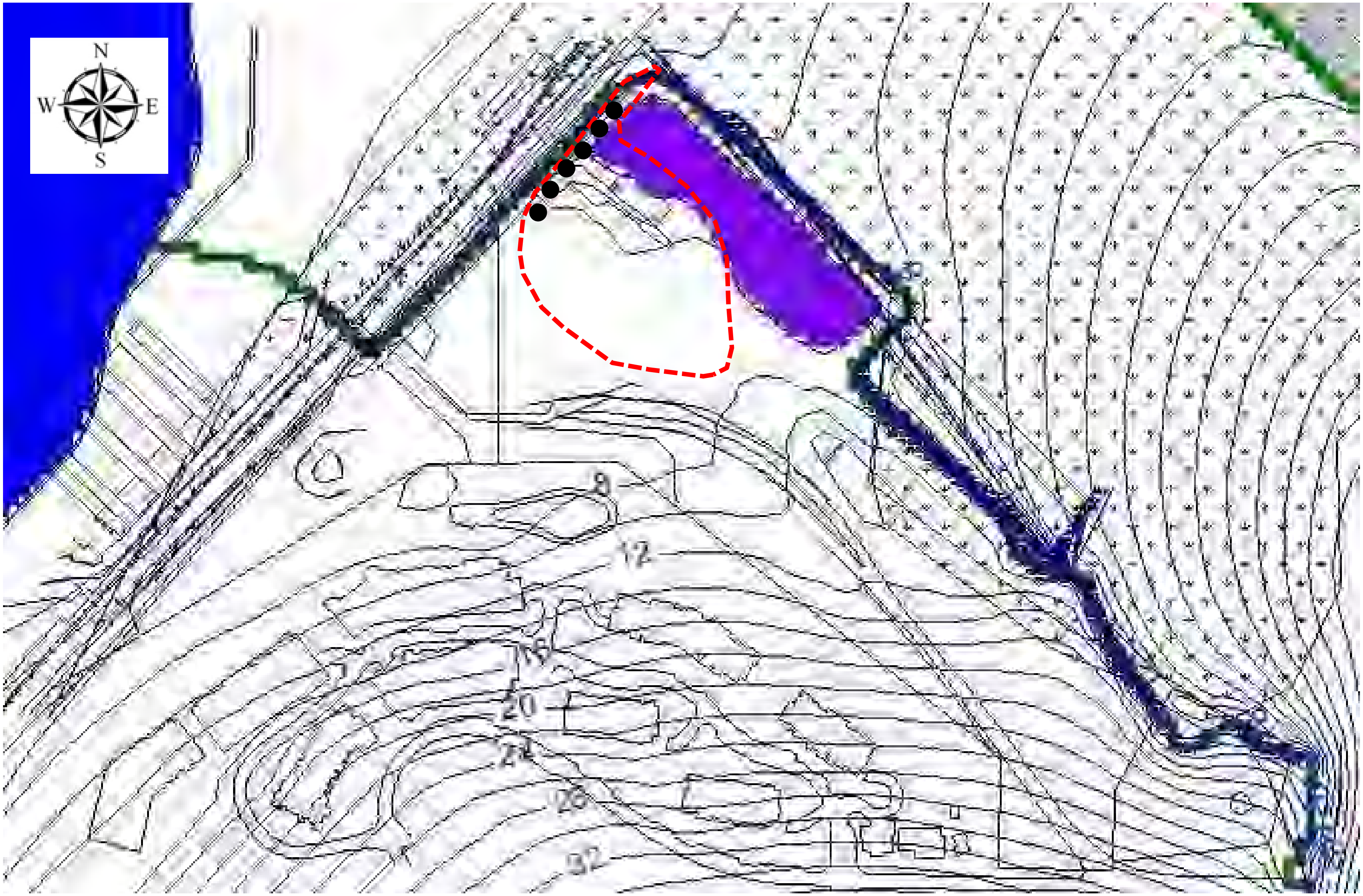
Note: Simulation performed under steady-state, average groundwater flow condition.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Simulated Potentiometric Surface
Calibrated Condition

ARCADIS

FIGURE
13



Legend

- Puget Sound
- Detention Basin #1
- Creek/River
- Simulated Potentiometric Contour (ft msl)
- Hypothetical Extraction Well
- Predicted Groundwater Capture Zone (approx)

0 100 200 300 400
Feet

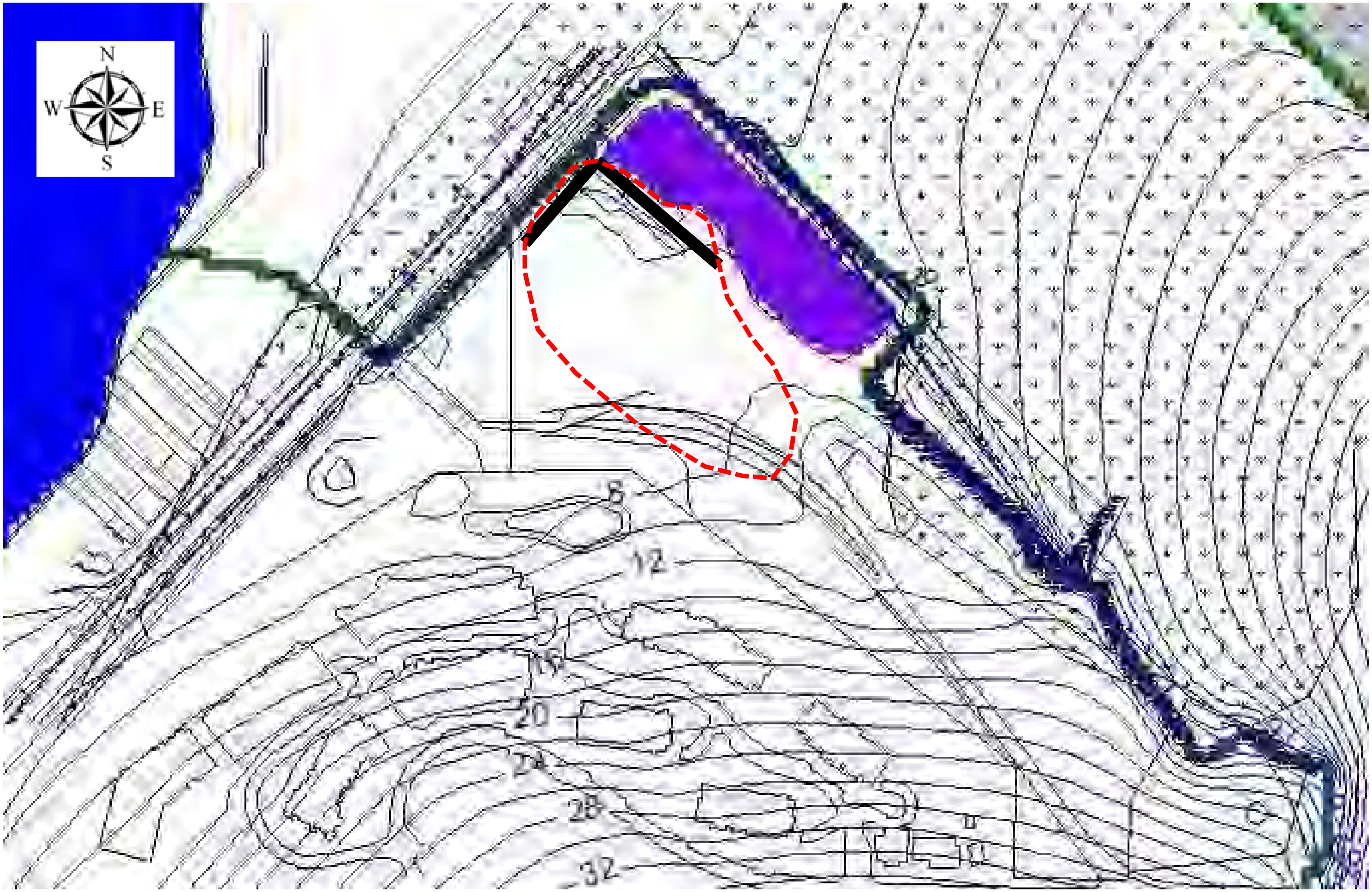
Note: Simulation performed under steady-state, average groundwater flow condition.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Remediation Scenario 1
6 Extraction Wells (3 to 5 GPM)

ARCADIS

FIGURE
14



Legend

- Puget Sound
- Detention Basin #1
- Creek/River
- Simulated Potentiometric Contour (ft msl)
- Hypothetical Groundwater Interceptor Trench
- Predicted Groundwater Capture Zone (approx)

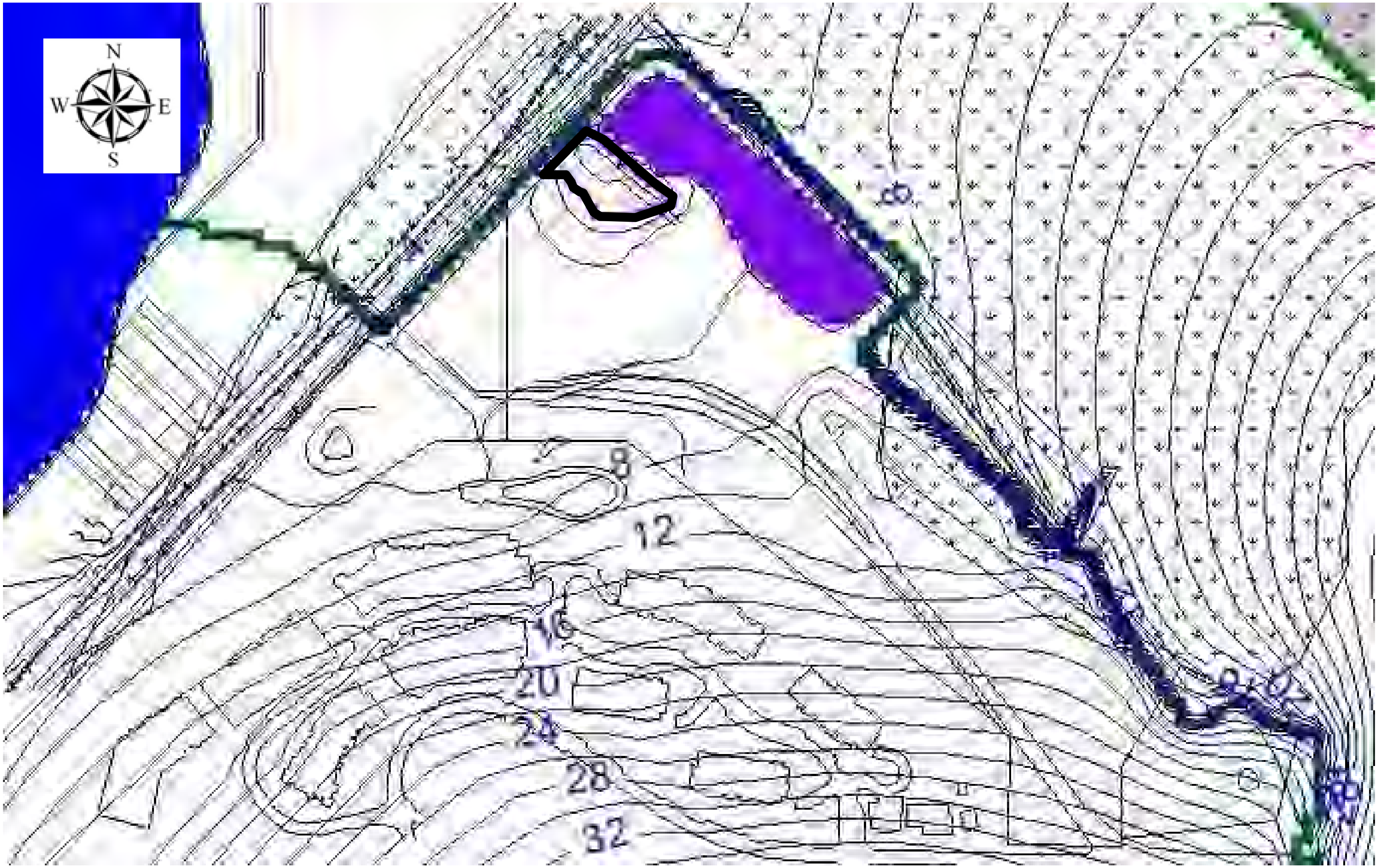
Note: Simulation performed under steady-state, average groundwater flow condition.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Remediation Scenario 2
Groundwater Interceptor Trench (4 to 7 GPM)

ARCADIS

FIGURE
15



Legend

- Puget Sound
- Detention Basin #1
- Creek/River
- Simulated Potentiometric Contour (ft msl)
- Limits of Soil Excavation (Approx)

0 100 200 300 400
Feet

Note: Simulation performed under steady-state, average groundwater flow condition.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

Remediation Scenario 3
Soil Excavation Near DB-1 and DB-2

ARCADIS

FIGURE
16

Legend
- Puget Sound
- Detention Basin #1
- Creek/River
- Simulated Potentiometric Contour (ft msl)
- Limits of Soil Excavation (Approx)

Note: Simulation performed under steady-state, average groundwater flow condition.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
Groundwater Flow Model

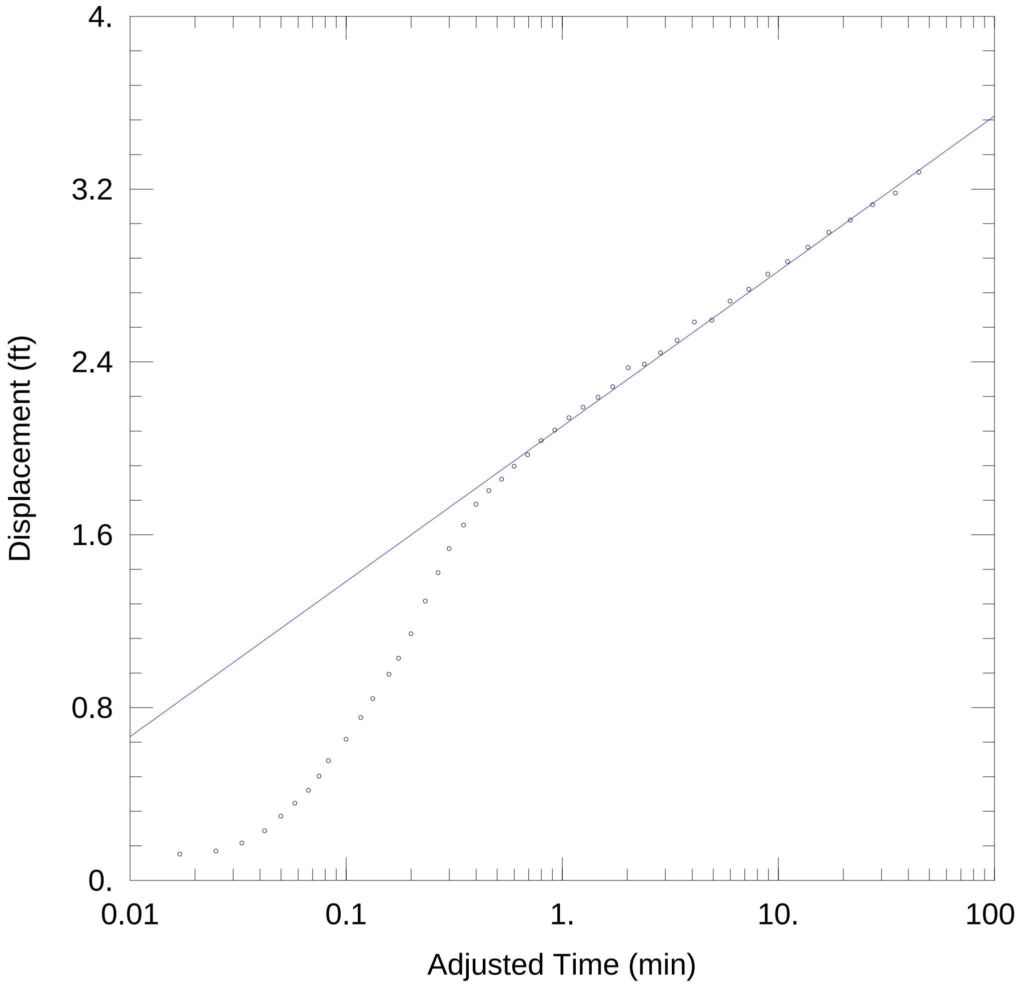
Remediation Scenario 4
Soil Excavation Near Storm Drain

ARCADIS

FIGURE
17

Attachment 1

Constant-Rate Pumping Test Plots



MW-122 CONSTANT-RATE TEST

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-122
Test Date: 3/5/13

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-122	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-122	0	0

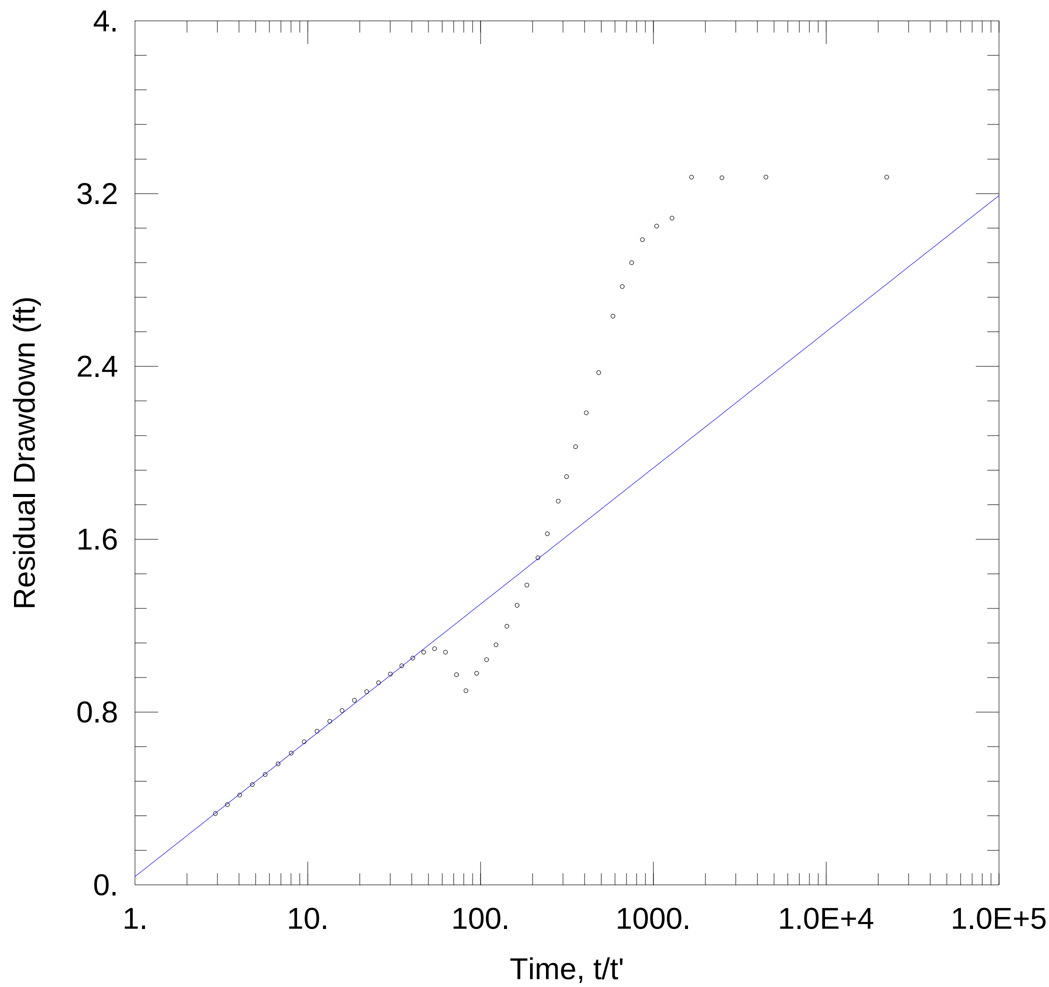
SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 165. ft^2/day

S = 0.0028



MW-122 CONSTANT-RATE TEST

PROJECT INFORMATION

Company: ARCADIS
Test Well: MW-122
Test Date: 3/5/13

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-122	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-122	0	0

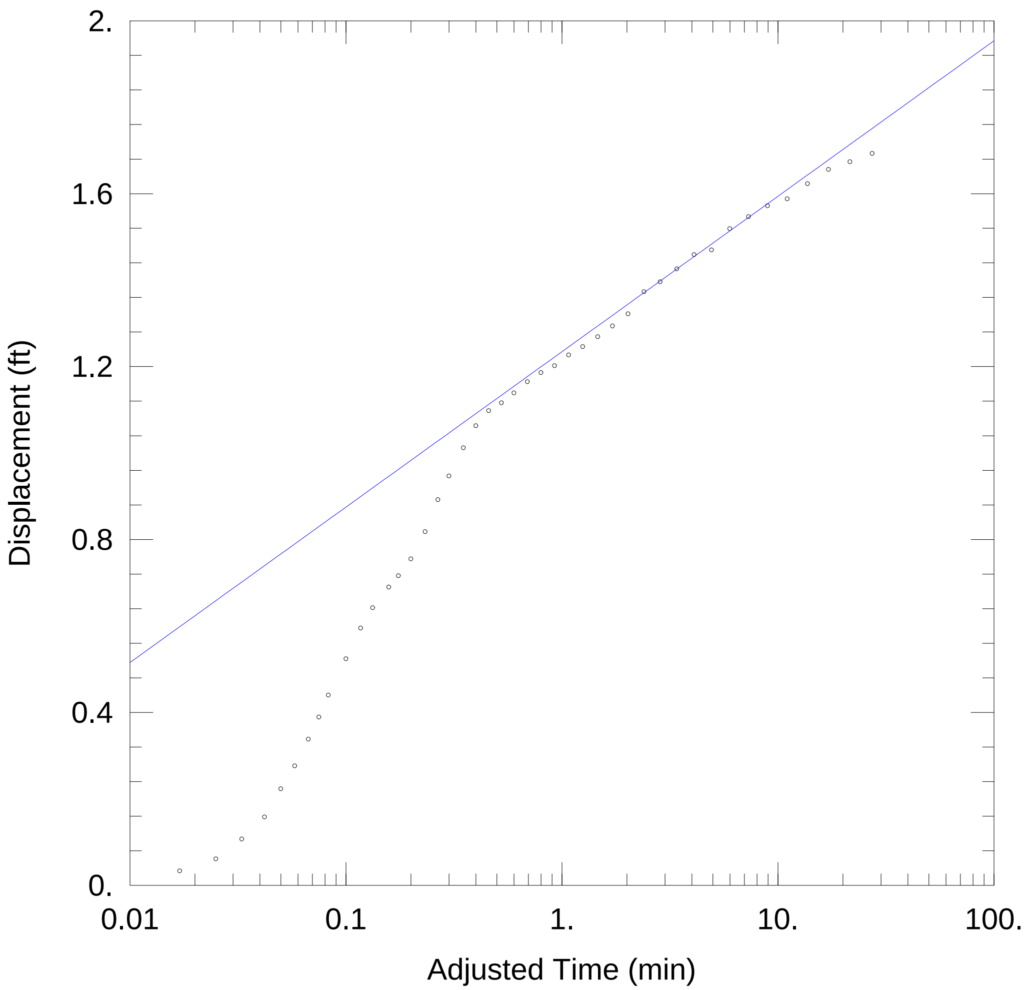
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 188. ft^2/day

S/S' = 0.87



MW-147 CONSTANT-RATE TEST

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-147
Test Date: 3/5/13

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-147	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-147	0	0

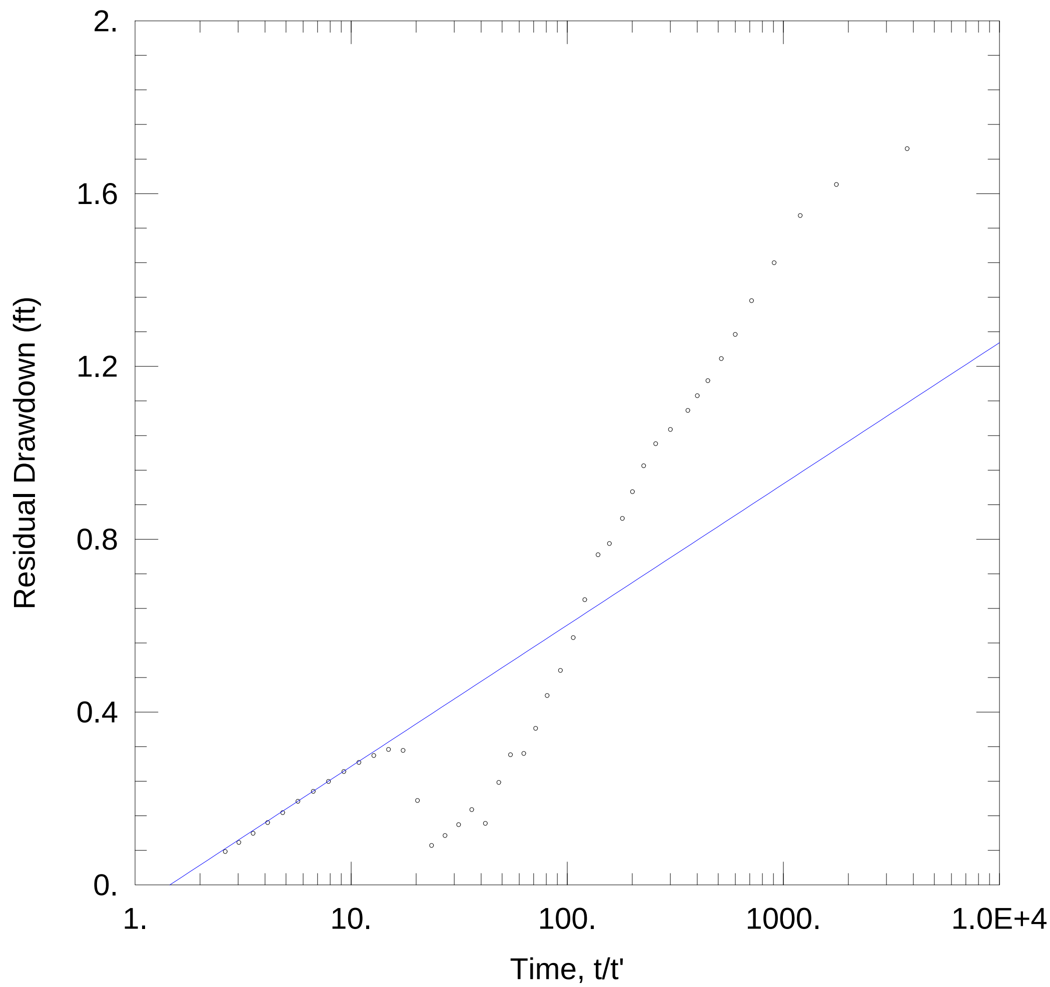
SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 360. ft^2/day

S = 0.0019



MW-147 CONSTANT-RATE TEST

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-147
Test Date: 3/5/13

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-147	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-147	0	0

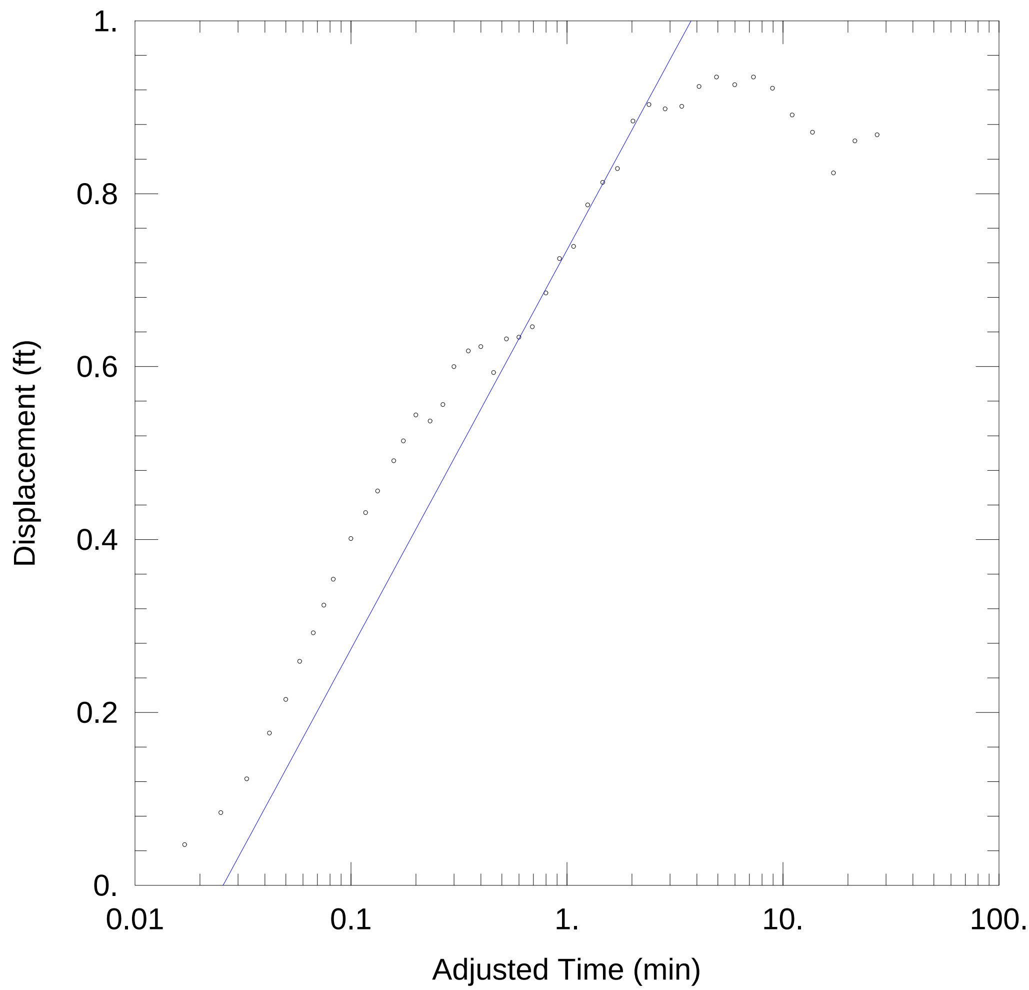
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 396. ft^2/day

S/S' = 1.45



MW-203 CONSTANT-RATE TEST

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-203
Test Date: 3/4/13

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-203	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-203	0	0

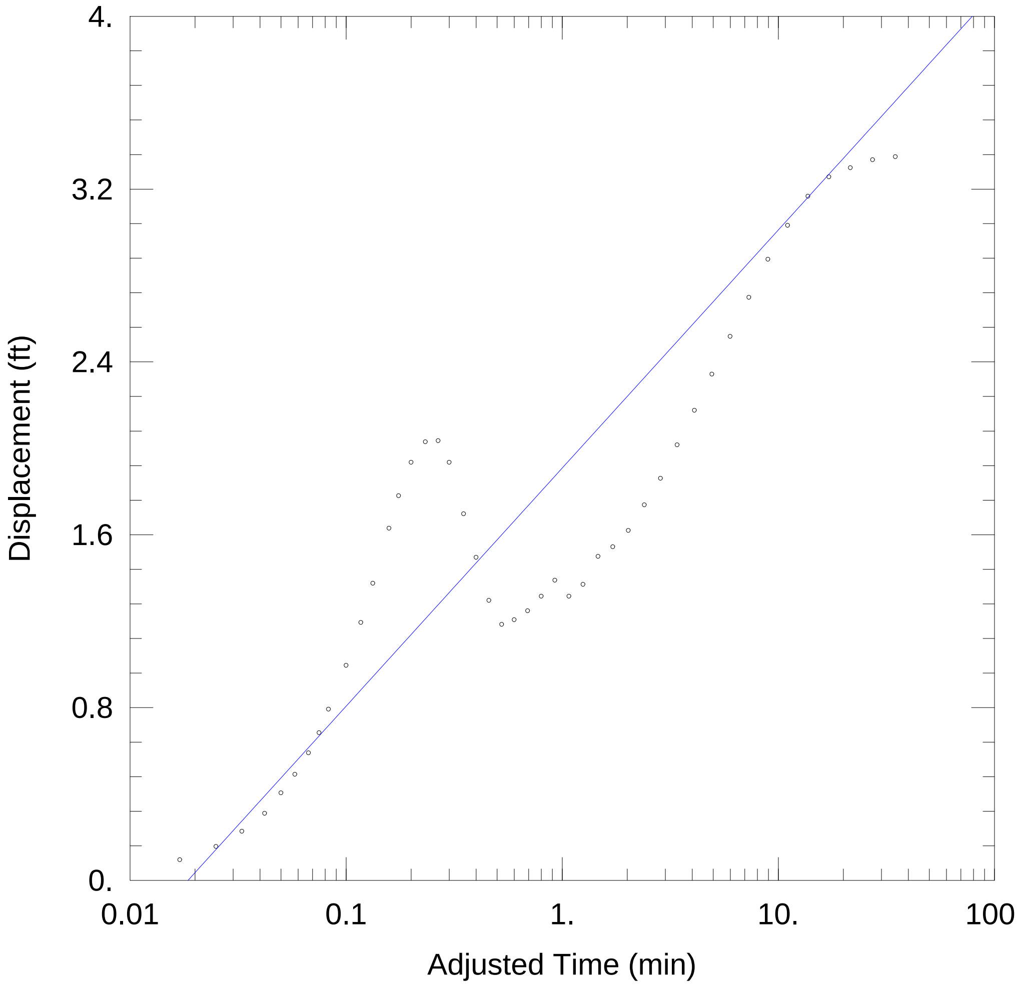
SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 191. ft^2/day

S = 0.07



MW-510 CONSTANT-RATE TEST

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-510
Test Date: 3/6/13

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-510	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-510	0	0

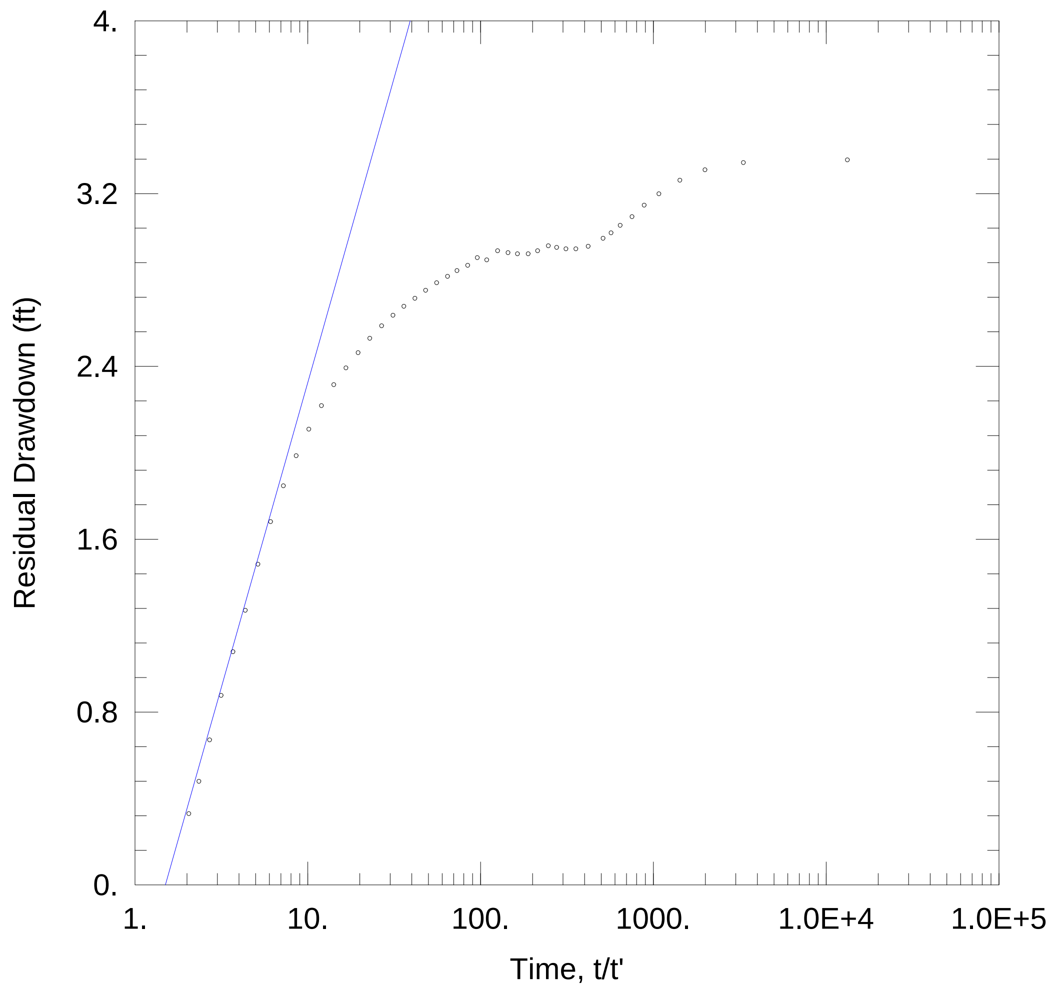
SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 6.4 ft^2/day

S = 0.0017



MW-510 CONSTANT-RATE TEST

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-510
Test Date: 3/6/13

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-510	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-510	0	0

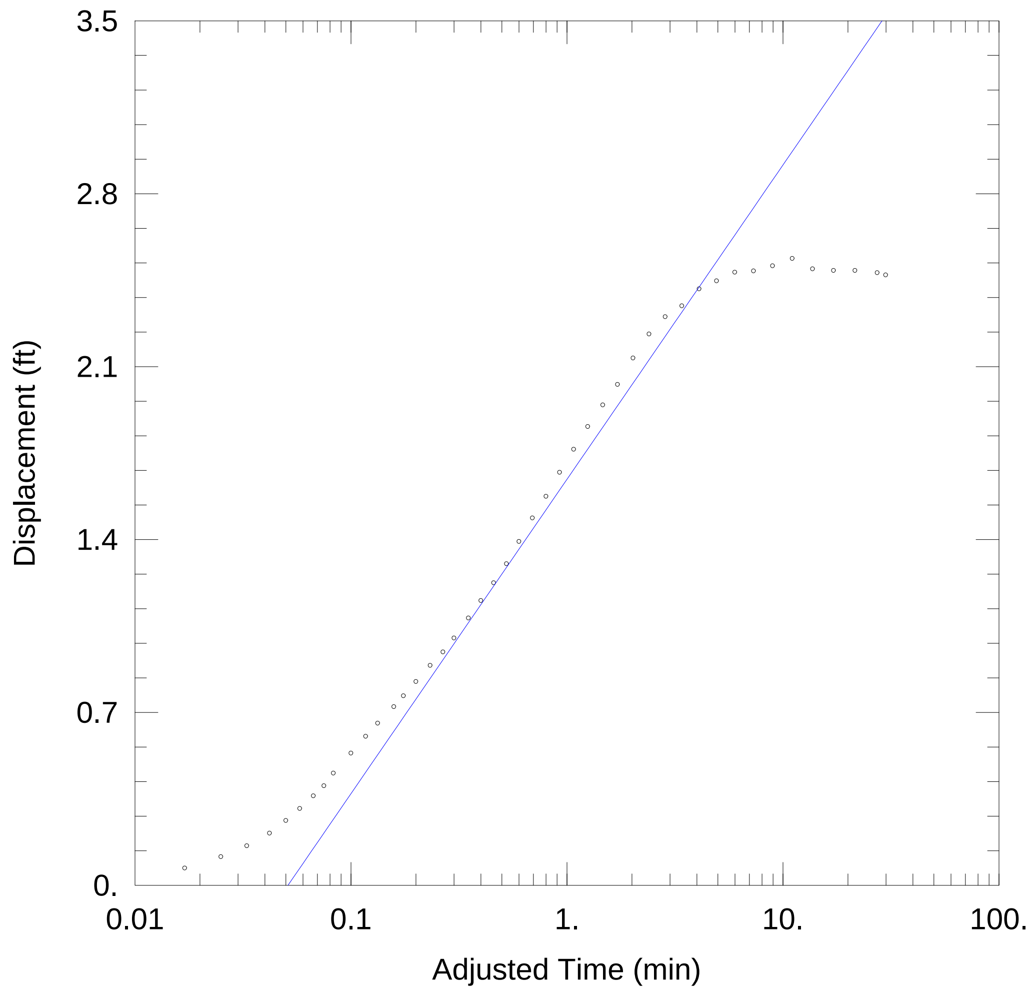
SOLUTION

Aquifer Model: Confined

Solution Method: Theis (Recovery)

T = 2.5 ft^2/day

S/S' = 1.5



MW-511 CONSTANT-RATE TEST

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-511
Test Date: 3/4/13

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-511	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-511	0	0

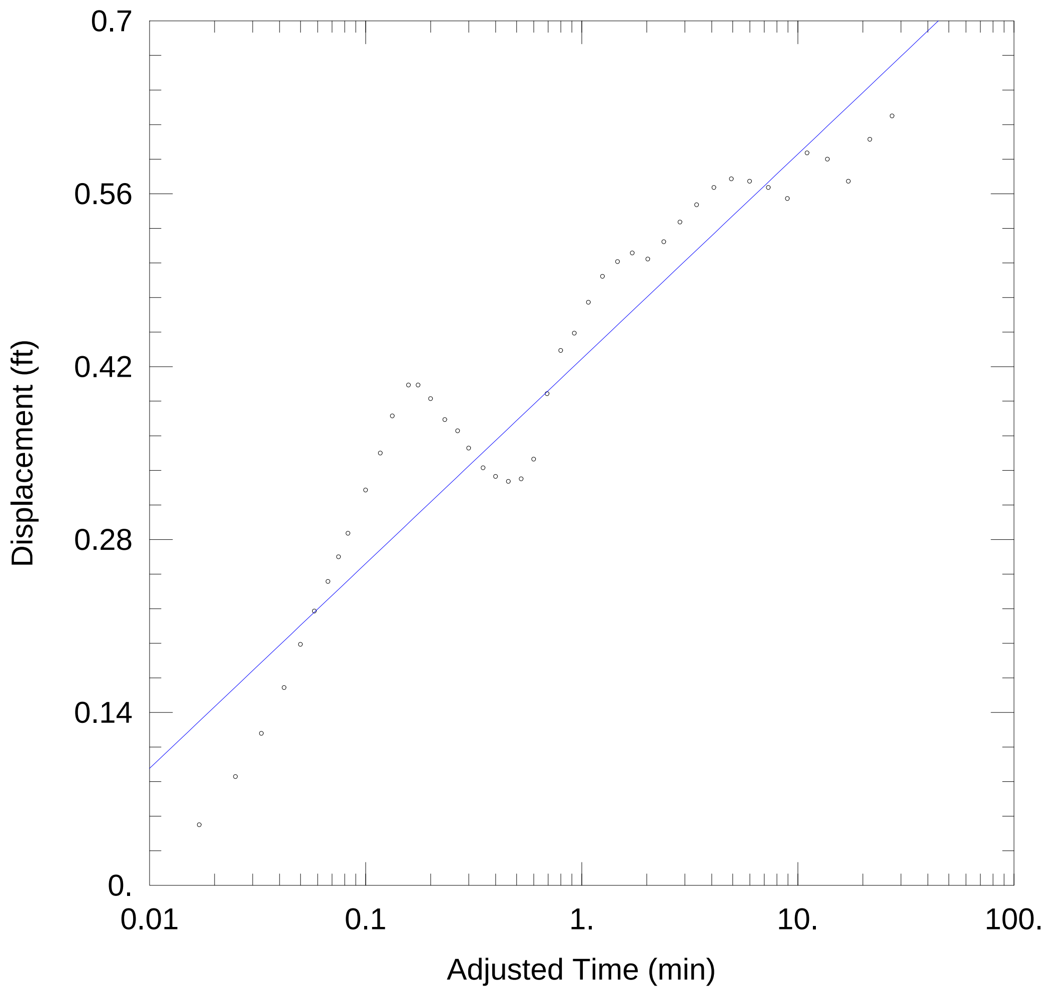
SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Jacob

T = 97. ft^2/day

S = 0.071



MW-522 CONSTANT-RATE TEST

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-522
Test Date: 3/5/13

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-522	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
◦ MW-522	0	0

SOLUTION

Aquifer Model: Confined

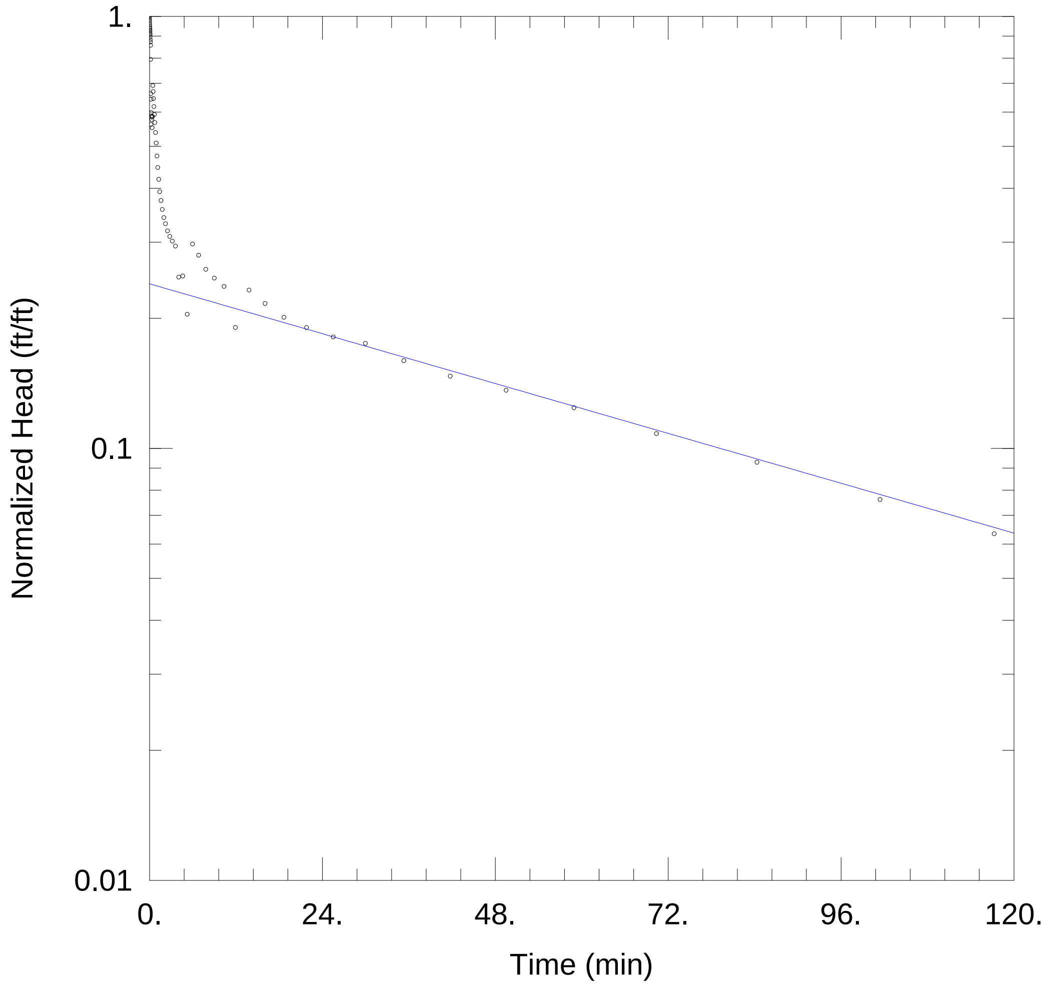
Solution Method: Cooper-Jacob

T = 117. ft^2/day

S = 0.0045

Attachment 2

Slug Test Plots



MW-108 RISING HEAD TEST 1

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-108
Test Date: 3/6/13

WELL DATA (MW-108)

Initial Displacement: 1.498 ft
Total Well Penetration Depth: 9.6 ft
Casing Radius: 0.0417 ft

Static Water Column Height: 9.67 ft
Screen Length: 9.6 ft
Well Radius: 0.17 ft
Gravel Pack Porosity: 0.35

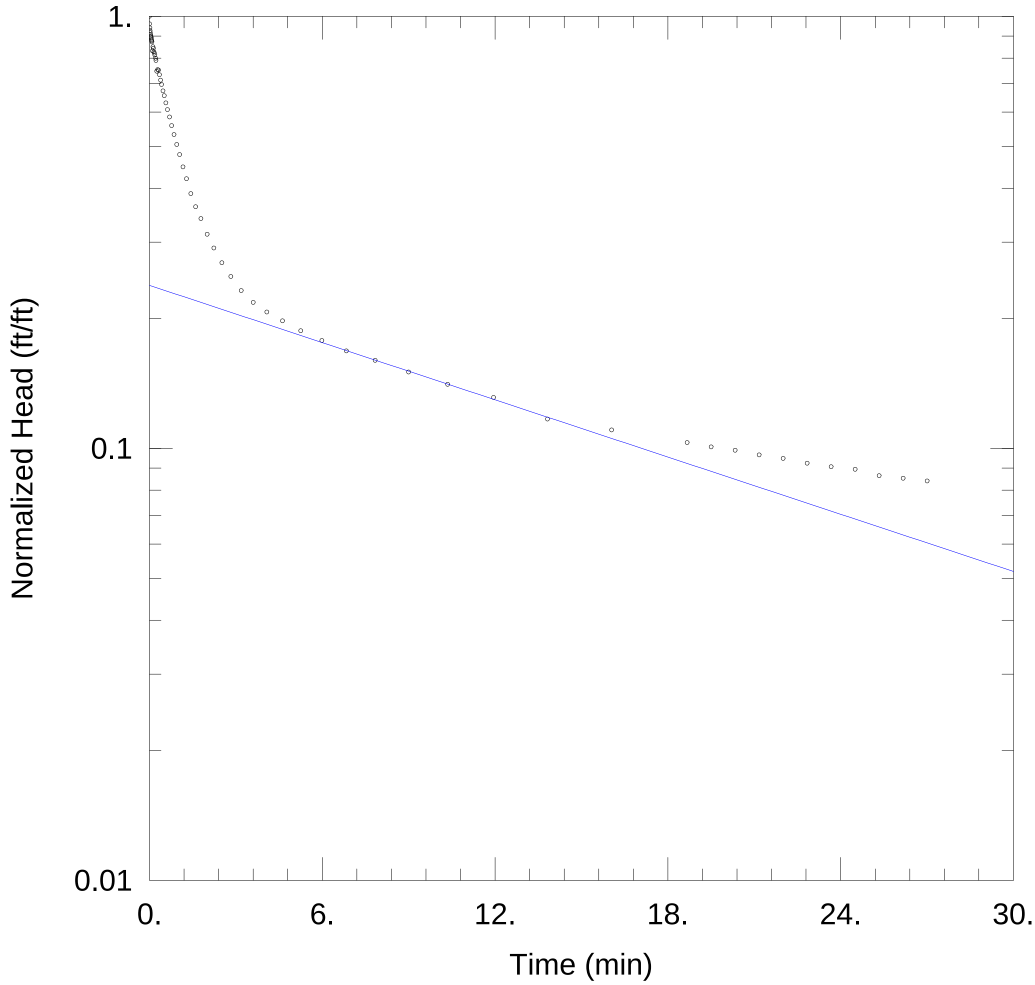
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.02 ft/day

y0 = 0.36 ft



MW-109 RISING HEAD TEST 1

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-109
Test Date: 3/7/13

WELL DATA (MW-109)

Initial Displacement: 1.678 ft
Total Well Penetration Depth: 8.09 ft
Casing Radius: 0.0417 ft

Static Water Column Height: 8.22 ft
Screen Length: 8.09 ft
Well Radius: 0.17 ft
Gravel Pack Porosity: 0.35

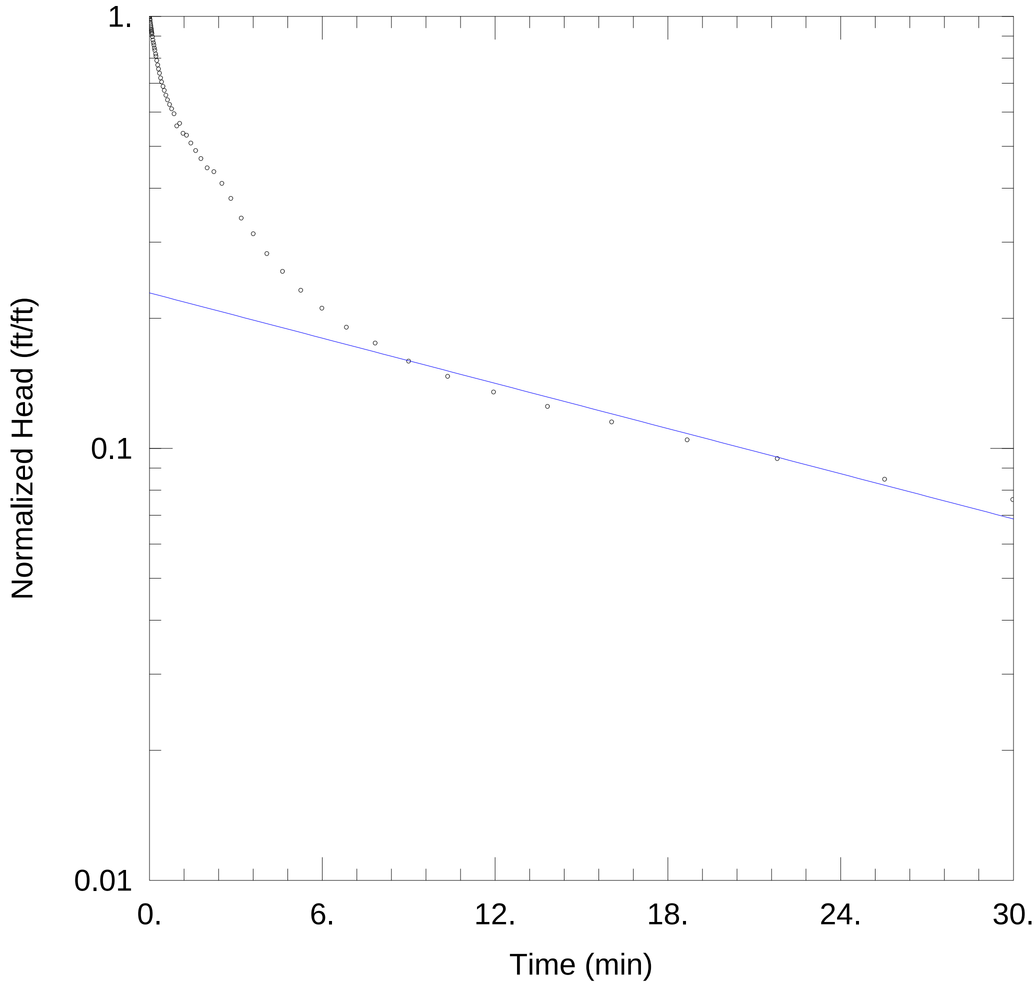
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.091 ft/day

y0 = 0.4 ft



MW-126 RISING HEAD TEST 1

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-126
Test Date: 3/6/13

WELL DATA (MW-126)

Initial Displacement: 1.616 ft
Total Well Penetration Depth: 9.65 ft
Casing Radius: 0.083 ft

Static Water Column Height: 9.75 ft
Screen Length: 9.65 ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.35

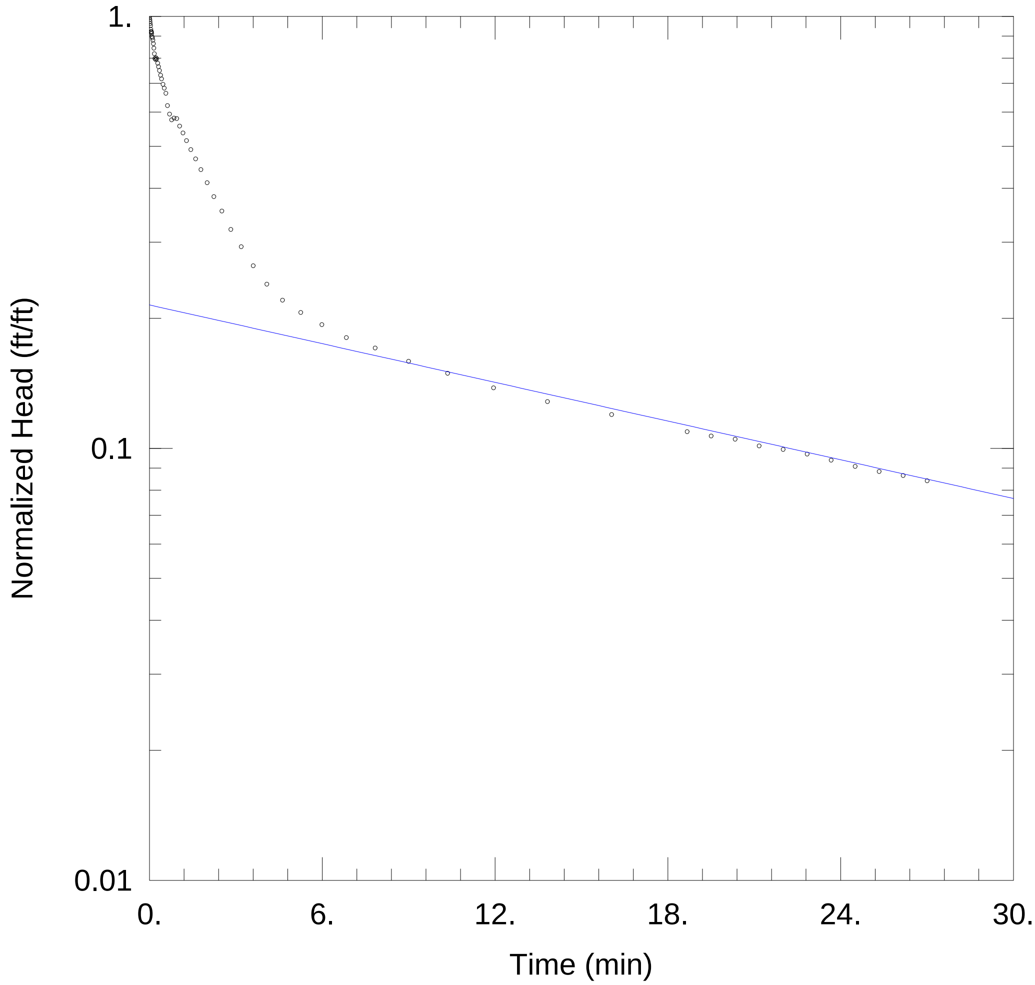
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.23 ft/day

y0 = 0.37 ft



MW-126 RISING HEAD TEST 2

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-126
Test Date: 3/7/13

WELL DATA (MW-126)

Initial Displacement: 1.63 ft
Total Well Penetration Depth: 9.8 ft
Casing Radius: 0.083 ft

Static Water Column Height: 9.9 ft
Screen Length: 9.8 ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.35

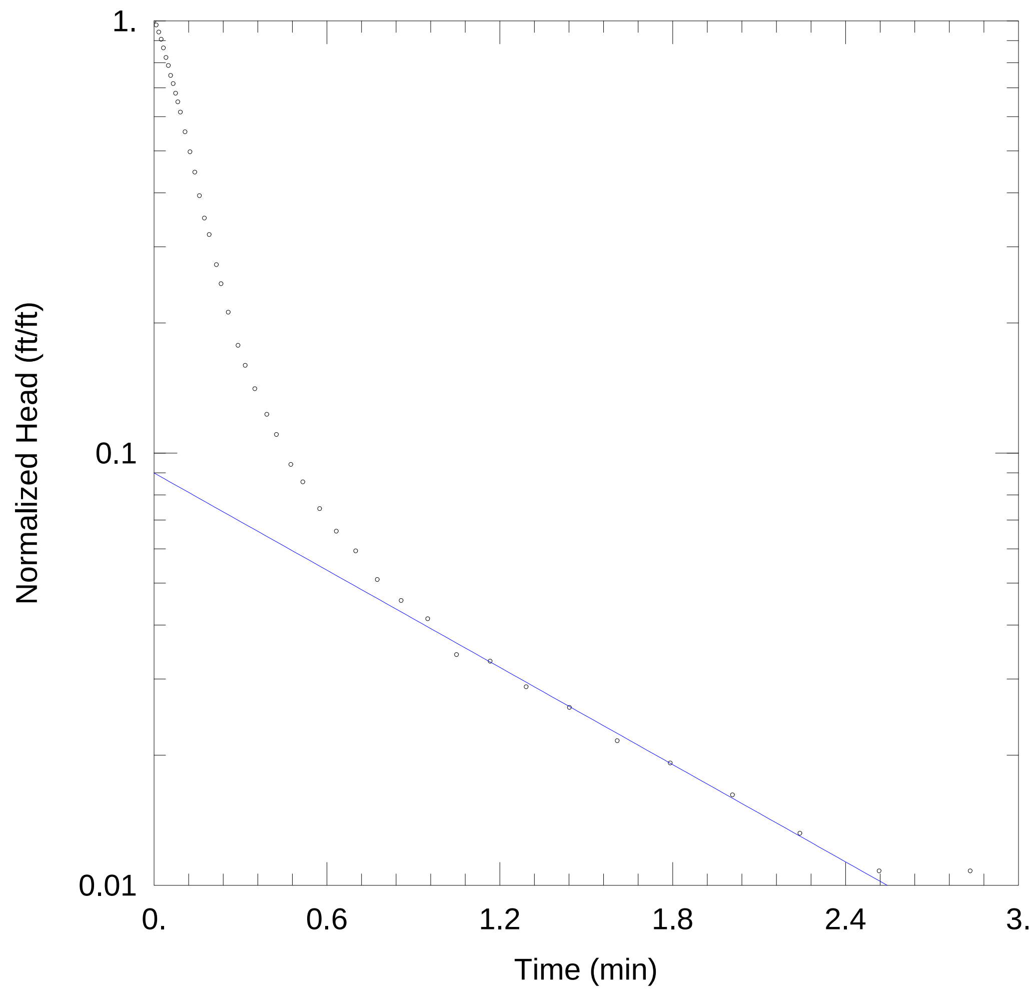
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.21 ft/day

y0 = 0.35 ft



MW-522 RISING HEAD TEST 1

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-522
Test Date: 3/7/13

WELL DATA (MW-522)

Initial Displacement: 1.668 ft
Total Well Penetration Depth: 4.91 ft
Casing Radius: 0.083 ft

Static Water Column Height: 5.16 ft
Screen Length: 4.91 ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.35

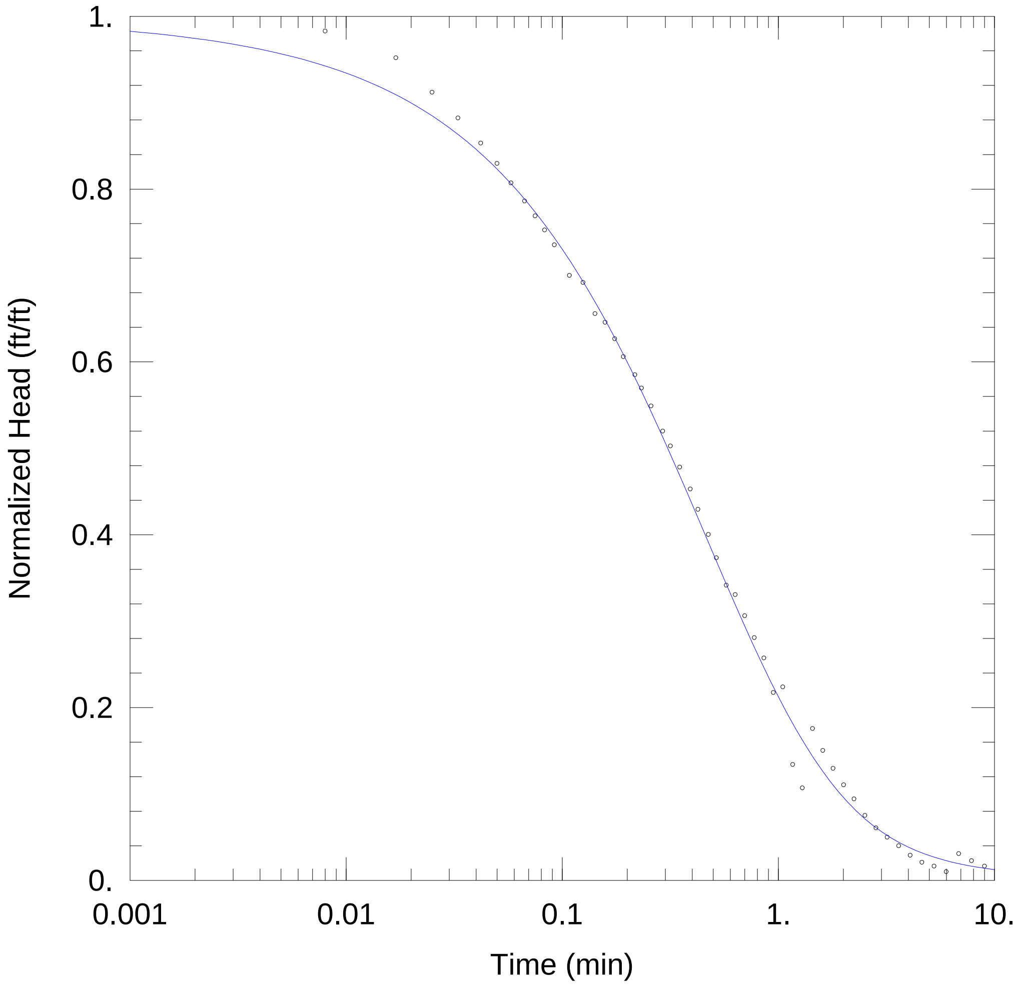
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 17.3 ft/day

y0 = 0.15 ft



MW-530 RISING HEAD TEST 2

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-530
Test Date: 3/7/13

WELL DATA (MW-530)

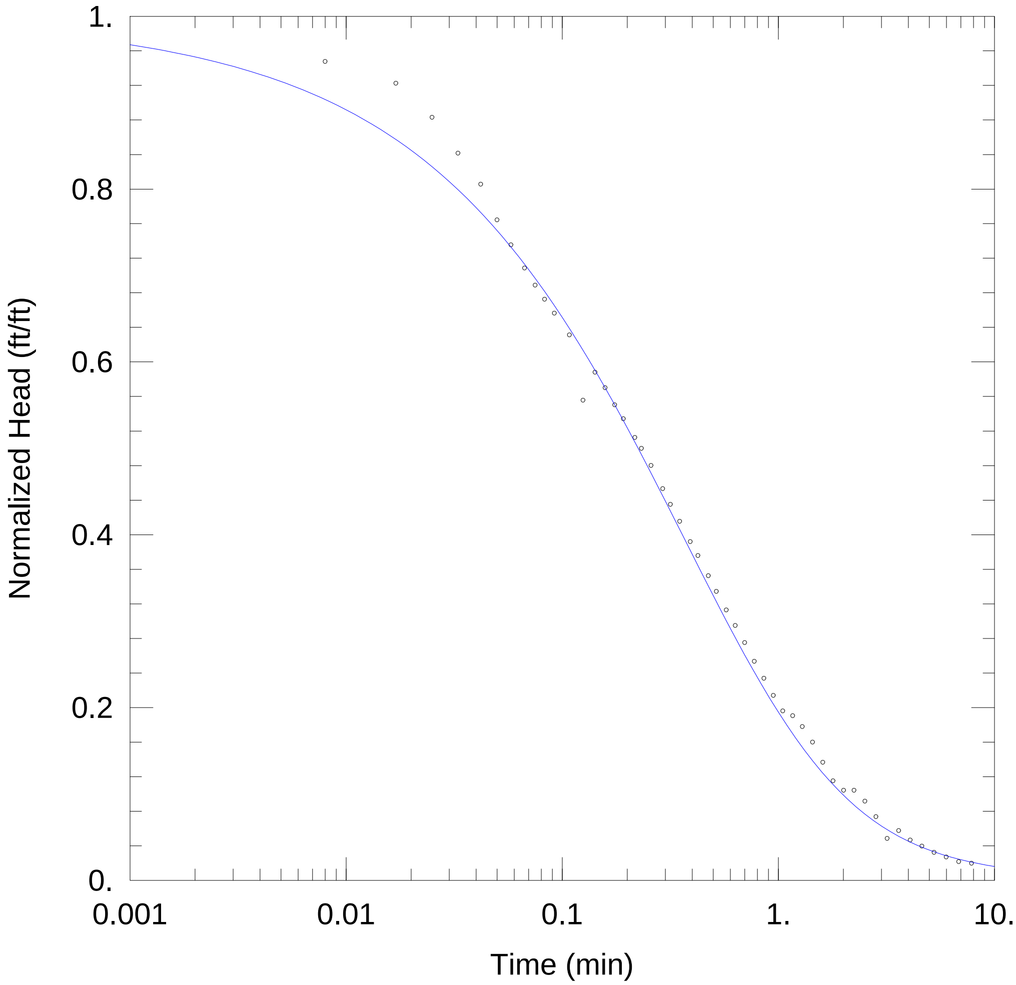
Initial Displacement: 1.104 ft
Total Well Penetration Depth: 6.56 ft
Casing Radius: 0.0417 ft

Static Water Column Height: 6.59 ft
Screen Length: 5. ft
Well Radius: 0.08 ft

SOLUTION

Aquifer Model: Confined
$T = 5.9\ ft^2/day$

Solution Method: Cooper-Bredehoeft-Papadopulos
S = 0.0053



MW-530 RISING HEAD TEST 3

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: MW-530
Test Date: 3/7/13

WELL DATA (MW-530)

Initial Displacement: 1.287 ft
Total Well Penetration Depth: 6.56 ft
Casing Radius: 0.0417 ft

Static Water Column Height: 6.59 ft
Screen Length: 5. ft
Well Radius: 0.083 ft

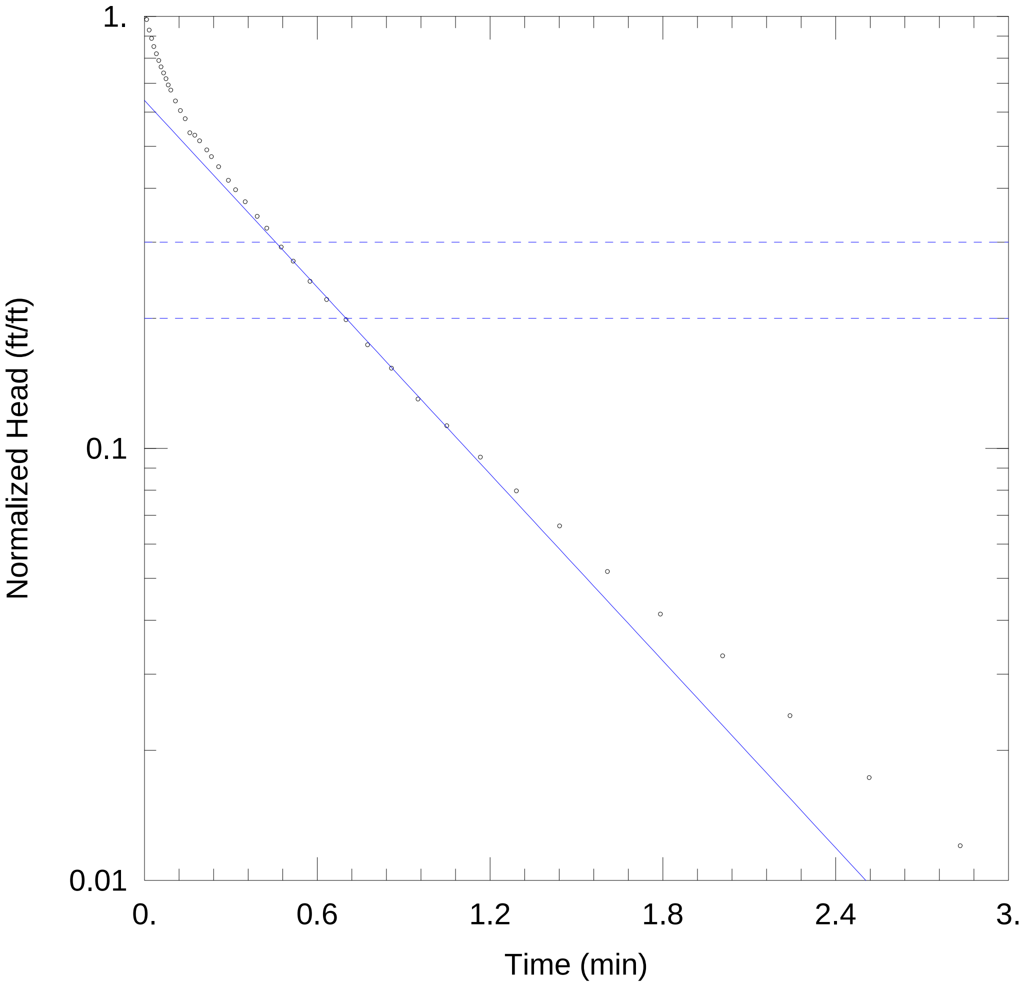
SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Bredehoeft-Papadopulos

T = 4.4 ft^2/day

S = 0.029



P-16 RISING HEAD TEST 1

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: P-16
Test Date: 3/6/13

WELL DATA (P-16)

Initial Displacement: 1.331 ft
Total Well Penetration Depth: 10.56 ft
Casing Radius: 0.0417 ft

Static Water Column Height: 10.71 ft
Screen Length: 10. ft
Well Radius: 0.13 ft
Gravel Pack Porosity: 0.35

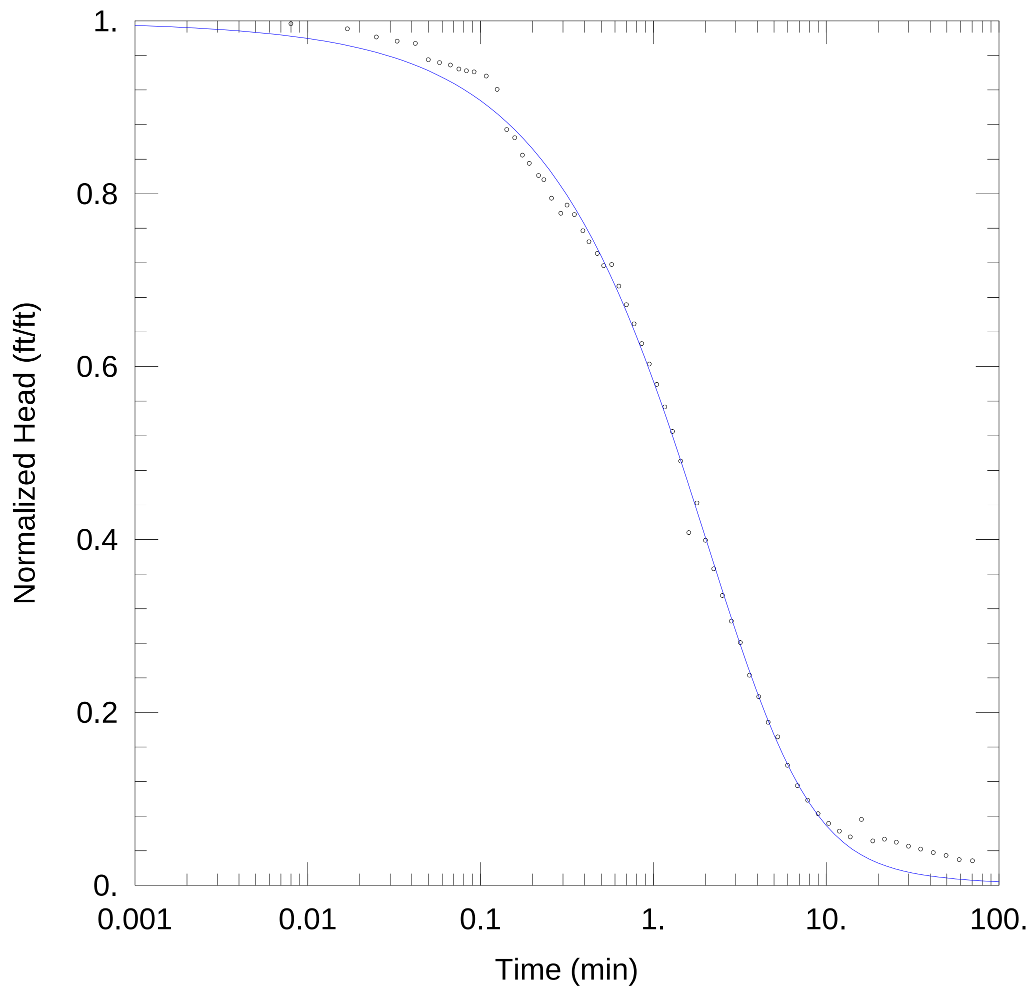
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.85 ft/day

y0 = 0.85 ft



P-4 RISING HEAD TEST 1

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: P-4
Test Date: 3/7/13

WELL DATA (P-4)

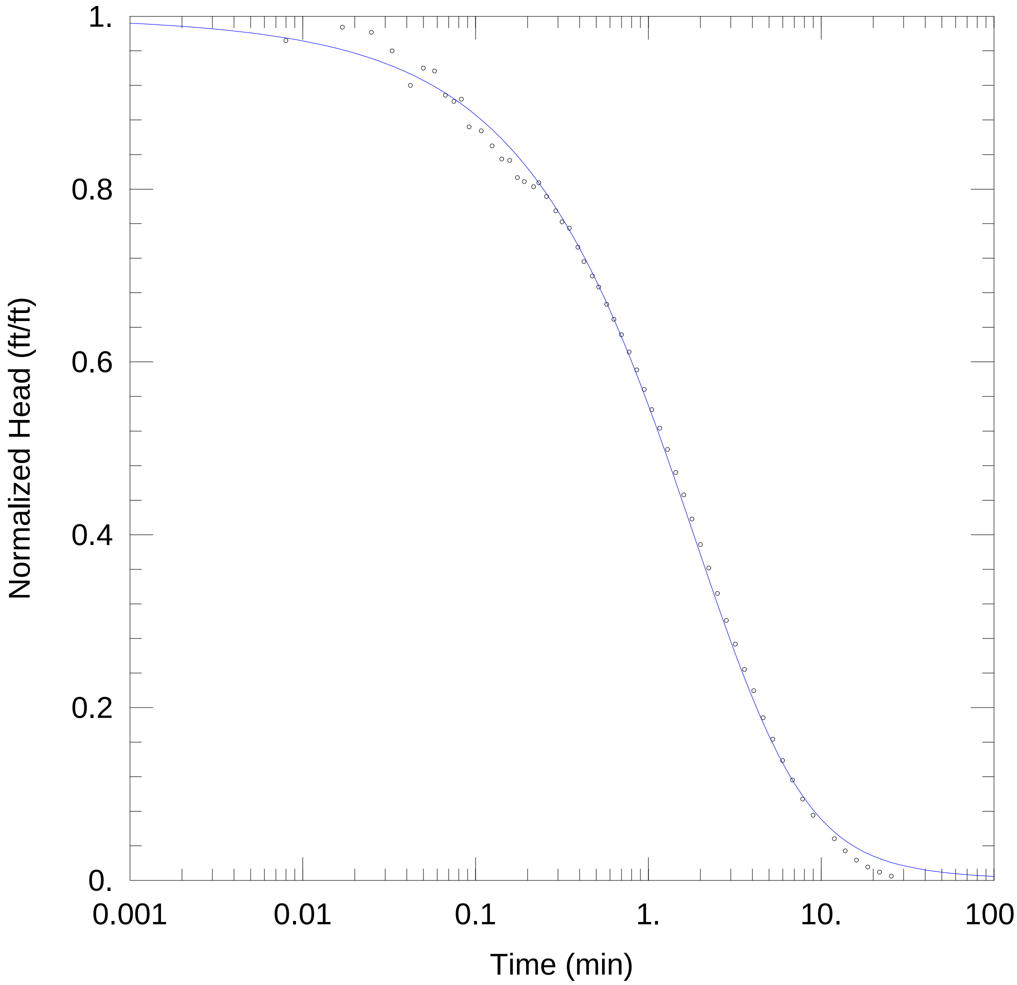
Initial Displacement: 1.486 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.0417 ft

Static Water Column Height: 14.55 ft
Screen Length: 5. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Confined
T = 1.7 ft^2/day

Solution Method: Cooper-Bredehoeft-Papadopulos
S = 0.0001



P-8 RISING HEAD TEST 1

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: P-8
Test Date: 3/7/13

WELL DATA (P-8)

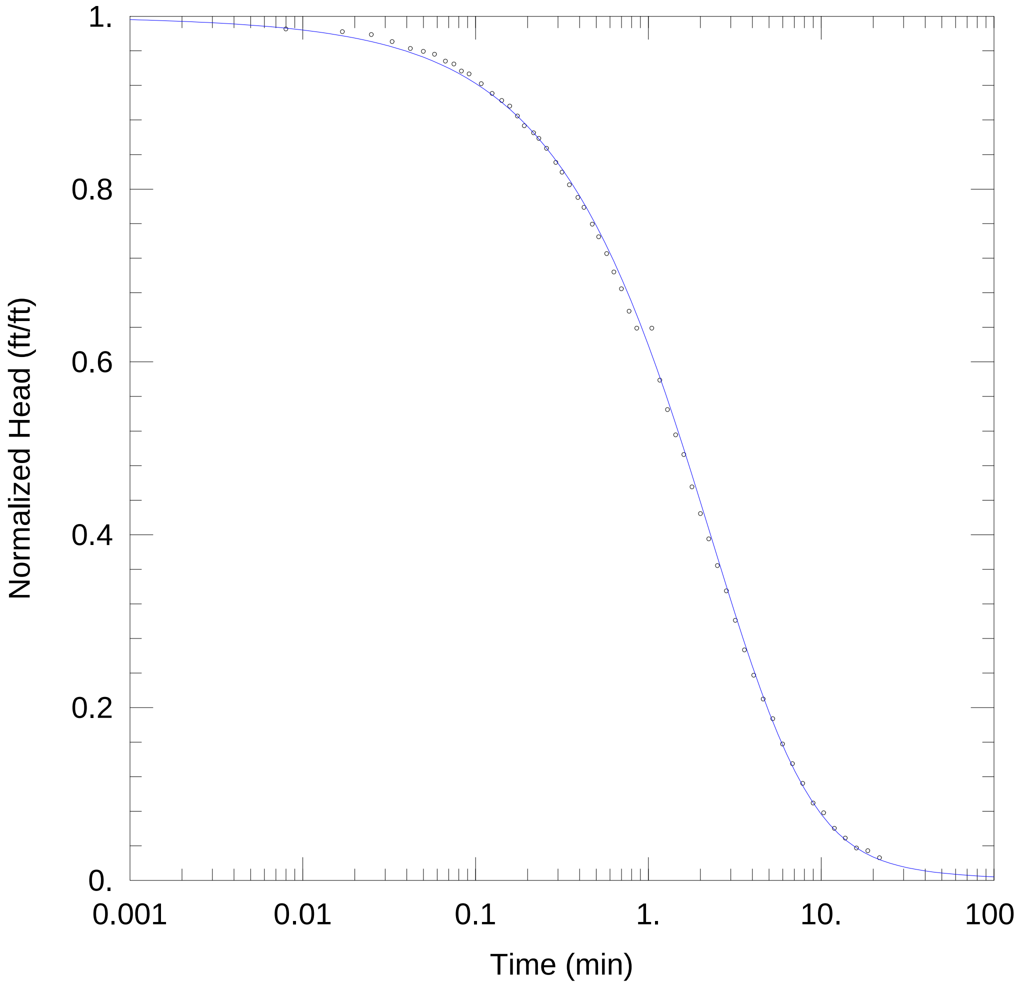
Initial Displacement: 1.5 ft
Total Well Penetration Depth: 17.51 ft
Casing Radius: 0.0417 ft

Static Water Column Height: 16.89 ft
Screen Length: 5. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Confined
$T = 1.5\ ft^2/day$

Solution Method: Cooper-Bredehoeft-Papadopulos
S = 0.00029



P-8 RISING HEAD TEST 2

PROJECT INFORMATION

Company: ARCADIS
Client: CHEVRON
Location: EDMONDS, WASHINGTON
Test Well: P-8
Test Date: 3/7/13

WELL DATA (P-8)

Initial Displacement: 0.615 ft
Total Well Penetration Depth: 17.51 ft
Casing Radius: 0.0417 ft

Static Water Column Height: 16.89 ft
Screen Length: 5. ft
Well Radius: 0.33 ft

SOLUTION

Aquifer Model: Confined

Solution Method: Cooper-Bredehoeft-Papadopulos

T = 1.7 ft^2/day

S = 4.9E-5

Attachment 3

Memorandum: Analysis of Site Geologic Data Using Mining Visualization Software (MVS)

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Fax 303 231 9571

MEMO

To:
Scott Zorn

Copies:
Eric Rogoff
Jim Bognar
Project File

From:
Dave Lipson, Loren North, Rob Porsche

Date:
December 12, 2013

ARCADIS Project No.:
B0045362

Subject:
Analysis of Site Geologic Data Using Mining Visualization Software (MVS)
Chevron Environmental Management Company
Former Unocal Edmonds Bulk Fuel Terminal, Edmonds, Washington

---

Introduction

ARCADIS utilized the Mining Visualization System (MVS) software to analyze and visualize geologic data from the Former Unocal Edmonds Bulk Fuel Terminal located in Edmonds, Washington (Site) and support development of the Site groundwater flow model which is being used to assist with feasibility screening of potential remedial alternatives (Figures A-1 and A-2). MVS was developed by C-Tech Development Corporation to efficiently manage, analyze, and help visualize large and complex geologic datasets such as the data from the Site. MVS can import and then use multiple types of digital information such as aerial photographs, topographic maps, digital elevation models, geographic information system (GIS) data, geologic data, water level data, analytical data, AutoCAD drawings, computer model output, data from other subsurface tools [*e.g.*, CPT, MIP, TarGOST, geophysical logs). The software can organize these various data types, analyze them in terms of spatial and volumetric relationships, and clearly display the results in a graphical format. MVS is known throughout the environmental industries for its ability to visualize the most challenging site conceptual models and complex datasets.

Methods

The following data types were imported into a Site-specific MVS model:

- Aerial photograph (source: Google Earth Pro, image date 10-1-2009);

- GIS and CAD drawings of site boundaries, historical excavations, roads, and other site features;
- Geologic data from soil boring and monitoring well construction logs; and
- Digital topographic data from the United States Geologic Survey (USGS).

After all of the data were entered, statistical Kriging methods were used to interpolate the geologic data and estimate the three-dimensional extent and distribution of the various soil layers at the Site. There are five different soil layers present at the Site that were included in the construction and calibration of the Site groundwater flow model and, by extension, analysis of potential remediation scenarios involving groundwater extraction. The five different Site soil layers include:

1. *2008 Fill*. The 2007-2008 Interim Action excavations were backfilled to 6 to 12 inches above the observed groundwater table in the open excavations with poorly graded coarse gravel (⅜ to 1 inch) with little to no fines. Backfill material above the coarse gravel to ground surface was a mixture of very fine to medium sand, trace silt, and fine to medium gravel materials.

2. *1929 Fill*. This 1929 fill consists of silty sands with gravel and sandy silts with gravel. During the 2007-2008 Interim Action excavations, subsurface materials encountered from ground surface to a depth of 8 to 15 feet below ground surface (bgs) were mostly fill material placed circa 1929 or later, during the creation of the Lower Yard facility.

3. *Marsh Deposits*. In many areas of the Lower Yard, beneath the 1929 Fill, there is a layer ranging from 1 foot to 15 feet thick composed of silt and sandy silt with large amounts of organic matter such as peat, and wood debris. This layer is encountered at depths ranging from 8 to 14 feet bgs, directly below the 1929 Fill material, and is interpreted to be representative of the former marsh horizon beneath the Lower Yard. This layer is typically demarcated by a 6 to 12 inch thick layer of decomposing vegetation.

4. *Beach Deposits*. Below the 1929 Fill and Marsh Deposits, a poorly graded sand formation of very fine to medium sand with fine gravel is present, containing organic material such as driftwood and seashells. This layer is interpreted to be representative of the former beach environment in the area prior to creation of the Lower Yard.

5. *Whidbey Formation*. This material is a poorly graded sand layer consisting of very fine to medium sand with fine gravel and is distinct from the overlying materials in the Lower Yard. It is present to the maximum explored depth of 41.8 feet bgs by Unocal. This unit contains interbedded sand with silt, and interbedded silt and sandy silt are also present. The interbeds range in thickness from less than 1 inch to several feet, and appear to be laterally discontinuous. This unit is interpreted to be alluvium, and is likely part of the Whidbey Formation.

Kriging is a spatial averaging technique that uses a linear combination of weights at known data points to estimate data values at unknown locations. Kriging uses a variogram (a.k.a. semivariogram) which is a representation of the spatial and data differences between some or all possible "pairs" of points in the measured data set. The variogram then describes the weighting factors that will be applied for the interpolation. Unlike other estimation procedures, kriging provides a measure of the error and associated confidence in the estimates.

For the Site, the traditional MVS modeling method of using geologic data alone to delineate the extent and distribution of the soil layers was supplemented with additional information. To expand on the geologic data, observations made during the recent remedial excavations were utilized to create points that defined both their surficial and sloped excavated extents, assuming all the replaced material was modern fill. This method allowed the kriging algorithm to better define the related excavation contacts while minimally impacting the distribution of historic and natural materials in the boring logs.

The final model was detail checked against existing geologic cross sections and the geologic contact elevations from the boring logs.

Results

Results of the MVS geologic data modeling were used to create a three-dimensional framework of the various soil types that was used to support development and calibration of the Site groundwater flow model. The groundwater flow model is a three-dimensional model that incorporates soil heterogeneities based on MVS analysis. The groundwater flow model is discussed elsewhere in the report.

Results of MVS geologic model are presented as graphical visualizations of the distribution and extent of the five Site soil layers on Figures A-3 through A-14.

Figure A-3 shows the Site plan in the MVS model and includes an aerial photograph, the Site groundwater monitoring well network, Detention Basin 1, Detention Basin 2, Willow Creek, and the historical remedial soil excavation areas.

Figure A-4 shows the Site monitoring well network from an oblique angle, and indicates the various soil layers identified at the monitoring wells.

Figure A-5 shows a map of the interpreted extent and distribution of the soil layers encountered at the Site. It is notable that not all of the soil layers can be seen in this view, because some soil layers exist beneath other soil layers. Because of this, the following figures show individual soil layers.

Figure A-6 shows a map of the interpreted extent and distribution of natural soil layer at the Site, including the marsh deposits, beach deposits, and Whidbey formation. As shown, marsh deposits fringe the surface water features at the Site (i.e., Willow Creek and the detention basins) and also exist within the marshlands. Furthermore, this view shows marsh deposits atop beach deposits, with both soil layers underlain by the Whidbey formation.

Figure A-7 shows a map of the interpreted extent and distribution of the fill layers at the Site, including the 2008 fill, 2008 fill gravel, and 1929 fill.

Figure A-8 shows a map of the interpreted extent and distribution of only the 2008 fill.

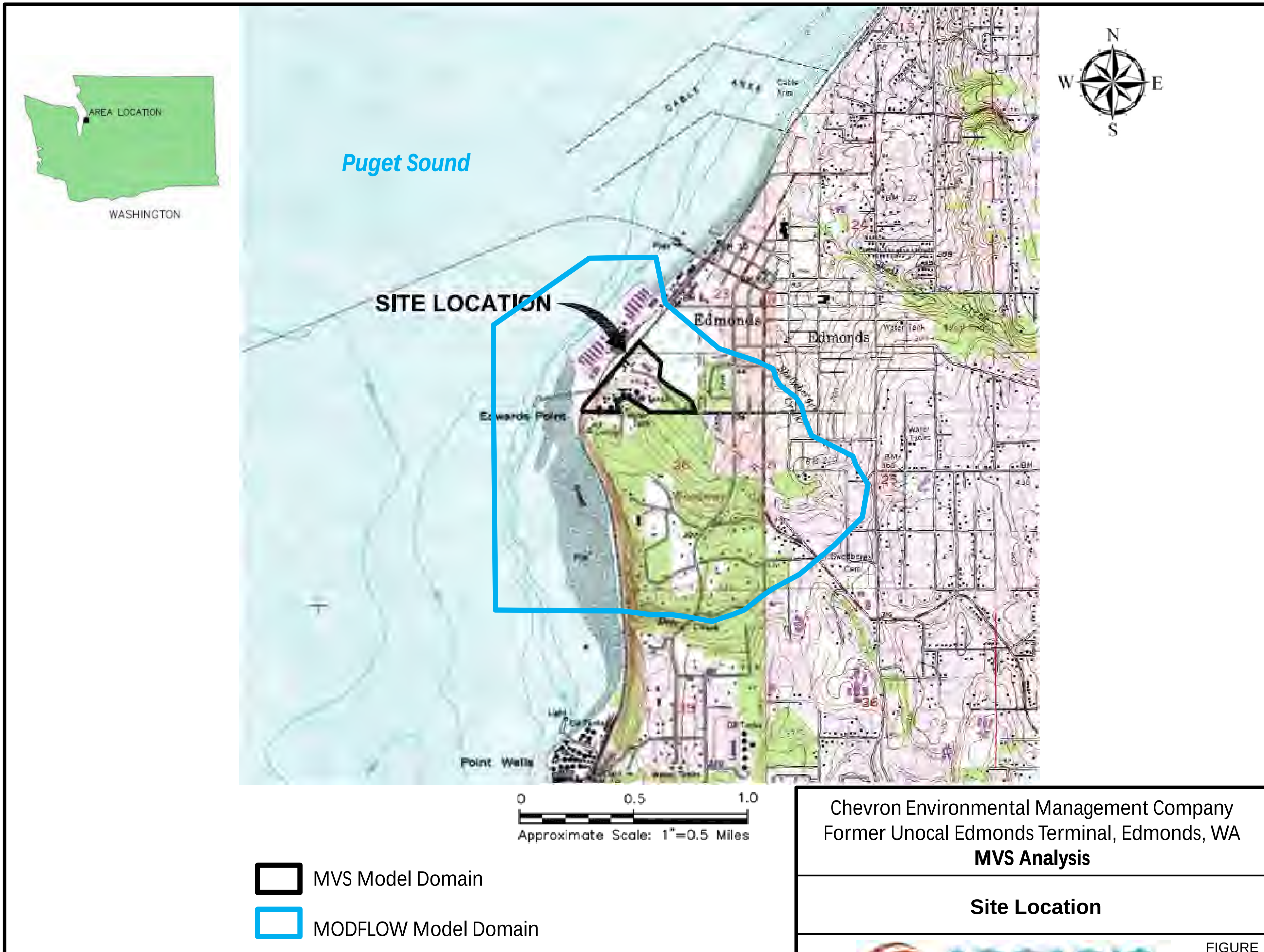
Figure A-9 shows a map of the interpreted extent and distribution of only the 1929 fill.

Figure A-10 shows a map of the interpreted extent and distribution of only the marsh deposits.

Figure A-11 shows a map of the interpreted extent and distribution of only the beach deposits.

Figure A-12 shows a geologic cross section extending north to south through the Site to show the vertical relationships between the various soil layers. As shown, the fill layers site atop the marsh deposits and, in some areas, they sit atop beach deposits. The Whidbey formation underlies the entire Site.

Figure A-13 shows a close-up geologic cross section extending northwest to southeast through the potential remediation areas. This view shows the vertical relationships between the various soil layers in this area. As shown, the potential remediation areas are limited to fill types, and are underlain by marsh and beach deposits.



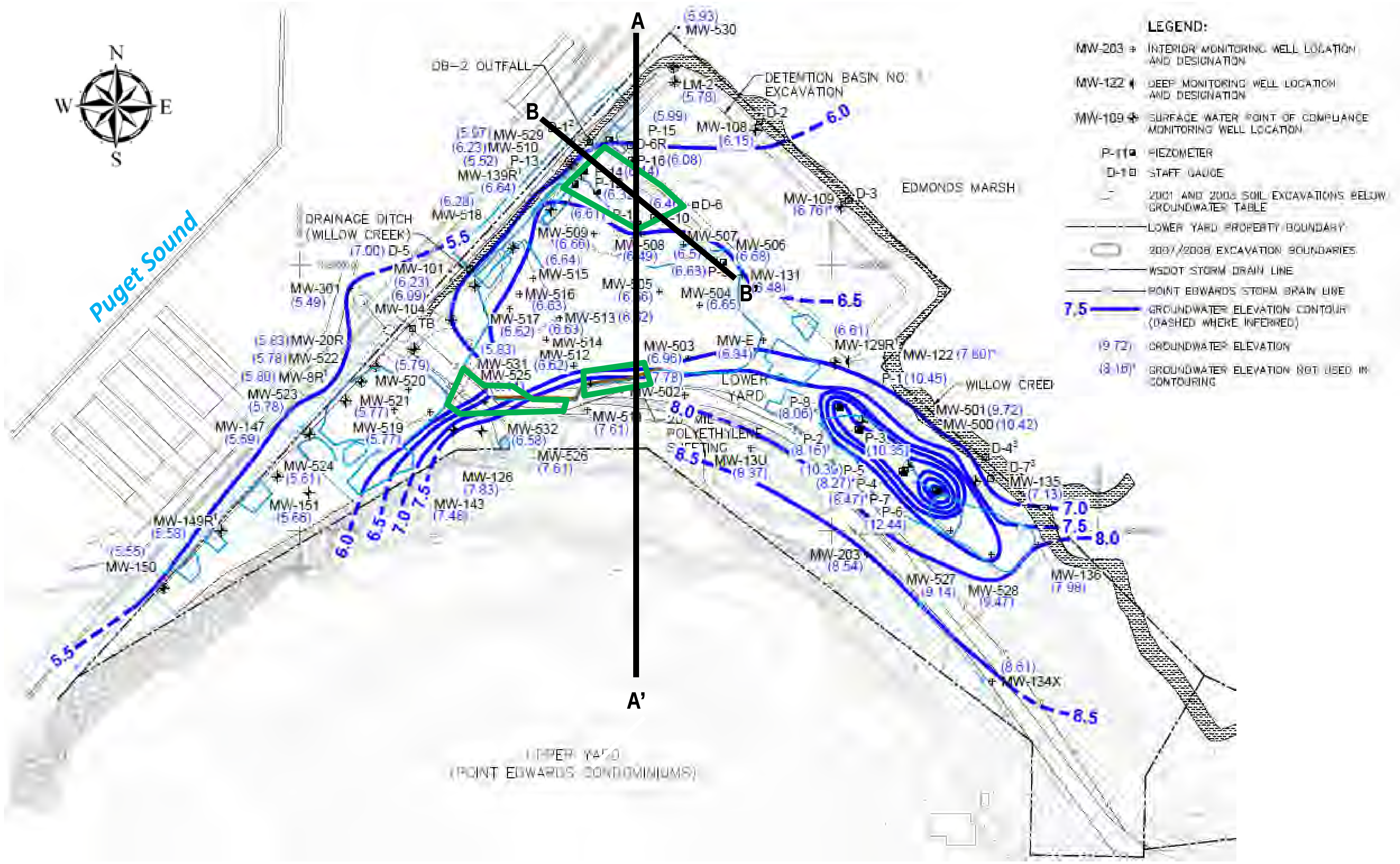
Source: USGS Quads., 7.5 Min. Series (Topographic) – Edmonds East, Wash., and Edmonds West, Wash.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
MVS Analysis

Site Location

ARCADIS

FIGURE
A-1



0 100 200 300 400

Feet

Potential Remediation Area (Approx)

Cross Section Location

Source: Third Quarter 2013 Groundwater Monitoring Report.

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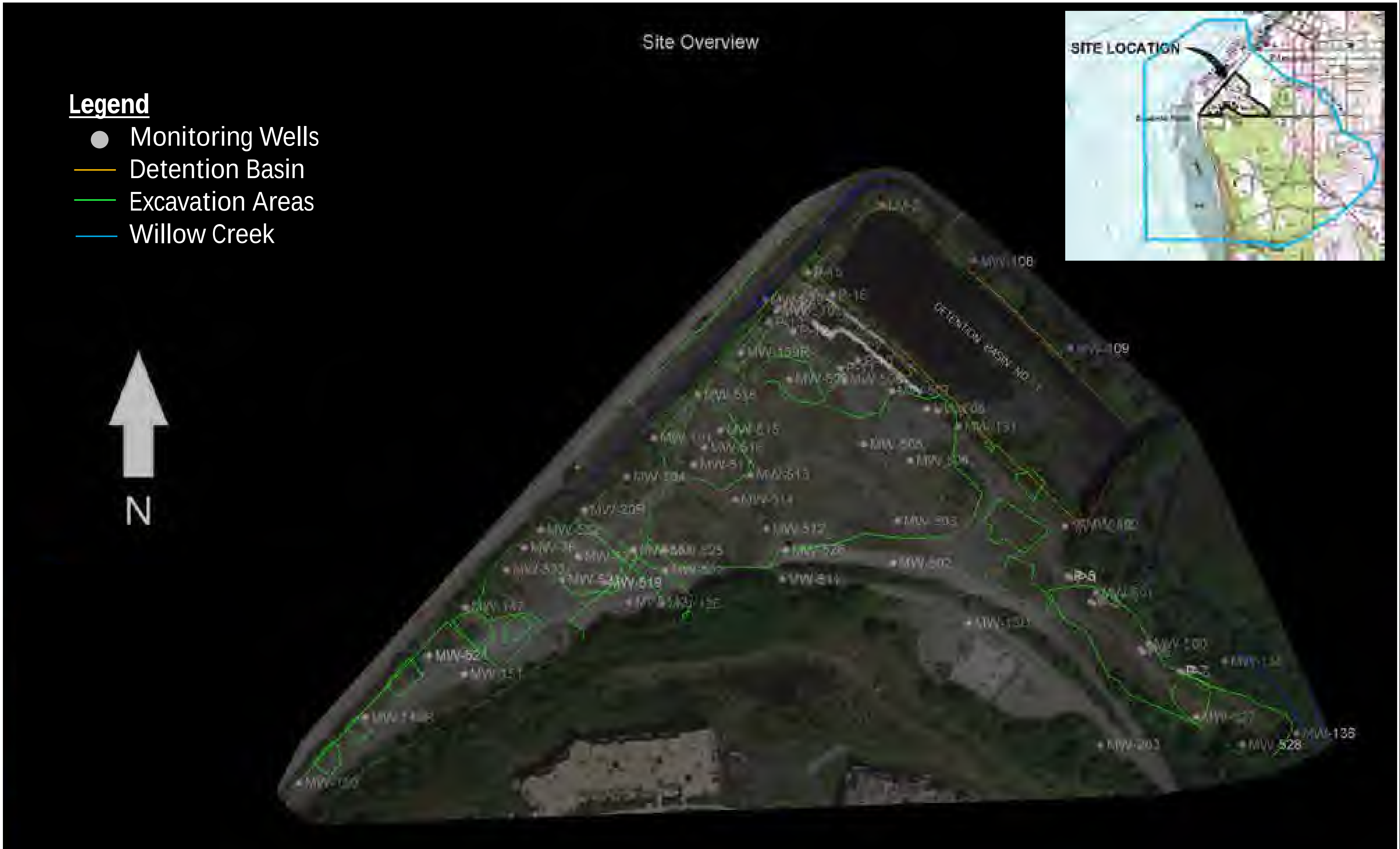
MVS Analysis

Site Map with Groundwater Contours, Cross Sections, and Potential Remediation Areas

ARCADIS

FIGURE
A-2



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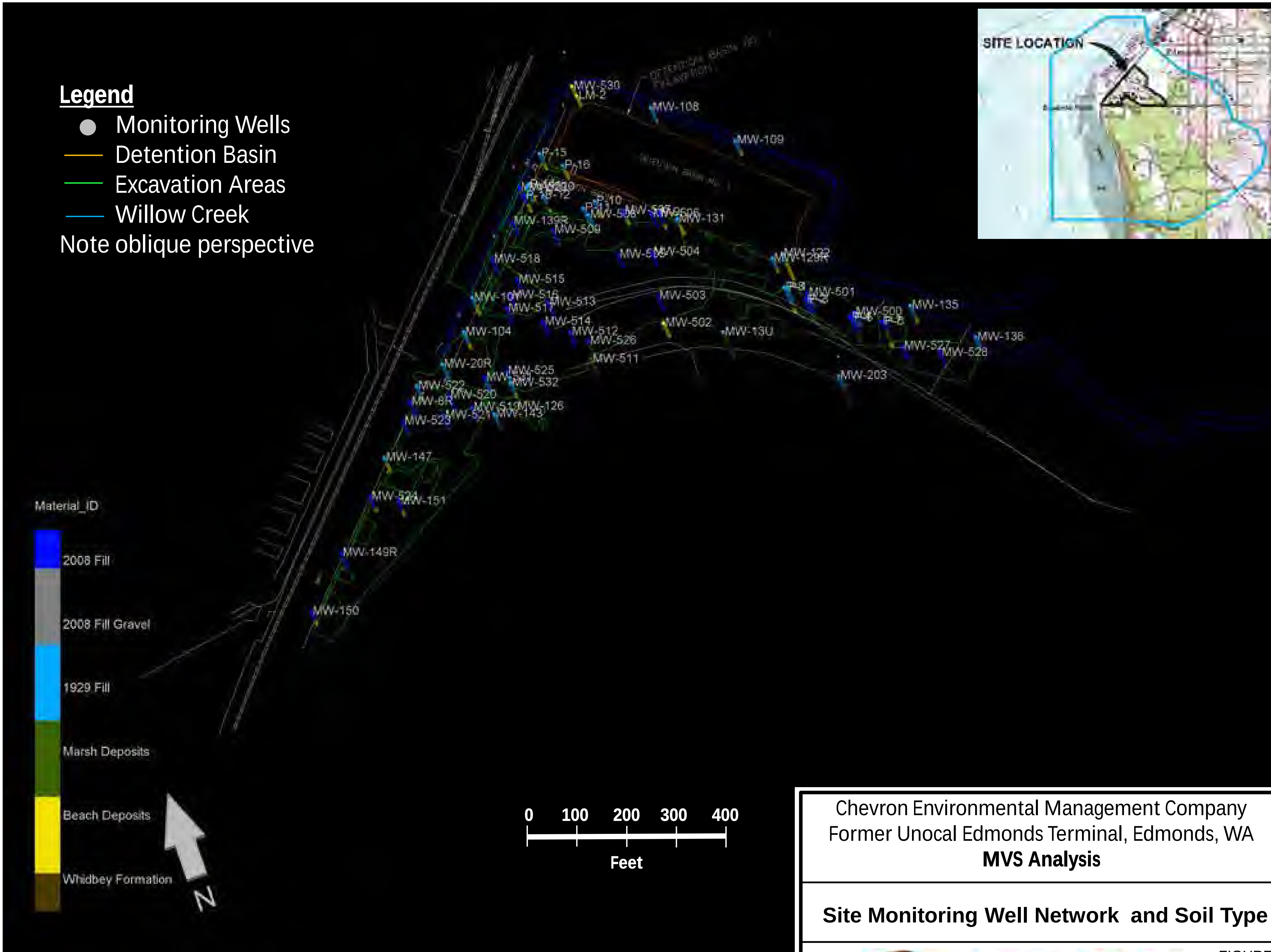
MVS Analysis

Site Plan

ARCADIS

FIGURE
A-3



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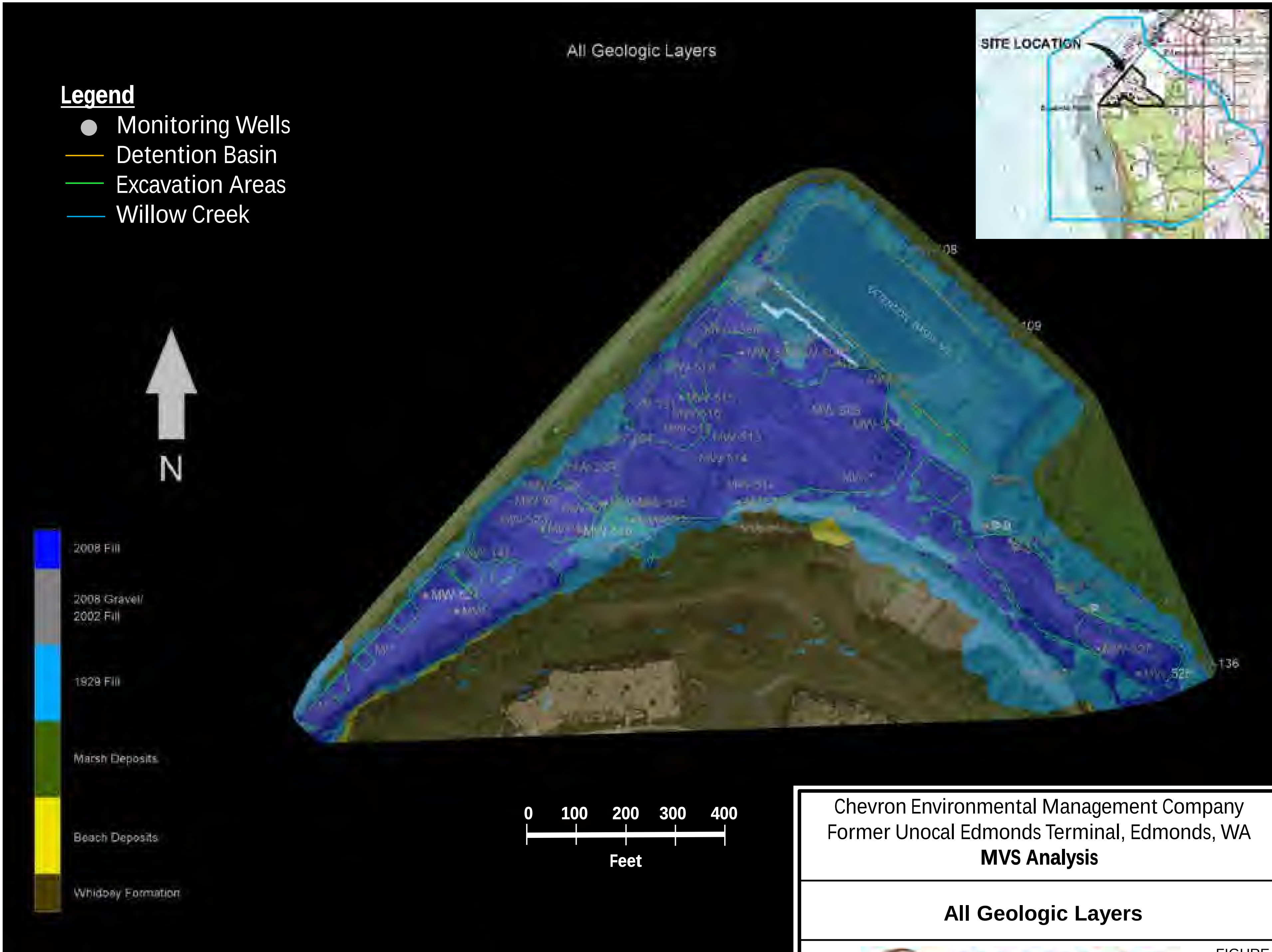
MVS Analysis

Site Monitoring Well Network and Soil Type

ARCADIS

FIGURE
A-4



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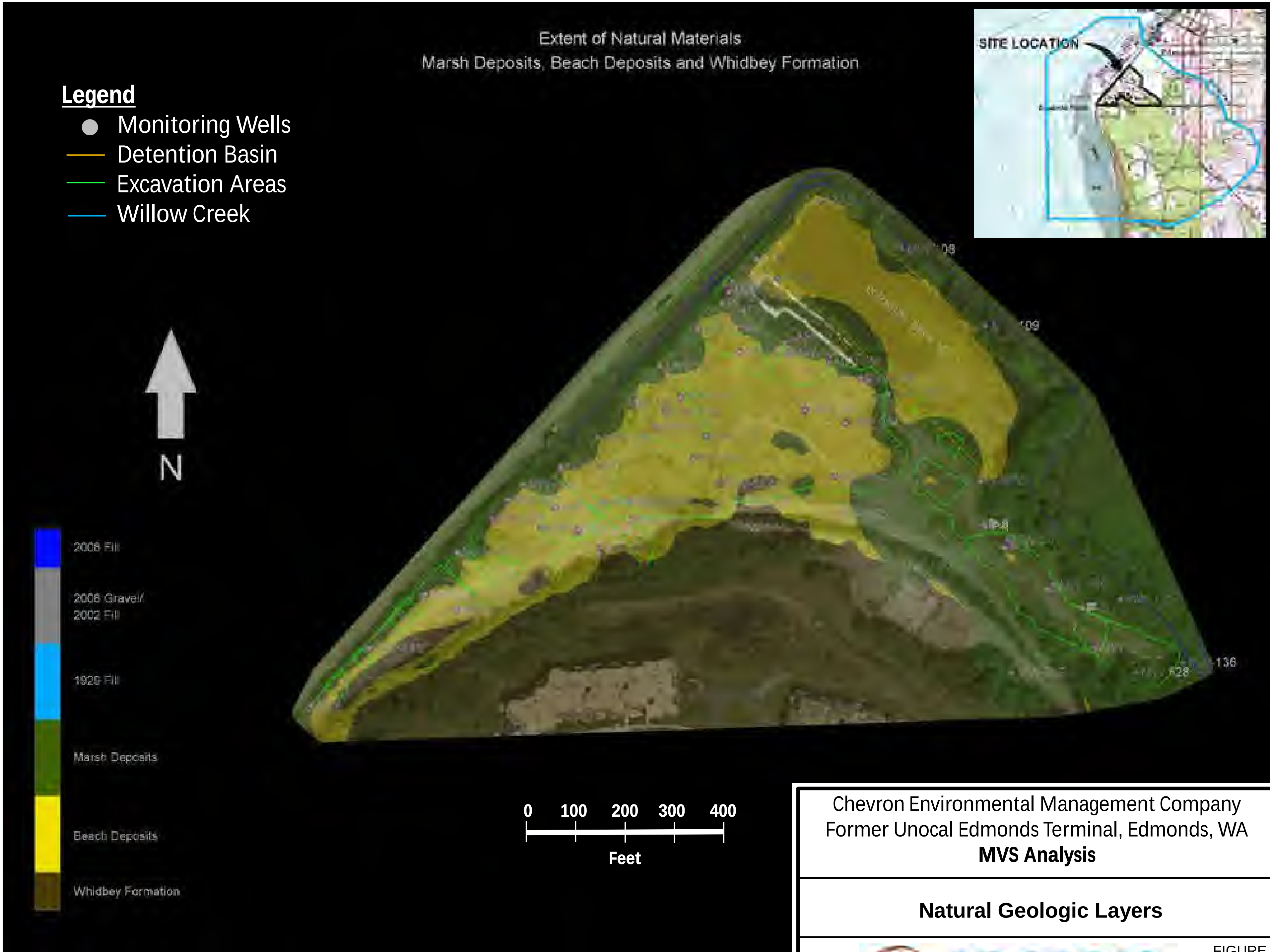
MVS Analysis

All Geologic Layers

ARCADIS

FIGURE
A-5



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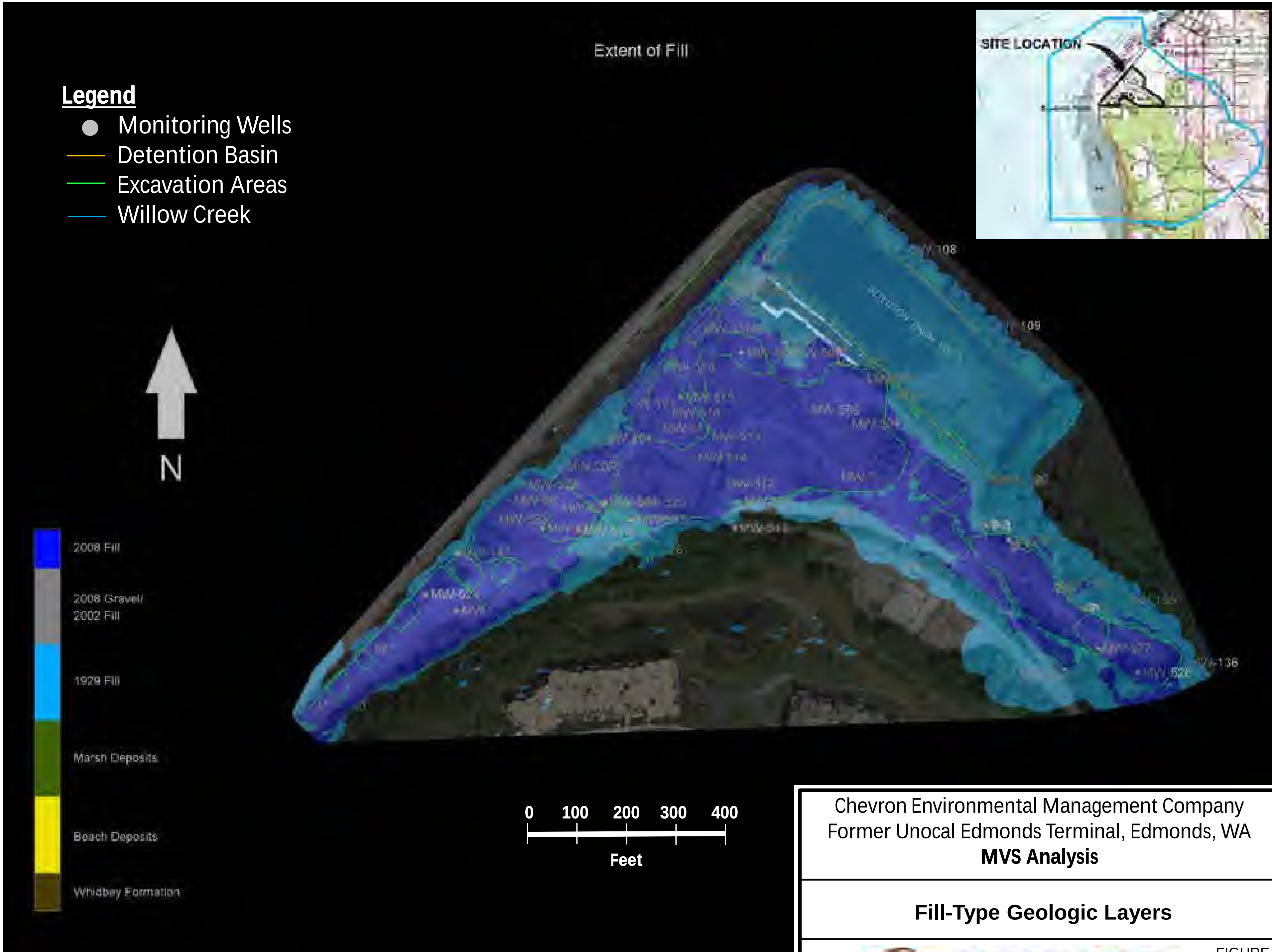
MVS Analysis

Natural Geologic Layers

ARCADIS

FIGURE
A-6



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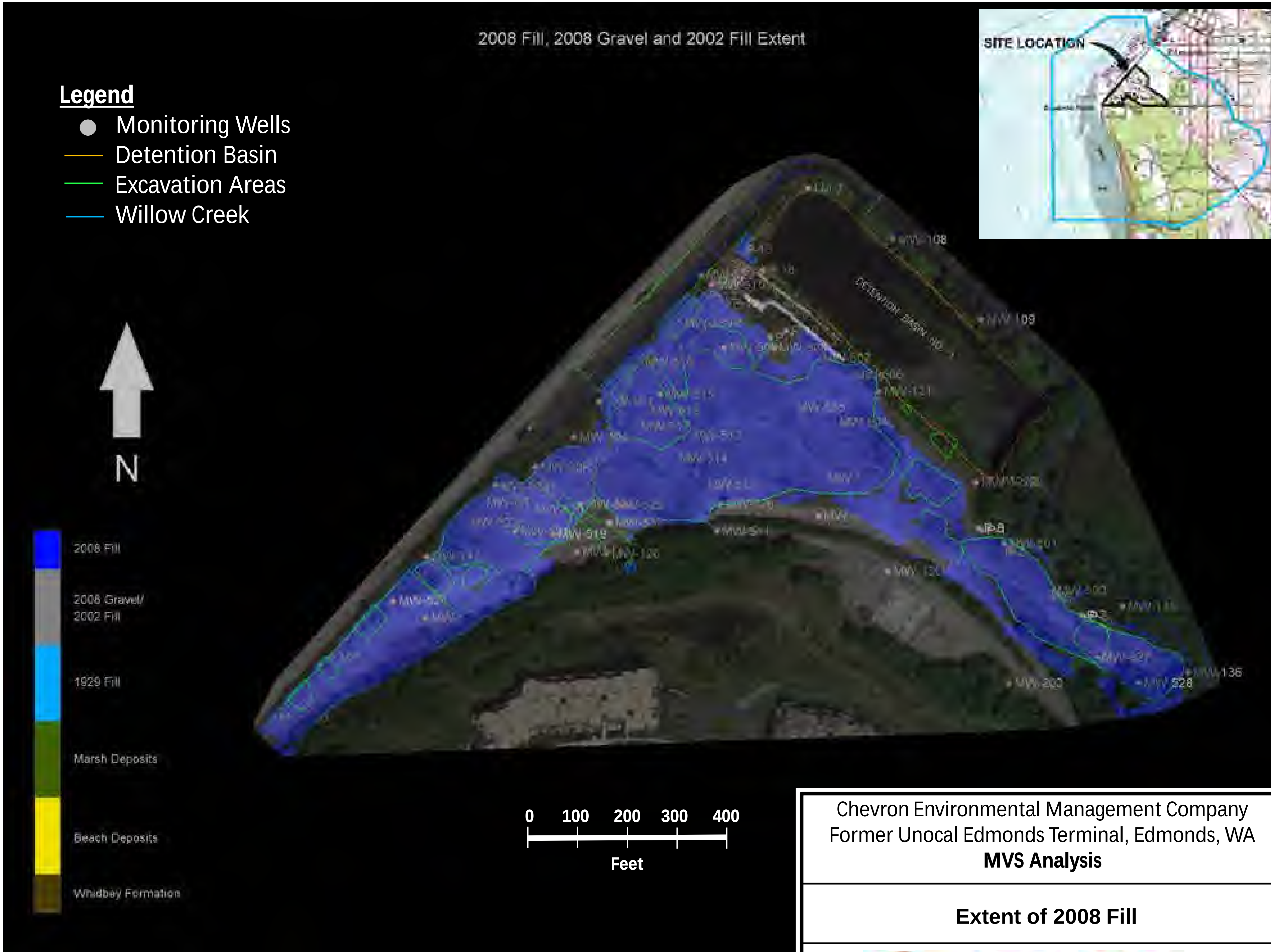
MVS Analysis

Fill-Type Geologic Layers

ARCADIS

FIGURE
A-7



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MVS Analysis

Extent of 2008 Fill

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FIGURE
A-8

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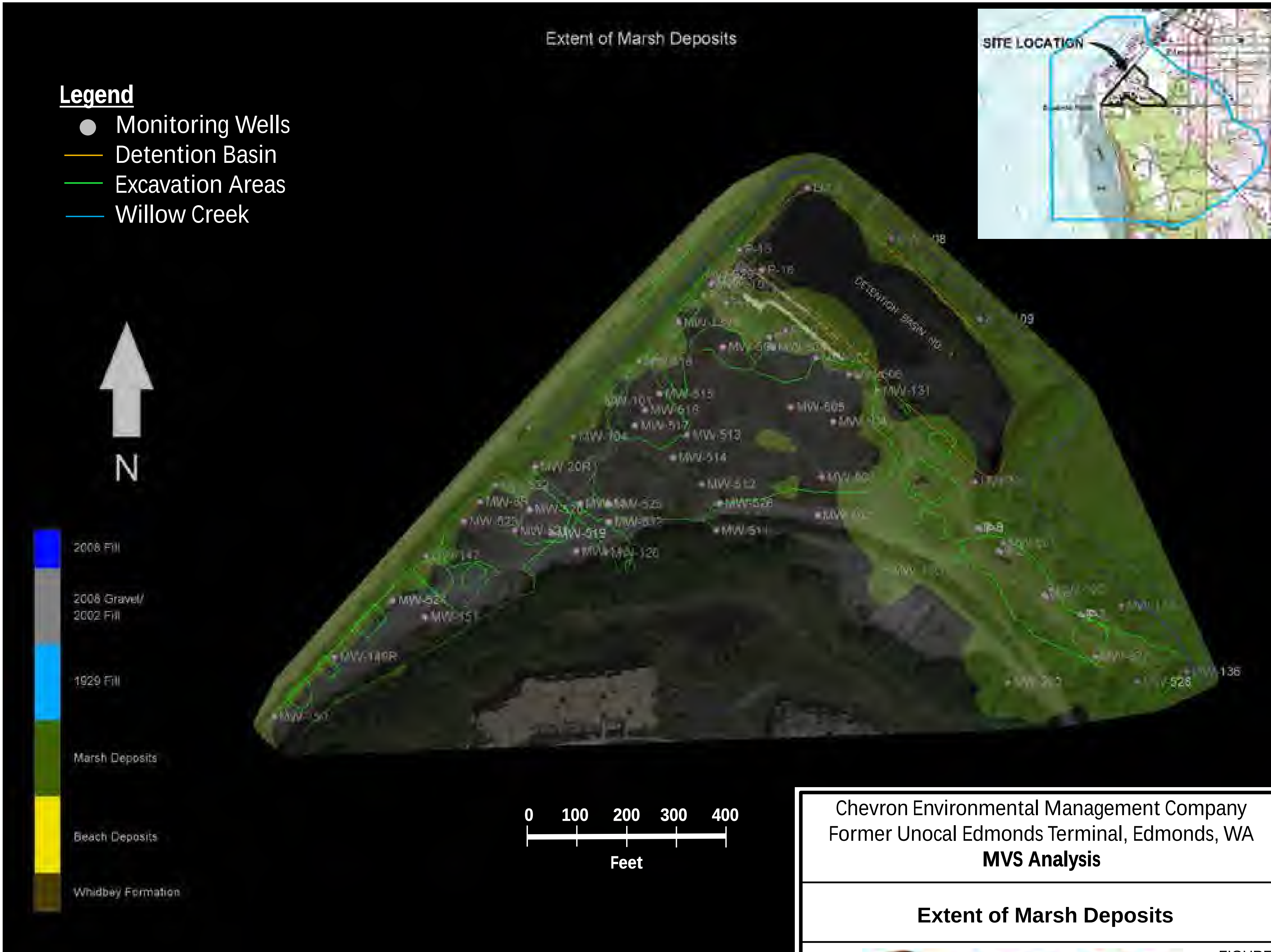
Former Unocal Edmonds Terminal, Edmonds, WA
MVS Analysis

Extent of 1929 Fill

ARCADIS

FIGURE
A-9



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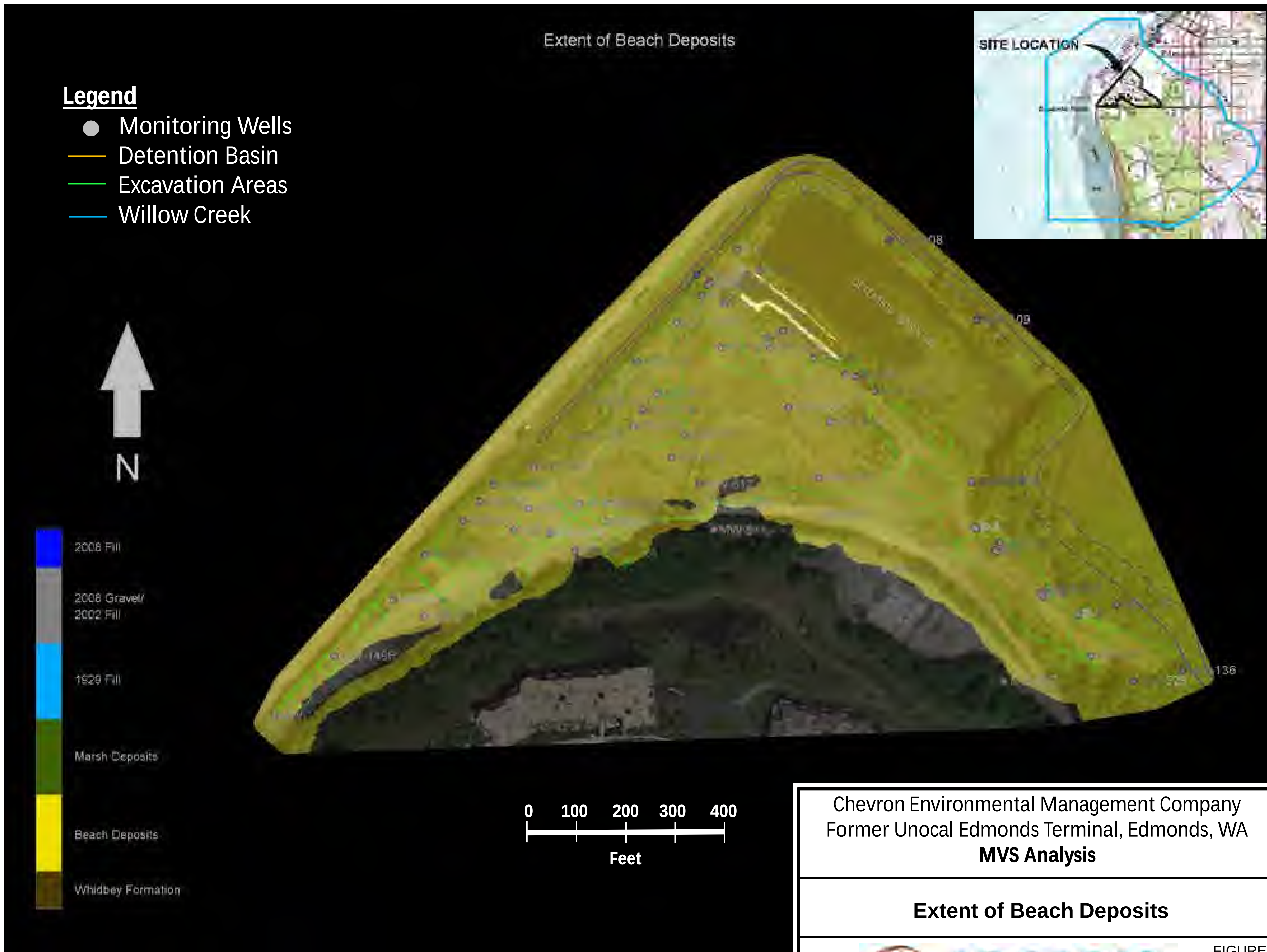
MVS Analysis

Extent of Marsh Deposits

ARCADIS

FIGURE
A-10



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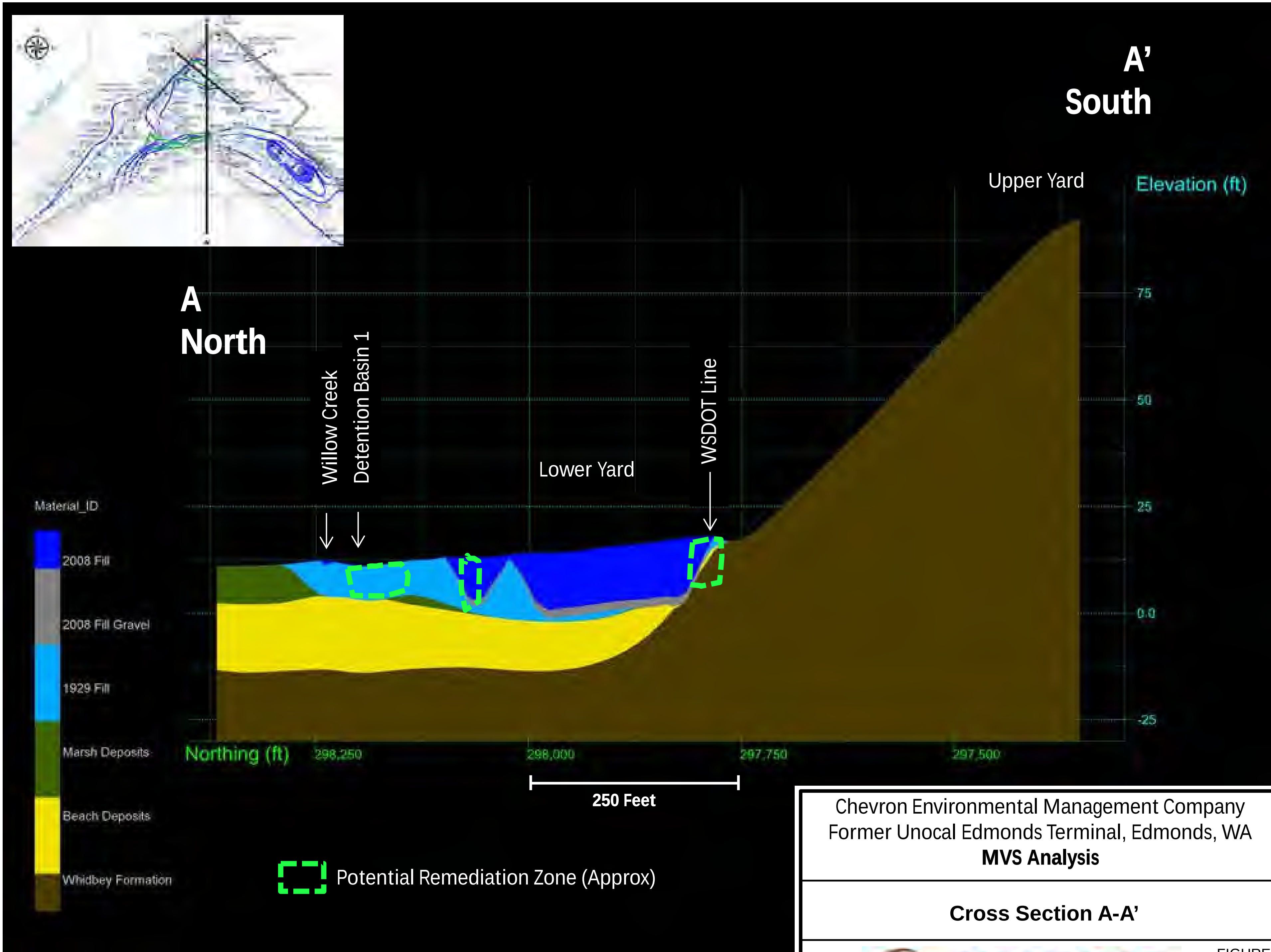
MVS Analysis

Extent of Beach Deposits

ARCADIS

FIGURE
A-11



Note: Elevation in ft msl.

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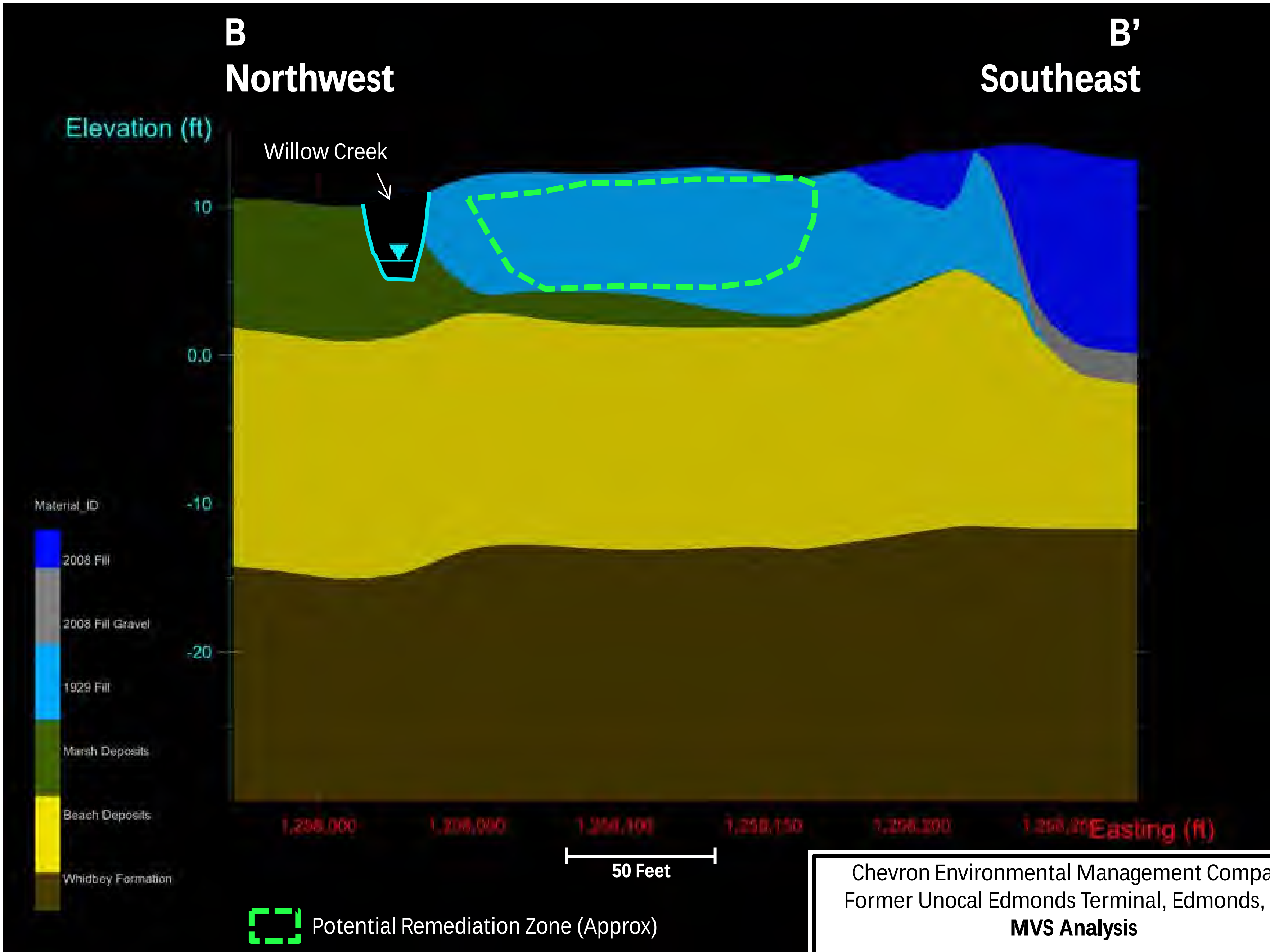
MVS Analysis

Cross Section A-A'

ARCADIS

FIGURE
A-12



Note: Elevation in ft msl.

Chevron Environmental Management Company
Former Unocal Edmonds Terminal, Edmonds, WA
MVS Analysis

Cross Section B-B'

ARCADIS

FIGURE
A-13

APPENDIX G

DPE Pilot Test Summary

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ENVIRONMENT

Date:
March 8, 2016

Contact:
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Phone:
206.726.4709

Email:
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Our ref:
B0045362.0006

David L. South
Senior Engineer
Washington State Department of Ecology
Toxics Cleanup Program, NWRO
3190 160th Avenue Southeast
Bellevue, Washington 98008-5452

Dual-Phase Extraction Pilot Test Summary
Former Unocal Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

Dear Mr. South:

On behalf of Chevron Environmental Management Company (Chevron), ARCADIS U.S., Inc. (ARCADIS) prepared this letter to summarize the Dual-Phase Extraction Pilot Test (DPE Summary) for the former Union Oil Company of California (Unocal) Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site; Figure 1). This DPE Summary is being submitted to present the results of DPE pilot testing to confirm the implementability of the technology as described in the Public Review Draft Interim Action Work Plan (IAWP; ARCADIS 2015).

Two pilot tests were performed during the first quarter of 2015. The first mobilization was completed from February 17 through 21, 2015. Based on the result of the first mobilization, a second pumping test was conducted from March 30 through April 1 in order to determine more specifically the appropriate extraction well depth and screen interval, as well as, improve overall pumping rate estimates and account for observed subsurface heterogeneity.

Dual-Phase Extraction Pilot Test

The pilot test plan was described in the IAWP (ARCADIS 2015) and proposed the installation of two DPE wells (DPE-1 and DPE-2) and two piezometers (PZ-1 and PZ-2) near the Washington State Department of Transportation (WSDOT) stormwater line. The initial plan was to perform extraction on well DPE-1 while monitoring water levels and induced vacuum in piezometers PZ-1 and PZ-2, extraction well DPE-2, and several existing monitoring wells (AS-1, MW-525, MW-531, and MW-532). During the initial pilot testing of DPE-1, the project team observed a groundwater yield of less than 1 gallon per minute (gpm) under vacuum conditions. This observed pumping rate was lower than pumping rates from historical pumping tests (2 to 3 gpm) that were performed under normal non-vacuum-enhanced conditions. After reviewing the results of the DPE-1 pilot test, pilot test was moved from DPE-1 to DPE-2.

Data collected from pilot testing on DPE-1 and DPE-2 indicated a variation in pumping rates from less than 1 gpm to more than 8 gpm. Due to this variation, the project team remobilized to the site and installed one additional DPE well (DPE-3) and one additional observation well (PZ-3). A second round of pilot testing of well DPE-3 was performed from March 30 through April 1, 2015. DPE and pilot test wells were installed using Schedule 40 polyvinyl chloride (PVC) and advanced using a hollow stem auger (HSA), as described below. The pilot test well layout is shown on Figures 2 and 3.

Pilot Test Well Construction Details

Six new monitoring wells were installed prior to pilot testing. The new wells included three DPE wells (DPE-1, DPE-2, and DPE-3) and three piezometers (PZ-1, PZ-2, and PZ-3). Piezometers PZ-1 and PZ-2 were advanced as 2-inch-diameter wells to 25 feet below ground surface (bgs), with 20 feet of 2-inch-diameter, 0.02-inch slotted screen. Wells DPE-1 and DPE-2 were installed to a total depth of 30 feet bgs, with 5 feet of 4-inch-diameter solid casing from 25 to 30 feet bgs to act as a sump, followed by 20 feet of 4-inch-diameter, 0.02-inch slotted screen from 25 to 5 feet bgs and 4-inch-diameter solid casing to surface. Wells DPE-3 and PZ-3, both 4-inch-diameter wells, were installed to a total depth of 22 feet bgs with a 4-foot sump from 22 to 18 feet bgs, followed by 14 feet of 0.02-inch slotted screen from 18 to 4 feet bgs and solid casing from 4 feet bgs to the surface. Well PZ-3 was installed as a dual-purpose well with the potential to be converted to a DPE well. Well construction details are provided in Table 1a and boring logs are included as Attachment A. Tables 1b and 1c presents the general setup of the pilot test, including the well pumped and the wells monitored, during the first mobilization and the second mobilization respectively.

Pilot Test Implementation

DPE pilot test equipment included a mobile DPE trailer with a rotary claw blower and a portable compressor connected to a downhole submersible pump.

An above grade hose was used to connect the vapor extraction portion of the DPE trailer to a manifold and then to the DPE well through a wellhead adaptor. The DPE trailer housed the rotary claw blower, an air/water separator tank, and the flow and vacuum gauges. The DPE blower effluent was treated using a Falco 300 electric catalytic oxidizer before being discharged to the air. Prior to implementing the DPE pilot testing, ARCADIS verified with the Puget Sound Clean Air Agency, a Notice of Construction application and Order of Approval were not required for short-term pilot testing.

The groundwater extraction portion of the DPE pilot test system included a portable electric compressor that powered a downwell top-loading pneumatic pump (QED AP4 long). The pneumatic pump discharged groundwater through a flow meter, into aboveground piping, and then into an aboveground tank.

Following a review of DPE-1 pumping data, additional pilot testing was conducted at wells DPE-2 and DPE-3 using a downhole electric submersible pump (Grundfos SQE 15) to handle the higher flow rates observed during pilot testing on DPE-2 and DPE-3. The electric submersible pump was powered by an on-site generator and discharged to a double-walled groundwater storage tanks. The water in these tanks was then analyzed and compared to the applicable constituents of concerns (COCs). Based on these results, the stored groundwater was either discharged to detention basin 2 (DB-2) or properly disposed of by Emerald Services. Analytical results are show in Table 2.

Pilot Test Results

Pilot test data were collected from the mobile remediation system gauges, extraction well gauges, and surrounding monitoring wells. System and pumping well data included groundwater pumping rate, system and wellhead vacuum, extraction well depth to water, vapor flow rates, vapor temperature, and vapor concentrations. Monitoring well data included depth to water, induced vacuum, and monitoring well volatile organic compound (VOC) headspace concentrations.

Monitoring well data collected during the DPE-1 and DPE-2 pilot tests are summarized in Table 3; monitoring well data collected during the DPE-3 pilot test are summarized in Table 4. Extraction well and system data collected from DPE-1 and DPE-2 are summarized in Table 5; extraction well and system data collected during the DPE-3 pilot test are summarized in Table 6.

Induced vacuum radius of influence (ROI) and distance versus groundwater drawdown graphs for each pilot test are included in Attachment B. To calculate the induced vacuum ROI, the normalized vacuum (vacuum observed at the monitoring wells, divided by the vacuum applied to the extraction well) was plotted on an arithmetic scale (y-axis) and radial distance from the extraction well on a logarithmic scale (x-axis) for all observation points. This distance (on the x-axis) represents the observed vacuum ROI equal to 1 percent of the applied vacuum using the spatially averaged vacuum data. The ROI based on 1 percent of normalized vacuum is the Chevron standard used to conservatively account for site heterogeneities as described in the 2010 Soil Vapor Extraction Guidance Document (Chevron 2010).

VOC concentrations were collected from wellheads, the vapor extraction manifold, and the pre- and post-treatment effluent stack using a handheld VOC meter. VOC concentration and vapor flow rates from the extraction manifold were used to calculate an estimated hourly mass removal rate. Pilot test results are presented in Tables 3 through 6.

DPE-1 Pilot Test Results

A downhole pneumatic pump was used in DPE-1 pilot test, along with the mobile DPE trailer, to extract both groundwater and vapor. Pilot test data were collected approximately every hour for the first 20 hours of the pilot test and every 2 hours thereafter, for a total operational time of approximately 40 hours. Wells DPE-2, PZ-1, PZ-2, AS-1, MW-525, MW-531, and MW-532 were monitored for depth to water, headspace VOC concentrations, and induced vacuum. DPE-1 pilot test data is provided in Tables 3 and 5.

DPE-1 pilot test data are summarized below:

- Groundwater pumping rates ranged from 0.65 to 1.05 gpm.
- Extraction well casing vacuum ranged from 271 to approximately 300 inches of water.
- Extraction well groundwater drawdown ranged from approximately 14.5 to 18.77 feet below static groundwater elevation.
- Vapor flow rates ranged from 36.58 to 128.16 standard cubic feet per minute (scfm) during the test.

- Mass removal estimates increased throughout the test, starting at approximately 0.7 pound per day (lb/day) to a high of 28 lbs/day (17 hours into the test), with an estimated 16.5 lbs/day at the end of DPE-1 pilot test.

- The induced vacuum influence observed was greater than 1 percent of normalized vacuum at a horizontal distance of 23 feet (MW-525) from the extraction well.

- Minimal drawdown was observed in wells surrounding the extraction well during the DPE-1 pilot test, with approximately 0.53 foot of drawdown observed at PZ-1, which is located approximately 7 feet from the extraction well.

The DPE-1 pilot test results show that elevated mass removal rates and reasonable vacuum ROI can be achieved; however, pumping rates and drawdown were lower than expected. Heaving sands were noted during installation of DPE-1 and may have compromised the well screen, resulting in the observed lower yield and drawdown. Based on these results, the project team performed a second pilot test using well DPE-2.

DPE-2 Pilot Test Results

The project team began the DPE-2 pilot test using the downhole pneumatic pump; however, the pneumatic pump could not sustain the desired drawdown under vacuum while pumping at approximately 5.5 to 6 gpm. After approximately 1.5 hours of pumping, the pneumatic pump was exchanged for an electric submersible pump. Pilot test data were collected approximately every hour for the first 16 hours and then every 2 hours thereafter, for a total operational time of approximately 44 hours. Wells DPE-1, PZ-1, PZ-2, AS-1, MW-525, MW-531, and MW-532 were monitored for depth to water, headspace VOC concentrations, and induced vacuum. DPE-2 pilot test data is provided in Tables 3 and 5. Additionally, a cross-section showing the drawdown at 80 hours after the beginning of the pilot test (after 34 hours of pumping at DPE-2) is presented on Figure 4. The location of the cross-section is showed on Figure 3.

DPE-2 pilot test data are summarized below:

- Groundwater pumping rates ranged from approximately 7 to 9 gpm.

- Extraction well casing vacuum ranged from approximately 183 to 268 inches of water.
- Extraction well groundwater drawdown ranged from approximately 12.5 to 16.2 feet below static water elevation.
- Vapor flow rates ranged from 38 to 117 scfm, averaging approximately 78 scfm during the test.
- Mass removal estimates increased from approximately 0.9 lb/day to 12.7 lbs/day approximately 14 hours into the test. Mass removal rates then decreased to 3.7 lbs/day at the end of the test.
- The induced vacuum influence observed was greater than 1 percent of normalized vacuum at a horizontal distance of 38 feet (MW-525) from the extraction well.
- Drawdown of approximately 1.4 feet was observed in monitoring well PZ-2, approximately 23 feet horizontally from extraction well DPE-2; drawdown of approximately 1 foot was observed in DPE-1, 30 feet horizontally from extraction well DPE-3.
- After 34 hours of pumping activities at extraction well DPE-2, groundwater elevations were drawn down to a level that would allow access to all know soil impacts above site cleanup levels (CULs) in the impacted area. Cross-Section A-A' showing draw down in extraction well DPE-2 is presented on Figure 4.

The DPE-2 pilot test results show that mass removal rates, reasonable vacuum ROI, and the target groundwater drawdown depth can be achieved. Groundwater yield was similar to expected conditions, with an average pumping rate of 7.5 gpm while under vacuum. Additional pumping wells should adequately dewater the target smear zone.

Based on the variation between pumping rates in wells DPE-1 and DPE-2, the project team performed an additional pilot test on well DPE-3. Well DPE-3 was installed to target groundwater extraction within the finer grained 1929 fill surrounding the WSDOT stormwater line, which was observed from approximately 4 to 22 feet bgs. Pilot test results from DPE-3 are discussed below.

DPE-3 Pilot Test Results

The DPE-3 pilot test was performed using an electric submersible pump. Pilot test data were collected approximately every hour for the first 10 hours, then every 2 hours for the next 20 hours and every hour thereafter. The total operational time of the DPE-3 pilot test was approximately 34 hours. Wells DPE-1, DPE-2, PZ-1, PZ-2, PZ-3, AS-1, MW-525, MW-531, and MW-532 were monitored for depth to water, headspace VOC concentrations, and induced vacuum. DPE-3 pilot test data is provided in Tables 4 and 6.

DPE-3 pilot test data are summarized below:

- Groundwater pumping rates ranged from approximately 8.7 to 13.3 gpm.
- Extraction well casing vacuum ranged from approximately 129 to 163 inches of water.
- Extraction well groundwater drawdown ranged from approximately 3.5 to 12.5 feet below static groundwater elevation.
- Vapor flow rates ranged from 95 to 112 scfm, averaging approximately 78 scfm during the test.
- Mass removal estimates increased from approximately 1.1 to 5 lbs/day at the end of the test.
- The induced vacuum influence observed was greater than 1 percent of normalized vacuum at a horizontal distance of 10 feet (PZ-3) from the extraction well.
- Drawdown of approximately 3.6 feet was observed in monitoring well PZ-3, approximately 10 feet horizontally from extraction well DPE-2; drawdown of approximately 2.2 feet was observed in DPE-1, 29 feet horizontally from extraction well DPE-3.

The DPE-3 pilot test results show that mass removal rates, reasonable vacuum ROI, and the target drawdown depth can be achieved. Induced vacuum greater than 1 percent of normalized vacuum was observed at approximately 10 feet horizontally from the extraction well. This induced vacuum ROI was lower than expected compared to results observed during DPE-1 and DPE-2 pilot testing.

Groundwater yield was greater than the rate observed during DPE-2 pilot testing, with an average pumping rate of 9.8 gpm while under vacuum. The greatest extent of groundwater drawdown was observed during the DPE-3 pilot test, with 3.6 feet of drawdown below static groundwater observed 10 feet horizontally from the extraction well.

Summary

The DPE pilot test was performed to aid in the full-scale design of the DPE system proposed in the IAWP (ARCADIS 2015). The full-scale design will focus remediation on the remaining COCs in shallow soil that exceed the Model Toxics Control Act Method B CULs near the WSDOT stormwater line. Pilot test results indicate that groundwater drawdown to below target soil is feasible. Pilot test data indicate that wells installed within the 1929 fill, similar to DPE-2 and DPE-3 construction, can create a drawdown of greater than 2.2 feet at a distance of 30 feet horizontally from the pumping wells after approximately 34 hours of pumping.

Average vapor mass VOC removal rates using PID readings and system air flow ranged from 3.1 lbs/day during DPE-3 pilot testing to 13.8 lbs/day observed during DPE-1 pilot testing, indicating that mass can be removed through DPE implementation.

Based on pilot test data, extraction wells will be installed on a maximum of 50 foot centers targeting a design ROI of 30 feet. Wells will be spaced closer in areas of highest soil impacts. Remediation wells will be installed to approximately 19 feet with 15 feet of screen allowing for pump intakes to be adjusted to target shallow soil impacts. The treatment system will be designed to operate at a pumping rate of 3 gpm on all remediation wells, with a target pumping rate of up to 13 gpm on wells with vacuum enhanced dewatering. Due to the high air flow rates observed ranging from 36 to 128 scfm, vacuum enhance dewatering will be applied to a subset of 4 to 6 wells. Focusing vacuum enhanced dewatering on a subset of wells will increase the overall operational efficiency of the proposed remediation system and improve maintenance and optimization downtime. A full-scale remediation system design and operation and maintenance plan will be submitted to Ecology prior to system construction.

If you have any questions regarding the information presented in this DPE Summary, please contact Scott Zorn at 206.713.8292.

Sincerely,

Peter Campbell
Senior Engineer

Scott Zorn
Project Manager

Copies:
Kim Jolitz, Chevron

Tables

Table 1a	Well Construction Details
Table 1b	Pilot Test DPE-1 and DPE-2 Setup
Table 1c	Pilot Test DPE-3 Setup
Table 2	Groundwater Storage Tank Analytical Results
Table 3	Monitoring Well Network Data – Pilot Test DPE-1 and DPE-2
Table 4	Monitoring Well Network Data – Pilot Test DPE-3
Table 5	System and Extraction Well Data – Pilot Test DPE-1 and DPE-2
Table 6	System and Extraction Well Data – Pilot Test DPE-3

Figures

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Pilot Test Layout
Figure 4	DPE Cross Section A-A’

Attachments

Attachment A	Boring Logs
Attachment B	Pilot Test Data

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Tables

TABLE 1a
Well Construction Details
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well Name	**Completion Date**	**Well Diameter (inches)**	**Total Depth of Boring (feet)**	**Total Depth of Well (feet)**	**Riser Length -** ***well box to screen*** **(feet)**	**Screen Length -** ***riser to sump*** **(feet)**	**Sump Lenth -** ***screen to bottom*** **(feet)**
DPE-1	2/10/2015	4	30	30	5	20	5
DPE-2	2/11/2015	4	30	30	5	20	5
DPE-3	3/24/2015	4	22	22	5	13	4
PZ-1	2/11/2015	2	25	25	5	20	NA
PZ-2	2/10/2015	2	25	25	5	20	NA
PZ-3	3/23/2015	4	22	22	5	13	4

Notes:
NA = not applicable

TABLE 1b
Pilot Test DPE-1 and DPE-2 Setup
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

	Baseline Data			
	Well ID	Date	DTW (ft BTOC)	DTB (ft BTOC)
Pumped wells / monitoring wells	DPE-1	02.16.15	6.19	28.80
	DPE-2	02.16.15	5.8	29.35
Monitoring wells	PZ-1	02.16.15	6.31	25.01
	PZ-2	02.16.15	6.04	23.89
	AS-1	02.16.15	6.2	18.32
	MW-525	02.16.15	5.6	12.45
	MW-531	02.16.15	7.07	12.84
	MW-532	02.16.15	6.25	12.55
Witness wells (tide)	MW-20R	02.16.15	6.01	14.23
	MW-512	02.16.15	5.76	12.73
	MW-514	02.16.15	3.96	12.60
	MW-518	02.16.15	7.8	13.36
	MW-526	02.16.15	4.35	13.03
	MW-20R	02.21.15	6.22	14.23
	MW-512	02.21.15	5.99	12.73
	MW-514	02.21.15	4.21	12.60
	MW-518	02.21.15	7.96	13.36
	MW-526	02.21.15	4.55	13.03

	DPE-1 Pumping test				
	Well ID	Distance from pumped well (ft)	DTW- beginning of test[1] (ft BTOC)	DTW- end of test[1] (ft BTOC)	Maximum Drawdown (ft BTOC)
Pumped well	DPE-1	0	20.76	24.94	18.77
Monitoring wells	DPE-2	30	5.85	5.95	0.23
	PZ-1	7	6.54	6.59	0.53
	PZ-2	15	6.2	6.30	0.59
	AS-1	5	6.61	6.61	0.64
	MW-525	23	5.63	5.58	0.45
	MW-531	40	7.03	7.17	0.25
	MW-532	23	6.53	6.54	0.44

	DPE-2 Pumping test				
	Well ID	Distance from pumped well (ft)	DTW- beginning of test[2] (ft BTOC)	DTW- end of test[2] (ft BTOC)	Maximum Drawdown (ft BTOC)
Pumped well	DPE-2	0	11	18.90	16.2
Monitoring wells	DPE-1	30	6.72	7.10	1.21
	PZ-1	45	6.62	6.94	0.78
	PZ-2	23	6.73	7.36	1.49
	AS-1	35	6.61	7.02	1
	MW-525	38	5.82	6.30	0.9
	MW-531	68	7.23	7.32	0.35
	MW-532	10	6.52	7.21	1.3

Note:
hh:mm = hour:minute   DTW = depth to water   BTOC = below top of casing
min = minute   ft = feet   DTB = depth to bottom
[1] = DPE-1 Pumping test was implemented from 2.17.15 16:30 to 2.19.15 8:30
[2] = DPE-2 Pumping test was implemented from 2.19.15 14:00 to 2.21.15 10:00

TABLE 1c
Pilot Test DPE-3 Setup
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

	Baseline Data			
	Well ID	Date	DTW (ft BTOC)	DTB (ft BTOC)
Pumped well	DPE-3	03.30.15	4.63	25.01
Monitoring wells	DPE-1	03.30.15	6.26	28.80
	DPE-2	03.30.15	5.92	29.35
	PZ-1	03.30.15	6.41	23.89
	PZ-2	03.30.15	6.2	18.32
	PZ-3	03.30.15	5.54	18.32
	AS-1	03.30.15	6.35	25.00
	MW-525	03.30.15	5.73	12.45
	MW-531	03.30.15	7.18	12.84
	MW-532	03.30.15	6.38	12.84

	DPE-3 Pumping test				
	Well ID	Distance from pumped well (ft)	DTW- beginning of test[1] (ft BTOC)	DTW- end of test[1] (ft BTOC)	Maximum Drawdown (ft BTOC)
Pumped well	DPE-3	0	16.04	16.50	12.47
Monitoring wells	DPE-1	29	8.17	8.40	2.73
	DPE-2	48	6.54	6.75	0.9
	PZ-1	31.5	7.80	8.09	1.89
	PZ-2	31	7.39	7.95	1.8
	PZ-3	10	9.02	9.02	3.82
	AS-1	25	7.84	8.21	2.02
	MW-525	5	10.13	9.56	4.49
	MW-531	57	7.23	7.31	0.22
	MW-532	40	6.95	7.65	1.32

Note:
hh:mm = hour:minute — DTW = depth to water — BTOC = below top of casing
min = minute — ft = feet — DTB = depth to bottom
[1] = DPE-3 Pumping test was implemented from 3.30.15 10:30 to 3.31.15 20:00

TABLE 2
Groundwater Storage Tank Analytical Results
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Sample ID	Date	Time	Gasoline Range Organics by NWTPH-Gx C7 - C12 (µg/L)	Benzene by 8021B (µg/L)	Diesel Range Organics by NWTPH-Dx (µg/L)	Heavy Range Organics by NWTPH-Dx (µg/L)	Zinc by EPA 200.7 (µg/L)	Copper by EPA 200.8 (µg/L)	Lead by EPA 200.8 (µg/L)	Turbidity by EPA 180.1 (NTU)	Total Alkalinity by SM 2320 (µg/L as CaC03)	Total Hardness by SM 2340 (µg/L as CaC03)	pH	Total cPAHs Adjusted for Toxicity (µg/L)	Comments
			GC Volatiles		GC Petroleum		Metals			Wet Chemistry					
B-TANK-1	2/20/2015	14:30	<50	<0.2	<29	<67	4.3	3.4	0.72	22.2	118,000	90,300	6.78	<0.0151	
BAKER-DPE-3-PILOT2	3/30/2015	14:30	830	170	110	<68	7.1	2.3	0.47	48.4	201,000	194,000	NA	<0.0151	Observed LNAPL on surface of water

Notes:
< = The compound was analyzed for but not detected. The associated value is the compound method detection limit.
cPAHs = Carcinogenic Polynuclear Aromatic Hydrocarbons, by EPA Method 8270C-HVI. cPAHs adjusted for toxicity according to WAC 173-340-708(8) and Air Toxics Hot Spots Program Risk Assessment
(µg/L) = micrograms per liter.
EPA = Environmental Protection Agency.
NWTPH = Northwest Total Petroleum Hydrocarbons
LNAPL = Light non-aqueous phase liquid.
NTU = nephelometric turbidity units
NA = Not Analyzed.

TABLE 3
Monitoring Well Network Data – Pilot Test DPE-1 DPE-2
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
DPE-1	02.16.15	10:10	--	--	306.7	--	6.19	28.8	6.19	--	
	02.17.15	16:29	0.00	0	509.0	271.8	20.76	28.8	6.19	14.57	Beginning of DPE-1 test
		17:30	1.02		390.0	271.8	20.72	28.8	6.19	14.53	
		18:30	2.02			271.8	20.75	28.8	6.19	14.56	
		19:30	3.02		352.5	278.6	20.78	28.8	6.19	14.59	
		21:00	4.52		377.3	285.4	20.77	28.8	6.19	14.58	
		21:45	5.27		376.4	278.6	20.75	28.8	6.19	14.56	
		22:30	6.02		349.7	278.6	20.80	28.8	6.19	14.61	
		23:30	7.02		631.0	278.6	20.75	28.8	6.19	14.56	
	02.18.15	0:30	8.02		422.9	278.6	20.80	28.8	6.19	14.61	
		1:30	9.02		381.3	275.9	20.77	28.8	6.19	14.58	
		2:30	10.02		682.6	278.6	20.76	28.8	6.19	14.57	
		3:30	11.02		621.4	278.6	20.80	28.8	6.19	14.61	
		4:30	12.02		681.5	278.6	20.78	28.8	6.19	14.59	
		5:30	13.02		704.1	278.6	20.80	28.8	6.19	14.61	
		6:30	14.02		355.2	278.6	20.78	28.8	6.19	14.59	
		7:35	15.10		346.7	278.6	20.75	28.8	6.19	14.56	
		8:30	16.02		426.1	339.8	20.77	28.8	6.19	14.58	
		10:30	18.02		465.0	278.6	20.72	28.8	6.19	14.53	
		12:30	20.02		418.0	292.2	24.93	28.8	6.19	18.74	Lowered pump
		14:30	22.02		405	285.4	24.95	28.8	6.19	18.76	
		16:30	24.02		384	299.0	24.96	28.8	6.19	18.77	
		18:30	26.02		424	299.0	24.95	28.8	6.19	18.76	
		20:30	28.02		426.4	292.2	24.93	28.8	6.19	18.74	
		22:30	30.02		473.5	292.2	24.78	28.8	6.19	18.59	
	02.19.15	0:30	32.02		416.7	299.0	24.81	28.8	6.19	18.62	
		2:30	34.02		459.1	299.0	24.80	28.8	6.19	18.61	
		4:30	36.02		476.2	292.2	24.88	28.8	6.19	18.69	
		6:30	38.02		483.6	292.2	24.85	28.8	6.19	18.66	
		8:30	40.02		384	292.2	24.94	28.8	6.19	18.75	End of DPE-1 test
	02.19.15	14:01	45.53	30	1.50	1.1	6.72	28.8	6.19	0.53	Beginning of DPE-2 test
		15:34	47.08		0.00	1.0	6.69	28.8	6.19	0.5	
		17:27	48.97		0.00	1.2	6.60	28.8	6.19	0.41	
		19:14	50.75		0.00	2.1	7.03	28.8	6.19	0.84	Use of Grundfoss
		20:18	51.82		0.10	1.7	7.17	28.8	6.19	0.98	
		21:26	52.95		0.00	1.8	7.25	28.8	6.19	1.06	
		22:25	53.93		0.10	2.1	7.28	28.8	6.19	1.09	
		23:33	55.07		0.00	2.1	7.30	28.8	6.19	1.11	
	02.20.15	0:37	56.13		0.00	1.5	7.33	28.8	6.19	1.14	
		1:39	57.17		0.00	1.8	7.31	28.8	6.19	1.12	
		2:35	58.10		0.00	1.7	7.30	28.8	6.19	1.11	
		3:23	58.90		0.00	1.9	7.29	28.8	6.19	1.1	
		4:34	60.08		0.00	2.0	7.25	28.8	6.19	1.06	
		5:48	61.32		0.00	1.9	7.23	28.8	6.19	1.04	
		6:31	62.03		0.10	1.6	7.23	28.8	6.19	1.04	

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
DPE-1	02.20.15	7:32	63.05	30	0.00	3.7	7.35	28.8	6.19	1.16	
		8:04	63.58		0.00	1.4	7.11	28.8	6.19	0.92	
		9:15	64.77		0.00	1.4	7.10	28.8	6.19	0.91	
		10:35	66.10		0.00	0.9	7.21	28.8	6.19	1.02	
		12:06	67.62		0.00	1.4	7.20	28.8	6.19	1.01	
		14:11	69.70		0.00	1.4	7.22	28.8	6.19	1.03	
		16:10	71.68		0.00	1.2	7.27	28.8	6.19	1.08	
		17:56	73.45		0.00	1.0	7.18	28.8	6.19	0.99	
		20:05	75.60		0.00	1.8	7.25	28.8	6.19	1.06	
		22:05	77.60		0.00	0.8	7.28	28.8	6.19	1.09	
		23:53	79.40		0.10	0.7	7.20	28.8	6.19	1.01	
	02.21.15	1:54	81.42		0.10	1.0	7.31	28.8	6.19	1.12	
		4:03	83.57		0.30	1.5	7.40	28.8	6.19	1.21	
		6:14	85.75		0.10	1.4	7.20	28.8	6.19	1.01	
		8:05	87.60		0.00	1.0	7.22	28.8	6.19	1.03	
		10:06	89.62		0.00	1.0	7.10	28.8	6.19	0.91	
DPE-2	02.16.15	10:10	--	--	30.0	--	5.80	29.35	5.80	--	Time recorded is approximate
	02.17.15	16:22	0	30	0.0	1.8	5.85	29.35	5.80	0.05	Beginning of DPE-1 test
		17:26	1.07		0.0	1.8	5.85	29.35	5.80	0.05	
		18:37	2.25		0.2	1.5	5.90	29.35	5.80	0.10	
		19:28	3.10		0.2	1.7	5.93	29.35	5.80	0.13	
		20:31	4.15		0.1	1.4	5.95	29.35	5.80	0.15	
		21:38	5.27		0.1	1.5	5.95	29.35	5.80	0.15	
		22:25	6.05		0.2	1.4	5.99	29.35	5.80	0.19	
		23:31	7.15		0.1	1.4	6.00	29.35	5.80	0.20	
	02.18.15	0:36	8.23		0.1	1.5	5.96	29.35	5.80	0.16	
		1:22	9.00		0.1	1.4	5.99	29.35	5.80	0.19	
		2:15	9.88		0.2	1.2	5.95	29.35	5.80	0.15	
		3:41	11.32		0.1	1.4	5.93	29.35	5.80	0.13	
		4:15	11.88		0.1	1.0	5.97	29.35	5.80	0.17	
		5:12	12.83		0.1	1.5	5.90	29.35	5.80	0.10	
		6:24	14.03		0.0	1.2	5.90	29.35	5.80	0.10	
		7:22	15.00		0.2	1.1	5.92	29.35	5.80	0.12	
		8:38	16.27		0.1	1.4	5.94	29.35	5.80	0.14	
		10:25	18.05		0.3	1.0	5.97	29.35	5.80	0.17	
		12:36	20.23		0.1	1.7	5.93	29.35	5.80	0.13	
		14:45	22.38		0.1	2.0	5.90	29.35	5.80	0.10	
		16:34	24.20		0.0	1.6	5.90	29.35	5.80	0.10	
		18:23	26.02		0.2	1.5	5.90	29.35	5.80	0.10	
		20:23	28.02		0.0	1.5	6.00	29.35	5.80	0.20	
		22:28	30.10		0.0	1.4	6.00	29.35	5.80	0.20	
	02.19.15	0:41	32.32		0.0	1.4	6.03	29.35	5.80	0.23	
		2:40	34.30		0.0	1.4	6.00	29.35	5.80	0.20	
		4:23	36.02		0.1	1.4	6.03	29.35	5.80	0.23	
		6:22	38.00		0.0	1.2	5.98	29.35	5.80	0.18	
		8:49	40.45		0.0	1.4	5.95	29.35	5.80	0.15	End of DPE-1 test

TABLE 3
Monitoring Well Network Data – Pilot Test DPE-1 DPE-2
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
DPE-2	02.19.15	14:00	45.63	0	70.0	81.5	11.00	29.35	5.80	5.20	Beginning of test in DPE-2, VOCs reading was post-dilution
		15:30	47.13		90.1	81.5	11.20	29.35	5.80	5.40	VOCs reading was post-dilution
		17:20	48.97		--	--	10.55	29.35	5.80	4.75	
		19:30	51.13		74.9	183.5	18.85	29.35	5.80	13.05	Use Grundfoss, VOCs reading was post-dilution
		20:30	52.13		399.4	183.5	18.75	29.35	5.80	12.95	
		21:30	53.13		426.8	197.1	18.60	29.35	5.80	12.80	
		22:30	54.13		380.7	190.3	18.40	29.35	5.80	12.60	
		23:30	55.13		--	190.3	18.40	29.35	5.80	12.60	
	02.20.15	0:30	56.13		356.0	190.3	18.40	29.35	5.80	12.60	
		1:30	57.13		371.8	190.3	18.80	29.35	5.80	13.00	
		2:30	58.13		490.1	190.3	18.80	29.35	5.80	13.00	
		3:30	59.13		--	190.3	18.30	29.35	5.80	12.50	
		4:30	60.13		411.9	190.3	18.50	29.35	5.80	12.70	
		5:30	61.13		426.5	190.3	18.40	29.35	5.80	12.60	
		6:30	62.13		426.8	190.3	18.55	29.35	5.80	12.75	
		7:30	63.13		--	190.3	18.35	29.35	5.80	12.55	
		8:00	63.63		--	190.3	19.25	29.35	5.80	13.45	
		9:00	64.63		390.0	190.3	19.63	29.35	5.80	13.83	
		10:00	65.63		--	203.9	19.35	29.35	5.80	13.55	
		12:00	67.63		359.0	190.3	21.45	29.35	5.80	15.65	
		14:00	69.63		370.0	197.1	21.92	29.35	5.80	16.12	
		16:00	71.63		245.0	244.6	19.00	29.35	5.80	13.20	
		18:00	73.63		316.0	244.6	20.93	29.35	5.80	15.13	
		20:00	75.63		310.0	255.5	22.00	29.35	5.80	16.20	
		22:00	77.63		296.0	247.3	22.00	29.35	5.80	16.20	
	02.21.15	0:00	79.63		156.0	222.9	22.00	29.35	5.80	16.20	
		2:00	81.63		396.0	244.6	22.00	29.35	5.80	16.20	
		4:00	83.63		313.0	244.6	22.00	29.35	5.80	16.20	
		6:00	85.63		374.3	271.8	17.72	29.35	5.80	11.92	
		8:00	87.63		175.5	265.0	19.18	29.35	5.80	13.38	
		10:00	89.63		216.7	268.4	18.90	29.35	5.80	13.10	End of DPE-2 test
PZ-1	02.16.15	10:10	--	--	223.1	--	6.31	25.01	6.31	--	Time recorded is approximate
	02.17.15	16:31	0	7	6.6	0.0	6.54	25.01	6.31	0.23	Beginning of DPE-1 test
		17:31	1.00		3.6	0.0	6.53	25.01	6.31	0.22	
		18:43	2.20		3.2	0.0	6.57	25.01	6.31	0.26	
		19:33	3.03		2.5	0.0	6.63	25.01	6.31	0.32	
		20:44	4.22		2.6	0.0	6.70	25.01	6.31	0.39	
		21:35	5.07		1.9	0.0	6.76	25.01	6.31	0.45	
		22:29	5.97		1.9	0.3	6.80	25.01	6.31	0.49	
		23:37	7.10		4.2	0.0	6.82	25.01	6.31	0.51	
	02.18.15	0:47	8.27		1.6	0.0	6.84	25.01	6.31	0.53	
		1:34	9.05		1.3	0.0	6.80	25.01	6.31	0.49	
		2:26	9.92		0.8	0.0	6.80	25.01	6.31	0.49	
		3:48	11.28		4.5	2.4	6.70	25.01	6.31	0.39	
		4:21	11.83		3.5	2.0	6.60	25.01	6.31	0.29	

TABLE 3
Monitoring Well Network Data – Pilot Test DPE-1 DPE-2
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
PZ-1	02.18.15	5:51	13.33	7	6.0	1.8	6.62	25.01	6.31	0.31	
		6:37	14.10		2.0	1.2	6.53	25.01	6.31	0.22	
		7:27	14.93		0.6	1.4	6.59	25.01	6.31	0.28	
		8:44	16.22		3.0	2.0	6.61	25.01	6.31	0.30	
		10:32	18.02		4.9	1.4	6.66	25.01	6.31	0.35	
		12:43	20.20		10.4	2.8	6.63	25.01	6.31	0.32	
		14:52	22.35		18.5	3.0	6.53	25.01	6.31	0.22	
		16:42	24.18		12.1	2.4	6.51	25.01	6.31	0.20	
		18:31	26.00		7.2	2.3	6.52	25.01	6.31	0.21	
		20:27	27.93		9.5	2.5	6.56	25.01	6.31	0.25	
		22:35	30.07		9.7	2.4	6.72	25.01	6.31	0.41	
	02.19.15	0:46	32.25		0.7	0.8	6.82	25.01	6.31	0.51	
		2:49	34.30		0.4	1.4	6.82	25.01	6.31	0.51	
		4:27	35.93		0.3	1.0	6.72	25.01	6.31	0.41	
		6:29	37.97		4.6	2.4	6.54	25.01	6.31	0.23	
		8:59	40.47		0.6	1.5	6.59	25.01	6.31	0.28	End of DPE-1 test
	02.19.15	14:03	45.53	45	7.8	0.7	6.62	25.01	6.31	0.31	Beginning of DPE-2 test
		15:39	47.13		0.8	0.6	6.62	25.01	6.31	0.31	
		17:30	48.98		0.7	0.5	6.55	25.01	6.31	0.24	
		19:15	50.73		0.5	0.9	6.72	25.01	6.31	0.41	Use of Grundfoss
		20:20	51.82		0.1	0.7	6.79	25.01	6.31	0.48	
		21:31	53.00		0.1	0.7	6.92	25.01	6.31	0.61	
		22:27	53.93		1.0	0.7	6.93	25.01	6.31	0.62	
		23:36	55.08		1.8	0.7	6.98	25.01	6.31	0.67	
	02.20.15	0:38	56.12		4.3	0.9	7.03	25.01	6.31	0.72	
		1:42	57.18		4.3	0.8	7.05	25.01	6.31	0.74	
		2:40	58.15		6.3	0.6	7.02	25.01	6.31	0.71	
		3:26	58.92		0.6	0.7	7.01	25.01	6.31	0.70	
		4:40	60.15		4.8	0.6	7.00	25.01	6.31	0.69	
		5:50	61.32		3.7	0.6	6.95	25.01	6.31	0.64	
		6:34	62.05		6.8	0.7	6.87	25.01	6.31	0.56	
		7:35	63.07		2.0	0.5	6.85	25.01	6.31	0.54	
		8:08	63.62		1.7	0.8	6.83	25.01	6.31	0.52	
		9:17	64.77		1.1	0.7	6.83	25.01	6.31	0.52	
		10:37	66.10		0.4	0.6	6.87	25.01	6.31	0.56	
		12:10	67.65		2.1	1.0	6.95	25.01	6.31	0.64	
		14:15	69.73		0.7	1.0	6.96	25.01	6.31	0.65	
		16:10	71.65		1.1	0.0	6.95	25.01	6.31	0.64	
		17:58	73.45		0.6	0.1	6.90	25.01	6.31	0.59	
		19:51	75.33		2.3	0.9	6.86	25.01	6.31	0.55	
		22:04	77.55		4.2	0.7	6.95	25.01	6.31	0.64	
		23:56	79.42		0.8	0.3	6.95	25.01	6.31	0.64	
	02.21.15	1:56	81.42		4.4	0.7	7.09	25.01	6.31	0.78	
		4:07	83.60		2.9	0.7	7.03	25.01	6.31	0.72	
		6:15	85.73		1.6	0.7	6.92	25.01	6.31	0.61	
		8:10	87.65		1.3	0.9	6.93	25.01	6.31	0.62	
		10:10	89.65		0.1	0.0	6.94	25.01	6.31	0.63	End of DPE-2 test

TABLE 3
Monitoring Well Network Data – Pilot Test DPE-1 DPE-2
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
PZ-2	02.16.15	10:10	--	--	101.6	--	6.04	23.89	6.04	--	Time recorded is approximate
	02.17.15	16:28	0	15	0.0	9.5	6.20	23.89	6.04	0.16	Beginning of DPE-1 test
		17:28	1.00		0.0	9.4	6.14	23.89	6.04	0.1	
		18:39	2.18		0.2	9.4	6.21	23.89	6.04	0.17	
		19:30	3.03		0.2	9.1	6.25	23.89	6.04	0.21	
		20:39	4.18		0.1	8.8	6.29	23.89	6.04	0.25	
		21:32	5.07		0.2	8.7	6.38	23.89	6.04	0.34	
		22:27	5.98		0.0	8.0	6.38	23.89	6.04	0.34	
		23:34	7.10		0.1	8.7	6.35	23.89	6.04	0.31	
	02.18.15	0:42	8.23		0.1	8.9	6.26	23.89	6.04	0.22	
		1:30	9.03		0.1	8.4	6.45	23.89	6.04	0.41	
		2:21	9.88		0.1	7.7	6.35	23.89	6.04	0.31	
		3:45	11.28		0.0	8.1	6.32	23.89	6.04	0.28	
		4:21	11.88		0.1	7.4	6.31	23.89	6.04	0.27	
		4:57	12.48		0.1	8.0	6.40	23.89	6.04	0.36	
		6:29	14.02		0.0	7.4	6.21	23.89	6.04	0.17	
		7:24	14.93		0.1	8.0	6.32	23.89	6.04	0.28	
		8:41	16.22		0.1	7.5	6.36	23.89	6.04	0.32	
		10:29	18.02		0.1	5.2	6.43	23.89	6.04	0.39	
		12:39	20.18		0.1	9.1	6.30	23.89	6.04	0.26	
		14:49	22.35		0.1	10.2	6.20	23.89	6.04	0.16	
		16:37	24.15		0.1	8.7	6.23	23.89	6.04	0.19	
		18:27	25.98		0.0	8.7	6.31	23.89	6.04	0.27	
		20:25	27.95		0.0	8.0	6.23	23.89	6.04	0.19	
		22:31	30.05		0.0	8.0	6.36	23.89	6.04	0.32	
	02.19.15	0:43	32.25		0.0	7.2	6.38	23.89	6.04	0.34	
		2:46	34.30		0.0	7.9	6.32	23.89	6.04	0.28	
		4:25	35.95		0.0	8.1	6.63	23.89	6.04	0.59	
		6:25	37.95		0.0	8.0	6.25	23.89	6.04	0.21	
		8:54	40.43		0.0	7.9	6.30	23.89	6.04	0.26	End of DPE-1 test
	02.19.15	13:58	45.50	23.00	0.0	3.7	6.73	23.89	6.04	0.69	Beginning of DPE-2 test
		15:31	47.05		0.0	3.7	6.80	23.89	6.04	0.76	
		17:25	48.95		0.0	3.5	6.65	23.89	6.04	0.61	
		19:13	50.75		0.0	6.0	7.15	23.89	6.04	1.11	Use of Grundfoss
		20:16	51.80		0.0	4.9	7.23	23.89	6.04	1.19	
		21:24	52.93		0.0	4.8	7.30	23.89	6.04	1.26	
		22:24	53.93		0.1	5.1	7.30	23.89	6.04	1.26	
		23:32	55.07		0.0	4.7	7.33	23.89	6.04	1.29	
	02.20.15	0:37	56.15		0.0	4.5	7.40	23.89	6.04	1.36	
		1:34	57.10		0.0	4.5	7.35	23.89	6.04	1.31	
		2:34	58.10		0.0	4.5	7.32	23.89	6.04	1.28	
		3:21	58.88		0.0	4.1	7.32	23.89	6.04	1.28	
		4:26	59.97		0.0	4.4	7.32	23.89	6.04	1.28	
		5:46	61.30		0.0	4.2	7.32	23.89	6.04	1.28	
		6:31	62.05		0.1	4.1	7.40	23.89	6.04	1.36	

TABLE 3
Monitoring Well Network Data – Pilot Test DPE-1 DPE-2
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
PZ-2	02.20.15	7:33	63.08	23.00	0.3	1.4	7.19	23.89	6.04	1.15	
		8:03	63.58		0.0	4.0	7.25	23.89	6.04	1.21	
		9:15	64.78		0.0	3.8	7.22	23.89	6.04	1.18	
		10:34	66.10		0.0	4.1	7.36	23.89	6.04	1.32	
		12:04	67.60		0.0	4.4	7.35	23.89	6.04	1.31	
		14:10	69.70		0.0	4.1	7.22	23.89	6.04	1.18	
		16:09	71.68		0.0	4.7	7.47	23.89	6.04	1.43	
		17:57	73.48		0.0	4.1	7.36	23.89	6.04	1.32	
		19:50	75.37		0.0	4.7	7.40	23.89	6.04	1.36	
		22:06	77.63		0.0	3.9	7.43	23.89	6.04	1.39	
		23:51	79.38		0.0	2.7	7.29	23.89	6.04	1.25	
	02.21.15	1:54	81.43		0.0	4.0	7.53	23.89	6.04	1.49	
		4:02	83.57		0.0	4.1	7.32	23.89	6.04	1.28	
		6:12	85.73		0.0	3.1	7.34	23.89	6.04	1.3	
		8:05	87.62		0.0	4.2	7.34	23.89	6.04	1.3	
		10:05	89.62		0.0	3.8	7.36	23.89	6.04	1.32	End of DPE-2 test
AS-1	02.16.15	10:10	--	--	14.7	--	6.20	18.32	6.20	--	Time recorded is approximate
	02.17.15	16:30	0	5	1.2	0.0	6.61	18.32	6.20	0.41	Beginning of DPE-1 test
		17:30	1.00		1.1	0.0	6.59	18.32	6.20	0.39	
		18:42	2.20		1.2	0.0	6.62	18.32	6.20	0.42	
		19:32	3.03		1.4	0.0	6.66	18.32	6.20	0.46	
		20:42	4.20		1.0	0.0	6.72	18.32	6.20	0.52	
		21:34	5.07		1.1	0.0	6.75	18.32	6.20	0.55	
		22:28	5.97		0.7	0.0	6.80	18.32	6.20	0.6	
		23:35	7.08		1.2	0.0	6.84	18.32	6.20	0.64	
	02.18.15	0:45	8.25		1.4	0.5	6.83	18.32	6.20	0.63	
		1:32	9.03		1.0	0.0	6.80	18.32	6.20	0.6	
		2:24	9.90		1.1	0.0	6.80	18.32	6.20	0.6	
		3:46	11.27		1.5	0.1	6.80	18.32	6.20	0.6	
		4:25	11.92		1.9	0.0	6.60	18.32	6.20	0.4	
		5:54	13.40		2.5	0.2	6.70	18.32	6.20	0.5	
		6:33	14.05		2.0	0.0	6.67	18.32	6.20	0.47	
		7:26	14.93		2.5	0.0	6.63	18.32	6.20	0.43	
		8:43	16.22		34.6	0.0	6.69	18.32	6.20	0.49	
		10:31	18.02		8.1	0.0	6.69	18.32	6.20	0.49	
		12:42	20.20		8.5	0.0	6.71	18.32	6.20	0.51	
		14:51	22.35		9.7	0.0	6.63	18.32	6.20	0.43	
		16:40	24.17		7.4	0.0	6.60	18.32	6.20	0.4	
		18:30	26.00		4.9	0.0	6.60	18.32	6.20	0.4	
		20:26	27.93		2.7	0.0	6.64	18.32	6.20	0.44	
		22:39	30.15		3.2	0.0	6.74	18.32	6.20	0.54	
	02.19.15	0:45	32.25		15.4	0.0	6.78	18.32	6.20	0.58	
		2:55	34.42		9.9	0.0	6.80	18.32	6.20	0.6	
		4:26	35.93		25.7	0.5	6.70	18.32	6.20	0.5	
		6:26	37.93		17.2	0.0	6.62	18.32	6.20	0.42	
		8:55	40.42		8.7	0.0	6.61	18.32	6.20	0.41	End of DPE-1 test

TABLE 3
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Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
AS-1	02.19.15	14:05	45.58	35	11.7	0.0	6.61	18.32	6.20	0.41	Beginning of DPE-2 test
		15:37	47.12		6.1	0.0	6.62	18.32	6.20	0.42	
		17:28	48.97		7.4	0.0	6.57	18.32	6.20	0.37	
		19:15	50.75		6.3	0.0	6.81	18.32	6.20	0.61	Use of Grundfoss
		20:17	51.78		6.6	0.0	6.89	18.32	6.20	0.69	
		21:27	52.95		3.0	0.0	6.97	18.32	6.20	0.77	
		22:36	54.10		2.8	0.0	7.00	18.32	6.20	0.8	
		23:35	55.08		8.9	0.0	7.08	18.32	6.20	0.88	
	02.20.15	0:42	56.20		5.8	0.0	7.10	18.32	6.20	0.9	
		1:44	57.23		4.9	0.0	7.10	18.32	6.20	0.9	
		2:38	58.13		8.8	0.0	7.08	18.32	6.20	0.88	
		3:25	58.92		7.5	0.0	7.10	18.32	6.20	0.9	
		4:39	60.15		7.1	0.0	7.05	18.32	6.20	0.85	
		5:55	61.42		9.9	0.0	7.00	18.32	6.20	0.8	
		6:33	62.05		27.8	0.0	6.93	18.32	6.20	0.73	
		7:34	63.07		12.8	0.0	6.92	18.32	6.20	0.72	
		8:07	63.62		3.8	0.0	6.91	18.32	6.20	0.71	
		9:16	64.77		7.5	0.0	6.92	18.32	6.20	0.72	
		10:36	66.10		8.7	0.0	6.93	18.32	6.20	0.73	
		12:08	67.63		14.1	0.0	6.92	18.32	6.20	0.72	
		14:12	69.70		4.5	0.0	7.02	18.32	6.20	0.82	
		16:10	71.67		7.6	0.0	7.04	18.32	6.20	0.84	
		18:00	73.50		3.6	0.0	6.98	18.32	6.20	0.78	
		19:55	75.42		3.6	0.0	6.96	18.32	6.20	0.76	
		22:09	77.65		3.0	0.0	7.00	18.32	6.20	0.8	
		23:54	79.40		5.2	0.0	7.20	18.32	6.20	1	
	02.21.15	1:55	81.42		3.0	0.0	7.13	18.32	6.20	0.93	
		4:05	83.58		4.0	0.0	7.15	18.32	6.20	0.95	
		6:13	85.72		4.8	0.0	7.01	18.32	6.20	0.81	
		8:07	87.62		3.9	0.0	7.01	18.32	6.20	0.81	
		10:08	89.63		3.5	0.0	7.02	18.32	6.20	0.82	End of DPE-2 test
MW-20R	02.16.15	10:22	--	--	0.0	--	6.01	14.23	--	--	
	02.21.15	10:21	--	--	0.0	--	6.22	14.23	--	--	
MW-512	02.16.15	10:24	--	--	0.7	--	5.76	12.73	--	--	
	02.21.15	10:33	--	--	0.6	--	5.99		--	--	
MW-514	02.16.15		--	--	0.1	--	3.96	12.60	--	--	
	02.21.15	10:29	--	--	0.0	--	4.21		--	--	
MW-518	02.16.15	10:26	--	--	0.3	--	7.80	13.36	--	--	
	02.21.15	10:26	--	--	0.1	--	7.96		--	--	
MW-525	02.16.15	10:10	--	--	69.0	--	5.60	12.45	5.6	--	Time recorded is approximate
	02.17.15	16:34	0	23	5.8	4.4	5.63	12.45	5.6	0.03	Beginning of DPE-1 test
		17:35	1.02		2.2	5.1	5.55	12.45	5.6	-0.05	
		18:45	2.18		106.6	5.0	5.50	12.45	5.6	-0.10	
		19:30	2.93		3.6	4.2	5.74	12.45	5.6	0.14	
		20:48	4.23		202.2	4.5	5.61	12.45	5.6	0.01	
		21:38	5.07		8.0	3.3	5.82	12.45	5.6	0.22	

TABLE 3
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Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
MW-525	02.17.15	22:31	5.95	23	318.7	4.7	5.65	12.45	5.6	0.05	
		23:39	7.08		6.8	4.0	5.97	12.45	5.6	0.37	
	02.18.15	0:50	8.27		356.1	5.0	5.70	12.45	5.6	0.10	
		1:38	9.07		268.4	3.4	5.70	12.45	5.6	0.10	
		2:33	9.98		292.8	4.2	5.67	12.45	5.6	0.07	
		3:51	11.28		248.1	4.3	5.65	12.45	5.6	0.05	
		4:29	11.92		203.4	3.8	5.58	12.45	5.6	-0.02	
		5:55	13.35		279.6	4.1	5.65	12.45	5.6	0.05	
		6:40	14.10		276.8	3.9	5.54	12.45	5.6	-0.06	
		7:29	14.92		202.6	4.1	5.60	12.45	5.6	0.00	
		8:50	16.27		5.4	2.9	5.79	12.45	5.6	0.19	
		10:36	18.03		205.0	3.4	5.69	12.45	5.6	0.09	
		12:47	20.22		145.7	4.7	5.57	12.45	5.6	-0.03	
		14:54	22.33		174.4	5.2	5.50	12.45	5.6	-0.10	
		16:45	24.18		208.70	4.3	5.55	12.45	5.6	-0.05	
		18:34	26.00		116.4	4.5	5.55	12.45	5.6	-0.05	
		20:29	27.92		80.7	4.3	5.77	12.45	5.6	0.17	
		22:37	30.05		76.3	4.0	5.65	12.45	5.6	0.05	
	02.19.15	0:49	32.25		103.8	3.8	5.95	12.45	5.6	0.35	
		2:51	34.28		55.7	4.0	6.05	12.45	5.6	0.45	
		4:29	35.92		6.1	3.7	5.83	12.45	5.6	0.23	
		6:34	38.00		90.9	4.1	5.80	12.45	5.6	0.20	
		9:03	40.48		126.8	4.2	5.58	12.45	5.6	-0.02	End of DPE-1 test
	02.19.15	14:09	45.58	38	81.0	2.7	5.82	12.45	5.6	0.22	Beginning of DPE-2 test
		15:38	47.07		70.4	2.6	5.89	12.45	5.6	0.29	
		17:33	48.98		107.7	2.5	5.83	12.45	5.6	0.23	
		19:18	50.73		93.4	4.0	5.96	12.45	5.6	0.36	Use of Grundfoss
		20:24	51.83		134.4	3.6	6.08	12.45	5.6	0.48	
		21:33	52.98		161.40	3.5	6.17	12.45	5.6	0.57	
		22:29	53.92		171.6	3.6	6.17	12.45	5.6	0.57	
		23:39	55.08		57.7	3.2	6.23	12.45	5.6	0.63	
	02.20.15	0:45	56.18		129.4	3.0	6.35	12.45	5.6	0.75	
		1:31	56.95		164.2	3.4	6.40	12.45	5.6	0.8	
		2:45	58.18		93.1	3.1	6.25	12.45	5.6	0.65	
		3:28	58.90		67.2	3.3	6.23	12.45	5.6	0.63	
		4:44	60.17		121.6	3.2	6.20	12.45	5.6	0.6	
		5:52	61.30		64.2	2.6	6.25	12.45	5.6	0.65	
		6:36	62.03		5.6	2.1	6.31	12.45	5.6	0.71	
		7:37	63.05		7.7	2.9	6.28	12.45	5.6	0.68	
		8:11	63.62		23.3	3.0	6.13	12.45	5.6	0.53	
		9:20	64.77		5.6	2.7	6.15	12.45	5.6	0.55	
		10:39	66.08		38.6	2.3	6.30	12.45	5.6	0.7	
		12:14	67.67		12.1	3.4	6.20	12.45	5.6	0.6	
		14:16	69.70		54.3	3.1	6.41	12.45	5.6	0.81	
		16:14	71.67		8.4	2.9	6.35	12.45	5.6	0.75	
		18:01	73.45		27.3	2.5	6.28	12.45	5.6	0.68	
		19:59	75.42		30.4	2.5	6.33	12.45	5.6	0.73	

TABLE 3
Monitoring Well Network Data – Pilot Test DPE-1 DPE-2
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
MW-525	02.20.15	21:10	76.60	38	20.7	2.0	6.35	12.45	5.6	0.75	
		23:58	79.40		20.7	1.7	6.35	12.45	5.6	0.75	
	02.21.15	1:58	81.40		5.0	2.2	6.47	12.45	5.6	0.87	
		4:10	83.60		19.4	2.5	6.50	12.45	5.6	0.9	
		6:20	85.77		0.6	2.4	6.31	12.45	5.6	0.71	
		8:14	87.67		19.9	3.1	6.26	12.45	5.6	0.66	
		10:14	89.67		5.7	3.1	6.30	12.45	5.6	0.7	End of DPE-2 test
MW-526	02.16.15	10:30	--	--	119.5	--	4.35	13.03	--	--	
	02.21.15	10:42	--	--	88.14	--	4.55		--	--	
MW-531	02.16.15	10:10	--	--	0.6	--	7.07	12.84	7.07	--	Time recorded is approximate
	02.17.15	16:32	0	40	3.9	0.0	7.03	12.84	7.07	-0.04	Beginning of DPE-1 test
		17:33	1.02		0.5	0.0	7.03	12.84	7.07	-0.04	
		18:47	2.25		0.7	0.0	7.02	12.84	7.07	-0.05	
		19:34	3.03		0.3	0.0	7.04	12.84	7.07	-0.03	
		20:46	4.23		0.2	0.0	7.11	12.84	7.07	0.04	
		21:36	5.07		1.2	0.0	7.18	12.84	7.07	0.11	
		22:30	5.97		0.4	0.0	7.20	12.84	7.07	0.13	
		23:38	7.10		0.5	0.0	7.25	12.84	7.07	0.18	
	02.18.15	0:49	8.28		0.9	0.0	--	12.84	7.07	--	
		1:36	9.07		0.9	0.0	7.29	12.84	7.07	0.22	
		2:29	9.95		0.2	0.0	7.32	12.84	7.07	0.25	
		3:50	11.30		0.5	0.0	7.30	12.84	7.07	0.23	
		4:28	11.93		0.7	0.0	7.26	12.84	7.07	0.19	
		5:52	13.33		0.0	0.0	7.23	12.84	7.07	0.16	
		6:39	14.12		0.0	0.0	7.30	12.84	7.07	0.23	
		7:28	14.93		0.1	0.0	7.19	12.84	7.07	0.12	
		8:46	16.23		0.1	0.0	7.17	12.84	7.07	0.1	
		10:34	18.03		0.1	0.3	7.19	12.84	7.07	0.12	
		12:45	20.22		0.1	0.3	7.21	12.84	7.07	0.14	
		14:45	22.22		0.1	0.4	7.17	12.84	7.07	0.1	
		16:04	23.53		0.1	0.0	7.12	12.84	7.07	0.05	
		18:32	26.00		0.0	0.3	7.05	12.84	7.07	-0.02	
		20:28	27.93		1.4	0.0	7.08	12.84	7.07	0.01	
		22:41	30.15		0.0	0.0	7.20	12.84	7.07	0.13	
	02.19.15	0:48	32.27		0.0	0.0	7.29	12.84	7.07	0.22	
		2:52	34.33		0.0	0.0	7.31	12.84	7.07	0.24	
		4:28	35.93		0.0	0.0	7.29	12.84	7.07	0.22	
		6:31	37.98		0.00	0.0	7.22	12.84	7.07	0.15	
		9:01	40.48		0.0	0.0	7.17	12.84	7.07	0.1	End of DPE-1 test
	02.19.15	14:07	45.58	68	0.0	0.0	7.23	12.84	7.07	0.16	Beginning of DPE-2 test
		15:42	47.17		0.0	0.0	7.21	12.84	7.07	0.14	
		17:31	48.98		0.0	0.0	7.15	12.84	7.07	0.08	
		19:17	50.75		0.0	0.0	7.04	12.84	7.07	-0.03	Use of Grundfoss
		20:22	51.83		0.0	0.0	7.12	12.84	7.07	0.05	
		21:32	53.00		0.0	0.0	7.17	12.84	7.07	0.1	
		22:28	53.93		0.0	0.0	7.20	12.84	7.07	0.13	

TABLE 3
Monitoring Well Network Data – Pilot Test DPE-1 DPE-2
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
MW-531	02.19.15	23:37	55.08	68	0.0	0.0	7.25	12.84	7.07	0.18	
	02.20.15	0:41	56.15		0.0	0.0	7.30	12.84	7.07	0.23	
		1:41	57.15		0.0	0.0	7.31	12.84	7.07	0.24	
		2:43	58.18		0.40	0.0	7.36	12.84	7.07	0.29	
		3:27	58.92		0.2	0.0	7.34	12.84	7.07	0.27	
		4:42	60.17		0.00	0.0	7.32	12.84	7.07	0.25	
		5:45	61.22		0.0	0.0	7.30	12.84	7.07	0.23	
		6:35	62.05		0.4	0.0	7.30	12.84	7.07	0.23	
		7:36	63.07		0.0	0.0	7.27	12.84	7.07	0.2	
		8:10	63.63		0.3	0.0	7.25	12.84	7.07	0.18	
		9:18	64.77		0.1	0.0	7.25	12.84	7.07	0.18	
		10:28	65.93		0.1	0.0	7.25	12.84	7.07	0.18	
		12:11	67.65		0.0	0.0	7.28	12.84	7.07	0.21	
		14:14	69.70		0.0	0.0	7.32	12.84	7.07	0.25	
		16:12	71.67		0.0	0.0	7.30	12.84	7.07	0.23	
		18:00	73.47		0.0	0.0	7.27	12.84	7.07	0.2	
		19:57	75.42		0.0	0.0	7.25	12.84	7.07	0.18	
		22:09	77.62		0.0	0.0	7.28	12.84	7.07	0.21	
		23:57	79.42		0.1	0.0	7.35	12.84	7.07	0.28	
	02.21.15	1:57	81.42		0.0	0.0	7.40	12.84	7.07	0.33	
		4:09	83.62		0.0	0.0	7.42	12.84	7.07	0.35	
		6:16	85.73		0.0	0.0	7.38	12.84	7.07	0.31	
		8:12	87.67		0.0	0.0	7.32	12.84	7.07	0.25	
		10:12	89.67		0.0	0.0	7.32	12.84	7.07	0.25	End of DPE-2 test
MW-532	02.16.15	10:10	--	--	36.0	--	6.25	12.55	6.25	--	Time recorded is approximate
	02.17.15	16:26	0.00	23	0.0	0.0	6.53	12.55	6.25	0.28	Beginning of DPE-1 test
		17:27	1.02		0.3	0.4	6.52	12.55	6.25	0.27	
		18:38	2.20		0.3	0.3	6.53	12.55	6.25	0.28	
		19:29	3.05		0.0	0.3	6.54	12.55	6.25	0.29	
		20:37	4.18		0.3	0.4	6.54	12.55	6.25	0.29	
		21:30	5.07		0.3	0.4	6.59	12.55	6.25	0.34	
		22:26	6.00		0.3	0.3	6.60	12.55	6.25	0.35	
		23:33	7.12		0.1	0.1	6.65	12.55	6.25	0.4	
	02.18.15	0:39	8.22		0.1	0.2	6.69	12.55	6.25	0.44	
		1:28	9.03		0.6	0.3	6.61	12.55	6.25	0.36	
		2:18	9.87		3.9	0.3	6.64	12.55	6.25	0.39	
		3:43	11.28		0.1	0.5	6.60	12.55	6.25	0.35	
		4:18	11.87		2.0	0.4	6.59	12.55	6.25	0.34	
		5:45	13.32		0.5	0.5	6.57	12.55	6.25	0.32	
		6:26	14.00		1.4	0.5	6.53	12.55	6.25	0.28	
		7:23	14.95		0.6	0.5	6.54	12.55	6.25	0.29	
		8:39	16.22		0.9	0.5	6.55	12.55	6.25	0.3	
		10:27	18.02		4.0	0.4	6.55	12.55	6.25	0.3	
		12:38	20.20		1.4	0.6	6.59	12.55	6.25	0.34	
		14:47	22.35		1.4	0.7	6.50	12.55	6.25	0.25	
		16:36	24.17		2.2	0.5	6.53	12.55	6.25	0.28	
		18:25	25.98		0.3	0.5	6.55	12.55	6.25	0.3	

TABLE 3
Monitoring Well Network Data – Pilot Test DPE-1 DPE-2
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft BTOC)	Note
MW-532	02.18.15	20:24	27.97	23	0.40	0.5	6.55	12.55	6.25	0.3	
		22:24	29.97		0.5	0.5	6.58	12.55	6.25	0.33	
	02.19.15	0:42	32.27		0.1	0.4	6.65	12.55	6.25	0.4	
		2:43	34.28		0.20	0.4	6.63	12.55	6.25	0.38	
		4:24	35.97		0.6	0.5	6.61	12.55	6.25	0.36	
		6:23	37.95		0.0	0.4	6.58	12.55	6.25	0.33	
		8:51	40.42		0.1	0.5	6.54	12.55	6.25	0.29	End of DPE-1 test
	02.19.05	13:57	45.52	10	0.0	5.1	6.52	12.55	6.25	0.27	Beginning of DPE-2 test
		15:30	47.07		1.3	5.8	6.55	12.55	6.25	0.3	
		17:23	48.95		0.0	5.4	6.65	12.55	6.25	0.4	
		19:12	50.77		0.0	11.4	7.55	12.55	6.25	1.3	Use of Grundfoss
		20:15	51.82		0.00	9.3	6.73	12.55	6.25	0.48	
		21:20	52.90		0.1	9.6	6.82	12.55	6.25	0.57	
		22:23	53.95		0.1	6.1	7.05	12.55	6.25	0.8	
		23:31	55.08		0.0	7.8	6.90	12.55	6.25	0.65	
	02.20.15	0:35	56.15		0.0	7.9	7.00	12.55	6.25	0.75	
		1:32	57.10		0.0	7.7	6.93	12.55	6.25	0.68	
		2:32	58.10		0.1	7.2	7.41	12.55	6.25	1.16	
		3:20	58.90		0.0	7.3	7.31	12.55	6.25	1.06	
		4:25	59.98		0.0	7.0	7.20	12.55	6.25	0.95	
		5:44	61.30		0.0	6.9	7.09	12.55	6.25	0.84	
		6:30	62.07		0.1	6.2	7.29	12.55	6.25	1.04	
		7:30	63.07		0.1	6.9	7.21	12.55	6.25	0.96	
		8:30	64.07		0.0	6.7	6.98	12.55	6.25	0.73	
		9:12	64.77		0.0	6.2	6.97	12.55	6.25	0.72	
		10:31	66.08		0.0	7.2	7.27	12.55	6.25	1.02	
		12:03	67.62		0.0	7.0	7.25	12.55	6.25	1.00	
		14:09	69.72		0.0	6.8	7.09	12.55	6.25	0.84	
		16:08	71.70		0.0	7.2	7.26	12.55	6.25	1.01	
		17:58	73.53		0.0	7.4	7.12	12.55	6.25	0.87	
		20:01	75.58		0.1	7.8	7.35	12.55	6.25	1.10	
		22:01	77.58		0.0	6.5	7.34	12.55	6.25	1.09	
		23:50	79.40		0.0	2.3	7.25	12.55	6.25	1.00	
	02.21.15	1:53	81.45		0.1	6.5	7.50	12.55	6.25	1.25	
		4:00	83.57		0.0	6.2	7.50	12.55	6.25	1.25	
		6:10	85.73		0.0	3.8	7.34	12.55	6.25	1.09	
		8:03	87.62		0.0	6.8	7.17	12.55	6.25	0.92	
		10:02	89.60		0.0	6.7	7.21	12.55	6.25	0.96	End of DPE-2 test

Note:

hh:mm = hour:minute
min = minute
gal = gallon
gpm = gallon per minute
°F = Fahrenheit
ft = feet

DTW = depth to water
DPE = dual phase extraction
"Hg = inches of mercury
"H2O= inches of water
ES = Electric Submersible
scfm = standard cubic feet per minute

ppmv = parts per million by volume
lb = pound
VOCs = Volatile organic compounds

[a]Mass removal rate calculated using average VOCs concentrations between time period for instances following post-dilution concentrations readings
Mass Removal Rate Equation: ((Average VOCs)/1000000)*(Average Volumetric Air Flow Rate))*(1440 min/day)*(1/379 ft3 air/mole)*(86.2lb/lb mole)
with: VOCs in ppmv Air flow rate in scfm Mass Removal Rate in lb/day
Vacuum Equation: Vacuum = DPE Vacuum*13.59 with: Vacuum in "H2O DPE Vacuum in "Hg

TABLE 4
Monitoring Well Network Data – Pilot Test DPE-3
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
DPE-1	03.30.15	8:21	--	29	30.9	--	6.26	28.8	6.26	--	
	03.30.15	10:53	0.00	29	1.3	0.0	8.17	28.8	6.26	1.91	Beginning of DPE-3 test
		11:51	0.97		6.6	0.0	8.32	28.8	6.26	2.06	Pulling full vacuum at DPE-3
		12:50	1.95		2.0	0.0	8.35	28.8	6.26	2.09	
		13:49	2.93		--	0.3	8.35	28.8	6.26	2.09	
		15:38	4.75		--	0.3	8.37	28.8	6.26	2.11	
		16:50	5.95		--	0.3	8.38	28.8	6.26	2.12	
		17:51	6.97		--	0.0	7.88	28.8	6.26	1.62	Blower Stopped
		18:53	8.00		--	0.7	8.34	28.8	6.26	2.08	
		20:24	9.52		170.6	0.6	8.48	28.8	6.26	2.22	
		21:25	10.53		8.9	0.9	8.65	28.8	6.26	2.39	
		23:18	12.42		8.6	0.6	8.59	28.8	6.26	2.33	
	03.31.15	1:15	14.37		130.5	0.5	8.54	28.8	6.26	2.28	
		3:28	16.58		36.7	0.6	8.53	28.8	6.26	2.27	
		5:24	18.52		82.2	0.6	8.45	28.8	6.26	2.19	
		7:20	20.45		2.4	0.7	8.47	28.8	6.26	2.21	
		8:41	21.80		51.7	0.9	8.45	28.8	6.26	2.19	
		10:48	23.92		39.5	1.3	8.49	28.8	6.26	2.23	
		12:43	25.83		61.3	1.3	8.48	28.8	6.26	2.22	
		14:46	27.88		53.5	1.3	8.47	28.8	6.26	2.21	
		16:50	29.95		34.1	0.9	8.43	28.8	6.26	2.17	
		17:46	30.88		2.7	0.8	8.40	28.8	6.26	2.14	
		18:51	31.97		24.8	0.9	8.40	28.8	6.26	2.14	
		20:02	33.15		25.1	0.9	8.99	28.8	6.26	2.73	End of DPE-3 test
		21:15	34.37		27.7	--	6.50	28.8	6.26	0.24	
		22:15	35.37		20.0	--	6.85	28.8	6.26	0.59	
		23:11	36.30		40.2	--	6.70	28.8	6.26	0.44	
	04.01.15	0:12	37.32		26.9	--	6.65	28.8	6.26	0.39	

TABLE 4
Monitoring Well Network Data – Pilot Test DPE-3
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
DPE-2	03.30.15	8:30	--	48	10.0	--	5.92	29.35	5.92	--	
		10:50	0	48	1.5	0.0	6.54	29.35	5.92	0.62	Beginning of DPE-3 test
		11:58	1.13		0.2	0.0	6.61	29.35	5.92	0.69	Pulling full vacuum at DPE-3
		12:59	2.15		0.2	0.0	6.65	29.35	5.92	0.73	
		13:55	3.08		--	0.0	6.65	29.35	5.92	0.73	
		15:35	4.75		--	0.0	6.67	29.35	5.92	0.75	
		16:56	6.10		--	0.0	6.68	29.35	5.92	0.76	
		18:00	7.17		--	0.0	6.51	29.35	5.92	0.59	Blower Stopped
		19:02	8.20		--	0.7	6.70	29.35	5.92	0.78	
		20:01	9.18		0.0	0.4	6.73	29.35	5.92	0.81	
		21:00	10.17		1.6	0.3	6.78	29.35	5.92	0.86	
		23:00	12.17		3.5	0.3	6.75	29.35	5.92	0.83	
	03.31.15	1:07	14.28		7.7	0.0	6.75	29.35	5.92	0.83	
		3:23	16.55		4.0	0.3	6.74	29.35	5.92	0.82	
		5:20	18.50		4.4	4.0	6.77	29.35	5.92	0.85	
		7:17	20.45		3.2	0.3	6.81	29.35	5.92	0.89	
		8:47	21.95		14.0	0.4	6.77	29.35	5.92	0.85	
		10:56	24.10		25.0	0.7	6.80	29.35	5.92	0.88	
		12:50	26.00		30.3	0.6	6.77	29.35	5.92	0.85	
		14:52	28.03		33.0	0.7	6.78	29.35	5.92	0.86	
		16:56	30.10		24.7	0.5	6.76	29.35	5.92	0.84	
		17:53	31.05		26.0	0.4	6.75	29.35	5.92	0.83	
		18:57	32.12		9.3	0.4	6.75	29.35	5.92	0.83	
		20:10	33.33		3.5	0.4	6.82	29.35	5.92	0.90	End of DPE-3 test
		21:20	34.50		13.6	--	6.25	29.35	5.92	0.33	
		22:20	35.50		18.0	--	6.15	29.35	5.92	0.23	
		23:16	36.43		25.3	--	6.15	29.35	5.92	0.23	
	04.01.15	0:19	37.48		8.6	--	6.12	29.35	5.92	0.20	

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
DPE-3	03.30.15	8:03	--	0	375.1	--	4.63	25.01	4.63	--	
	03.30.15	10:37	0	0	35.1	142.7	16.04	25.01	4.63	11.41	Beginning of DPE-3 test
		12:05	1.47		53.0	142.7	7.60	25.01	4.63	2.97	Pulling full vacuum at DPE-3
		13:05	2.47		62.1	142.7	8.20	25.01	4.63	3.57	
		14:01	3.40		72.2	142.7	8.70	25.01	4.63	4.07	
		15:50	5.22		67.2	163.1	9.45	25.01	4.63	4.82	
		17:02	6.42		71.0	163.1	10.15	25.01	4.63	5.52	
		18:09	7.53		--	0.0	15.70	25.01	4.63	11.07	Blower Stopped
		19:10	8.55		90.0	135.9	10.30	25.01	4.63	5.67	
		20:00	9.38		84.2	135.9	10.80	25.01	4.63	6.17	
		23:30	12.88		97.0	135.9	12.00	25.01	4.63	7.37	
	03.31.15	1:00	14.38		95.6	129.1	12.50	25.01	4.63	7.87	
		3:33	16.93		107.9	129.1	13.09	25.01	4.63	8.46	
		5:32	18.92		112.0	129.1	13.40	25.01	4.63	8.77	
		7:25	20.80		115.0	122.3	13.75	25.01	4.63	9.12	
		8:53	22.27		116.0	135.9	14.00	25.01	4.63	9.37	
		11:01	24.40		132.0	135.9	13.92	25.01	4.63	9.29	
		12:59	26.37		140.0	145.4	13.80	25.01	4.63	9.17	
		14:58	28.35		130.0	149.5	14.28	25.01	4.63	9.65	
		17:02	30.42		130.0	148.0	17.10	25.01	4.63	12.47	
		18:00	31.38		131.0	106.0	16.72	25.01	4.63	12.09	
		19:03	32.43		132.0	108.0	16.80	25.01	4.63	12.17	
		20:13	33.60		130.0	108.0	16.50	25.01	4.63	11.87	
		21:25	34.80		389.1	--	7.10	25.01	4.63	2.47	End of DPE-3 test
		22:24	35.78		433.6	--	6.90	25.01	4.63	2.27	
		23:20	36.72		381.2	--	6.84	25.01	4.63	2.21	
	04.01.15	0:21	37.73		488.9	--	6.80	25.01	4.63	2.17	

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
PZ-1	03.30.15	8:15	--	31.5	80.3	--	6.41	23.89	6.41	--	
		10:44	0	31.5	2.0	0.0	7.80	23.89	6.41	1.39	Beginning of DPE-3 test
		11:47	1.05		1.4	0.0	8.01	23.89	6.41	1.6	Pulling full vacuum at DPE-3
		12:46	2.03		0.8	0.0	8.05	23.89	6.41	1.64	
		13:44	3.00		--	0.0	8.05	23.89	6.41	1.64	
		15:40	4.93		--	0.0	8.03	23.89	6.41	1.62	
		16:46	6.03		--	0.0	8.03	23.89	6.41	1.62	
		17:45	7.02		--	0.0	7.69	23.89	6.41	1.28	Blower Stopped
		18:48	8.07		--	0.4	8.00	23.89	6.41	1.59	
		20:30	9.77		91.6	0.0	8.14	23.89	6.41	1.73	
		21:29	10.75		282.1	0.4	8.30	23.89	6.41	1.89	
		23:24	12.67		43.5	0.0	8.27	23.89	6.41	1.86	
	03.31.15	1:17	14.55		12.7	0.0	8.24	23.89	6.41	1.83	
		3:30	16.77		33.2	0.0	8.20	23.89	6.41	1.79	
		5:28	18.73		7.1	0.0	8.15	23.89	6.41	1.74	
		7:22	20.63		14.9	0.4	8.10	23.89	6.41	1.69	
		8:37	21.88		15.4	0.3	8.11	23.89	6.41	1.7	
		10:42	23.97		6.5	0.5	8.19	23.89	6.41	1.78	
		13:05	26.35		149.2	0.8	8.14	23.89	6.41	1.73	
		14:42	27.97		5.7	0.0	8.18	23.89	6.41	1.77	
		16:46	30.03		4.5	0.0	8.09	23.89	6.41	1.68	
		17:42	30.97		1.3	0.0	8.08	23.89	6.41	1.67	
		18:47	32.05		0.7	0.0	8.09	23.89	6.41	1.68	
		19:57	33.22		--	--	--	23.89	6.41		End of DPE-3 test

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
PZ-2	03.30.15	8:24	--	31	367.2	--	6.20	18.32	6.20	--	
	03.30.15	10:56	0	31	21.0	0.0	7.39	18.32	6.20	1.19	Beginning of DPE-3 test
		11:53	0.95		0.4	0.3	7.54	18.32	6.20	1.34	Pulling full vacuum at DPE-3
		12:52	1.93		0.3	0.4	7.61	18.32	6.20	1.41	
		13:51	2.92		0.5	0.4	7.63	18.32	6.20	1.43	
		15:37	4.68		0.5	0.5	7.70	18.32	6.20	1.5	
		16:52	5.93		0.4	0.4	7.72	18.32	6.20	1.52	
		17:54	6.97		1.7	0.0	7.44	18.32	6.20	1.24	Blower Stopped
		18:56	8.00		0.5	0.8	7.74	18.32	6.20	1.54	
		20:21	9.42		0.0	0.7	7.82	18.32	6.20	1.62	
		21:24	10.47		0.0	0.8	7.92	18.32	6.20	1.72	
		23:16	12.33		0.0	0.8	7.95	18.32	6.20	1.75	
	03.31.15	1:12	14.27		0.0	0.6	7.96	18.32	6.20	1.76	
		3:28	16.53		0.0	0.9	8.00	18.32	6.20	1.8	
		5:22	18.43		0.0	0.9	7.92	18.32	6.20	1.72	
		7:20	20.40		0.0	0.9	7.95	18.32	6.20	1.75	
		8:43	21.78		0.0	1.1	7.95	18.32	6.20	1.75	
		10:50	23.90		0.0	1.4	8.00	18.32	6.20	1.8	
		12:45	25.82		0.0	1.4	7.97	18.32	6.20	1.77	
		14:48	27.87		0.0	1.4	7.98	18.32	6.20	1.78	
		16:52	29.93		0.1	1.3	7.95	18.32	6.20	1.75	
		17:48	30.87		0.0	1.1	7.93	18.32	6.20	1.73	
		18:53	31.95		0.0	1.1	7.95	18.32	6.20	1.75	
		20:05	33.15		0.0	1.1	7.96	18.32	6.20	1.76	End of DPE-3 test
		21:16	34.33		0.2	--	7.00	18.32	6.20	0.8	
		22:16	35.33		1.5	--	6.85	18.32	6.20	0.65	
		23:12	36.27		8.6	--	6.78	18.32	6.20	0.58	
	04.01.15	0:13	37.28		19.5	--	6.74	18.32	6.20	0.54	

TABLE 4
Monitoring Well Network Data – Pilot Test DPE-3
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
PZ-3	03.30.15	8:33	--	10	737.5	--	5.54	18.32	5.54	--	
	03.30.15	11:02	0	10	16.9	0.4	9.02	18.32	5.54	3.48	Beginning of DPE-3 test
		12:00	0.97		0.9	1.0	9.18	18.32	5.54	3.64	Pulling full vacuum at DPE-3
		13:01	1.98		0.6	1.0	9.18	18.32	5.54	3.64	
		13:57	2.92		0.5	1.0	9.19	18.32	5.54	3.65	
		15:33	4.52		0.6	1.0	9.18	18.32	5.54	3.64	
		16:58	5.93		0.7	1.1	9.18	18.32	5.54	3.64	
		18:03	7.02		1.7	0.0	8.07	18.32	5.54	2.53	Blower Stopped
		19:05	8.05		0.5	1.3	9.13	18.32	5.54	3.59	
		20:33	9.52		0.5	1.3	9.25	18.32	5.54	3.71	
		21:35	10.55		0.0	0.9	9.36	18.32	5.54	3.82	
		23:28	12.43		0.0	1.1	9.28	18.32	5.54	3.74	
	03.31.15	1:21	14.32		0.0	0.9	9.31	18.32	5.54	3.77	
		3:35	16.55		0.0	1.3	9.30	18.32	5.54	3.76	
		5:31	18.48		0.0	0.9	9.20	18.32	5.54	3.66	
		7:24	20.37		0.1	1.3	9.16	18.32	5.54	3.62	
		8:49	21.78		0.0	1.4	9.19	18.32	5.54	3.65	
		10:58	23.93		0.0	1.9	9.21	18.32	5.54	3.67	
		12:53	25.85		0.0	2.0	9.16	18.32	5.54	3.62	
		14:54	27.87		0.1	2.1	9.15	18.32	5.54	3.61	
		16:58	29.93		0.1	1.4	9.12	18.32	5.54	3.58	
		17:56	30.90		0.1	1.3	9.03	18.32	5.54	3.49	
		18:59	31.95		0.0	0.6	9.02	18.32	5.54	3.48	
		20:11	33.15		0.0	0.7	9.02	18.32	5.54	3.48	End of DPE-3 test
		21:22	34.33		2.7	--	6.10	18.32	5.54	0.56	
		22:22	35.33		12.9	--	5.95	18.32	5.54	0.41	
		23:18	36.27		23.7	--	6.16	18.32	5.54	0.62	
	04.01.15	0:19	37.28		24.9	--	6.93	18.32	5.54	1.39	

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Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
AS-1	03.30.15	8:18	--	25	4.7	--	6.35	25	6.35	--	
	03.30.15	10:47	0	25	0.4	0.0	7.84	25	6.35	1.49	Beginning of DPE-3 test
		11:49	1.03		0.7	0.0	8.05	25	6.35	1.7	Pulling full vacuum at DPE-3
		12:48	2.02		0.7	0.0	8.11	25	6.35	1.76	
		13:46	2.98		1.4	0.0	8.11	25	6.35	1.76	
		15:39	4.87		2.2	0.0	8.17	25	6.35	1.82	
		16:48	6.02		1.3	0.0	8.13	25	6.35	1.78	
		17:48	7.02		0.9	0.0	7.72	25	6.35	1.37	Blower Stopped
		18:50	8.05		1.9	0.0	8.14	25	6.35	1.79	
		20:26	9.65		2.1	0.0	8.28	25	6.35	1.93	
		21:26	10.65		0.8	0.3	8.33	25	6.35	1.98	
		23:20	12.55		0.8	0.0	8.37	25	6.35	2.02	
	03.31.15	1:15	14.47		1.2	0.0	8.35	25	6.35	2	
		3:29	16.70		0.8	0.0	8.32	25	6.35	1.97	
		5:27	18.67		1.0	0.0	8.29	25	6.35	1.94	
		7:21	20.57		0.7	0.0	8.25	25	6.35	1.9	
		8:39	21.87		0.0	0.0	8.29	25	6.35	1.94	
		10:45	23.97		0.2	0.0	8.32	25	6.35	1.97	
		12:41	25.90		0.2	0.0	8.37	25	6.35	2.02	
		14:44	27.95		0.4	0.0	8.32	25	6.35	1.97	
		16:48	30.02		0.2	0.0	8.23	25	6.35	1.88	
		17:44	30.95		0.1	0.0	8.20	25	6.35	1.85	
		18:49	32.03		0.0	0.0	8.21	25	6.35	1.86	
		20:00	33.22		0.4	1.2	8.25	25	6.35	1.9	End of DPE-3 test
		21:13	34.43		1.2	--	7.01	25	6.35	0.66	
		22:13	35.43		0.5	--	6.99	25	6.35	0.64	
		23:09	36.37		1.3	--	6.80	25	6.35	0.45	
	04.01.15	0:10	37.38		0.1	--	6.95	25	6.35	0.6	

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
MW-525	03.30.15	8:36	--	5	117.4	--	5.73	12.45	5.73	--	
	03.30.15	11:05	0	5	242.5	1.5	10.13	12.45	5.73	4.40	Beginning of DPE-3 test
		12:03	0.97		0.4	3.7	10.22	12.45	5.73	4.49	Pulling full vacuum at DPE-3
		13:03	1.97		0.3	5.7	10.05	12.45	5.73	4.32	
		13:59	2.90		0.3	6.0	9.94	12.45	5.73	4.21	
		15:32	4.45		0.3	6.2	9.95	12.45	5.73	4.22	
		17:00	5.92		0.3	4.0	9.97	12.45	5.73	4.24	
		18:06	7.02		2.4	0.0	8.55	12.45	5.73	2.82	Blower Stopped
		19:08	8.05		0.3	6.3	9.78	12.45	5.73	4.05	
		20:31	9.43		0.5	3.9	10.00	12.45	5.73	4.27	
		21:32	10.45		0.1	5.5	9.98	12.45	5.73	4.25	
		23:26	12.35		0.0	5.6	9.91	12.45	5.73	4.18	
	03.31.15	1:20	14.25		0.0	3.2	10.10	12.45	5.73	4.37	
		3:32	16.45		0.0	5.7	9.85	12.45	5.73	4.12	
		5:30	18.42		12.1	3.9	9.89	12.45	5.73	4.16	
		7:24	20.32		0.0	4.9	9.83	12.45	5.73	4.10	
		8:51	21.77		0.0	5.2	9.75	12.45	5.73	4.02	
		11:00	23.92		0.0	8.2	9.74	12.45	5.73	4.01	
		12:56	25.85		0.0	8.4	9.59	12.45	5.73	3.86	
		14:56	27.85		0.0	8.2	9.68	12.45	5.73	3.95	
		17:00	29.92		0.0	6.6	9.62	12.45	5.73	3.89	
		17:58	30.88		0.0	6.2	9.58	12.45	5.73	3.85	
		19:01	31.93		0.0	6.1	9.56	12.45	5.73	3.83	
		20:12	33.12		0.0	6.1	9.54	12.45	5.73	3.81	End of DPE-3 test
		21:23	34.30		3.8	--	6.25	12.45	5.73	0.52	
		22:23	35.30		385.5	--	6.25	12.45	5.73	0.52	
		23:19	36.23		294.1	--	6.80	12.45	5.73	1.07	
	04.01.15	0:20	37.25		196.6	--	6.10	12.45	5.73	0.37	

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
MW-531	03.30.15	8:12	--	57	0.2	--	7.18	12.84	7.18	--	
	03.30.15	10:41	0	57	0.3	0.0	7.23	12.84	7.18	0.05	Beginning of DPE-3 test
		11:45	1.07		0.2	0.0	7.23	12.84	7.18	0.05	Pulling full vacuum at DPE-3
		12:45	2.07		0.2	0.0	7.23	12.84	7.18	0.05	
		13:42	3.02		0.2	0.0	7.24	12.84	7.18	0.06	
		15:43	5.03		0.2	0.0	7.22	12.84	7.18	0.04	
		16:44	6.05		0.4	0.0	7.21	12.84	7.18	0.03	
		17:42	7.02		1.0	0.0	7.21	12.84	7.18	0.03	Blower Stopped
		18:45	8.07		0.2	0.0	7.24	12.84	7.18	0.06	
		20:31	9.83		0.3	0.0	7.26	12.84	7.18	0.08	
		21:37	10.93		0.4	0.0	7.29	12.84	7.18	0.11	
		23:30	12.82		0.2	0.0	7.33	12.84	7.18	0.15	
	03.31.15	1:24	14.72		0.3	0.0	7.34	12.84	7.18	0.16	
		3:40	16.98		0.0	0.0	7.35	12.84	7.18	0.17	
		5:29	18.80		0.5	0.0	7.33	12.84	7.18	0.15	
		7:24	20.72		0.1	0.0	7.29	12.84	7.18	0.11	
		8:35	21.90		0.0	0.0	7.29	12.84	7.18	0.11	
		10:40	23.98		0.0	0.0	7.32	12.84	7.18	0.14	
		12:38	25.95		0.0	0.0	7.33	12.84	7.18	0.15	
		14:40	27.98		0.1	0.0	7.34	12.84	7.18	0.16	
		16:44	30.05		0.0	0.0	7.33	12.84	7.18	0.15	
		17:39	30.97		0.0	0.0	7.30	12.84	7.18	0.12	
		18:45	32.07		0.0	0.0	7.31	12.84	7.18	0.13	
		19:55	33.23		0.0	0.0	7.34	12.84	7.18	0.16	End of DPE-3 test
		21:14	34.55		0.0	--	7.35	12.84	7.18	0.17	
		22:14	35.55		0.0	--	7.35	12.84	7.18	0.17	
		23:10	36.48		0.0	--	7.40	12.84	7.18	0.22	
	04.01.15	0:11	37.50		0.0	--	7.40	12.84	7.18	0.22	

TABLE 4
Monitoring Well Network Data – Pilot Test DPE-3
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Well ID	Date	Time (hh:mm)	Elapsed Time (hr)	Distance from pumped well (ft)	Headspace VOCs (ppmv)	Vacuum ("H2O)	DTW (ft BTOC)	DTB (ft BTOC)	Static DTW (ft BTOC)	Drawdown (ft below Static DTW)	Note
MW-532	03.30.15	8:27	--	40	6.3	--	6.38	12.84	6.38	--	
	03.30.15	10:59	0	40	2.7	0.0	6.95	12.84	6.38	0.57	Beginning of DPE-3 test
		11:56	0.95		2.0	0.0	7.12	12.84	6.38	0.74	Pulling full vacuum at DPE-3
		12:55	1.93		0.9	0.0	7.21	12.84	6.38	0.83	
		13:53	2.90		1.2	0.0	7.28	12.84	6.38	0.9	
		15:36	4.62		3.2	0.0	7.32	12.84	6.38	0.94	
		16:54	5.92		3.1	0.0	7.36	12.84	6.38	0.98	
		17:57	6.97		2.7	0.0	7.29	12.84	6.38	0.91	Blower Stopped
		18:59	8.00		1.4	0.0	7.36	12.84	6.38	0.98	
		20:15	9.27		3.2	0.0	7.43	12.84	6.38	1.05	
		21:22	10.38		1.5	0.0	7.53	12.84	6.38	1.15	
		23:14	12.25		0.9	0.0	7.57	12.84	6.38	1.19	
	03.31.15	1:11	14.20		1.4	0.0	7.60	12.84	6.38	1.22	
		3:25	16.43		0.7	0.0	7.70	12.84	6.38	1.32	
		5:22	18.38		0.8	0.0	7.65	12.84	6.38	1.27	
		7:18	20.32		0.8	0.0	7.63	12.84	6.38	1.25	
		8:45	21.77		0.4	0.0	7.64	12.84	6.38	1.26	
		10:53	23.90		0.1	0.4	7.68	12.84	6.38	1.3	
		12:48	25.82		0.2	0.4	7.67	12.84	6.38	1.29	
		14:50	27.85		1.4	0.4	7.69	12.84	6.38	1.31	
		16:54	29.92		0.3	0.0	7.66	12.84	6.38	1.28	
		17:51	30.87		0.2	0.0	7.62	12.84	6.38	1.24	
		18:55	31.93		0.2	0.0	7.65	12.84	6.38	1.27	
		20:08	33.15		0.3	0.0	7.67	12.84	6.38	1.29	End of DPE-3 test
		21:18	34.32		0.1	--	7.26	12.84	6.38	0.88	
		22:18	35.32		0.6	--	7.10	12.84	6.38	0.72	
		23:14	36.25		1.1	--	6.99	12.84	6.38	0.61	
	04.01.15	0:15	37.27		0.2	--	6.93	12.84	6.38	0.55	

Note:

hh:mm = hour:minute
min = minute
gal = gallon
gpm = gallon per minute
°F = Fahrenheit
ft = feet

DTW = depth to water
DPE = dual phase extraction
"Hg = inches of mercury
"H2O= inches of water
ES = Electric Submersible
scfm = standard cubic feet per minute

ppmv = parts per million by volume
lb = pound
VOCs = Volatile organic compounds

[a]Mass removal rate calculated using average VOCs concentrations between time period for instances following post-dilution concentrations readings
Mass Removal Rate Equation:
((Average VOCs)/1000000)*(Average Volumetric Air Flow Rate))*(1440 min/day)*(1/379 ft3
with: VOCs in ppmv Air flow rate in scfm Mass Removal Rate in lb/day
Vacuum Equation: Vacuum = DPE Vacuum*13.59 with: Vacuum in "H2O DPE Vacuum in "Hg

TABLE 5
System and Extraction Well Data – Pilot Test DPE-1 DPE-2
Chevron Environmental Management Company
Pilot Test Summary Memorandum
Former Unocal Edmonds Bulk Fuel Terminal
Edmonds, Washington

Date	Time (hh:mm)	Elapsed Time Since Last Measurement (min)	Operating Period (cumulative mins)	Cumulative Gallons (totalizer, gal)	Calculated pumping rate (gpm)	Cycle counter (0.65 gallons per cycle)	Manifold Bleed Valve Open	DTW Interface probe (ft)	DPE Vacuum ("Hg)	Blower Inlet Vacuum ("Hg)	Temperature at Measurment point (°F)	Air Flow Meter (scfm)	VOCs (ppmv)	Mass Removal Rate[a] (lb/day)	Cumulative Mass Removed (lb)	Note
DPE-1 test																
02.17.15	12:05	--	--	3513.68	--	263	yes	21.86	23.10	--	--	--	--	--	--	Beginning of test in DPE-1
	13:15	70.00	70	3625.77	1.60	347	50%	21.43	6.00	6.00	64.5	12.46	163.3	0.7	--	
	14:20	65.00	135	3676.12	0.77	435	no	21.23	20.00	20.00	65.7	16.92	191.0	0.9	0.038	
	14:57	37.00	172	--	--	477	no	20.72	20.00	20.00	68.2	17.50	227.0	1.2	0.069	
	16:30	93.00	265	3789.35	1.22	641	no	20.76	20.00	20.00	69.1	26.03	509.0	2.6	0.238	
	17:30	60.00	325	3828.32	0.65	749	no	20.72	20.00	20.00	61.2	36.58	390.0	4.6	0.430	
	18:30	60.00	385	3995.47	2.79	826	no	20.75	20.00	20.00	61.1	82.42	--	8.9	0.800	
	19:30	60.00	445	4035.07	0.66	919	no	20.78	20.50	20.50	58.4	100.11	352.5	8.9	1.170	
	21:00	90.00	535	4087.82	0.59	1001	no	20.77	21.00	20.30	49.0	85.10	377.3	11.1	1.862	
	21:45	45.00	580	4129.01	0.92	1066	no	20.75	20.50	20.10	55.0	102.65	376.4	11.6	2.224	
	22:30	45.00	625	4166.05	0.82	1124	no	20.80	20.50	20.50	52.8	104.20	349.7	12.3	2.608	
	23:30	60.00	685	4215.95	0.83	1198	no	20.75	20.50	20.10	61.2	102.40	631.0	16.6	3.300	
02.18.15	0:30	60.00	745	4279.59	1.06	1277	no	20.80	20.50	20.10	57.2	100.86	422.9	17.5	4.030	
	1:30	60.00	805	4313.62	0.57	1350	no	20.77	20.30	20.00	57.4	123.26	381.3	14.8	4.645	
	2:30	60.00	865	4363.01	0.82	1426	no	20.76	20.50	20.10	60.9	111.58	682.6	20.5	5.498	
	3:30	60.00	925	4426.53	1.06	1504	no	20.80	20.50	20.10	61.3	113.42	621.4	24.0	6.499	
	4:30	60.00	985	4468.11	0.69	1573	no	20.78	20.50	20.10	54.7	122.47	681.5	25.2	7.547	
	5:30	60.00	1045	4518.10	0.83	1650	no	20.80	20.50	20.10	56.9	125.10	704.1	28.1	8.717	
	6:30	60.00	1105	4554.40	0.60	1722	no	20.78	20.50	20.10	59.1	118.86	355.2	21.2	9.599	
	7:35	65.00	1170	4605.99	0.79	1800	no	20.75	20.50	20.10	58.4	127.52	346.7	14.2	10.238	
	8:30	55.00	1225	4682.17	1.39	1919	no	20.72	25.00	25.00	67.8	83.72	426.1	13.4	10.749	
	10:30	120.00	1345	4756.50	0.62	2033	no	20.72	20.50	20.00	73.6	112.45	465.0	14.3	11.941	
	12:30	120.00	1465	4762.81	0.05	2215	no	24.93	21.50	21.00	72.6	106.60	418.0	15.8	13.261	
	14:30	120.00	1585	4823.06	0.50	2314	no	24.95	21.00	20.30	74.7	115.16	405.0	14.9	14.507	
	16:30	120.00	1705	4929.53	0.89	2470	no	24.96	22.00	21.50	68.6	116.02	384.0	14.9	15.751	
	18:30	120.00	1825	5011.34	0.68	2617	no	24.95	22.00	21.00	67.4	118.43	424.0	15.5	17.044	
	20:30	120.00	1945	5104.55	0.78	2767	no	24.93	21.50	21.00	69.8	116.59	426.4	16.4	18.407	
	22:30	120.00	2065	5201.95	0.81	2924	no	24.78	21.50	21.00	66.5	113.74	473.5	17.0	19.822	
02.19.15	0:30	120.00	2185	5393.92	1.60	3070	no	24.81	22.00	20.50	65.8	128.16	416.7	17.6	21.291	
	2:30	120.00	2305	5499.91	0.88	3224	no	24.80	22.00	21.00	64.0	121.40	459.1	17.9	22.782	
	4:30	120.00	2425	5576.27	0.64	3365	no	24.88	21.50	21.00	65.4	102.75	476.2	17.2	24.213	
	6:30	120.00	2545	5665.65	0.74	3507	no	24.85	21.50	20.60	64.2	113.90	483.6	17.0	25.632	
	8:30	120.00	2665	5783.17	0.98	3698	no	24.94	21.50	21.00	65.7	118.33	384.0	16.5	27.006	End of test in DPE-1
DPE-2 test																
02.19.15	14:00	330.00	2995	6042.22	--	4190	no	11.00	6.00	6.00	53.9	38.11	70.0	0.9	27.207	Beginning of test in DPE-2
	15:30	90.00	3085	6603.76	6.24	5096	no	11.20	6.00	6.00	54.8	43.80	90.1	1.1	27.274	VOCs reading was post-dilution
	19:30	240.00	3325	7917.00	5.47	Switch to ES	yes	18.50	13.50	12.60	54.8	86.58	74.9	1.8	27.567	Use Grundfoss, VOCs reading was post-dilution
	20:30	60.00	3385	8432.00	8.58	--	50%	18.75	13.50	12.90	69.0	92.13	399.4	12.1	28.069	
	21:30	60.00	3445	8942.00	8.50	--	50%	18.60	14.50	13.50	57.4	82.69	426.8	11.8	28.562	
	22:30	60.00	3505	9451.00	8.48	--	50%	18.40	14.00	13.20	56.5	81.71	380.7	10.9	29.015	
	23:30	60.00	3565	9933.00	8.03	--	50%	18.40	14.00	12.90	59.8	81.34	--	10.1	29.435	
02.20.15	0:30	60.00	3625	10439.00	8.43	--	50%	18.50	14.00	13.20	60.4	87.57	356.0	10.1	29.855	
	1:30	60.00	3685	10800.00	6.02	--	50%	18.80	14.00	13.00	61.1	89.40	371.8	10.5	30.294	
	2:30	60.00	3745	11325.00	8.75	--	50%	18.80	14.00	13.10	62.9	82.31	490.1	12.1	30.799	
	3:30	60.00	3805	11778.00	7.55	--	50%	18.30	14.00	13.10	63.9	86.52	--	12.7	31.327	
	4:30	60.00	3865	12221.00	7.38	--	50%	18.50	14.00	13.00	64.1	88.41	411.9	12.7	31.855	
	5:30	60.00	3925	12677.00	7.60	--	50%	18.40	14.00	13.10	63.8	91.43	426.5	12.3	32.369	
	6:30	60.00	3985	13000.00	5.38	--	50%	18.55	14.00	13.10	64.5	89.40	426.8	12.6	32.895	
	7:30	60.00	4045	13548.00	9.13	--	50%	18.35	14.00	13.00	65.2	83.59	--	11.6	33.379	
	8:00	30.00	4075	13895.00	11.57	--	50%	19.25	14.00	13.00	62.7	84.63	--	11.6	33.621	
	9:00	60.00	4135	14250.40	5.92	--	50%	19.63	14.00	13.20	58.4	89.60	390.0	11.6	34.105	
	10:00	60.00	4195	14883.00	10.54	--	50%	19.35	15.00	15.00	52.8	85.48	--	10.6	34.547	
	12:00	120.00	4315	15472.00	4.91	--	50%	21.45	14.00	14.50	53.3	84.55	359.0	10.0	35.380	
	14:00	120.00	4435	16367.00	7.46	--	50%	21.92	14.50	15.00	54.7	87.70	370.0	10.3	36.237	
	16:00	120.00	4555	17392.00	8.54	--	50%	19.00	18.00	18.00	52.1	105.08	245.0	9.7	37.046	
	18:00	120.00	4675	18287.00	7.46	--	50%	20.93	18.00	18.00	50.9	117.36	316.0	10.2	37.897	
	20:00	120.00	4795	19123.00	6.97	--	30%	22.00	18.80	18.80	62.4	62.14	310.0	9.2	38.664	
	22:00	120.00	4915	19925.00	6.68	--	30%	22.00	18.20	18.20	61.8	64.50	296.0	6.3	39.188	
02.21.15	0:00	120.00	5035	20762.00	6.98	--	30%	22.00	16.40	15.50	62.7	73.46	156.0	5.1	39.613	
	2:00	120.00	5155	21621.00	7.16	--	30%	22.00	18.00	17.20	61.0	62.42	369.0	5.8	40.100	
	4:00	120.00	5275	22411.00	6.58	--	30%	22.00	18.00	17.70	63.4	66.21	313.0	7.2	40.699	
	6:00	120.00	5395	23325.00	7.62	--	20%	17.72	20.00	20.00	60.0	51.26	374.3	6.6	41.249	
	8:00	120.00	5515	24253.00	7.73	--	20%	19.18	19.50	20.00	58.5	52.05	175.5	4.7	41.637	
	10:00	120.00	5635	25163.00	7.58	--	20%	18.90	19.75	20.00	51.6	62.90	216.7	3.7	41.945	End of test in DPE-2

Note:

hh:mm = hour:minute
min = minute
gal = gallon
gpm = gallon per minute
°F = Fahrenheit

ft = feet
DTW = depth to water
DPE = dual phase extraction
"Hg = inches of mercury
ES = Electric Submersible

scfm = standard cubic feet per minute
ppmv = parts per million by volume
lb = pound
VOCs = Volatile organic compounds

[a]Mass removal rate calculated using average VOCs concentrations between time period for instances following post-dilution concentrations readings
Mass Removal Rate Equation:
((Average VOCs)/1000000)*(Average Volumetric Air Flow Rate))*(1440 min/day)*(1/379 ft3 air/mole)*(86.2lb/lb mole)
with: VOCs in ppmv Air flow rate in scfm Mass Removal Rate in lb/day

Date	Time (hh:mm)	Elapsed Time Since Last Measurement (min)	Operating Period (cumulative hrs)	Cumulative Gallons (totalizer, gal)	Calculated pumping rate (gpm)	Manifold Bleed Valve Open	DTW Interface probe (ft)	DPE Vacuum ("Hg)	Blower Inlet Vacuum ("Hg)	Temperature at Measurment point (°F)	Air Flow Meter (scfm)	VOCs (ppmv)	Mass Removal Rate[a] (lb/day)	Cumulative Mass Removed (lb)	Note
DPE-3 test															
03.30.15	9:00	--	--	25808.11			4.63								
	11:00	120	0	27049.11	225.41	no	8.50	10.5	13.50	61.2	100	35	1.1	0.096	Beginning of test
	12:00	60	1	27594.11	9.08	no	7.60	10.5	14.00	58.9	95	51	1.4	0.153	
	13:00	60	2	28001.11	6.78	no	8.20	10.5	14.00	57.5	95	60	1.7	0.225	
	14:00	60	3	28802.11	13.35	no	8.85	10.5	14.00	59.8	95	68	2.0	0.308	
	16:00	120	5	29806.11	8.37	no	9.65	12.0	14.00	61.9	97	69	2.2	0.487	
	17:00	60	6	30471.11	11.08	no	10.10	12.0	13.80	63.5	97	78	2.3	0.584	
	18:00	60	7	31075.11	10.07	no	14.00	0.0	0.00	--	--	--	2.8	0.702	SVE System restarting but pumping continued
	19:00	60	8	31696.94	10.36	no	10.30	10.0	13.50	63.1	97	100	2.8	0.820	
	20:00	60	9	32219.00	8.70	no	10.80	10.0	13.80	57.6	97	100	3.2	0.952	
	21:00	60	10	32982.00	12.72	no	11.30	10.0	13.80	55.5	97	90	3.0	1.078	
	23:00	120	12	34168.00	9.88	no	11.90	9.5	13.80	55.4	97	111	3.2	1.344	
03.31.15	1:00	120	14	35359.00	9.93	no	12.50	9.5	13.80	55.9	97	109	3.5	1.636	
	3:00	120	16	36582.00	10.19	no	--	9.5	13.80	54.2	97	115	3.6	1.932	
	5:00	120	18	37767.11	9.88	no	13.40	9.5	13.80	55.1	97	112	3.6	2.233	
	7:00	120	20	38826.11	8.83	no	13.75	9.0	13.80	53.4	97	115	3.6	2.533	
	9:00	120	22	39907.11	9.01	no	13.95	9.0	13.80	56.1	99	116	3.7	2.842	
	11:00	120	24	41200.11	10.78	no	13.95	10.0	14.20	55.2	99	132	4.0	3.177	
	13:00	120	26	42366.11	9.72	no	13.80	10.7	14.50	55.9	81	140	4.0	3.511	
	15:00	120	28	43508.11	9.52	no	14.20	11.0	14.40	61.7	77	130	3.5	3.802	
	17:00	120	30	44694.11	9.88	no	17.12	8.00	10.70	56.7	45	130	2.6	4.019	Reduced well head vacuum
	18:00	60	31	45266.11	9.53	no	16.72	8.00	10.90	56.0	46	131	1.9	4.100	
	19:00	60	32	45820.00	9.23	no	16.40	8.00	10.80	54.2	45	132	2.0	4.181	
	20:00	60	33	46460.00	10.67	no	16.50	8.00	10.90	54.7	45	130	1.9	4.262	

Note:

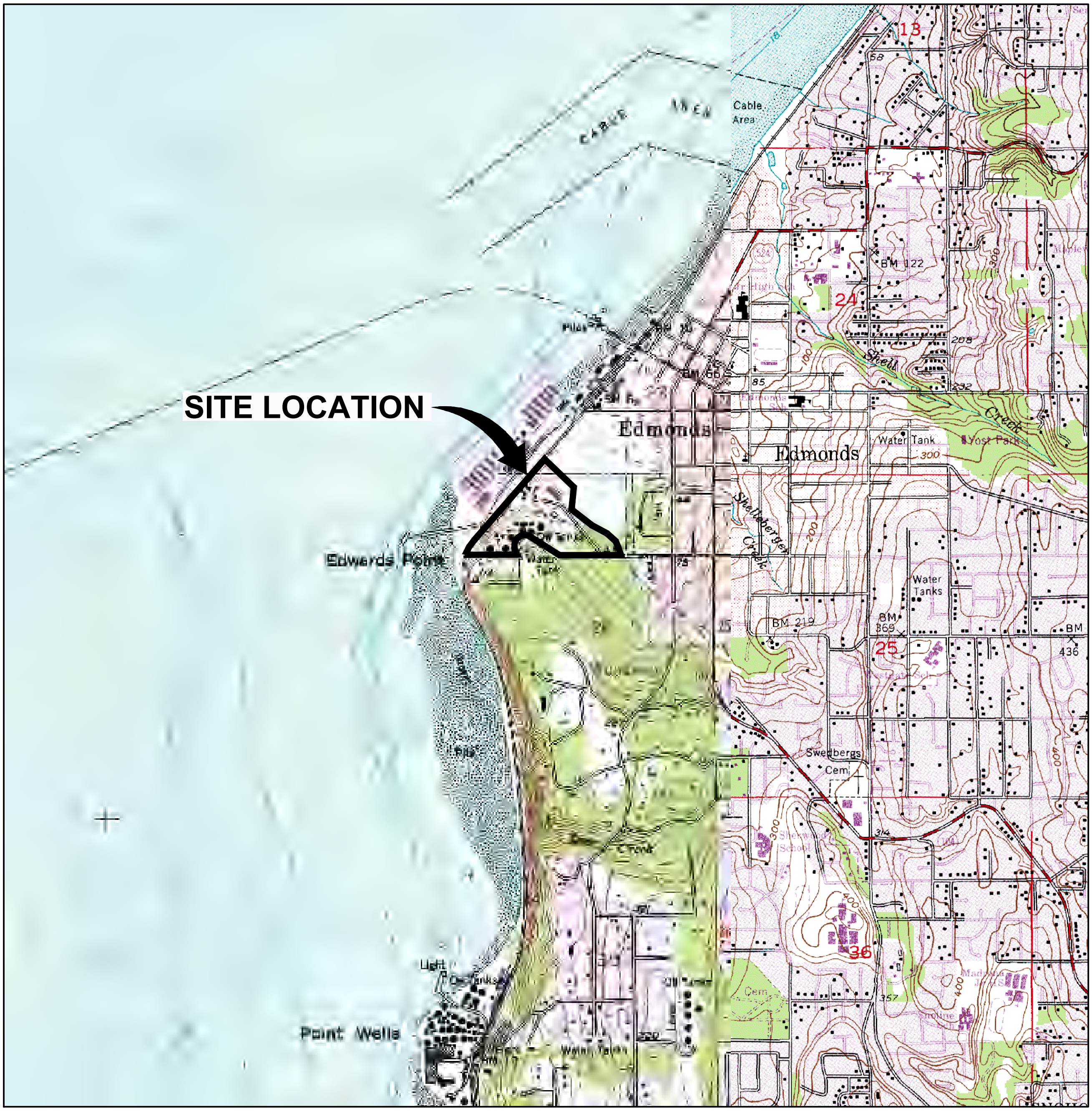
hh:mm = hour:minute
gal = gallon
gpm = gallon per minute
°F = Fahrenheit

ft = feet
DTW = depth to water
"Hg = inches of mercury
ES = Electric Submersible

scfm = standard cubic feet per minute
ppmv = parts per million by volume
VOCs = Volatile organic compounds
SVE = Soil Vapor Extraction

[a]Mass removal rate calculated using average VOCs concentrations between time period for instances following post-dilution concentrations readings
Mass Removal Rate Equation:
((Average VOCs)/1000000)*(Average Volumetric Air Flow Rate))*(1440 min/day)*(1/379 ft3 air/mole)*(86.2lb/lb mole)
with: VOCs in ppmv Air flow rate in scfm Mass Removal Rate in lb/day

Figures



REFERENCE: USGS QUADS., 7.5 MIN. SERIES (TOPOGRAPHIC) - EDMONDS EAST, WASH. AND EDMONDS WEST, WASH.

0 0.5 1.0

Approximate Scale: 1"=0.5 Miles

WASHINGTON

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
PILOT TEST SUMMARY MEMORANDUM

SITE LOCATION MAP

ARCADIS

FIGURE
1

CITY:SYRACUSE, NY DIV/GROUP: IMDV/CAD DB: K.SARTORI PM: TM: TR:A.PATEL LYR:(OPT)ON=*;OFF=REF
G:\ENVCAD\Minneapolis-MN\ACT\B0045362\0006\00003\DWG\45362G01.dwg LAYOUT: 1 SAVED: 3/3/2016 4:12 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/3/2016 4:13 PM BY: OBERLANDER, ROSEANNE
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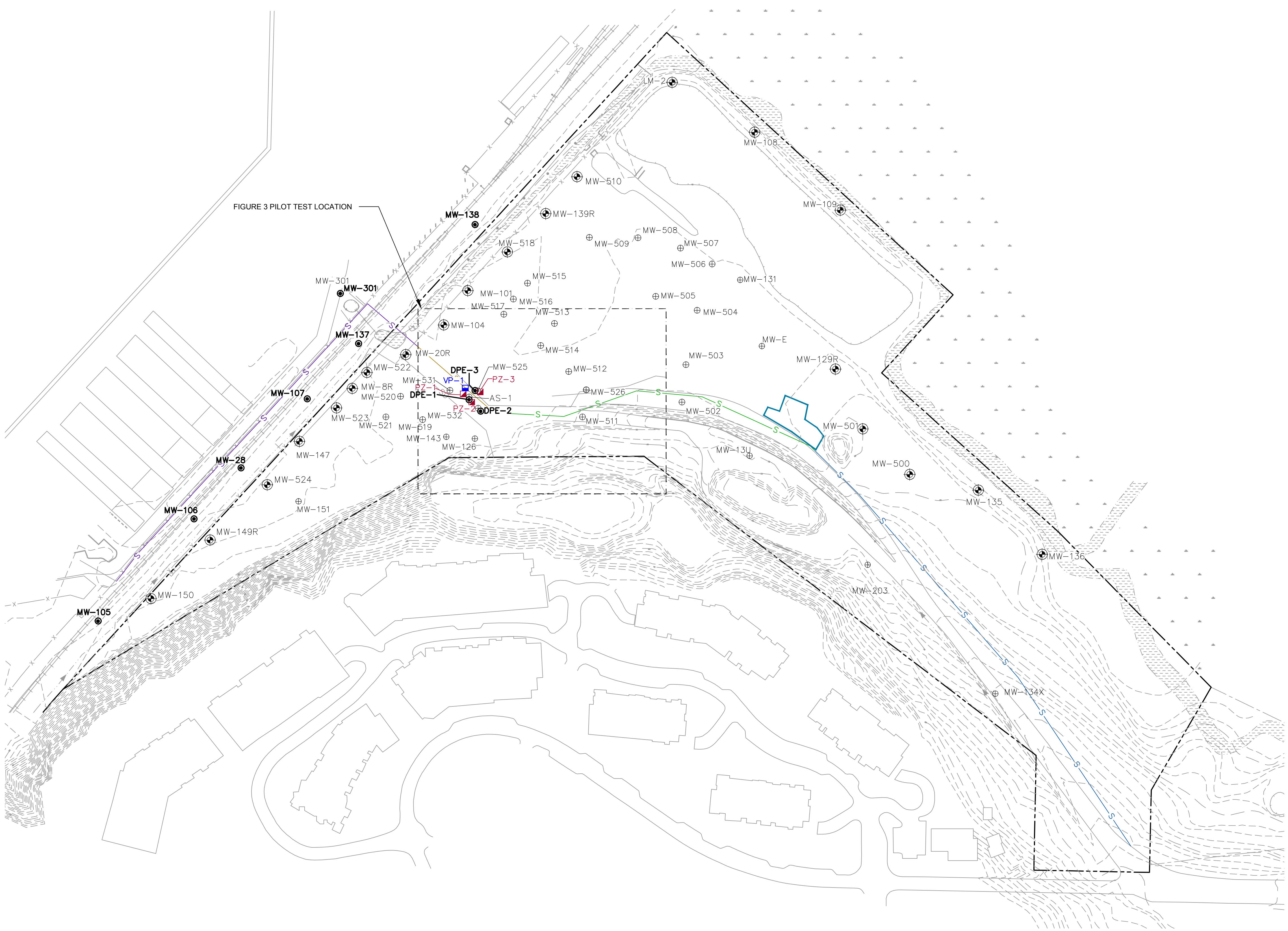
EDMOND-W.TIF



LEGEND:

DPE-1	DPE WELL LOCATION
MW-203	INTERIOR MONITORING WELL LOCATION AND DESIGNATION
MW-108	PERIMETER MONITORING WELL LOCATION
PZ-1	PIEZOMETER WELL LOCATION
VP-1	SOIL VAPOR PROBE / SAMPLING LOCATION
	PROPERTY BOUNDARY
S	WSDOT STORMWATER LINE
SD	POINT EDWARDS STORM DRAIN LINE

NOTES:

1. BUILDING AND ROAD INFORMATION DIGITIZED FROM GOOGLE EARTH AERIAL PHOTO. TOPOGRAPHIC CONTOURS WERE OBTAINED FROM AN UNKNOWN SOURCE. ALL LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD BY CONTRACTOR PRIOR TO CONSTRUCTION.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
VERTICAL DATUM: N.A.V.D. 88
UNITS: U.S. SURVEY FEET
HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. LOCATION OF EXISTING POWER SUPPLY PANEL HAS NOT BEEN SURVEYED.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

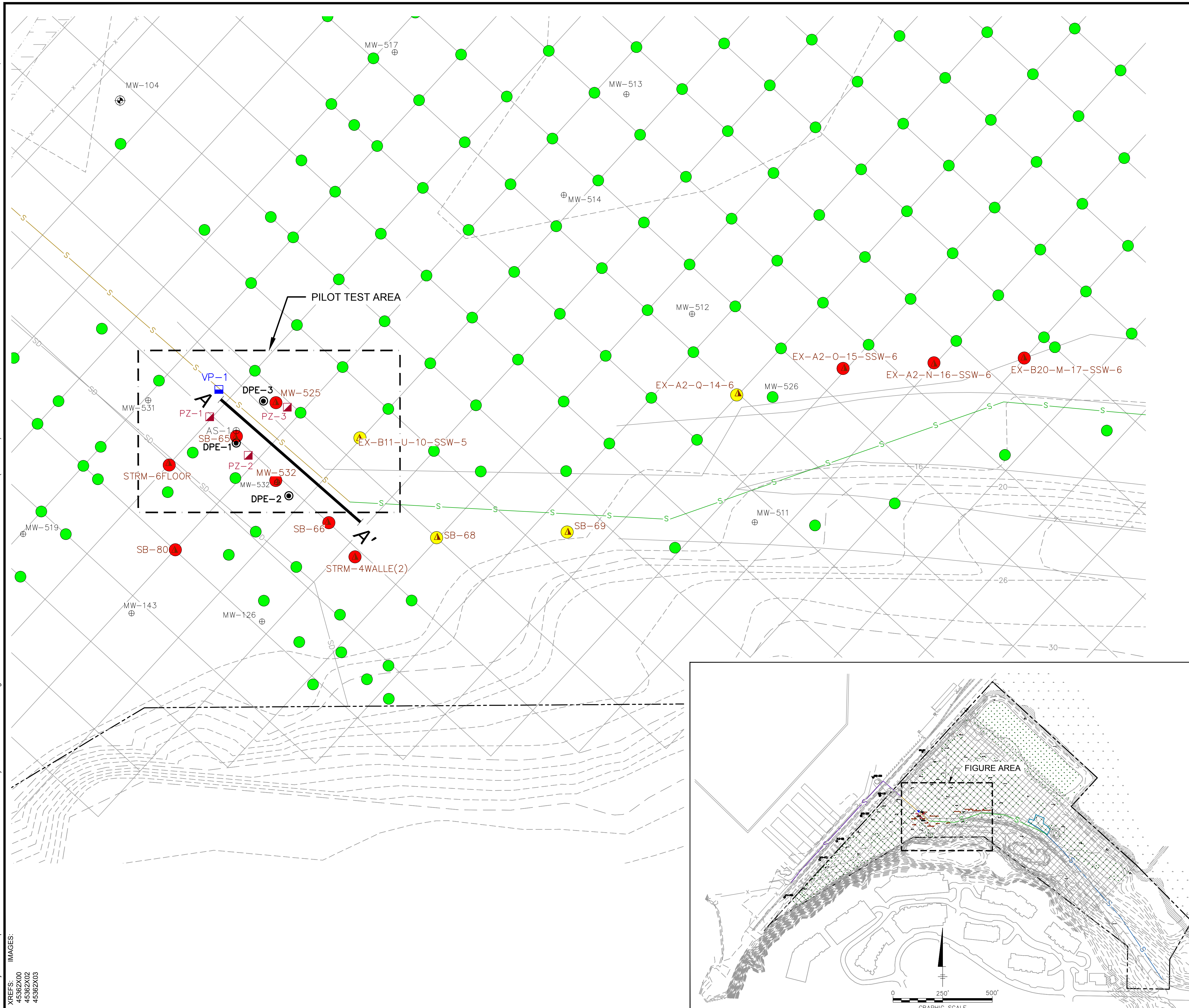
PILOT TEST SUMMARY MEMORANDUM

SITE MAP

ARCADIS

FIGURE
2

CITY:SYRACUSE-NY DIV/GROUP:ENVCAD DB:G.STEINBERGER LD: PIC:M.FLEISCHNER PM:S.ZORN TM:P.CAMPBELL LYR:(Opt)ON=*;OFF=*REF* C:\Users\jharris\Desktop\ENVCAD\B0045362\0006\00003\Pilot Test Summary Memo\DWG\45362G02.dwg LAYOUT: 2 SAVED: 2/22/2016 3:43 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: SETUP1 PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/3/2016 2:14 PM BY: HARRIS, JESSICA
XREFS: 45362X00 45362X02 45362X03 IMAGES:



LEGEND:

DPE-1	DPE WELL LOCATION
MW-203	INTERIOR MONITORING WELL LOCATION AND DESIGNATION
MW-108	PERIMETER MONITORING WELL LOCATION
PZ-1	PIEZOMETER WELL LOCATION
VP-1	SOIL VAPOR PROBE / SAMPLING LOCATION
	PROPERTY BOUNDARY
S	WSDOT STORMWATER LINE
SD	POINT EDWARDS STORM DRAIN LINE
A'—A'	CROSS SECTION A-A'
	SOIL SAMPLE LOCATION WITH ANALYTE CONCENTRATIONS EXCEEDING SITE CULs OR RELs
	SOIL SAMPLE LOCATION WITH ANALYTE CONCENTRATIONS EXCEEDING TWICE THE CUL
	SOIL SAMPLE LOCATION WITH ANALYTE CONCENTRATIONS LESS THAN SOIL CULs/RELs

NOTES:

1. BUILDING AND ROAD INFORMATION DIGITIZED FROM GOOGLE EARTH AERIAL PHOTO. TOPOGRAPHIC CONTOURS WERE OBTAINED FROM AN UNKNOWN SOURCE. ALL LOCATIONS ARE APPROXIMATE AND SHALL BE VERIFIED IN THE FIELD BY CONTRACTOR PRIOR TO CONSTRUCTION.
2. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE (NAD 83/98).
   VERTICAL DATUM: N.A.V.D. 88
   UNITS: U.S. SURVEY FEET
   HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK (VRSN).
3. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
4. LOCATION OF EXISTING POWER SUPPLY PANEL HAS NOT BEEN SURVEYED.

0 20' 40'
GRAPHIC SCALE

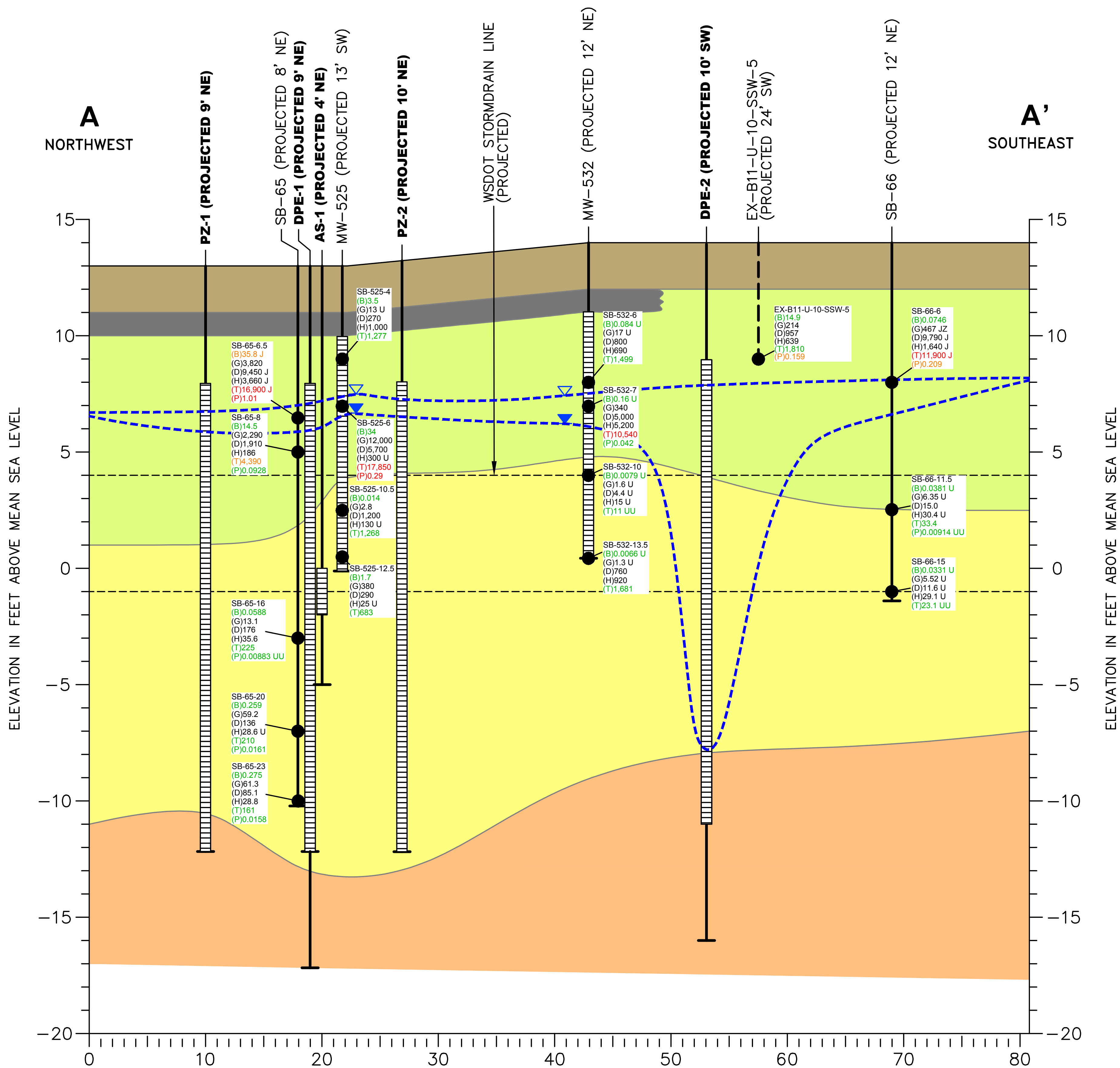
CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
PILOT TEST SUMMARY MEMORANDUM

PILOT TEST LAYOUT

ARCADIS

FIGURE
3

CITY:SYRACUSE-NY DIV/GROUP:ENVCAD DB:G.STEINBERGER LD: PIC:M.FLEISCHNER PM:S.ZORN TM:P.CAMPBELL LYR:(Opt)ON=*;OFF=*REF* ACADVER: 19.1S (LMS TECH) PAGESETUP: C-LD2B-PDF-CONV PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 3/3/2016 2:15 PM BY: HARRIS, JESSICA
C:\Users\jharris\Desktop\ENVCAD\B0045362\0006\00003\Pilot Test Summary Memo\DWG\45362G03.dwg LAYOUT: 3 SAVED: 2/29/2016 10:57 AM
XREFS: IMAGES:
45362X00
45362X02
45362X03



LEGEND:

MW-532 (PROJECTED 12' NE) — WELL OR BORING ID, PROJECTED DISTANCE AND DIRECTION **(BOLD REPRESENTS AS/DPE WELLS)**

GROUND SURFACE

HISTORICAL HIGH WATER LEVEL

DPE PILOT TEST STATIC WATER LEVEL AND DRAW DOWN AT ~80 HOURS OF PUMPING

HISTORICAL LOW WATER LEVEL

LITHOLOGIC CONTACT (DASHED WHERE INFERRED)

SB-532-7 (B)0.16 U (G)340 (D)5,000 (H)5,200 (T)10,540 (P)0.042 — SAMPLE ID AND DEPTH
B = BENZENE (mg/kg)
G = GASOLINE RANGE ORGANICS (mg/kg)
D = DIESEL RANGE ORGANICS (mg/kg)
H = HEAVY RANGE ORGANICS (mg/kg)
T = TOTAL HYDROCARBONS (mg/kg)
P = TOTAL PAHs (mg/kg)

SCREENED INTERVAL

BOTTOM OF BORING

ASPHALT
SAND/GRAVEL BACKFILL
SILTY SAND WITH GRAVEL (1929 FILL) MEDIUM TO FINE, LOW PLASTIC FINES
SILTY SAND, FINE TO VERY FINE
FINE TO VERY FINE SAND

(12' NE)= OFFSET DISTANCE FROM CROSS SECTION
PAH POLYNUCLEAR AROMATIC HYDROCARBONS
mg/kg MILLIGRAMS PER KILOGRAM
NE NORTHEAST
SW SOUTHWEST
CUL CLEANUP LEVEL

SOIL CLEANUP LEVELS	
BENZENE = 18 mg/kg	GREEN = BELOW CUL
TPH = 2,775 mg/kg	ORANGE = ABOVE CUL
TOTAL CPAHs = 0.14 mg/kg	RED = >2x CUL

VERTICAL EXAGGERATION: 2x

0 5' 10'
VERTICAL SCALE

0 10' 20'
HORIZONTAL SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
PILOT TEST SUMMARY MEMORANDUM

DPE CROSS SECTION A-A'

ARCADIS

FIGURE
4

Attachment A

Boring Logs

Date Start/Finish: 2/10/2015
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 10" Outer Diameter
Rig Type: Truck Mounted
Sampling Method: Split Spoon

Northing: NE
Easting: NE
Casing Elevation: NE

Borehole Depth: 30' bgs
Surface Elevation: NE

Descriptions By: SLM

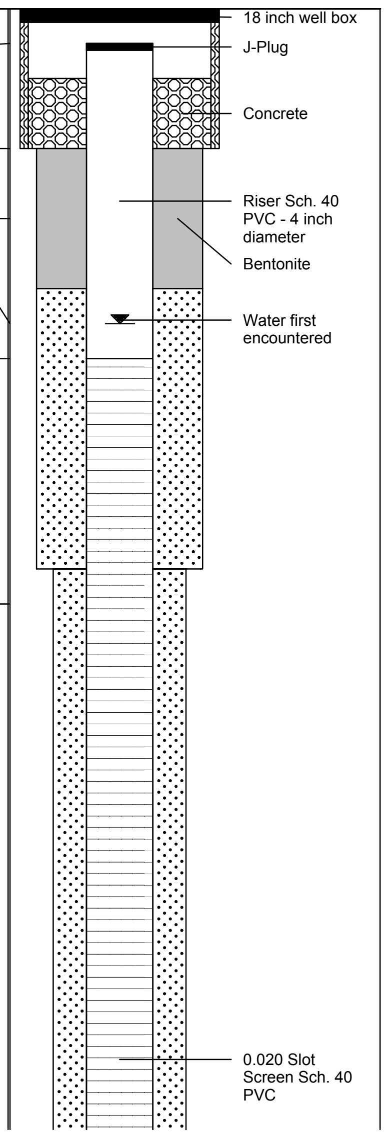
Well/Boring ID: **DPE-1**

Client: Chevron EMC

Location: Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description
0	0										Topsoil
											Fill
			2-2.5	0	NA	NA	NA				No recovery, 12 inches of asphalt
		HA	4.5 - 5	.5	NA	NA	162.9		SM		Silty Sand, medium to fine sand, trace small gravel, well graded, dark brown, wet, HCLO
5	-5										
		HA	7-7.5	0	NA	NA	NA				No recovery, too wet for hand auger
		1	8.5 -10	1.0	1 1 1	2	730.1				Sand, medium grain, poorly graded, dark brown, wet, HCLO
10	-10										
		2	11-12.5	0	NA	NA	NA				Sample interval missed by driller
									SP		
		3	13.5 -15	1.5	1 2 1	3	296				Same As Above at the 10 foot interval
15	-15										

Well/Boring Construction



ARCADIS
Infrastructure, Water, Environment, Buildings

Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Project Number:B0045362
Data File:
Date: 5/20/2015 Created/Edited by:RwL

Date Start/Finish: 2/10/2015
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 10" Outer Diameter
Rig Type: Truck Mounted
Sampling Method: Split Spoon

Northing: NE
Easting: NE
Casing Elevation: NE

Borehole Depth: 30' bgs
Surface Elevation: NE

Descriptions By: SLM

Well/Boring ID: DPE-1

Client: Chevron EMC

Location: Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	16-17.5	1.5	1 1 1	2	463				Same As Above	
		5	18.5-20	1.5	1 2 2	4	343		SP		Sand, medium to fine grain, poorly graded, silt seam at 19 feet, dark brown, wet, HCLO	#2/12 Sand
20	-20											
		6	21-22.5	1.5	2 2 1	3	421		SP		Sand, medium to fine grain, poorly graded, dark brown, wet, HCLO, noticible sheen	
		7	23.5-25	1.5	1 1 1	2	359				Same As Above	
25	-25											
		8	26-27.5	0	NA	NA	NA				No recovery due to well heaving - the driller inserted a well plug	
		9	27.5-29	1.5	NA	NA	582		CM		Clay and Silt, dense, woody debris, dark brown, wet, no odor	Sump Sch. 40 PVC
		10	29-30	1.0	NA	NA	582				Same as Above, the bottom two intervals were combined and screened	
30	-30											

ARCADIS
Infrastructure, Water, Environment, Buildings

Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 2/10/2015
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 10" Outer Diameter
Rig Type: Truck Mounted
Sampling Method: Split Spoon

Northing: NE
Easting: NE
Casing Elevation: NE

Borehole Depth: 30' bgs
Surface Elevation: NE

Descriptions By: SLM

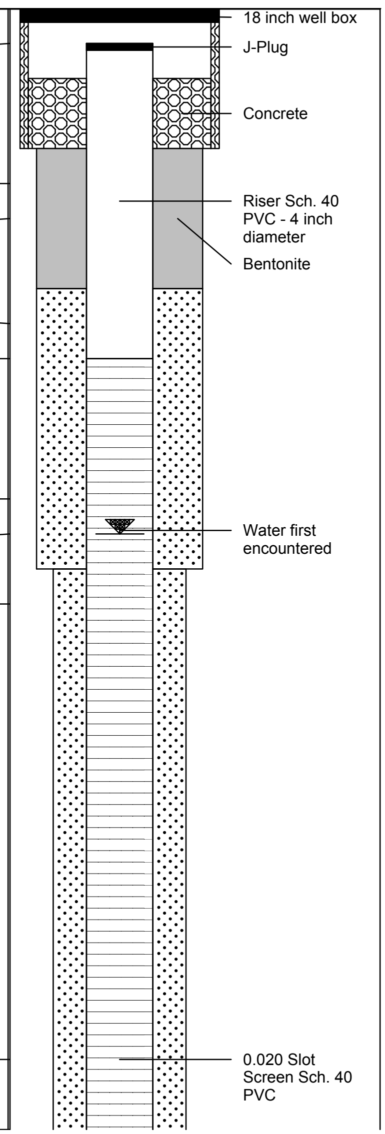
Well/Boring ID: **DPE-2**

Client: Chevron EMC

Location: Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description
0	0										Topsoil
		HA	2.5-3	.5	NA	NA	0.7		SG		Sand, small Gravel, fine to course grain size, well graded, brown, no HCLO
		HA	4.5 - 5	.5	NA	NA	77.7		SP		Sand, medium to fine grain, poorly graded, grey, no HCLO
5	-5										
		HA	7-7.5	.5	NA	NA	20.5		SG		Sand, coarse to medium grain, trace small gravel, grey, wet
		1	8.5 -10	1.5	1 2 1	3	4.3		SP		Sand, medium grain, poorly graded, grey, wet, no HCLO
10	-10										
		2	11-12.5	1.5	2 5 4	9	1.4				Same As Above
		3	13.5 -15	1.5	4 7 2	9	13.4				Same As Above
15	-15										

Well/Boring Construction



ARCADIS
Infrastructure, Water, Environment, Buildings

Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 2/10/2015 **Drilling Company:** Cascade Drilling **Driller's Name:** Curtis A. **Drilling Method:** Hollow Stem Auger **Auger Size:** 10" Outer Diameter **Rig Type:** Truck Mounted **Sampling Method:** Split Spoon	**Northing:** NE **Easting:** NE **Casing Elevation:** NE **Borehole Depth:** 30' bgs **Surface Elevation:** NE **Descriptions By:** SLM	**Well/Boring ID: DPE-2** **Client:** Chevron EMC **Location:** Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
		4	16-17.5	1.5	7 9 10	19	12.7		SP		Sand, medium grain, porrly graded, brown, no HCLO, wet	
		5	18.5-20	1.5	6 8 9	17	7.1				Same As Above	#2/12 Sand
20	-20											
		6	21-22.5	1.5	7 9 10	19	3.5				Same As Above	
		7	23.5-25	1.5	16 20 20	40	7.4		SP		Sand, medium to fine grain, poorly graded, dark grey, no HCLO, wet	
25	-25											
		8	26-27.5	1.5	11 16 25	41	5.6		SM		Silty Sand, medium to fine grain, poorly graded, brown, no HCLO, wet	Sump Sch. 40 PVC
		9	28.5-30	1.5	6 10 15	25	4.5		SM		Silty Sand, medium grain, poorly graded, brown, No HCLO, wet	
30	-30											

ARCADIS
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Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 3/23/15 - 3/24/15
Drilling Company: Cascade Drilling
Driller's Name: James G.
Drilling Method: Hollow Stem Auger
Auger Size: 10" Outer Diameter
Rig Type: Truck Mounted
Sampling Method: Split Spoon

Northing: NE
Easting: NE
Casing Elevation: NE

Borehole Depth: 22' bgs
Surface Elevation: NE

Descriptions By: RL/RB

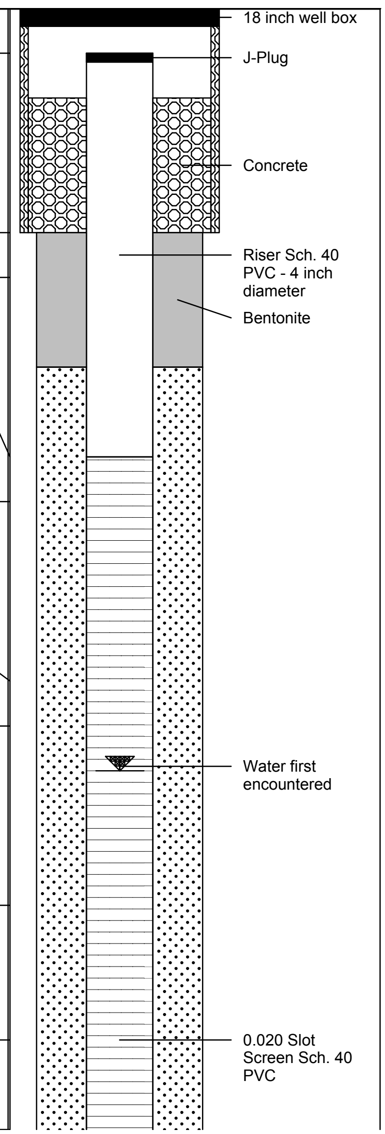
Well/Boring ID: DPE-3

Client: Chevron EMC

Location: Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description
0	0										Topsoil and gravel/cobbles
											Fill
		HA	2.5-3	.5	NA	NA	132.8		SP		Sand fill - poorly graded medium sand, loose, brown, dry, HCLO
											Cleared past 20-Mil Polyethylene sheeting at 4.5 feet bgs, which delineates Phase I 2007/2008 excavation and un-excavated soils around the WSDOT Stormwater Line
5	-5	HA	5-5.5	.5	NA	NA	807		CH		Clay with trace Organics - clay has medium to high plasticity, organics are woody debris, thick black substance with sheen, dark brown to grey and black color, moist, HCLO
		HA	7.5-8	.5	NA	NA	1,035		SC		Sand with Clay and Organics - Sand fine to coarse, well graded, clay has low plasticity, organics are roots, grey, wet, HCLO
											cleared hole with air knife and vacuum to 8.5 feet bgs
10	-10	1	10-11.5	1.5	6 6 9	15	1,267				Sand with little Gravel and trace Silt - well graded, sand is fine to coarse, gravel is small to medium and subrounded, grey, wet, HCLO
									SG		

Well/Boring Construction



ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks:
bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 3/23/15 - 3/24/15
Drilling Company: Cascade Drilling
Driller's Name: James G.
Drilling Method: Hollow Stem Auger
Auger Size: 10" Outer Diameter
Rig Type: Truck Mounted
Sampling Method: Split Spoon

Northing: NE
Easting: NE
Casing Elevation: NE

Borehole Depth: 22' bgs
Surface Elevation: NE

Descriptions By: RL/RB

Well/Boring ID: DPE-3

Client: Chevron EMC

Location: Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
		2	12.5-14	1.5	9 12 14	26	981				Same as Above - Chunck of wood found at 14 feet bgs	#2/12 Sand
15	-15	3	15-16.5	1.5	10 11 11	22	563				Sand with trace Gravel - sand is fine to coarse, gravel is very small and subrounded, wood chunck found at 16 feet bgs, grey, wet, HCLO	
		4	17.5-19	1.5	12 16 18	34	594		SW		Same as Above - small lenses of woody debris, decreasing gravel content	
20	-20	5	20-21.5	1.5	6 12 10	22	346				Same as Above - woody debris throughout with a large chunck at 21.5 feet bgs	Sump Sch. 40 PVC

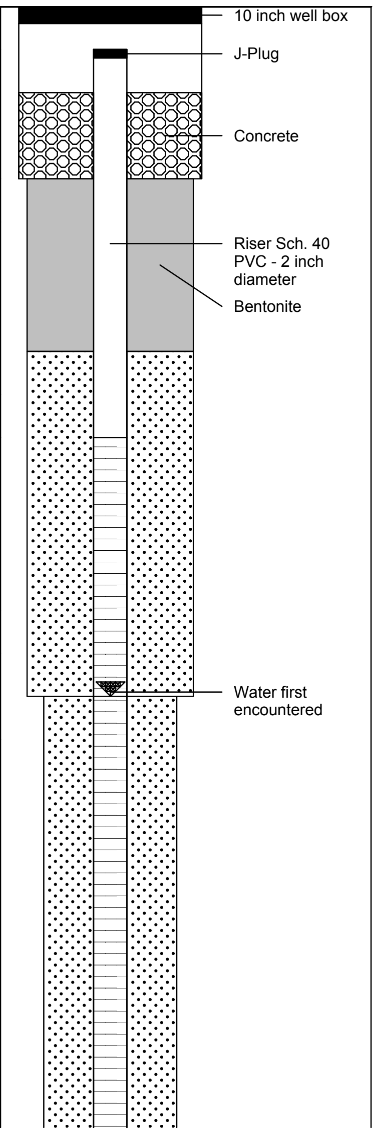
ARCADIS
Infrastructure, Water, Environment, Buildings

Remarks:
bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Date Start/Finish: 2/10/2015 **Drilling Company:** Cascade Drilling **Driller's Name:** Curtis A. **Drilling Method:** Hollow Stem Auger **Auger Size:** 10" Outer Diameter **Rig Type:** Truck Mounted HSA **Sampling Method:** Split Spoon	**Northing:** NE **Easting:** NE **Casing Elevation:** NE **Borehole Depth:** 25 feet bgs **Surface Elevation:** NE **Descriptions By:** SLM	**Well/Boring ID:** **PZ-1** **Client:** Chevron EMC **Location:** Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description
0	0										Topsoil
		HA	2-2.5	.5	NA	NA	NA				No Recovery, Asphalt removed
		HA	4.5 - 5	.5	NA	NA	377		SP		Sand, medium, poorly graded, brown, HCLO, dry
5	-5										
		HA	7-7.5	.5	NA	NA	740		SP		Sand, medium grain, trace small gravel, poorly graded, wet
		1	8.5 -10	1.5	1 1 2	3	721				Sand, medium grain, poorly graded, dark grey, wet, HCLO
10	-10										
		2	11-12.5	1.5	1 2 2	4	136.4				Same As Above

Well/Boring Construction



Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

ARCADIS Infrastructure, Water, Environment, Buildings

Date Start/Finish: 2/10/2015
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 10" Outer Diameter
Rig Type: Truck Mounted HSA
Sampling Method: Split Spoon

Northing: NE
Easting: NE
Casing Elevation: NE

Borehole Depth: 25 feet bgs
Surface Elevation: NE

Descriptions By: SLM

Well/Boring ID: **PZ-1**

Client: Chevron EMC

Location: Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description
		3	13.5-15	1.5	2 2 4	6	347.0		SP		Same As Above
15	-15										
		4	16-17.5	1.5	5 4 3	7	374.6				Same As Above
		5	18.5-20	1.5	5 4 4	8	327				Same As Above
20	-20										
		6	21-22.5	1.5	5 10 9	19	165.1		SW		Sand, medium to fine grain, small gravel, well graded, dark grey, HCLO
		7	23.5-25	1.5	10 14 11	25	10.5		SM		Silty Sand, very fine to fine grain, poorly graded, no HCLO, wet
25	-25										

Well/Boring Construction

0.020 Slot Screen Sch. 40 PVC

#2/12 Sand

Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

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Project Number:B0045362
Data File:
Date: 5/20/2015
Created/Edited by:RwL

Date Start/Finish: 2/10/2015
Drilling Company: Cascade Drilling
Driller's Name: Curtis A.
Drilling Method: Hollow Stem Auger
Auger Size: 10" Outer Diameter
Rig Type: Truck Mounted HSA
Sampling Method: Split Spoon

Northing: NE
Easting: NE
Casing Elevation: NE

Borehole Depth: 25 feet bgs
Surface Elevation: NE

Descriptions By: SLM

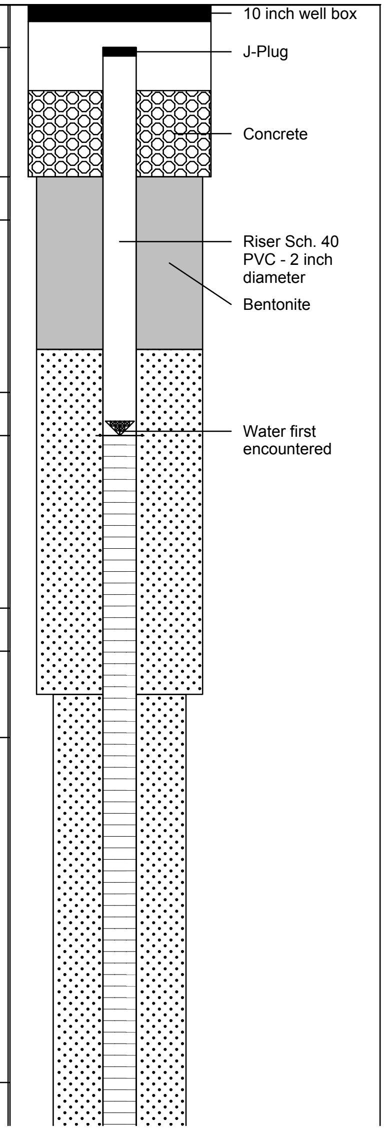
Well/Boring ID: PZ-2

Client: Chevron EMC

Location: Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description
0	0										Topsoil
		HA	2-2.5	.5	NA	NA	NA				No Recovery, Asphalt removed
		HA	4.5 - 5	.5	NA	NA	98.1		SP		Sand, medium to fine grain, poorly graded, brown, no HCLO, wet
5	-5										
		HA	7-7.5	.5	NA	NA	583		SP		Sand, fine grain, poorly graded, brown, HCLO, wet
		1	8.5 -10	1.5	0 1 1	2	419				Sand, medium grain, poorly graded, dark grey, HCLO, wet
10	-10								SP		
		2	11-12.5	1.5	4 5 6	11	122				Same As Above

Well/Boring Construction



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Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Project Number:B0045362
Data File:
Date: 5/20/2015
Created/Edited by:RwL

Date Start/Finish: 2/10/2015 **Drilling Company:** Cascade Drilling **Driller's Name:** Curtis A. **Drilling Method:** Hollow Stem Auger **Auger Size:** 10" Outer Diameter **Rig Type:** Truck Mounted HSA **Sampling Method:** Split Spoon	**Northing:** NE **Easting:** NE **Casing Elevation:** NE **Borehole Depth:** 25 feet bgs **Surface Elevation:** NE **Descriptions By:** SLM	**Well/Boring ID: PZ-2** **Client:** Chevron EMC **Location:** Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
		3	13.5 -15	1.5	2 2 2	4	34.8		SP		Sand, medium to coarse grain, poorly graded, dark grey to brown, HCLO, wet	
15	-15											0.020 Slot Screen Sch. 40 PVC
		4	16-17.5	1.5	5 4 5	9	69.1				Same As Above	#2/12 Sand
									SP			
		5	18.5 -20	1.5	5 5 5	10	44.8				Same As Above	
20	-20											
		6	21-22.5	1.5	7 9 40	49	34.7		SM		Silty Sand, medium grain, poorly graded, brown, HCLO, wet	
		7	23.5 -25	0	50/5	100	NA		OP		Recovery limited to wood chuncks seen in split spoon	
25	-25											

Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

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Date Start/Finish: 3/23/15
Drilling Company: Cascade Drilling
Driller's Name: James G.
Drilling Method: Hollow Stem Auger
Auger Size: 10" Outer Diameter
Rig Type: Truck Mounted
Sampling Method: Split Spoon

Northing: NE
Easting: NE
Casing Elevation: NE

Borehole Depth: 22' bgs
Surface Elevation: NE

Descriptions By: RL/RB

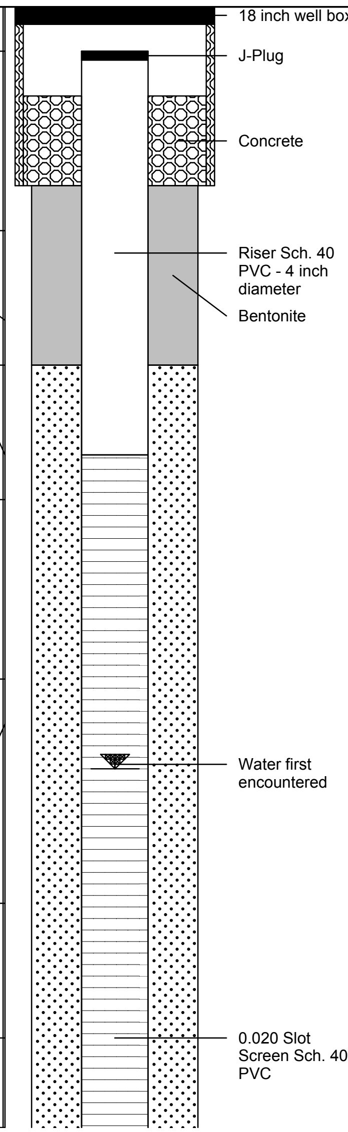
Well/Boring ID: **PZ-3**

Client: Chevron EMC

Location: Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description
0	0										Topsoil and sand/gravel/cobbles
											Fill - Sand/gravel/cobbles
											Cleared past 20-Mil Polyethylene sheeting at 3.5 feet bgs, which delineates Phase I 2007/2008 excavation and un-excavated soils around the WSDOT Stormwater Line
		HA	3.5 -4	.5	NA	NA	98.3		SG		Sand with Gravel - sand is medium to very coarse grain, gravel is small to large with trace cobbles, angular to subrounded, well graded, brown, moist, HCLO
5	-5	HA	5- 5.5	.5	NA	NA	322.6		CH		Clay with trace Gravel and Organic material - clay has high plasticity, gravel is medium and sub angular, organic material comprised of woody debris, grey, moist, HCLO
											At 5.5 feet bgs, encountered plastic fabric debris - brittle and weak
		HA	7.5 -8	.5	NA	NA	919.2				Sand with little Silt and Organics - sand is well graded, silt has low plasticity, woody debris comprised of small roots and sticks, grey, very moist, strong HCLO
											cleared hole with air knife and vacuum to 9.5 feet bgs
10	-10	1	10- 11.5	1.5	5 7 7	14	889				Sand with little Silt, trace Gravel and Organics, sand well graded, silt low plasticity, gravel subangualr, organics comprised of bark pieces, grey, wet, HCLO
									SW		

Well/Boring Construction



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Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Project Number:B0045362
Data File:
Date: 5/20/2015
Created/Edited by:RwL

Date Start/Finish: 3/23/15 **Drilling Company:** Cascade Drilling **Driller's Name:** James G. **Drilling Method:** Hollow Stem Auger **Auger Size:** 10" Outer Diameter **Rig Type:** Truck Mounted **Sampling Method:** Split Spoon	**Northing:** NE **Easting:** NE **Casing Elevation:** NE **Borehole Depth:** 22' bgs **Surface Elevation:** NE **Descriptions By:** RL/RB	**Well/Boring ID: PZ-3** **Client:** Chevron EMC **Location:** Edmonds Terminal, 11720 Unoco Rd, Edmonds, WA

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N-Value	PID Headspace (ppm)	Analytical Sample	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
		2	12.5-14	1.5	6 6 6	12	391				Same as above	#2/12 Sand
15	-15	3	15-16.5	1.5	9 10 10	20	469				Same as above with a lense of brown high plasticity clay at 16 feet bgs, lense less than one inch thick. Decreasing amount of woody debris and silt	
		4	17.5-19	1.5	9 12 10	22	432		SP		Sand - medium to coarse grain, little woody debris that appears to be a chunck of a larger piece of wood, wet, grey, HCLO	
20	-20	5	20-21.5	1.5	8 10 9	19	160				Same as above - thin high plasticity, borwn clay lense at 21 feet bgs, lense is less than one quarter inch thick with consistent lithology on either side, grey, HCLO	Sump Sch. 40 PVC

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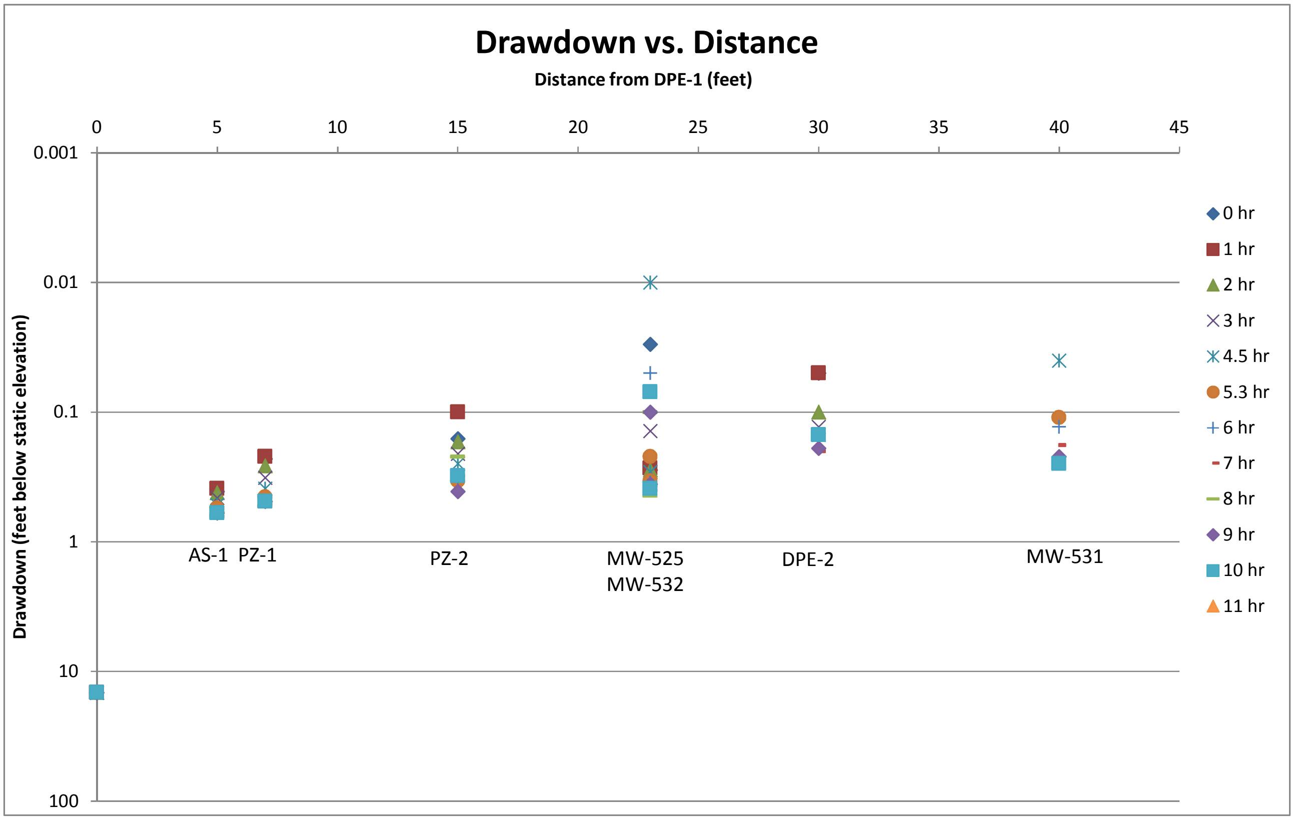
Remarks: bgs = below ground surface
NA = Not Available
ppm = parts per million
NE = Not Established
HA = Hand Auger
HCLO = Hydrocarbon like odor

Attachment B

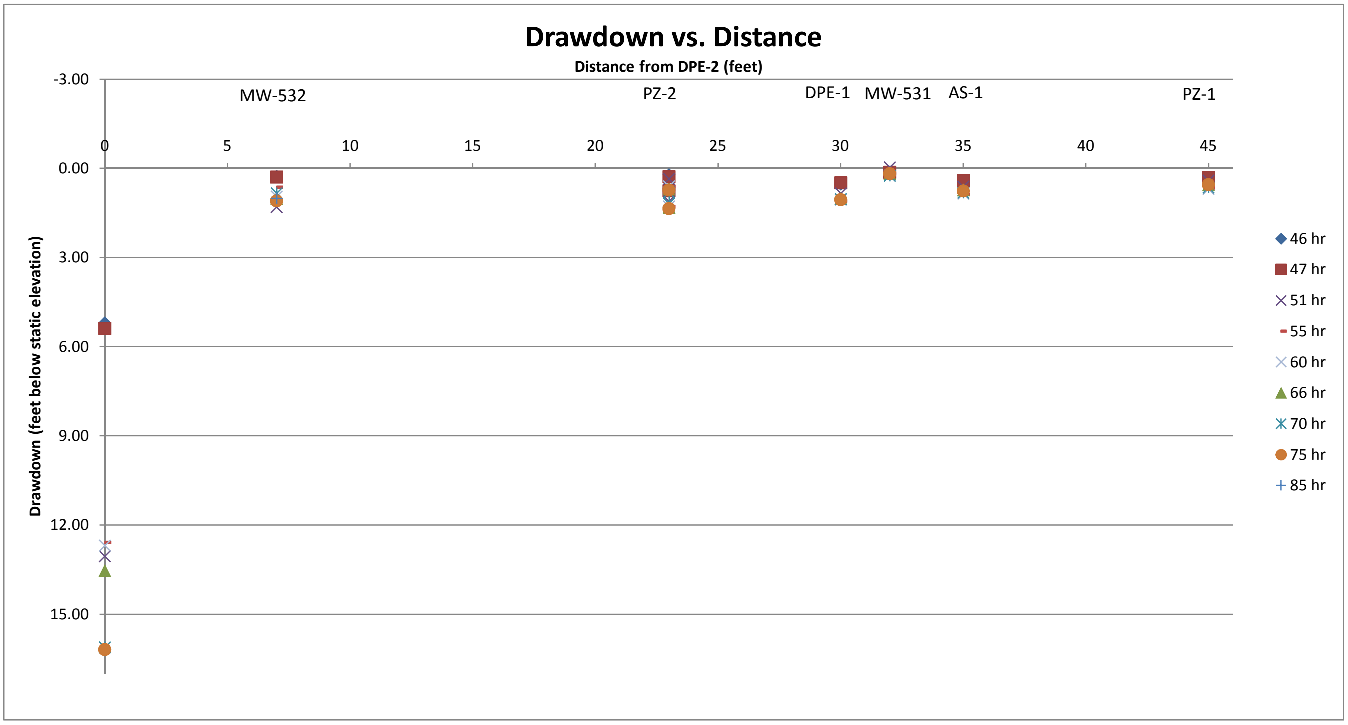
Pilot Test Data



DPE-1 Test

	Time elapsed (hr)	0	1	2	3	4	5	6	7	8	9	10	11
Well	**Distance (feet)**	**Drawdown (feet below static groundwater elevation)**											
DPE-1	0	14.57	14.53	14.56	14.59	14.58	14.56	14.61	14.56	14.61	14.58	14.57	14.61
AS-1	5	0.41	0.39	0.42	0.46	0.52	0.55	0.6	0.64	0.63	0.6	0.6	0.6
PZ-1	7	0.23	0.22	0.26	0.32	0.39	0.45	0.49	0.51	0.53	0.49	0.49	0.39
PZ-2	15	0.16	0.1	0.17	0.21	0.25	0.34	0.34	0.31	0.22	0.41	0.31	0.28
MW-525	23	0.03	-0.05	-0.1	0.14	0.01	0.22	0.05	0.37	0.1	0.1	0.07	0.05
MW-532	23	0.28	0.27	0.28	0.29	0.29	0.34	0.35	0.4	0.44	0.36	0.39	0.35
DPE-2	30	0.05	0.05	0.1	0.13	0.15	0.15	0.19	0.2	0.16	0.19	0.15	0.13
MW-531	40	-0.04	-0.04	-0.05	-0.03	0.04	0.11	0.13	0.18	--	0.22	0.25	0.23

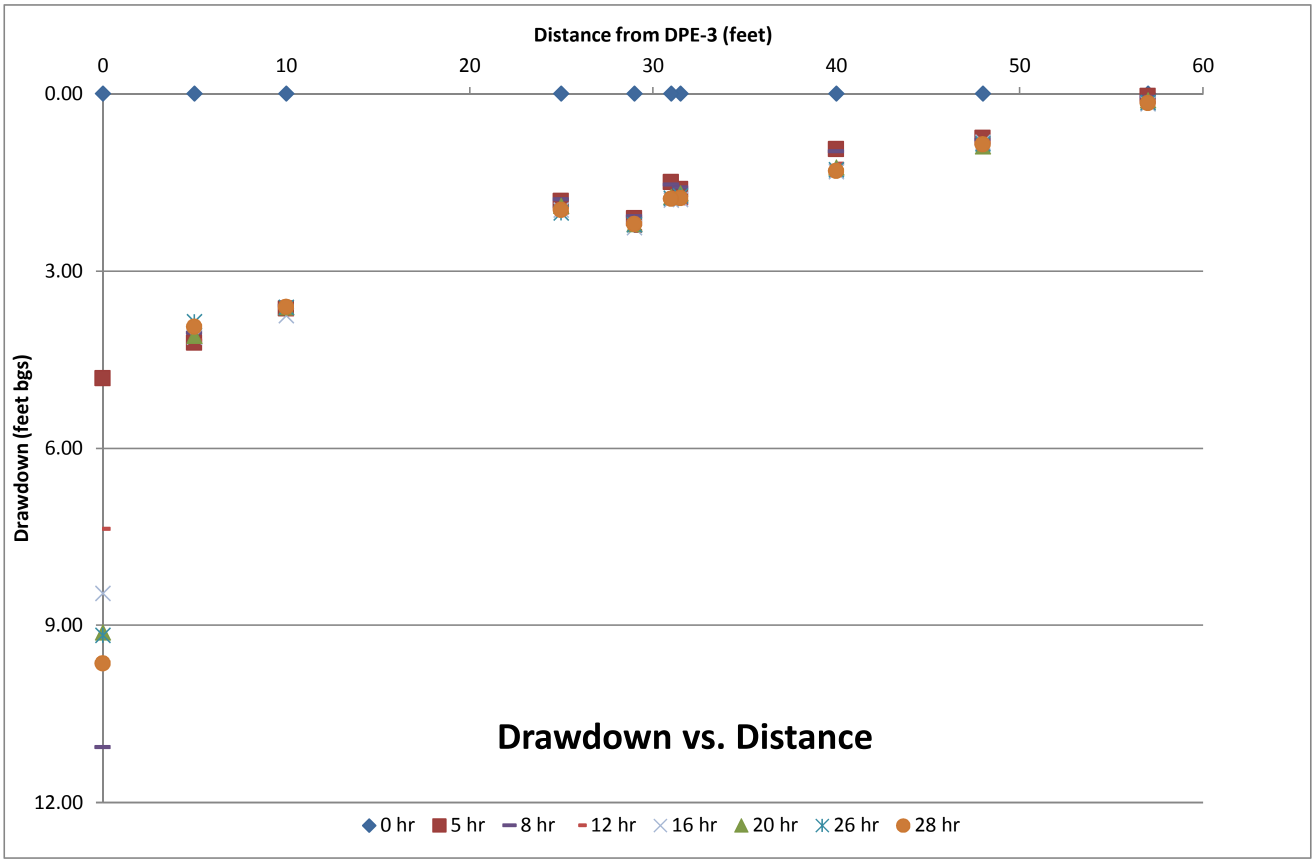
Note:
hr = hour
bgs = below ground surface
DPE = dual phase extraction



DPE-2 Test

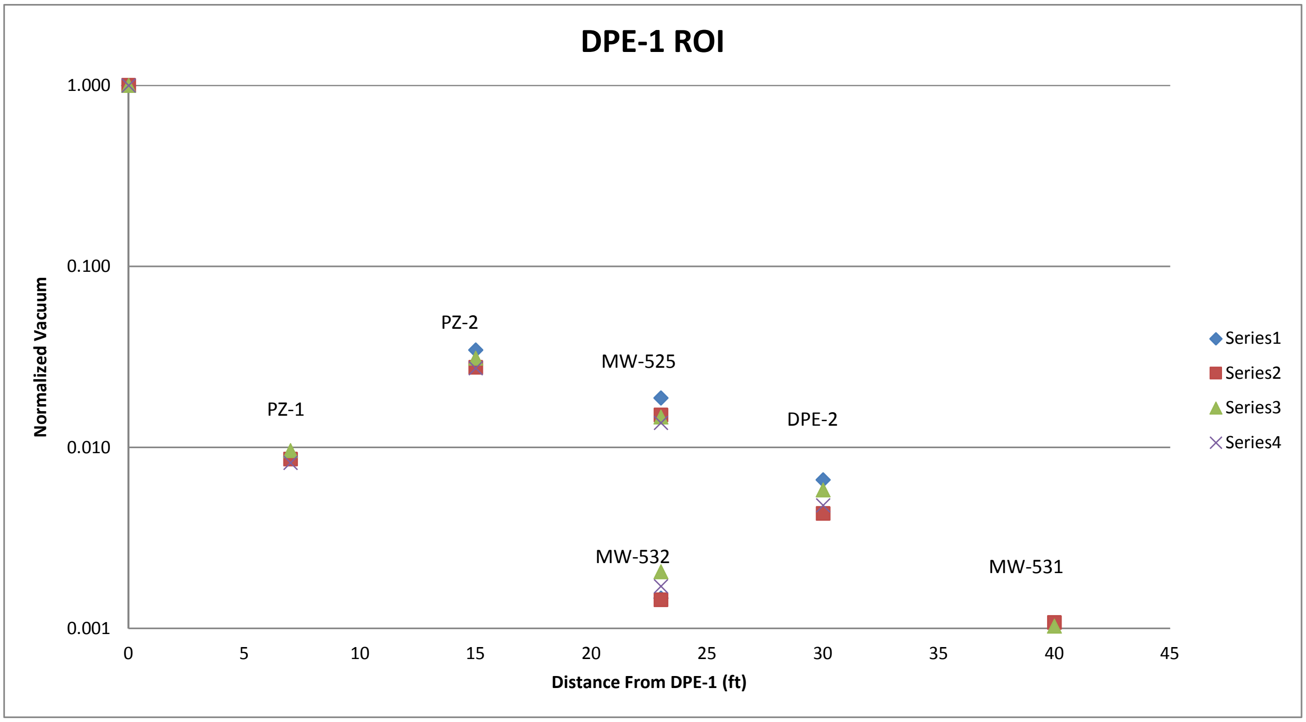
	Time elapsed (hr)	46 hr	47 hr	49 hr	51 hr	52 hr	53 hr	54 hr	55 hr	56 hr	57 hr	58 hr	59 hr	60 hr	61 hr	62 hr	66 hr	70 hr	75 hr	85 hr
Well	Distance (feet)	Drawdown (feet below static groundwater elevation)																		
DPE-1	30	0.53	0.50	0.41	0.84	0.98	1.06	1.09	1.11	1.14	1.12	1.11	Measu	1.06	1.04	1.04	1.02	1.03	1.06	1.01
DPE-2	0	5.20	5.40	4.75	13.05	12.95	12.80	12.60	12.60	12.60	13.00	13.00	12.50	12.70	12.60	12.75	13.55	16.12	16.20	11.92
PZ-1	45	0.31	0.31	0.24	0.41	0.48	0.61	0.62	0.67	0.72	0.74	0.71	0.70	0.69	0.64	0.56	0.56	0.65	0.55	0.61
PZ-2	23	0.69	0.76	0.61	1.11	1.19	1.26	1.26	1.29	1.36	1.31	1.28	1.28	1.28	1.28	1.36	1.32	1.18	1.36	1.30
AS-1	35	0.41	0.42	0.37	0.61	0.69	0.77	0.80	0.88	0.90	0.90	0.88	0.90	0.85	0.80	0.73	0.73	0.82	0.76	0.81
MW-525	23	0.22	0.29	0.23	0.36	0.48	0.57	0.57	0.63	0.75	0.80	0.65	0.63	0.60	0.65	0.71	0.70	0.81	0.73	0.71
MW-531	32	0.16	0.14	0.08	-0.03	0.05	0.10	0.13	0.18	0.23	0.24	0.29	0.27	0.25	0.23	0.23	0.18	0.25	0.18	0.31
MW-532	7	0.27	0.30	0.40	1.30	0.48	0.57	0.80	0.65	0.75	0.68	1.16	1.06	0.95	0.84	1.04	1.02	0.84	1.10	1.09

Note:
hr = hour
bgs = below ground surface
DPE = dual phase extraction



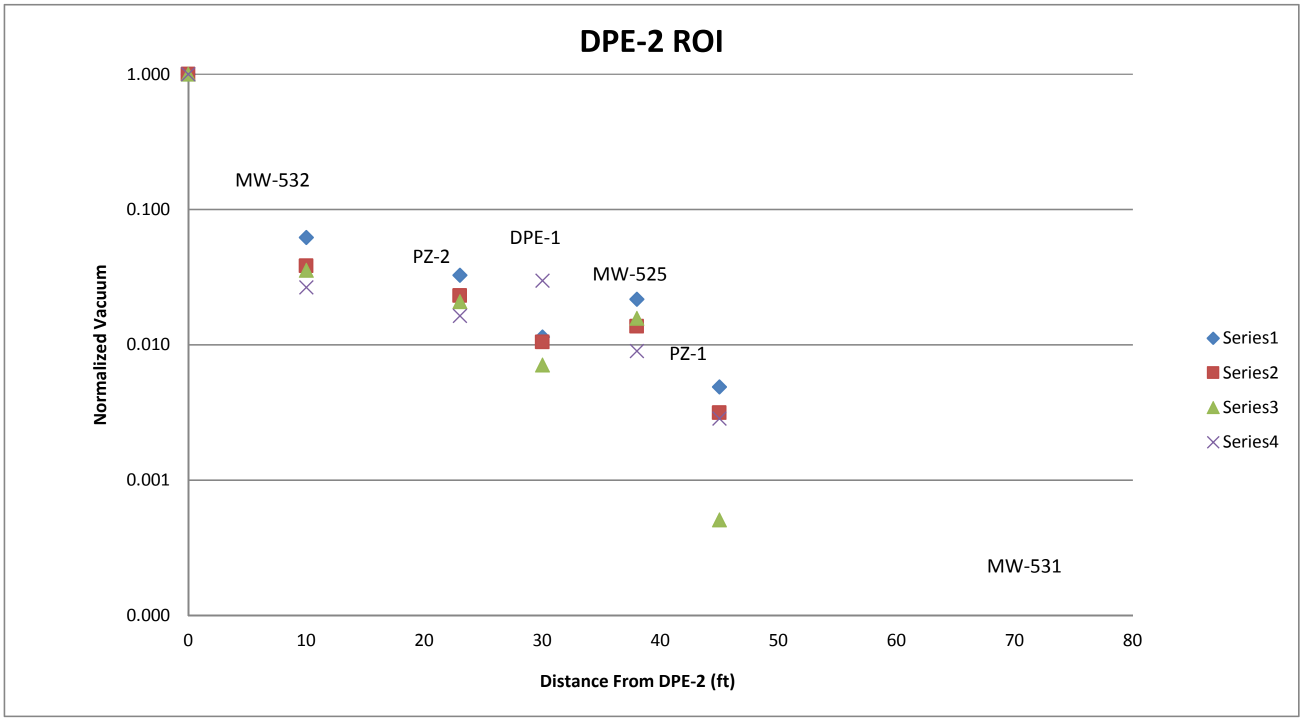
	Time elapsed (hr)	0 hr	5 hr	8 hr	12 hr	16 hr	20 hr	26 hr	28 hr
Well	Distance (feet)	Drawdown (feet bgs)							
DPE-1	29	0.00	2.11	2.08	2.33	2.27	2.21	2.22	2.21
DPE-2	48	0.00	0.75	0.78	0.83	0.82	0.89	0.85	0.86
DPE-3	0	0.00	4.82	11.07	7.37	8.46	9.12	9.17	9.65
PZ-1	31.5	0.00	1.62	1.59	1.86	1.79	1.69	1.73	1.77
PZ-2	31	0.00	1.50	1.54	1.75	1.80	1.75	1.77	1.78
PZ-3	10	0.00	3.64	3.59	3.74	3.76	3.62	3.62	3.61
AS-1	25	0.00	1.82	1.79	2.02	1.97	1.90	2.02	1.97
MW-525	5	0.00	4.22	4.05	4.18	4.12	4.10	3.86	3.95
MW-531	57	0.00	0.04	0.06	0.15	0.17	0.11	0.15	0.16
MW-532	40	0.00	0.94	0.98	1.19	1.32	1.25	1.29	1.31

Note:
hr = hour
bgs = below ground surface
DPE = dual phase extraction



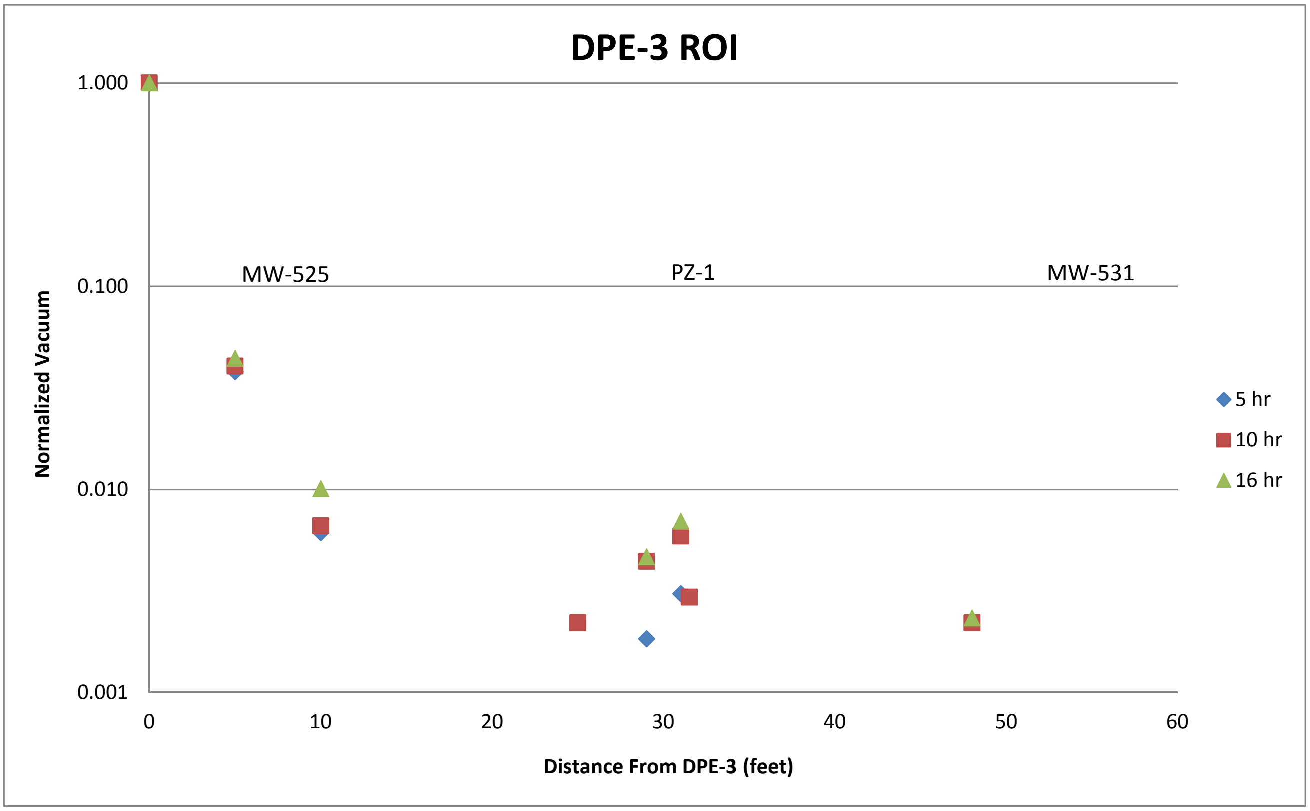
Time elapsed (hr)		1 hr		10 hr		20 hr		30 hr	
Vacuum ("H2O)		Vacuum	Normalized Vacuum	Vacuum	Normalized Vacuum	Vacuum	Normalized Vacuum	Vacuum	Normalized Vacuum
Well	Distance (feet)								
DPE-1	0	271.800	1.000	278.595	1.000	292.185	1.000	292.185	1.000
DPE-2	30	1.800	0.007	1.200	0.004	1.700	0.006	1.4	0.005
PZ-1	7	0.000	0.000	2.400	0.009	2.800	0.010	2.4	0.008
PZ-2	15	9.400	0.035	7.700	0.028	9.100	0.031	8	0.027
MW-525	23	5.100	0.019	4.200	0.015	4.300	0.015	4	0.014
MW-531	40	0.000	0.000	0.300	0.001	0.300	0.001	0	0.000
MW-532	23	0.400	0.001	0.400	0.001	0.600	0.002	0.5	0.002

Note:
hr = hour
DPE = dual phase extraction
"H2O = inches of water



Time elapsed (hr)		50 hr		60 hr		70 hr		80 hr	
Vacuum ("H2O)		Vacuum	Normalized Vacuum	Vacuum	Normalized Vacuum	Vacuum	Normalized Vacuum	Vacuum	Normalized Vacuum
Well	**Distance (feet)**								
DPE-2	0	183.465	1.000	190.260	1.000	197.055	1.000	244.62	1.000
MW-532	10	11.400	0.062	7.300	0.038	7.000	0.036	6.5	0.027
PZ-2	23	6.000	0.033	4.400	0.023	4.100	0.021	4	0.016
DPE-1	30	2.100	0.011	2.000	0.011	1.400	0.007	7.31	0.030
MW-525	38	4.000	0.022	2.600	0.014	3.100	0.016	2.2	0.009
PZ-1	45	0.900	0.005	0.600	0.003	0.100	0.001	0.7	0.003
MW-531	68	0.000	0.000	0.000	0.000	0.000	0.000	0	0.000

Note:
hr = hour
DPE = dual phase extraction
"H2O = inches of water



Time elapsed (hr)		5 hr		10 hr		16 hr	
Vacuum ("H2O)		Vacuum	Normalized Vacuum	Vacuum	Normalized Vacuum	Vacuum	Normalized Vacuum
Well	**Distance (feet)**						
DPE-3	0	163.080	1.000	135.900	1.000	129.105	1.000
MW-525	5	6.200	0.038	5.500	0.040	5.700	0.044
PZ-3	10	1.000	0.006	0.900	0.007	1.300	0.010
AS-1	25	0.000	0.000	0.300	0.002	0.000	0.000
DPE-1	29	0.300	0.002	0.600	0.004	0.600	0.005
PZ-2	31	0.500	0.003	0.800	0.006	0.900	0.007
PZ-1	31.5	0.000	0.000	0.400	0.003	0.000	0.000
DPE-2	48	0.000	0.000	0.300	0.002	0.300	0.002
MW-532	40	0.000	0.000	0.000	0.000	0.000	0.000
MW-531	57	0.000	0.000	0.000	0.000	0.000	0.000

Note:
hr = hour
DPE = dual phase extraction
"H2O = inches of water

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Appendix B

Draft Site-Specific Terrestrial Ecological Evaluation

Chevron Environmental Management Company

Appendix B – Draft Site-Specific Terrestrial Ecological Evaluation

Former Unocal Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

August 19, 2024

Appendix B – Draft Site-Specific Terrestrial Ecological Evaluation

Former Unocal Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

August 5, 2024

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Project Manager

Contents

Acronyms and Abbreviations iv

1 Introduction 1-1

2 Site Description 2-1

2.1 Site History 2-1

2.2 Habitat Description 2-2

2.2.1 Emergent Wetlands 2-3

2.2.2 Forested/Shrub Wetlands 2-3

2.2.3 Upland Forest 2-3

2.2.4 Disturbed Upland Habitat 2-4

3 Problem Formulation 3-1

3.1 Constituents of Potential Ecological Concern 3-1

3.2 Ecological Receptors and Exposure Pathways 3-1

3.2.1 Ecological Receptors 3-1

3.2.2 Potential Exposure Pathways 3-1

3.2.3 Threatened and Endangered Species 3-2

4 Selection of Appropriate Terrestrial Ecological Evaluation Methods 4-1

4.1 Point of Compliance 4-1

4.2 Ecologically Protective Soil Values 4-2

5 Risk Characterization 5-1

5.1 Arsenic 5-1

5.2 Benzene 5-1

5.3 Carcinogenic Polycyclic Aromatic Hydrocarbons 5-2

5.4 Diesel-Range Organics and Heavy Oil 5-2

5.5 Gasoline-Range Organics 5-3

6 Summary 6-1

7 References 7-1

Tables

Table B-1 **Ecologically Protective Soil Values for Use in the TEE (in text)**

Table B-2 **Constituent of Potential Ecological Concern Summary Statistics (Point of Compliance, 0 to 15 feet bgs)**

Table B-3 **Constituent of Potential Ecological Concern Summary Statistics (Point of Compliance – Buffer Zone, 0 to 4 feet bgs)**

Table B-4 **Constituent of Potential Ecological Concern Summary Statistics (Point of Compliance – Interior Zone, 0 to 4 feet bgs)**

Figures

Figure B-1 Location Map

Figure B-2 Site Map

Figure B-3 Historical High Groundwater Depths

Figure B-4 Covertype Map

Figure B-5 Ecological Conceptual Site Model

Figure B-6 Proposed Remedial Zones

Figure B-7A Soil COPEC Concentrations Arsenic Standard Point of Compliance 0 to 15 feet bgs

Figure B-7B Soil COPEC Concentrations Arsenic Alternative Point of Compliance 0 to 4 feet bgs

Figure B-8A Soil COPEC Concentrations Benzene Standard Point of Compliance 0 to 15 feet bgs

Figure B-8B Soil COPEC Concentrations Benzene Alternative Point of Compliance 0 to 4 feet bgs

Figure B-9A Soil COPEC Concentrations DRO and HRO Standard Point of Compliance 0 to 15 feet bgs

Figure B-9B Soil COPEC Concentrations DRO and HRO Alternative Point of Compliance 0 to 4 feet bgs

Figure B-10A Soil COPEC Concentrations GRO Standard Point of Compliance 0 to 15 feet bgs

Figure B-10B Soil COPEC Concentrations GRO Alternative Point of Compliance 0 to 4 feet bgs

Attachments

Attachment B-1	**Terrestrial Ecological Evaluation Process**
Attachment B-2	**Site Photographs**
Attachment B-3	**Priority Habitat and Species Report**
Attachment B-4	**ProUCL Output**
Attachment B-5	**Terrestrial Ecological Evaluation Dataset (0 to 15 feet bgs)**

Acronyms and Abbreviations

95% UCL	95 percent upper confidence limit
Arcadis	Arcadis U.S., Inc.
bgs	below ground surface
COPEC	constituent of potential ecological concern
cPAH	carcinogenic polycyclic aromatic hydrocarbon
DB-1	Detention Basin 1
DB-2	Detention Basin 2
DPE	dual-phase extraction
DRO	diesel-range organics
Ecology	Washington State Department of Ecology
FS Addendum	Public Review Draft Final Feasibility Study Report Addendum
GRO	gasoline-range organics
HRO	heavy-oil-range organics
IHS	indicator hazardous substance
LNAPL	light nonaqueous phase liquid
mg/kg	milligram per kilogram
MTCA	Model Toxics Control Act
POC	point of compliance
Site	former Unocal Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington
SLR	SLR International Corporation
SV	soil value
TEE	terrestrial ecological evaluation
TEE Report	Site-Specific Terrestrial Ecological Evaluation
TPH	total petroleum hydrocarbons
Unocal	Union Oil Company of California
upland forest	mixed deciduous and conifer forest
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish & Wildlife Service
WAC	Washington Administrative Code

WDFW	Washington Department of Fish & Wildlife
WSDOT	Washington State Department of Transportation

1 Introduction

On behalf of Chevron Environmental Management Company (CEMC), Arcadis U.S., Inc. (Arcadis) prepared this *Site-Specific Terrestrial Ecological Evaluation* (TEE Report) for the Lower Yard of the former Union Oil Company of California (Unocal) Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road in Edmonds, Washington (Site; Figure B-1). This TEE Report was prepared in accordance with Washington Administrative Code (WAC) 173-340-7490 and the Technical Document: Terrestrial Ecological Evaluations under the Model Toxics Control Act (Washington State Department of Ecology [Ecology] 2017a). This TEE Report is provided as Appendix B to the Public Review Draft Final Feasibility Study Report Addendum (FS Addendum).

The purpose of the terrestrial ecological evaluation (TEE) process is to identify and provide an additional level of scrutiny to areas that contain significant habitat, wildlife populations, and/or species requiring an additional level of protection (Ecology 2017a). In general, a site qualifies for exclusion from the TEE process if there is little or no threat to ecological receptors. A site qualifies for a simplified TEE if it does not contain significant habitat, sensitive areas, or threatened or endangered species. A site-specific TEE is required if a site is located on, or directly adjacent to, a natural area; if a site is used by a listed vulnerable species; if there is extensive habitat located onsite or near a site; or if Ecology determines that a site may present a risk to significant wildlife populations.

Ecology (2017a) guidance is used to determine if a TEE is required and, if so, whether the TEE is a simplified TEE or a site-specific TEE. Based on the process presented in the Ecology (2017a) guidance, a site-specific TEE is required for the Lower Yard (Attachment B-1). A site-specific TEE is required because although the Lower Yard only provides marginal habitat for ecological receptors, higher quality habitat exists adjacent to the Site in Edmonds Marsh and the adjacent tributary (Willow Creek).

The TEE process is intended to protect terrestrial ecological receptors from exposure to impacted soil when the potential exists to cause significant adverse effects. The TEE may be ended at a site if the total area of soil contamination is not more than 350 square feet or land use at the site and surrounding area make substantial wildlife exposure unlikely (Ecology 2017a). The presence of wildlife corridors on or adjacent to a site such as greenbelts, riparian zones, or water bodies should also be considered when determining if a site is likely to attract wildlife. If it has been determined that significant potential exists for ecological receptors to be exposed to contaminants at a site, then an analysis of exposure pathways and/or contaminants must be completed (Ecology 2017a). As such, this TEE Report evaluates potential risks to terrestrial ecological receptors at the Lower Yard.

2 Site Description

The Site is located at 11720 Unoco Road in Edmonds, Washington (Figure B-1). The approximately 22-acre Lower Yard surrounds the former Upper Yard to the north, east, and west (Figure B-2). The Lower Yard is mostly a manmade area built between the 1920s and the 1960s, and primarily consists of fill material. Several remedial activities have already been conducted at the Lower Yard, including soil excavation and coverage with clean fill/ gravel.

The Lower Yard is currently a fenced vacant property, is not accessible to the public, and has no permanent aboveground structures. A temporary storage shed, concrete pad, and remediation system enclosure are located along lower Unoco Road in the central portion of the Site (Figure B-2). The ground surface primarily comprises compacted dirt and gravel, and vegetative cover exists along the perimeter of the Lower Yard. Approximately 2.4 acres of the Lower Yard consist of paved areas, including Unoco Road and a paved area to the south of upper Unoco Road.

A Washington State Department of Transportation (WSDOT) stormwater line crosses beneath the Lower Yard and discharges stormwater collected from State Route 104 to Puget Sound. According to a 1971 drainage plan (Washington State Highway Commission 1971), the WSDOT stormwater line is composed of sections of increasing diameter pipe from 48 inches at the eastern part of the Lower Yard to 72 inches at the western part of the Lower Yard. The WSDOT stormwater line is made of asphalt-coated corrugated metal and crosses the Lower Yard at depths of 9 to 12 feet below ground surface (bgs) to the top of the pipe. The WSDOT stormwater line generally runs along the northern edge of Lower Unoco Road and trends west across the Lower Yard to the tidal basin leading to Puget Sound. The WSDOT stormwater line was installed between 1972 and 1975 and is a major stormwater drainage structure for State Route 104; WSDOT evaluated the stormwater line in 2011 and found its integrity to be sound, with no visible signs of deterioration (Figure B-2).

Until summer 2017, the Lower Yard stormwater system conveyed direct precipitation and stormwater through 12 storm drains to two detention basins (Detention Basin 1 [DB-1] and Detention Basin 2 [DB-2]), located in the northern part of the Lower Yard, and then discharged into Willow Creek under an appropriate discharge permit. DB-2 was excavated and backfilled to grade with clean fill material during summer 2017. Since fall 2017, the Lower Yard stormwater system has conveyed direct precipitation and stormwater to DB-1 only.

Groundwater at the Site is tidally influenced in areas bordering the northeast and west boundaries along Willow Creek. Historically, depth to water has ranged from less than 4 feet bgs in the central Lower Yard, to greater than 6 feet bgs near the WSDOT storm drain line and along the Site boundary with Willow Creek as the creek runs into the tidal basin. Figure B-3 shows historical high water table elevations between 2014 and 2024.

2.1 Site History

Onsite soil was impacted by petroleum hydrocarbons, primarily in the gasoline, diesel, and oil range, from historical petroleum product storage and transfer activities. Unocal has performed interim actions to remove light nonaqueous phase liquid (LNAPL) and excavate soils across most of the Site where soil removal and remedial activities were feasible. The interim remedial actions included LNAPL recovery, excavation of approximately 46 percent of the Lower Yard, and installation and operation of a dual-phase extraction (DPE) remediation system surrounding the WSDOT stormwater line. The actions were conducted to minimize potential risks, including to terrestrial receptors, by reducing contaminant levels and limiting potential exposure. A significant amount of impacted soil has been removed, significantly reducing both the spatial extent of contamination and the concentrations of remaining contaminants. Impacted soil remains near the WSDOT stormwater line. Given the conditions, excavation around the stormwater line is considered high risk and impracticable because it could undermine the structural stability and damage the line. The DPE system was installed near the stormwater line to prevent offsite migration of impacted groundwater and to reduce residual petroleum hydrocarbon concentrations in soil and groundwater. Soils containing residual concentrations of constituents of potential ecological concern (COPECs) only remain in limited areas of the Lower Yard.

Remedial investigation (RI) and FS activities included sediment sampling for chemical analyses and bioassays in Willow Creek, adjacent to the Lower Yard. Environmental studies of Edmonds Marsh, which is located on the opposite side of Willow Creek from the Lower Yard, were conducted in conjunction with the Final Environmental Impact Statement (CH2M Hill 2004), which was prepared for the SR104 Edmonds Crossing Project. Information from these studies was used to prepare this TEE Report.

2.2 Habitat Description

The habitat at the Lower Yard, which is described below, is based on an initial wildlife and habitat study that was performed and included in the Draft Remedial Investigation Report by Maul Foster & Alongi, Inc. (2001). This study involved a literature review; database searches; discussions with agency personnel, conservation group members, and botany and wildlife experts; and a field study. Results from the initial wildlife and habitat study were amended for purposes of the TEE, with a review of updated satellite imagery, online database review including U.S. Fish & Wildlife Service's (USFWS's) Integrated Planning and Consultation online resource tool (USFWS 2023), and Site field observations. A habitat covertype map is shown on Figure B-4 and representative photographs of the Lower Yard habitat are provided in Attachment B-2.

As described above, the terrestrial area for the Lower Yard is primarily compact soil and gravel (Attachment B-2, Photo 1). Additionally, approximately 2.4 of the 22 acres are paved (Attachment B-2, Photo 2). Barren soil, gravel, and paved areas provide poor habitat for terrestrial receptors. Therefore, habitat onsite is limited to the edges of the Lower Yard where vegetative cover exists.

Willow Creek runs along the northern portion of the western boundary and the entire eastern boundary of the Lower Yard. Willow Creek is approximately 10 feet wide and is underlain by silt and sand material. To the north and northeast of the Lower Yard beyond Willow Creek is Edmonds Marsh, which is a 23-acre freshwater and brackish water marsh (Attachment B-2, Photo 3). Willow Creek (Attachment B-2, Photo 4) and Edmonds Marsh are directly connected to Puget Sound and are tidally influenced. At high tide, water flows from Puget Sound upstream into Edmonds Marsh; at low tide, water drains from Edmonds Marsh into Puget Sound. At its nearest point (the southwest corner of the Lower Yard), the Lower Yard is approximately 160 feet from the Puget Sound shoreline. The tidal variations in water levels in Puget Sound also influence groundwater elevations at the Lower Yard perimeter.

Four vegetation communities are found at the Lower Yard and adjacent areas, including emergent wetlands, forested/shrub wetlands, mixed deciduous and conifer forest (upland forest), and disturbed upland habitat. These communities are further described in Sections 2.2.1 through 2.2.4.

2.2.1 Emergent Wetlands

Emergent wetlands are found in portions of the Lower Yard (primarily in DB-1 and Willow Creek along the northwest site boundary) and Edmonds Marsh. Emergent wetlands in Willow Creek and Edmonds Marsh are tidally influenced. Edmonds Marsh, which is fed by Willow and Shellabarger Creeks, is approximately 23 acres (Attachment B-2, Photo 5). In 1989, the tide gate that serves as the outlet to Edmonds Marsh was permanently opened, restoring saltwater influence to the marsh. The marsh now supports both brackish and freshwater species, and vegetative makeup has changed from freshwater wetland species to brackish- and saline-tolerant species. Vegetation in DB-1 (approximately 2.75 acres) is dominated by common cattail, spreading bentgrass, purple loosestrife, and American three square. Willow Creek and the tidal basin are saltwater influenced and vegetation is dominated by seashore saltgrass and Baltic rush, with oracle and seaside plantain as associated species. Dominant vegetation in the western, brackish portion of Edmonds Marsh includes seashore saltgrass, American three square, and Baltic rush, with seaside plantain and oracle plaintain as common associates. Cattail and purple loosestrife dominate the eastern, freshwater portion of the marsh; associated species include water parsley, field horsetail, and yellow flag. The quality of the emergent wetland habitat in DB-1 is low due to low plant diversity and small size (Attachment B-2, Photo 6). Emergent wetland quality in the marsh is high due to the large number of plant species, its relatively large size (greater than 20 acres), the presence of both brackish and freshwater marsh, and the proximity of shrub and forest habitat.

2.2.2 Forested/Shrub Wetlands

Forested/shrub wetland vegetation dominates the southwest corner of the marsh and extends onto the Lower Yard along Willow Creek. The forest canopy is dominated by red alder, big leaf maple, and Scouler's willow. Himalayan blackberry, beaked hazelnut, salmonberry, red currant, and red elderberry predominate in the shrub layer. Herbaceous species include reed canary grass, American brooklime, and horsetail; hydrophytic species include skunk cabbage, fringecup, and creeping buttercup. The quality of the forested/shrub habitat along Willow Creek and extending east of the Lower Yard is moderate to high due to its moderate size (approximately 10 acres), large number of plant species present, association with a permanent stream, and presence of snags and downed trees. Approximately 3.5 of the 10 acres are estimated to be onsite (Attachment B-2, Photo 7).

2.2.3 Upland Forest

A 150- to 400-foot-wide band of upland forest exists on the west-facing bluff adjacent to the Lower Yard (Attachment B-2, Photo 8). The dominant canopy vegetation consists of red alder, big leaf maple, and bitter cherry. Dominant understory vegetation includes English ivy, salmonberry, red elderberry, ocean spray, Himalayan blackberry, stinging nettle, and horsetail. The overall quality of the upland forest habitat is low to moderate due to low to moderate plant diversity, small area of contiguous forest (less than 8 acres onsite), and proximity of disturbed or paved areas, which limit access by smaller species of non-avian wildlife. The upland forest located north of the access road and adjacent to the marsh is high habitat value due to proximity to a large area of undeveloped habitat and the presence of surface water.

2.2.4 Disturbed Upland Habitat

The majority of the Lower Yard consists of highly altered topography that is sparsely vegetated by non-native species. The disturbed upland habitat exists along the roadway, on the berm between DB-1 and the marsh, and along the railroad. In the area north of the access road, adjacent to Willow Creek, disturbed meadow vegetation is dominated by bentgrass species, birdsfoot-trefoil, pink and white clover, and bull thistle. The detention basin berm is dominated by Himalayan blackberry, Scot's broom, non-native pine, and birch. The habitat value of the disturbed areas of the Lower Yard is low due to sparse vegetative cover, low species diversity, and human activity, which limit wildlife use (Attachment B-2, Photo 9).

Habitat value for wildlife use depends on the complexity of the vegetative community, plant species, and proximity of other habitat types used by wildlife species. The list includes vertebrate species identified directly or indirectly (i.e., vocalizations, tracks, and scat) and other species expected to be found due to their occurrence in similar habitats.

Thirty-two (32) species of birds were observed onsite and at the marsh, and 80 species were identified as potentially using the habitat. Thirty (30) mammal species, nine amphibian species, and three reptile species were identified as potentially using the habitat onsite and at the marsh. The disturbed upland areas of the Lower Yard are used by numerous urban-adapted, native, and introduced bird and mammal species. Species observed during the wildlife survey included American crow, bushtit, California quail, Canada goose, European starling, house finch, pine siskin, rock dove, and killdeer. Black rat, eastern gray squirrel, raccoon, opossum, house mouse, and deer mouse may also use these areas; northern alligator lizard and northwest and common garter snakes may use the disturbed area to the north of the access road.

3 Problem Formulation

The problem formulation is the first step in a site-specific TEE process and is used to define the focus of the evaluation. For this TEE, problem formulation is based on information from historical investigations conducted at the Lower Yard. The problem formulation identifies COPECs and characterizes potential terrestrial ecological receptors and exposure pathways.

3.1 Constituents of Potential Ecological Concern

The COPECs for the Lower Yard are based on those identified in Section 3.1.3 of the Cleanup Levels and Remediation Levels Report (Arcadis 2013), and include arsenic, benzene, diesel-range organics (DRO), gasoline-range organics (GRO), heavy-oil-range organics (HRO), and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) and polycyclic aromatic hydrocarbons (PAHs). The cPAH constituents include, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene while the PAH constituents include 1-methyldnaphthalene and 2-methylnaphthalene and benzo(g,h,i)perylene

3.2 Ecological Receptors and Exposure Pathways

The exposure analysis determines the potential for exposure to ecological receptors that may either use or inhabit the Lower Yard. The ecological receptors and potential exposure pathways identified for the Lower Yard are discussed below.

3.2.1 Ecological Receptors

Ecological receptors may include soil biota, plants, or animals that have the potential to be affected by chemical contamination (Ecology 2017a). An exposure pathway refers to the way an ecological receptor can contact hazardous substances. Certain pathways may be deemed incomplete due to the presence of manmade physical barriers, either currently existing or to be placed in the future as part of a future land use or a final remedy approved by Ecology (Ecology 2017a). These barriers may include (but are not limited to) parking lots, foundations, or geotextile membranes.

As described in Section 2.2, the Lower Yard primarily is comprised of compacted dirt and gravel with vegetative cover along the perimeter. Portions of the Lower Yard consist of paved areas (including Unoco Road) and an area south of upper Unoco Road. Although the Lower Yard provides minimal terrestrial habitat, the adjacent marsh area is identified as an important ecological resource. Terrestrial ecological receptors at the Lower Yard may include plants, soil invertebrates, and terrestrial wildlife (i.e., birds, mammals, and reptiles/amphibians).

3.2.2 Potential Exposure Pathways

At the Lower Yard, plants may be exposed to COPECs via direct contact with soil, and soil invertebrates may be exposed to COPECs via direct contact and ingestion. Wildlife may be exposed to COPECs via direct contact, incidental ingestion, and to bioaccumulative compounds via uptake in the foodweb and dietary exposure. The ecological conceptual site model is shown on Figure B-5 and summarizes contaminant sources, release mechanisms, and potential routes of exposure and receptors.

3.2.3 Threatened and Endangered Species

A review of state and federally listed threatened and endangered species that may occur near the Lower Yard or onsite was conducted using the U.S. Fish & Wildlife Service's (USFWS's) Integrated Planning and Consultation online resource tool. According to the USFWS (2023), in Snohomish County the endangered species potentially found include gray wolf and Taylor's checkerspot, and threatened species potentially found include Canada lynx, marble murrelet, northern spotted owl, yellow-billed cuckoo, bull trout, and whitebark pine. These species are unlikely to occur within the Lower Yard due to the limited available habitat and have not been observed onsite.

According to the Washington Department of Fish & Wildlife (WDFW [2023a]), species considered endangered in Washington are fin whale, sei whale, blue whale, humpback whale, North Pacific right whale, sperm whale, killer whale, gray wolf, grizzly bear, lynx, fisher, cascade red fox, woodland caribou, pygmy rabbit, sandhill crane, snowy plover, upland sandpiper, marbled murrelet, tufted puffin, Columbian sharp-tailed grouse, greater sage-grouse, ferruginous hawk, northern spotted owl, yellow-billed cuckoo, streaked horned lark, Oregon vesper sparrow, northwestern pond turtle, leatherback sea turtle, loggerhead sea turtle, Oregon spotted frog, northern leopard frog, Oregon silverspot butterfly, Taylor's checkerspot, mardon skipper, and pinto abalone. Species considered threatened in Washington state include sea otter, western gray squirrel, mazama pocket gopher, Columbian white-tailed deer, and green sea turtle (WDFW 2023a). These threatened and endangered species have not been observed onsite and are unlikely to occur on the Lower Yard given the limited habitat. The WDFW Priority Habitat and Species Report for the Site (Attachment B-3) supports the lack of threatened and endangered species expected to be present at the Lower Yard.

4 Selection of Appropriate Terrestrial Ecological Evaluation Methods

According to Ecology (2017a), if it is determined during the problem formulation that further evaluation is necessary, several methods can be used to evaluate potential terrestrial ecological effects, including comparing sit-specific data to table values, soil bioassays, wildlife exposure modeling, and site-specific field studies. The approach used in this TEE Report is the comparison of site-specific data to ecologically protective soil values (PSVs). This approach includes identifying the point of compliance (POC) and PSVs.

4.1 Point of Compliance

For the TEE, the conditional POC is set as the biologically active soil zone for sites with institutional controls to prevent deeper soil excavation. According to Ecology (2017a), a POC is the point (or points) where cleanup levels established in accordance with Model Toxics Control Act (MTCA) requirements will be attained. This term includes both the standard and conditional POC. Specifically, the standard POC for cleanup levels developed under the TEE process is throughout soil in the Lower Yard, from the ground surface to a depth of 15 feet bgs. This represents a reasonable estimate of the depth of soil that could be excavated and then redistributed at the soil surface from redevelopment activities, with the subsequent potential for ecological receptors to be exposed to contamination.

Used in conjunction with institutional controls to prevent excavation of deeper soils, a conditional POC may be set to a depth of 6 feet (Ecology 2017a). This depth is assumed to represent the biologically active zone. In addition, Ecology may approve a site-specific depth based on a demonstration that the alternative depth is more appropriate for the Lower Yard. The following items will be considered to demonstrate an alternative soil depth (Ecology 2017a):

- Depth to which soil macroinvertebrates are likely to occur
- Depth to which soil turnover is likely to occur due to the activities of soil invertebrates
- Depth to which animals likely to occur at the Site are expected to burrow
- Depth to which plant roots are likely to extend
- The presence of a manmade subsurface biological barrier (e.g., geomembrane cap or cobble barrier designed to limit penetration by plant roots and burrowing animals).

The default conditional POC for ecological receptors is typically assumed to be 0 to 6 feet. However, given the limited habitat and coarse gravel generally covering the Lower Yard, an alternative (site-specific) POC of 0 to 4 feet is proposed for this TEE. A conditional POC pursuant to WAC 173-340-7490(4) (a) is described in this TEE Report and is based on plant rooting depth, bioturbation, soil biota, and burrowing wildlife. A conditional site-specific POC of 0 to 4 feet remains protective of ecological receptors at the Lower Yard. For example, for most ecological receptors, United States Environmental Protection Agency (USEPA [2015a]) guidance indicates that the standard assumption for the biologically active zone is 1 to 2 feet bgs, although a deeper soil interval may be appropriate if burrowing animals are present onsite. The limited habitat at the Lower Yard and barren soil and gravel cover limits the attractiveness of the area to burrowing animals. Similarly, the USEPA (2015b) recommends a sampling depth of 25 to 30 centimeters (approximately 0.8 to 1 foot) when using constant depths as opposed to an adaptive approach.

An alternative site-specific POC of 0 to 4 feet is appropriate for the Lower Yard based on the following:

- *Shallow groundwater*. Groundwater has been measured at depths less than 4 feet bgs at 18 wells across the Lower Yard. The occurrence of saturated soil across much of the Lower Yard prevents ecological exposure to deeper soils. Historical depth to water using the shallowest measured groundwater occurrence in wells between 2014 and 2024 is shown on Figure B-3.
- *Protection of plants*. Given the compacted soil and gravel surface, plants occur sporadically across the Lower Yard and primarily only along the perimeter. Most vegetation on the inner portion of the Lower Yard is grasses and forbs, which have fairly shallow roots. The few trees in the area appear healthy.
- *Protection of soil biota*. Soil invertebrates are found in most environments, and earthworms are frequently the most prolific soil biota. The typical depth where earthworms are encountered is assumed to reach 3 feet bgs. Also, gravel contains low amounts of organic matter, which is required by soil invertebrates. Organic matter provides the food base and is vitally important in determining the distribution and abundance of soil biota. There is a highly significant correlation between earthworm density and soil organic content (Curry 1998). The main source of organic matter on which earthworms feed is litter from aboveground plant parts in most ecosystems, although dead roots and rhizodeposition can also be important sources (Curry 1998). The low abundance of plants throughout much of the Lower Yard contributes minimal organic matter to soil. Also, compacted soil decreases burrowing activity by soil invertebrates (Capowiez et al. 2021). Therefore, it is expected that any soil invertebrates at the Lower Yard will remain closer to the surface (e.g., the upper 2 feet).
- *Protection of wildlife*. Birds and mammals may burrow and be exposed to soil at depth. Some small mammal species (e.g., chipmunks) tend to seek the refuge provided by large boulders, trees, and shrubs, and areas devoid of these features will have very low chances of attracting these animals (Gano and States 1982). Soil texture is another very important factor in habitat selection. Several species of burrowing mammals (e.g., ground squirrels) prefer fine-textured soil. Burrowing by small mammals can be discouraged by soil textures unattractive to endemic burrowing rodents (Gano and States 1982). Other burrowing mammals (e.g., Townsend mole) create surface tunnels that are located 3 to 12 inches below the surface but may be as deep as 40 inches (WDFW 2023b). Therefore, it is expected that wildlife at the Lower Yard will remain closer to the surface (e.g., the upper 1 foot), with infrequent exposure at deeper intervals (e.g., to a depth of less than 4 feet).

In addition to the default POC of 0 to 15 feet bgs, an alternative (site-specific) POC of 0 to 4 feet bgs will be evaluated as a cleanup option. If this alternative POC is approved by Ecology, an institutional control will be added as a deed restriction to the Lower Yard to prevent excavation of deeper soils.

4.2 Ecologically Protective Soil Values

The Technical Document: Terrestrial Ecological Evaluations under the Model Toxics Control Act (Ecology 2017a) states that establishing ecologically protective soil concentrations is required when the simplified TEE process cannot be ended under any of the simplified analysis criteria (i.e., exposure analysis, pathways analysis, and toxicity analysis). Ecological PSVs are available from WAC 173-340-7492 (Table 749-2 [Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure]) and WAC 173-340-7493 (Table 749-3 [Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and

Animals]). The values from Table 749-2 were developed for use at sites where a site-specific TEE is not required, and the values from Table 749-3 represent soil concentrations that are expected to be protective at any MTCA site. These concentrations may be used to satisfy the literature survey requirements for conducting a site-specific TEE, per WAC 173-340-7493(3)(a)(i) and (ii) and should be used by those conducting TEEs at MTCA cleanup sites (Ecology 2017a).

The TEE compares the soil COPEC concentrations to PSVs. The COPECs are based on the indicator hazardous substances (IHSs) in the Lower Yard. Specifically, the Agreed Order No. DE 4460 (Ecology 2017c) and subsequent interim action identified IHSs based on the understanding of previous Site activities and history. Based on this initial understanding, an MTCA Method B approach was used to determine cleanup standards for the Lower Yard. The Interim Action Work Plan (IAWP; SLR International Corporation [SLR] 2007) identified the IHSs as total petroleum hydrocarbons (TPH [sum of GRO, DRO, HRO]), benzene, cPAHs (adjusted for human health toxicity), and arsenic (for direct contact only). Arsenic was identified as an IHS only in the southwestern portion of the Lower Yard.

For this TEE, two sets of PSVs are identified for DRO and GRO (the primary COPECs). These values include site-specific TEE values (DRO + HRO = 260 milligrams per kilogram [mg/kg]; GRO = 120 mg/kg) and generic TEE values (DRO + HRO = 460 mg/kg; GRO = 200 mg/kg). As further described in Section 5, the more conservative soil screening values for site-specific TEEs are applied to those portions of the Lower Yard that are adjacent to better habitat (i.e., Edmonds Marsh and Willow Creek). The less conservative soil screening values for generic TEEs are applied to interior portions of the Lower Yard because these areas provide relatively poor habitat and limited potential for ecological exposure. The buffer zone adjacent to better habitat and the interior portion of the Lower Yard are shown on Figure B-6.

The PSVs for arsenic (10 mg/kg), 1, methylnaphthalene (29 mg/kg),2-methylnaphthalene (29 mg/kg), benzo(a)anthracene (1.1 mg/kg), benzo(a)pyrene (12 mg/kg), benzo(b)fluoranthene (1.1 mg/kg), benzo(k)fluoranthene (1.1 mg/kg), chrysene (1.1 mg/kg), dibenz(a,h)anthracene (1.1 mg/kg),indeno(1,2,3-cd)pyrene (1.1 mg/kg) and benzo(g,h,i)pyrelene (1.1 mg/kg) are the minimum of the plant, soil biota, and wildlife values from WAC 173-340-7493, Table 749-3 or USEPAs Eco SSLs for PAHs. Ecology guidance documents do not provide an PSV for benzene. Therefore, the benzene screening level of 0.12 mg/kg was selected from the USEPA Region 4 guidance (USEPA 2018). The benzene value is based on predicted toxicity to soil invertebrates. The PSVs are presented in Table B-1, below.

Table B-1. Ecologically Protective Soil Values for use in the TEE

COPEC	PSV (mg/kg)	Source
Arsenic [1]	10 (buffer zone) 95 (interior zone)	WAC 173-340-7493, Tables 749-2 and 749-3
Benzene	0.12 (sitewide)	USEPA (2018)
Benzo(a)pyrene	12 (sitewide)	WAC 173-340-7493, Tables 749-2 and 749-3
1-Methylnapthalene 2-methylnaphthalene	29 (sitewide)	USEPA EcoSSLs for PAHs
Benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene Benzo(g,h,i)perylene	1.1(sitewide)	USEPA EcoSSLs for PAHs
DRO and HRO[2]	260 (buffer zone) 460 (interior zone)	Memorandum 19 (Ecology 2017b) and WAC 173-340-7493, Table 749-3
GRO	120 (buffer zone) 200 (interior zone)	Memorandum 19 (Ecology 2017b) and WAC 173-340-7493, Table 749-3

Notes:

[1] The value for arsenic assumes arsenic (V).

[2] The PSV for DRO is applied to cumulative DRO and HRO.

As described in Section 4.1**,** the default POC is 0 to 15 feet bgs and the alternative (site-specific) POC for these values is 0 to 4 feet bgs.

5 Risk Characterization

The risk characterization portion of the TEE compares the soil COPEC concentrations to PSVs and focuses on the IHS in the Lower Yard (TPH [sum of GRO, DRO, and HRO], benzene, cPAHs, and arsenic). The dataset includes all soil samples onsite except for soil samples currently covered by water in DB-1, which were considered sediment samples. The Lower Yard COPEC summary statistics for soil using the default POC (0 to 15 feet bgs) are presented in Table B-2. The Lower Yard COPEC summary statistics for soil using the site-specific alternate POC (0 to 4 feet bgs) within the proposed buffer zone are presented in Table B-3. The Lower Yard COPEC summary statistics for soil using the site-specific alternate POC (0 to 4 feet bgs) within the interior of the Lower Yard are presented in Table B-4. The analysis includes the number of detections, sample count, maximum detection, and 95 percent upper confidence limits (95% UCLs). Statistics were calculated using ProUCL Version 5.2 (USEPA 2022) and the ProUCL outputs are provided in Attachment B-4. The full dataset (0 to 15 feet bgs) used in the evaluation is presented in Attachment B-5. The results for each COPEC are summarized below.

5.1 Arsenic

Arsenic is naturally occurring; therefore, background concentrations are also considered. Ecology (1994) identifies the arsenic background value statewide and for the Puget Sound region as 7 mg/kg. Because the arsenic background value of 7 mg/kg is less than 10 mg/kg, the PSV of 10 mg/kg is selected as the applicable screening value for comparison with soil concentrations. Collection of arsenic data was limited to locations where sand blasting of tanks took place.

Based on the default POC (0 to 15 feet bgs), arsenic was detected in 58 of 59 soil samples, with a maximum detected concentration of 30.9 mg/kg. Concentrations in two of the 59 soil samples exceeded the PSV (10 mg/kg) and the arsenic 95% UCL (5.84 mg/kg) is less than this value with one sample exceeding twice the PSV. Soil sample locations for arsenic within the default POC are shown on Figure B-7A.

Based on the site-specific POC (0 to 4 feet bgs) in the interior area of the Lower Yard, arsenic was detected in 40 of 41 soil samples, with a maximum detected concentration of 30.9 mg/kg. All detected concentrations and the 95% UCL (6.38 mg/kg) were less than the PSV (95 mg/kg [WAC 173-340-7493, Table 749-2]).

Based on the site-specific POC (0 to 4 feet bgs) in the buffer area of the Lower Yard, arsenic was detected in 16 of 16 soil samples, with a maximum detected concentration of 10.6 mg/kg. Concentrations in one of the 16 soil samples exceeded the PSV (10 mg/kg) and the arsenic 95% UCL (5.59 mg/kg) is less than this value. The one soil sample in the buffer zone with an arsenic concentration greater than the PSV was located on the sidewall of DB-1 (DB1-A-30wall-3) collected in 2007

Because the 95% UCL for soil samples within the buffer zone and interior zone is less than the PSV, arsenic concentrations do not present an unacceptable ecological risk at the Lower Yard. Soil sample locations and results for arsenic within the alternative POC are shown on Figure B-7B.

5.2 Benzene

Based on the default POC (0 to 15 feet bgs), benzene was detected in 106 of 781 soil samples, with a maximum detected concentration of 33 mg/kg. Concentrations in 60 of the 781 soil samples exceeded the PSV (0.12 mg/kg) and the benzene 95% UCL (0.20 mg/kg) is also greater than this value. Soil sample locations and results for benzene within the default POC are shown on Figure B-8A.

Based on the site-specific POC (0 to 4 feet bgs) in the interior area of the Lower Yard, benzene was detected in 25 of 187 soil samples, with a maximum detected concentration of 4.47 mg/kg. Concentrations in 16 of the 189 soil samples exceeded the PSV (0.12 mg/kg) with 10 samples exceeding twice the PSV. The benzene 95% UCL (0.16 mg/kg) is greater than the PSV.

Based on the site-specific POC (0 to 4 feet bgs) in the buffer area of the Lower Yard, benzene was detected in four of 38 soil samples, with a maximum detected concentration of 0.26 mg/kg. The concentration in one of the 38 samples exceeded the twice the PSV (0.12 mg/kg). Insufficient detected concentrations were available in the buffer area for the site-specific POC (0 to 4 feet bgs); therefore, a 95% UCL was not calculated.

Soil sample locations and results for benzene within the alternative POC are shown on Figure B-8B.

Because the 95% UCL slightly exceeds the PSV in the interior of the Lower Yard and there are locations where benzene exceed twice the PSV. some additional remedial actions (including the addition of an engineered cover system following confirmation soil sampling) will be implemented to reduce potential ecological exposure to benzene. Addressing benzene impacts to within the alternative POC is part of updated remedial alternatives in the FS Addendum.

5.3 Carcinogenic Polycyclic Aromatic Hydrocarbons and Polycyclic Aromatic Hydrocarbons

Although the IAWP identified cPAHs as an IHS in the Lower Yard, carcinogenicity is not typically considered a relevant endpoint for ecological risk assessment. Historically, soil samples have been analyzed for the seven individual cPAHs [i.e., benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)flouoranthene, chrysene, dibenz(a,h)anthracene and indeno(1,2,3-cd)pyrene]. Additionally PAHs including 1-methylnapthalene, 2-benthylnapthalene and benzo(g,h,i)perylene were also samples. The cPAH constituents were then adjusted for toxicity per WAC 173-340-708(8). Comparing individual PAHs and cPAHs to their respective PSVs based on the default POC (0 to 15 feet bgs), none of the cPAH or PAH constituents were detected above their respective PSVs.

PAH and cPAH concentrations do not present an unacceptable ecological risk at the Lower Yard; therefore, an assessment of the alternative POC is not needed.

5.4 Diesel-Range Organics and Heavy-Oil-Range Organics

Based on the default POC (0 to 15 feet bgs), the maximum cumulative DRO and HRO result was 14,600 mg/kg. Concentrations in 104 of the 780 soil samples exceeded the PSV (260 mg/kg) and the DRO and HRO 95% UCL (290.6 mg/kg) is greater than this value. Soil sample locations and results for DRO and HRO within the default POC are shown on Figure B-9A.

Based on the site-specific POC (0 to 4 feet bgs) for the interior portion of the Lower Yard (outside of the buffer), the maximum cumulative DRO and HRO result was 9,970 mg/kg. Concentrations in 19 of the 187 soil samples exceeded the PSV (460 mg/kg) and the 95% UCL for cumulative DRO and HRO (334.5 mg/kg) is less than this value; however, 11 samples in the interior Lower Yard exceeded twice the PSV.

Based on the site-specific POC (0 to 4 feet bgs) for the buffer area of the Lower Yard, the maximum cumulative DRO and HRO result was 2,288 mg/kg. Concentrations in 12 of the 37 soil samples exceeded the PSV (260 mg/kg) and the 95% UCL for cumulative DRO and HRO (538.7 mg/kg) is greater than this value. Soil sample locations and results for DRO and HRO within the alternative POC are shown on Figure B-9B.

Given that the 95% UCL exceeds the PSV in the buffer area, greater than 10 percent of the samples exceeded the PSV in the buffer zone, and 11 samples exceeded twice the PSV in the Site interior, some additional remedial actions (including the addition of an engineered cover system following confirmation soil sampling) will be implemented to reduce potential ecological exposure to DRO and HRO. Details of potential additional remedial actions are discussed in the FS Addendum.

5.5 Gasoline-Range Organics

Based on the default POC (0 to 15 feet bgs), GRO was detected in 240 of 781 soil samples, with a maximum concentration of 3,100 mg/kg. Concentrations in 50 of the 781 soil samples exceeded the PSV (120 mg/kg) and the 95% UCL (71.5 mg/kg) is less than this value. GRO concentrations do not present an unacceptable ecological risk at the Lower Yard; therefore, an assessment of the alternative POC is not needed. Soil sample locations and results for GRO within the default POC are shown on Figure B-10A.

6 Summary

This TEE Report was prepared in accordance with the Technical Document: Terrestrial Ecological Evaluations under the Model Toxics Control Act (Ecology 2017a). The TEE identifies habitat and wildlife populations, including species requiring an additional level of protection. A site-specific TEE is required because although the Lower Yard only provides marginal habitat for ecological receptors, higher quality habitat exists adjacent to the Lower Yard in Edmonds Marsh and the adjacent tributary.

Four vegetation communities are found at the Lower Yard and adjacent areas, including emergent wetlands, forested/shrub wetlands, upland forest, and disturbed upland habitat. The majority of the Lower Yard consists of highly altered topography that is sparsely vegetated by non-native species. The habitat value of the disturbed areas of the Lower Yard is low due to sparse vegetative cover, low species diversity, and human activity, which limit wildlife use.

The approach used in this TEE Report is the comparison of Site data to PSVs. This approach includes identifying the POC and PSVs. The standard POC of 0 to 15 feet bgs and an alternative site-specific POC of 0 to 4 feet bgs were evaluated for the TEE of the Lower Yard.

The TEE compares the soil COPEC concentrations to PSVs. The COPECs are based on the IHS in the Lower Yard, which are GRO, the sum of DRO and HRO, benzene, PAHs, cPAHs, and arsenic. The PSVs are from WAC 173-340-7492 (Table 749-2), WAC 173-340-7493 (Table 749-3), USEPA EcoSSLs and USEPA (2018) Region 4 guidance. For this TEE, two sets of PSVs are identified for arsenic the sum of DRO and HRO (the primary COPECs). GRO, PAHs and cPAHs are in compliance for the ecological assessment for 0 to 15 feet bgs and therefore do not need an alternative POC assessment. The more conservative soil screening values for site-specific TEEs are applied to the standard POC (0 to 15 feet bgs) . The more conservative soil screening values are also applied to those portions of the Lower Yard that are adjacent to better habitat (i.e., Edmonds Marsh and Willow Creek) for the alternative site-specific POC (0 to 4 feet bgs). The less conservative soil screening values for generic TEEs are applied to interior portions of the Lower Yard for the alternative site-specific POC (0 to 4 feet bgs) because these areas provide relatively poor habitat and limited potential for ecological exposure.

Comparison of the Lower Yard soil data to PSVs indicates that additional remedial actions are required for soils within the Lower Yard interior and buffer zone to mitigate residual concentrations of benzene, DRO, and HRO. Some soil data used for comparison to PSVs are over 22 years old. Prior to implementation of any remedial strategy to address protection of ecological receptors, additional soil sampling will occur. The soil sampling and potential additional remedial actions are discussed in the FS Addendum.

7 References

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Tables

Table B-2 Constituent of Potential Ecological Concern Summary Statistics
(Point of Compliance, 0 to 15 feet bgs)
Appendix B – Site-Specific Terrestrial Ecological Evaluation
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

ARCADIS

Constituent of Potential Ecological Concern	Cleanup Level (mg/kg)	Number of Detections	Sample Size	Maximum Detect or Result[3]	95% UCL (mg/kg)	Number of Samples Exceeding CUL	Percent of Samples Exceeding CUL	Does UCL Exceed CUL?	Samples Exceeding 2 Times CUL
Arsenic	10	58	59	30.9	5.84	3 out of 59	5.1%	No	1 out of 59
Benzene[1]	0.12	106	781	33.0	0.20	60 out of 781	7.7%	Yes	25 out of 781
DRO+HRO[2]	260	310	780	14,600	290.6	104 out of 780	13%	Yes	NA
Gasoline-range organics	120	240	781	3,100	71.5	50 out of 781	6.4%	No	NA

Notes:

[1] Reported sample values should be less than 2 times the CUL and less than 10 percent of samples exceed the CUL.

[2] Results for DRO+HRO are the sum of multiple results that may include nondetect concentrations. Nondetects were incorporated in the calculations as one-half of the analytical limit. If parent and field duplicate results were reported, the maximum of two detections was selected, the minimum of two nondetect concentrations was selected, or the detected concentration was selected if one detection and one nondetect concentration were reported.

[3] Maximum detect is presented for arsenic, benzene, and gasoline-range organics. Maximum calculated result is presented for DRO+HRO.

1. For all nondetect values, one-half of the analytical limit was screened against the CUL. For results that are the sum of multiple concentrations (i.e., DRO+HRO and cPAHs), the full result was screened against the CUL.

2. Red font indicates UCLs greater than the CUL or at least one sample exceeding 2 times the CUL.

Acronyms and Abbreviations:

95% UCL = 95 percent upper confidence limit
% = percent
bgs = below ground surface
cPAH = carcinogenic polycyclic aromatic hydrocarbon
CUL = cleanup level
DRO+HRO = sum of diesel-range organics and heavy-oil-range organics
mg/kg = milligram per kilogram
NA = not applicable
UCL = upper confidence limit

Constituent of Potential Ecological Concern	Cleanup Level (mg/kg)	Number of Detections	Sample Size	Maximum Detect or Result[3]	95% UCL (mg/kg)	Number of Samples Exceeding CUL	Percent of Samples Exceeding CUL	Does UCL Exceed CUL?	Samples Exceeding 2 Times CUL
Arsenic	10	16	16	10.6	5.59	1 out of 16	6.3%	No	0 out of 16
Benzene[1]	0.12	4	38	0.26	NC	1 out of 38	2.6%	NA	1 out of 38
DRO+HRO[2]	260	28	37	2,288	538.7	12 out of 37	32.4%	Yes	6 out of 37
Gasoline-range organics	120	11	38	356	55.0	2 out of 38	5.3%	No	1 out of 38

Notes:

[1] Reported sample values should be less than 2 times the CUL and less than 10 percent of samples exceed CUL.

[2] Results for DRO+HRO are the sum of multiple results that may include nondetect concentrations. Nondetects were incorporated in the calculations as one-half of the analytical limit. If parent and field duplicate results were reported, the maximum of two detections was selected, the minimum of two nondetect concentrations was selected, or the detected concentration was selected if one detection and one nondetect concentration were reported.

[3] Maximum detect is presented for arsenic, benzene, and gasoline-range organics. Maximum calculated result is presented for DRO+HRO.

1. For all nondetect values, one-half of the analytical limit was screened against the CUL. For results that are the sum of multiple concentrations (i.e., DRO+HRO and cPAHs), the full result was screened against the CUL.

2. Red font indicates UCLs greater than the CUL or at least one sample exceeding 2 times the CUL.

Acronyms and Abbreviations:

95% UCL = 95 percent upper confidence limit
% = percent
bgs = below ground surface
cPAH = carcinogenic polycyclic aromatic hydrocarbon
CUL = cleanup level
DRO+HRO = sum of diesel-range organics and heavy-oil-range organics
mg/kg = milligram per kilogram
NA = not applicable
NC = not calculated; insufficient data to calculate 95% UCL
UCL = upper confidence limit

Table B-4 Constituent of Potential Ecological Concern Summary Statistics
(Point of Compliance – Interior Zone, 0 to 4 feet bgs)
Appendix B – Site-Specific Terrestrial Ecological Evaluation
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

ARCADIS

Constituent of Potential Ecological Concern	Cleanup Level (mg/kg)	Number of Detections	Sample Size	Maximum Detect or Result[3]	95% UCL (mg/kg)	Number of Samples Exceeding CUL	Percent of Samples Exceeding CUL	Does UCL Exceed CUL?	Samples Exceeding 2 Times CUL
Arsenic[1]	95	40	41	30.9	6.38	0 out of 41	0.0%	No	0 out of 41
Benzene[1]	0.12	25	187	4.47	0.16	16 out of 187	8.6%	Yes	10 out of 187
DRO+HRO[1, 2]	460	100	187	9,970	334.5	19 out of 187	10%	No	11 out of 187
Gasoline-range organics[1]	200	69	187	2,440	96	14 out of 187	7.5%	No	10 out of 187

Notes:

[1] Reported sample values should be less than 2 times the CUL and less than 10 percent of samples exceed CUL.

[2] Results for DRO+HRO are the sum of multiple results that may include nondetect concentrations. Nondetects were incorporated in the calculations as one-half of the analytical limit. If parent and field duplicate results were reported, the maximum of two detections was selected, the minimum of two nondetect concentrations was selected, or the detected concentration was selected if one detection and one nondetect concentration were reported.

[3] Maximum detect is presented for arsenic, benzene, and gasoline-range organics. Maximum calculated result is presented for DRO+HRO.

1. For all nondetect values, one-half of the analytical limit was screened against the CUL. For results that are the sum of multiple concentrations (i.e., DRO+HRO and cPAHs), the full result was screened against the CUL.

2. Red font indicates UCL(s) greater than the CUL or at least one sample exceeding 2 times the CUL.

Acronyms and Abbreviations:

95% UCL = 95 percent upper confidence limit
% = percent
bgs = below ground surface
cPAH = carcinogenic polycyclic aromatic hydrocarbon
CUL = cleanup level
DRO+HRO = sum of diesel-range organics and heavy-oil-range organics
mg/kg = milligram per kilogram
UCL = upper confidence limit

Figures

REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., EDMONDS EAST AND WEST, WASHINGTON, 2023.

NOTE:
1. UNOCAL = UNION OIL COMPANY OF CALIFORNIA.

0 2000' 4000'
GRAPHIC SCALE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS BULK FUEL TERMINAL
EDMONDS, WASHINGTON

SITE-SPECIFIC TERRESTRIAL ECOLOGICAL EVALUATION

LOCATION MAP

ARCADIS

FIGURE
B-1

CITY: MINNEAPOLIS, MN DIV/GROUP: ENV/CAD DB: R. OBERLANDER LD: R. OBERLANDER PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* C:\Users\jadhavs7711\DC\ACCDocs\Arcadis ACC US\AUS-99999999-CHEV_FMR UNOCAL BULK FUEL_EDMONDS_WA\Project Files\10_WIP\10T_ARC_ENV\2024\01-DWG\GEN-F01-PRDCAP-SLM.dwg LAYOUT: B-1 SAVED: 7/19/2024 12:37 PM ACADVER: 24.2S (LMS TECH) PAGESETUP: --- PLOTSTYLETABLE: --- PLOTTED: 7/19/2024 3:56 PM BY: JADHAV, SHRUTI
XREFS: IMAGES: PROJECTNAME: ---
45362X0A WA_Edmonds_East_20230823_TM_geo.png WA_Edmonds_West_20230821_TM_geo.png Arcadis logo-2023.png

LEGEND

- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- LOWER YARD PROPERTY BOUNDARY

NOTES:
1. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
2. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

0 150 300
SCALE IN FEET

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS BULK FUEL TERMINAL
EDMONDS, WASHINGTON

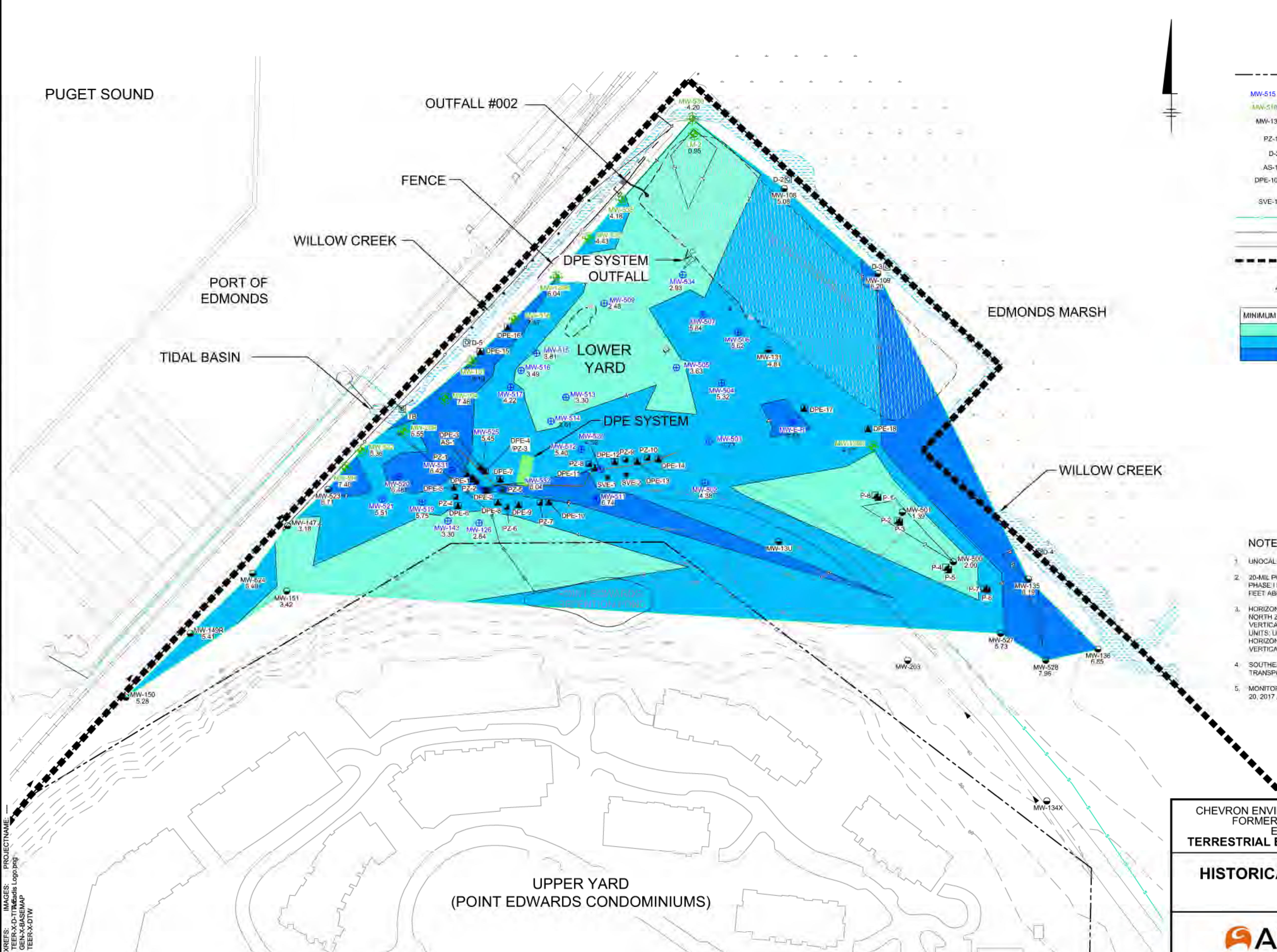
TERRESTRIAL ECOLOGICAL EVALUATION REPORT

SITE MAP

ARCADIS

FIGURE
B-**2**

Path: T:_ENV\Chevron_Edmonds\ArcPro\Exceedances.aprx\Fig2 Site Map Last Saved By: ksinsabaugh 5/31/2024



LEGEND:

- FORMER UNOCAL BULK FUEL TERMINAL PROPERTY BOUNDARY
- MW-515 INTERIOR MONITORING WELL LOCATION
- MW-518 PERIMETER MONITORING WELL LOCATION
- MW-13 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- D-2 STAFF GAUGE LOCATION
- AS-1 AIR SPARGE WELL LOCATION
- DPE-10 DUAL PHASE EXTRACTION (DPE) WELL LOCATION
- SVE-1 SOIL VAPOR EXTRACTION (SVE) WELL LOCATION
- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- 20-MIL POLYETHYLENE SHEETING
- SITE BOUNDARY
- TB TIDAL BASIN GAUGE
- 4.17 DEPTH TO WATER

MINIMUM DEPTH TO WATER OBSERVED FROM 2014 TO 2024	
	BETWEEN 0 AND 4 FEET
	BETWEEN 4 AND 6 FEET
	OVER 6 FEET

NOTES:

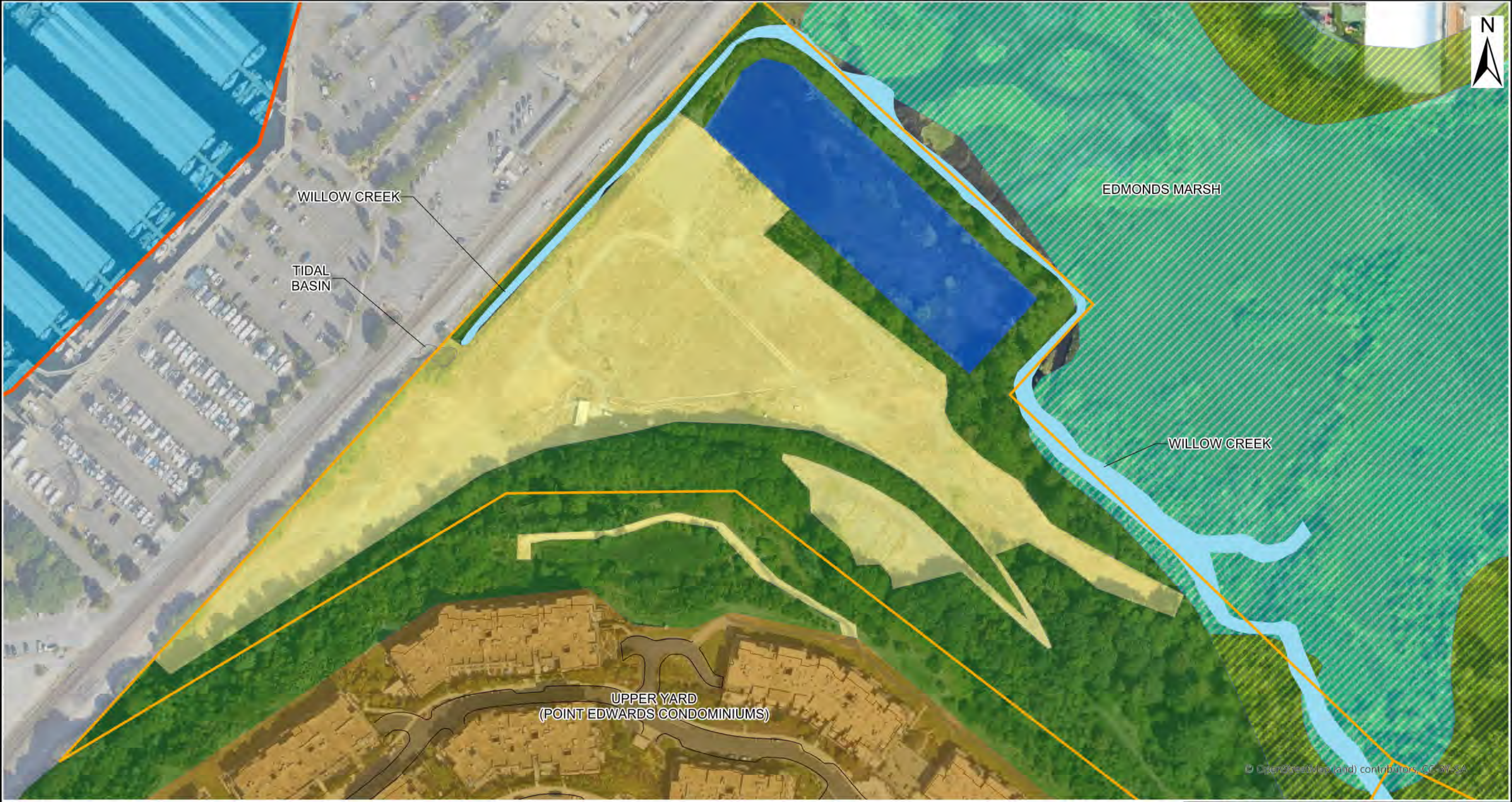
1. UNOCAL = UNION OIL COMPANY OF CALIFORNIA.
2. 20-MIL POLYETHYLENE SHEETING INSTALLED UPON COMPLETION OF PHASE I EXCAVATION. SHEETING REACHES TO APPROXIMATELY 7.5 FEET ABOVE MEAN SEA LEVEL
3. HORIZONTAL DATUM: WASHINGTON STATE COORDINATE SYSTEM NORTH ZONE NORTH AMERICAN DATUM OF 1983/1998.
VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988
UNITS: U.S. SURVEY FEET
HORIZONTAL AND VERTICAL CONTROL ESTABLISHED BY GPS VIA VERTICAL REFERENCE STATION NETWORK.
4. SOUTHEAST PORTION OF WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STORMWATER LINE HAS NOT BEEN SURVEYED.
5. MONITORING WELL MW-E WAS RE-INSTALLED IN PLACE ON OCTOBER 20, 2017 AND RENAMED MW-E-R.

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON
TERRESTRIAL ECOLOGICAL EVALUATION REPORT

HISTORICAL HIGH GROUNDWATER DEPTHS

ARCADIS

FIGURE
B-3



LEGEND

LOWER YARD PROPERTY BOUNDARY

CRITICAL HABITAT - BULL TROUT

NWI WETLAND

- FRESHWATER EMERGENT
- FRESHWATER FOREST/SHRUB

COVER TYPE

- COMMERICAL/INDUSTRIAL
- DETENTION BASIN
- DISTURBED GRAVEL/FILL/PAVED
- FOREST/SHRUB
- PORT OF EDMONDS/PUGET SOUND
- RESIDENTIAL

NOTES:
1. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
2. NWI = NATIONAL WETLANDS INVENTORY
3. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

0 150 300
SCALE IN FEET

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS BULK FUEL TERMINAL
EDMONDS, WASHINGTON

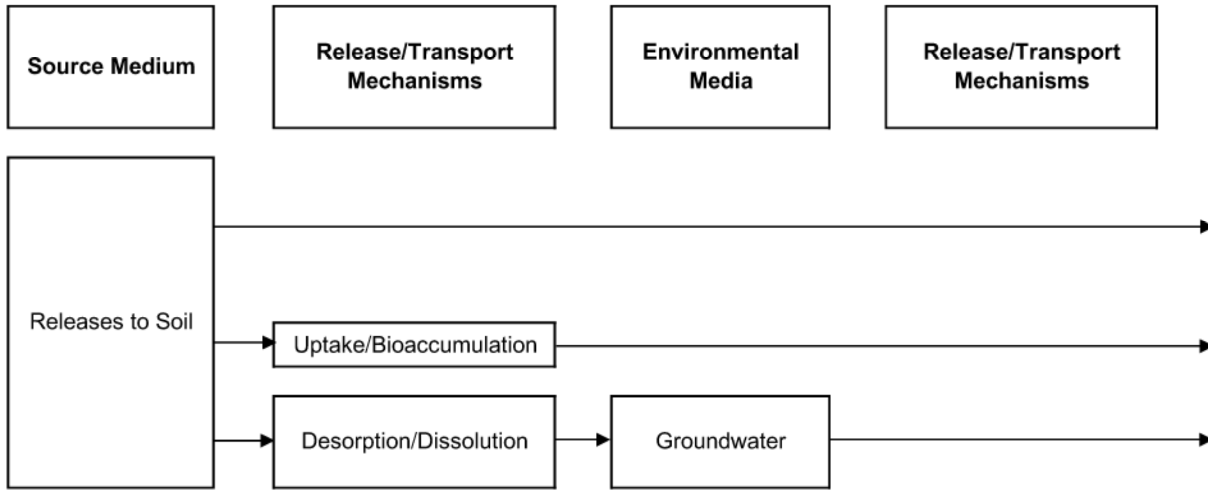
TERRESTRIAL ECOLOGICAL EVALUATION REPORT

COVERTYPE MAP

ARCADIS

FIGURE
B-4

Path: T:_ENV\Chevron_Edmonds\MrsPro\Exceedances.aprx\FigB-4 CovertypeMap Last Saved By: ksinsabaugh 7/23/2024



Exposure Media	Exposure Route	Terrestrial Ecological Receptors[2]			
		Plants	Soil Invertebrates	Birds	Mammals
Soil[1]	Ingestion	○	●	●	●
	Direct Contact	●	●	●	●
	Inhalation (dust)	○	○	○	○
Terrestrial Biota	Ingestion	○	○	◐	◐
Groundwater	Drinking Water Ingestion	○	○	○	○
	Direct Contact	○	○	○	○

Legend:
- ● = Complete Exposure Pathway
- ◐ = Potentially Complete Exposure Pathway
- ○ = Incomplete Exposure Pathway

Note:
[1] The soil depth standard point of compliance is 0 to 15 feet and the alternative point of compliance is 0 to 4 feet. Additional details are provided in the Site-Specific Terrestrial Ecological Evaluation.
[2] The focus of the Site-Specific Terrestrial Ecological Evaluation is specific to terrestrial exposure pathways and does not include potential exposure to aquatic media (i.e., surface water, sediment).

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FORMER UNOCAL EDMONDS BULK FUEL TERMINAL
EDMONDS, WASHINGTON
TERRESTRIAL ECOLOGICAL EVALUATION

ECOLOGICAL CONCEPTUAL SITE MODEL

ARCADIS

Figure
B- 5

LEGEND

- WSDOT STORMWATER LINE
- POINT EDWARDS STORM DRAIN LINE
- LOWER YARD PROPERTY BOUNDARY
- BUFFER ZONE
- INTERNAL ZONE

NOTES:
1. SOUTHEAST PORTION OF WSDOT STORMWATER LINE HAS NOT BEEN SURVEYED.
2. WSDOT = WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL EDMONDS BULK FUEL TERMINAL
EDMONDS, WASHINGTON

TERRESTRIAL ECOLOGICAL EVALUATION REPORT

PROPOSED REMEDIAL ZONES

ARCADIS

FIGURE
B-6

Path: T:_ENV\Chevron_Edmonds\ArcPro\Exceedances.aprx\FigB-6 PropRemZones Last Saved By: ksinsabaugh 7/23/2024

LEGEND

ARSENIC RESULT (mg/kg)
- ≤ 10
- > 10

- DETENTION BASIN
- 10 METER CREEK BUFFER
- WILLOW CREEK
- FEATURES
- ROAD
- BUILDING

0 150 300
SCALE IN FEET

NOTES:
1. 95% UCL = 95 PERCENT UPPER CONFIDENCE LIMIT
2. < = LESS THAN
3. > = GREATER THAN
4. ≤ = LESS THAN OR EQUAL TO
5. bgs = BELOW GROUND SURFACE
6. COPEC = CONSTITUENT OF POTENTIAL ECOLOGICAL CONCERN
7. CUL = CLEANUP LEVEL
8. mg/kg = MILLIGRAM PER KILOGRAM

CULs:
10 mg/kg ARSENIC (FROM TABLE 749-3)

95% UCL:
5.839 mg/kg ARSENIC

95% UCL < CUL

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

TERRESTRIAL ECOLOGICAL EVALUATION REPORT

SOIL COPEC CONCENTRATIONS ARSENIC STANDARD POINT OF COMPLIANCE 0 - 15 FEET BGS

ARCADIS

FIGURE
B-7A

Path: T:_ENV\Chevron_Edmonds\ArcPro\Exceedances.aprx\FigB-7A Arsenic 0-15 ft depth Last Saved By: ksinsabaugh 7/23/2024

LEGEND

ARSENIC RESULT IN BUFFER ZONE (mg/kg)
- ≤ 10
- > 10

ARSENIC RESULT-SITE INTERIOR (mg/kg)
- ≤ 95
- > 95

DETENTION BASIN
10 METER CREEK BUFFER
WILLOW CREEK
FEATURES
ROAD
BUILDING

0 150 300
SCALE IN FEET

NOTES:
1. 95% UCL = 95 PERCENT UPPER CONFIDENCE LIMIT
2. < = LESS THAN
3. > = GREATER THAN
4. ≤ = LESS THAN OR EQUAL TO
5. bgs = BELOW GROUND SURFACE
6. COPEC = CONSTITUENT OF POTENTIAL ECOLOGICAL CONCERN
7. CUL = CLEANUP LEVEL
8. mg/kg = MILLIGRAM PER KILOGRAM

BUFFER ZONE:
ECOLOGICALLY PROTECTIVE SOIL VALUE:
10 mg/kg ARSENIC (FROM TABLE 749.3)

95% UCL: 5.591 mg/kg ARSENIC

95% UCL<CUL THEREFORE DETECTIONS ARE STATISTICALLY INSIGNIFICANT

INTERIOR SITE:
ECOLOGICALLY PROTECTIVE SOIL VALUE:
95 mg/kg ARSENIC (FROM TABLE 749.2)

95% UCL: 6.376 mg/kg ARSENIC

DOES NOT EXCEED 3 PART RULE THEREFORE DETECTIONS ARE STATISTICALLY INSIGNIFICANT

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

TERRESTRIAL ECOLOGICAL EVALUATION REPORT

SOIL COPEC CONCENTRATIONS ARSENIC ALTERNATIVE POINT OF COMPLIANCE 0 - 4 FEET BGS

ARCADIS

FIGURE
B-7B

Path: T:_ENV\Chevron_Edmonds\ArcPro\Exceedances.aprx\FigB-7B Arsenic 0-4 ft depth Last Saved By: ksinsabaugh 7/23/2024

Path: T:_ENV\Chevron_Edmonds\ArcPro\Exceedances.aprx\FigB-8A Benzene 0-15 ft depth   Last Saved By: ksinsabaugh   7/23/2024

LEGEND

BENZENE RESULT (mg/kg)
- ≤ 0.12
- 0.12 - 0.24
- > 0.24

DETENTION BASIN
WILLOW CREEK
FEATURES
ROAD
BUILDING

0 150 300
SCALE IN FEET

NOTES:
1. 95% UCL = 95 PERCENT UPPER CONFIDENCE LIMIT
2. > = GREATER THAN
3. ≤ = LESS THAN OR EQUAL TO
4. bgs = BELOW GROUND SURFACE
5. COPEC = CONSTITUENT OF POTENTIAL ECOLOGICAL CONCERN
6. CUL = CLEANUP LEVEL
7. mg/kg = MILLIGRAM PER KILOGRAM

ECOLOGICALLY PROTECTIVE SOIL VALUE:
0.12 mg/kg BENZENE

95% UCL: 0.204 mg/kg BENZENE

95% UCL > CUL SEE ALTERNATIVE POINT OF COMPLIANCE

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

TERRESTRIAL ECOLOGICAL EVALUATION REPORT

SOIL COPEC CONCENTRATIONS BENZENE STANDARD POINT OF COMPLIANCE 0 - 15 FEET BGS

ARCADIS

FIGURE
B-8A

LEGEND

BENZENE RESULT (mg/kg)

- ≤ 0.12
- 0.12 - 0.24
- > 0.24

- DETENTION BASIN
- 10 METER CREEK BUFFER
- WILLOW CREEK
- FEATURES
- ROAD
- BUILDING

0 150 300

SCALE IN FEET

NOTES:
1. 95% UCL = 95 PERCENT UPPER CONFIDENCE LIMIT
2. < = LESS THAN
3. > = GREATER THAN
4. ≤ = LESS THAN OR EQUAL TO
5. bgs = BELOW GROUND SURFACE
6. COPEC = CONSTITUENT OF POTENTIAL ECOLOGICAL CONCERN
7. CUL = CLEANUP LEVEL
8. mg/kg = MILLIGRAM PER KILOGRAM
9. NA = NOT APPLICABLE

BUFFER ZONE:
ECOLOGICALLY PROTECTIVE SOIL VALUE:
0.12 mg/kg BENZENE

95% UCL: NA

INTERIOR SITE:
ECOLOGICALLY PROTECTIVE SOIL VALUE:
0.12 mg/kg BENZENE

95% UCL: 0.154 mg/kg BENZENE

95% UCL>CUL
<10% EXCEED CUL
10 SAMPLES EXCEED 2 TIMES CUL

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

TERRESTRIAL ECOLOGICAL EVALUATION REPORT

SOIL COPEC CONCENTRATIONS BENZENE ALTERNATIVE POINT OF COMPLIANCE 0 - 4 FEET BGS

ARCADIS

FIGURE

B-8B

Path: T:_ENV\Chevron_Edmonds\ArcPro\Exceedances.aprx\FigB-8B Benzene 0-4 ft depth Last Saved By: ksinsabaugh 7/23/2024

LEGEND

DRO + HRO RESULT (mg/kg)
- ≤ 260
- >260

- DETENTION BASIN
- WILLOW CREEK
- FEATURES
- ROAD
- BUILDING

0 150 300
SCALE IN FEET

NOTES:
1. 95% UCL = 95 PERCENT UPPER CONFIDENCE LIMIT
2. > = GREATER THAN
3. ≤ = LESS THAN OR EQUAL TO
4. bgs = BELOW GROUND SURFACE
5. COPEC = CONSTITUENT OF POTENTIAL ECOLOGICAL CONCERN
6. CUL = CLEANUP LEVEL
7. DRO = DIESEL-RANGE ORGANICS
8. ECOLOGY = WASHINGTON STATE DEPARTMENT OF ECOLOGY
9. ECOLOGY. 2017. IMPLEMENTATION MEMORANDUM NO. 19: GASOLINE AND DIESEL SOIL CONCENTRATIONS PREDICTED TO BE PROTECTIVE OF UPLAND ECOLOGICAL RECEPTORS. AUGUST 2017 PUBLICATION NO. 17-09-051.
10. HRO = HEAVY-OIL-RANGE ORGANICS
11. mg/kg = MILLIGRAM PER KILOGRAM

ECOLOGICALLY PROTECTIVE SOIL VALUE:
260 mg/kg DRO + HRO (FROM IMPLEMENTATION MEMORANDUM NO. 19 (ECOLOGY 2017) AND TABLE 749-3)

95% UCL: 290.6 mg/kg DRO + HRO

95% UCL > CUL

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

TERRESTRIAL ECOLOGICAL EVALUATION REPORT

SOIL COPEC CONCENTRATIONS DRO + HRO STANDARD POINT OF COMPLIANCE 0 - 15 FEET BGS

ARCADIS

FIGURE
B- 9 A

Path: T:_ENV\Chevron_Edmonds\...\ProExceedances.aprx\FigB-10A DRO HO 0-15 ft depth Last Saved By: ksinsabaugh 7/24/2024

Path: T:_ENV\Chevron_Edmonds\ArcPro\Exceedances.aprx\FigB-10B DRO HO 0-4 ft depth   Last Saved By: ksinsabaugh 7/24/2024

LEGEND

BUFFER ZONE
DRO + HRO RESULT (mg/kg)
- ≤ 260
- > 260

INTERIOR
DRO + HRO RESULT (mg/kg)
- ≤ 460
- 460 - 920
- > 920

- WILLOW CREEK
- 10 METER CREEK BUFFER
- DETENTION BASIN
- FEATURES
- ROAD
- BUILDING

0 150 300
SCALE IN FEET

NOTES:
1. 95% UCL = 95 PERCENT UPPER CONFIDENCE LIMIT
2. > = GREATER THAN
3. ≤ = LESS THAN OR EQUAL TO
4. bgs = BELOW GROUND SURFACE
5. COPEC = CONSTITUENT OF POTENTIAL ECOLOGICAL CONCERN
6. CUL = CLEANUP LEVEL
7. DRO = DIESEL-RANGE ORGANICS
8. ECOLOGY = WASHINGTON STATE DEPARTMENT OF ECOLOGY
9. ECOLOGY, 2017. IMPLEMENTATION MEMORANDUM NO. 19: GASOLINE AND DIESEL SOIL CONCENTRATIONS PREDICTED TO BE PROTECTIVE OF UPLAND ECOLOGICAL RECEPTORS. AUGUST 2017 PUBLICATION NO. 17-09-051
10. HRO = HEAVY-OIL-RANGE ORGANICS
11. mg/kg = MILLIGRAM PER KILOGRAM

BUFFER ZONE
ECOLOGICALLY PROTECTIVE SOIL VALUE:
260 mg/kg DRO + HRO (FROM IMPLEMENTATION MEMORANDUM NO. 19 (ECOLOGY 2017) AND TABLE 749-3)

95% UCL: 503.3 mg/kg DRO + HRO

95% UCL>CUL

INTERIOR SITE
ECOLOGICALLY PROTECTIVE SOIL VALUE:
460 mg/kg DRO + HRO (FROM IMPLEMENTATION MEMORANDUM NO. 19 (ECOLOGY 2017) AND TABLE 749-3)

95% UCL: 342.6 mg/kg DRO+ HRO

95% UCL<CUL
>10% EXCEED CUL
12 SAMPLES EXCEED 2 TIMES CUL

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

TERRESTRIAL ECOLOGICAL EVALUATION REPORT

SOIL COPEC CONCENTRATIONS DRO + HRO ALTERNATIVE POINT OF COMPLIANCE 0 - 4 FEET BGS

ARCADIS

FIGURE
B-9 B

LEGEND

GRO RESULT (mg/kg)
- ≤ 120
- > 120

DETENTION BASIN
WILLOW CREEK
FEATURES
ROAD
BUILDING

0 150 300
SCALE IN FEET

NOTES:
1. 95% UCL = 95 PERCENT UPPER CONFIDENCE LIMIT
2. > = GREATER THAN
3. ≤ = LESS THAN OR EQUAL TO
4. bgs = BELOW GROUND SURFACE
5. COPEC = CONSTITUENT OF POTENTIAL ECOLOGICAL CONCERN
6. CUL = CLEANUP LEVEL
7. DRO = DIESEL-RANGE ORGANICS
8. ECOLOGY = WASHINGTON STATE DEPARTMENT OF ECOLOGY
9. ECOLOGY. 2017. IMPLEMENTATION MEMORANDUM NO. 19: GASOLINE AND DIESEL SOIL CONCENTRATIONS PREDICTED TO BE PROTECTIVE OF UPLAND ECOLOGICAL RECEPTORS. AUGUST 2017 PUBLICATION NO. 17-09-051
10. GRO = GASOLINE-RANGE ORGANICS
11. mg/kg = MILLIGRAM PER KILOGRAM

ECOLOGICALLY PROTECTIVE SOIL VALUE
120 mg/kg GRO (FROM IMPLEMENTATION MEMORANDUM NO. 19 (ECOLOGY 2017) AND TABLE 749-3)

95% UCL: 71.47 mg/kg GRO

95% UCL<CUL THEREFORE CUL EXCEEDANCES ARE STATISTICALLY INSIGNIFICANT

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

TERRESTRIAL ECOLOGICAL EVALUATION REPORT

SOIL COPEC CONCENTRATIONS GRO STANDARD POINT OF COMPLIANCE 0 - 15 FEET

ARCADIS

FIGURE
B-10A

Path: T:_ENV\Chevron_Edmonds\ArcPro\Exceedances.aprx\FigB-11A GRO 0-15 ft depth Last Saved By: ksinsabaugh 7/24/2024

Path: T:_ENV\Chevron_Edmonds\Mxd\Pro\Exceedances.aprx\FigB-11B GRO 0-4 ft depth Last Saved By: kainsabaugh 7/24/2024

LEGEND

BUFFER ZONE GRO RESULT (mg/kg)
- ≤ 120
- > 120

INTERIOR GRO RESULT (mg/kg)
- ≤ 200
- 200 - 400
- > 400

- WILLOW CREEK
- 10 METER CREEK BUFFER
- DETENTION BASIN
- BUILDING
- ROAD
- FEATURES

0 150 300
SCALE IN FEET

NOTES:
1. 95% UCL = 95 PERCENT UPPER CONFIDENCE LIMIT
2. > = GREATER THAN
3. ≤ = LESS THAN OR EQUAL TO
4. bgs = BELOW GROUND SURFACE
5. COPEC = CONSTITUENT OF POTENTIAL ECOLOGICAL CONCERN
6. CUL = CLEANUP LEVEL
7. DRO = DIESEL-RANGE ORGANICS
8. ECOLOGY = WASHINGTON STATE DEPARTMENT OF ECOLOGY
9. ECOLOGY. 2017. IMPLEMENTATION MEMORANDUM NO. 19: GASOLINE AND DIESEL SOIL CONCENTRATIONS PREDICTED TO BE PROTECTIVE OF UPLAND ECOLOGICAL RECEPTORS. AUGUST 2017 PUBLICATION NO. 17-09-051.
10. GRO = GASOLINE-RANGE ORGANICS
11. mg/kg = MILLIGRAM PER KILOGRAM

BUFFER ZONE:
ECOLOGICALLY PROTECTIVE SOIL VALUE:
120 mg/kg GRO (FROM IMPLEMENTATION MEMORANDUM NO. 19 (ECOLOGY 2017) AND TABLE 749-3)

95% UCL: 58.49 mg/kg GRO

95% UCL<CUL

INTERIOR SITE:
ECOLOGICALLY PROTECTIVE SOIL VALUE:
200 mg/kg GRO (FROM IMPLEMENTATION MEMORANDUM NO. 19 (ECOLOGY 2017) AND TABLE 749-3)

95% UCL: 94.75 mg/kg GRO

95% UCL<CUL
<10% EXCEED CUL
10 SAMPLES EXCEED 2 TIMES CUL

CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY
FORMER UNOCAL BULK FUEL TERMINAL
EDMONDS, WASHINGTON

TERRESTRIAL ECOLOGICAL EVALUATION REPORT

SOIL COPEC CONCENTRATIONS GRO ALTERNATIVE POINT OF COMPLIANCE 0 - 4 FEET BGS

ARCADIS

FIGURE
B-10B

Attachment B-1

Terrestrial Ecological Evaluation Process

Attachment B-1

Terrestrial Ecological Evaluation Process

This attachment assesses the terrestrial ecological evaluation (TEE) process specific to the Lower Yard of the former Union Oil Company of California Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington (Site), as required by Washington Administrative Code (WAC) 173-3407490. Specifically, this attachment includes:

- The identification of primary exclusions
- Whether a simplified or site-specific evaluation is required.

1. Primary Exclusions

An answer of "Yes" to any one question in this section excludes the Site from a further TEE [WAC 173-340-7491(1)].

1a) Will soil contamination be located at least 6 feet beneath the ground surface and less than 15 feet [WAC 173-340-7491(1)(a)1]?

No. Concentrations of several constituents of potential ecological concern (COPECs) greater than the ecologically protective soil screening levels will likely be present within 6 feet of ground surface following remediation.

1b) Will soil contamination be located at least 15 feet beneath the ground surface [WAC 173-340-7491(1)(a)]?

No. As noted above, soil COPEC concentrations greater than the soil screening levels will likely be present within 15 feet of ground surface following remediation.

1c) Will soil contamination be located below the conditional point of compliance [WAC 173-340-7491(1)(a)r]?

No. Soil COPEC concentrations will be located above and below the conditional point of compliance.

2) Will soil contamination be covered by buildings, paved roads, pavement, or other physical barriers that will prevent plants or wildlife from being exposed [WAC 173340-7491(1)(b)1]?

No. After redevelopment there may be some uncapped areas that contain soil COPEC concentrations greater than ecologically protective soil screening levels.

3a) Is there less than 1.5 acres of contiguous undeveloped land on the site, or within 500 feet of any area of the site affected by hazardous substances (other than those substances listed in WAC 173-340-7491(1)(c)(ii)) [WAC 173-340-7491(1)(c)(i)r]?

No. There are more than 1.5 acres of contiguous undeveloped land in the wooded area adjacent to the southwest portion of the Lower Yard and the adjacent Willow Creek and Edmonds Marsh.

3b) Is there less than 0.25 acres of contiguous undeveloped land on or within 500 feet of any area of the site affected by hazardous substances listed in WAC 173-340-7491(1)(c)(ii)?

Not applicable. The Site is not impacted by any of the listed substances.

4) Are concentrations of hazardous substances in the soil less than or equal to natural background concentrations of those substances at the point of compliance [WAC 173-340-7491(1)(d)]?

> No. Natural background concentrations are not available for benzene, carcinogenic polycyclic aromatic hydrocarbons, gasoline-range organics, diesel-range organics, or heavy oil. The statewide and Puget Sound region natural background concentration for arsenic is 7 milligrams per kilogram (Washington State Department of Ecology [Ecology] 1994). Arsenic concentrations in soil exceed background in four of eight samples.

Conclusion: The Lower Yard does not qualify for exclusion from the TEE.

2. Simplified or Site-Specific Evaluation

An answer of "Yes" to any one question below means the Lower Yard is required to undergo a site-specific TEE [WAC 173-340-7491(2)]. Otherwise, a simplified evaluation is allowed.

1) Is the site located on or directly adjacent to an area where management or land use plans will maintain or restore native or semi-native vegetation [WAC 173-340-7491(2)(a)(i)1]?

> Yes. Edmonds Marsh is directly adjacent to the eastern portion of the Lower Yard. Edmonds Marsh has been rated by the City of Edmonds (City) as a Category 1 (high-quality) wetland, in part due to its habitat for a state priority species (great blue heron) (CH2M Hill 2004; WDFW 2023a). Edmonds Marsh is also designated as a Priority Habitat in the Washington Department of Fish and Wildlife (WDFW) Priority Habitat and Species database (2023a).

2a) Is the site used by a threatened or endangered species [WAC 173-340-7491(2)(a)(ii)]? For animals, "used" means that individuals of a species have been observed to live, feed or breed at the site. For plants, "used" means that a plant species grows at the site or has been found growing at the site.

> No. State listed threatened, endangered, or sensitive species (WDFW 2023b) or federal listed threatened and endangered species (in Snohomish County; USFWS 2023) are not indicated on the Priority Habitats and Species Database (WDFW 2023a) in the area of the Lower Yard.

Is the site used by a wildlife species classified by the Washington State Department of Fish and Wildlife as a "priority species" or "species of concern" under Title 77 RCW [WAC 173-340-7491(2)(a)(ii)1]?

> Possibly. The Priority Habitats and Species Database (WDFW 2023a) identified priority species potentially onsite as resident coastal cutthroat, coho, and great blue heron.

2b) Is the site used by a plant species classified by the Washington State Department of Natural Resources Natural Heritage Program as "endangered," "threatened," or "sensitive" under Title 79 RCW [WAC 173-340-7491(2)(a)001?

No. A review of the Washington State Department of Natural Resources' (WSDNR) Natural Heritage Data Explorer (https://www.dnr.wa.gov/NHPdataexplorer) indicated there are no records of known rare plants or ecosystems near the Lower Yard (WSDNR 2023).

3) Is the area of contamination located on a property that contains at least 10 acres of native vegetation within 500 feet of the area of contamination [WAC 173-340-7491(2)(a)(iii)]?

No. The 23-acre Lower Yard was an active industrial site that has recently been subject to intensive remedial activity including excavation, backfilling, and grading, and it contains limited vegetation and disturbed terrestrial habitat. The sparse vegetative cover, low species diversity, and amount of human disturbance in this area limit wildlife use of this habitat.

4) Has the department determined that the site may present a risk to significant wildlife populations [WAC 173-340-7491 (2)(a)(iv)]?

No. Ecology has not determined that the Lower Yard may present a significant risk to wildlife populations.

Simplified or Site-Specific Evaluation Conclusion: A site-specific TEE is required due to the Lower Yard's location next to Edmonds Marsh.

References:

Arcadis. 2013. Cleanup Levels and Remediation Levels Report. September 17.

CH2M Hill. 2004. SR 104 Edmonds Crossing. October.

Ecology. 1994. Natural Background Soil Metals Concentrations in Washington State. Toxics Cleanup Program Department of Ecology. October.

USFWS. 2023. Integrated Planning and Consultation resource list – Snohomish County, Washington. October. Available at: https://ipac.ecosphere.fws.gov/. Accessed on October 26, 2023.

WDFW. 2023a. Priority Habitats and Species: Maps. Available at: https://wdfw.wa.gov/species-habitats/at-risk/phs/maps. Accessed November, 2023.

WDFW. 2023b. State Listed Species, Revised May 2023. May.

WSDNR. 2023. Washinton Natural Heritage Program (WHNP) Data Explorer. November. Available at: https://www.dnr.wa.gov/NHPdataexplorer.

Attachment B-2

Site Photographs

ATTACHMENT B-2 – PHOTOGRAPH LOG

Appendix B – Draft Site-Specific Terrestrial Ecological Evaluation
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds
Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

Photograph: 1

Description:

Lower Yard

Location:
Former Union Oil Company of California (Unocal) Edmonds Bulk Fuel Terminal

Photograph taken by:
Arcadis U.S., Inc.

Date: 12/062023

Photograph: 2

Description:
Paved area

Location:
Former Unocal Edmonds Bulk Fuel Terminal

Photograph taken by:
Arcadis U.S., Inc.

Date 12/6/2023

Appendix B – Draft Site-Specific Terrestrial Ecological Evaluation
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds
Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

Photograph: 3

Description:

Edmonds Marsh

Location:
Former Unocal Edmonds Bulk Fuel Terminal

Photograph taken by:
Arcadis U.S., Inc.

Date : 12/6/2023

Appendix B – Draft Site-Specific Terrestrial Ecological Evaluation
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds
Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

Photograph: 4

Description:

Willow Creek

Location:
Former Unocal Edmonds Bulk Fuel Terminal

Photograph taken by:
Arcadis U.S., Inc.

Date : 12/6/2023

Appendix B – Draft Site-Specific Terrestrial Ecological Evaluation
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

Photograph: 5

Description:

Edmonds Marsh

Location:
Former Unocal Edmonds Bulk Fuel Terminal

Photograph taken by:
Arcadis U.S., Inc.

Date : 12/6/2023

Photograph: 6

Description:

Detention Basin 1

Location:
Former Unocal Edmonds Bulk Fuel Terminal

Photograph taken by:
Arcadis U.S., Inc.

Date : 12/6/2023

Photograph: 7

Description:

Forested/shrub habitat

Location:
Former Unocal Edmonds Bulk Fuel Terminal

Photograph taken by:
Arcadis U.S., Inc.

Date : 12/6/2023

Appendix B – Draft Site-Specific Terrestrial Ecological Evaluation
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds
Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

Photograph: 8

Description:

Upland forest

Location:
Former Unocal Edmonds Bulk Fuel Terminal

Photograph taken by:
Arcadis U.S., Inc.
Date: 12/6/2023

Photograph: 9

Description:

Disturbed Habitat

Location:
Former Unocal Edmonds Bulk Fuel Terminal

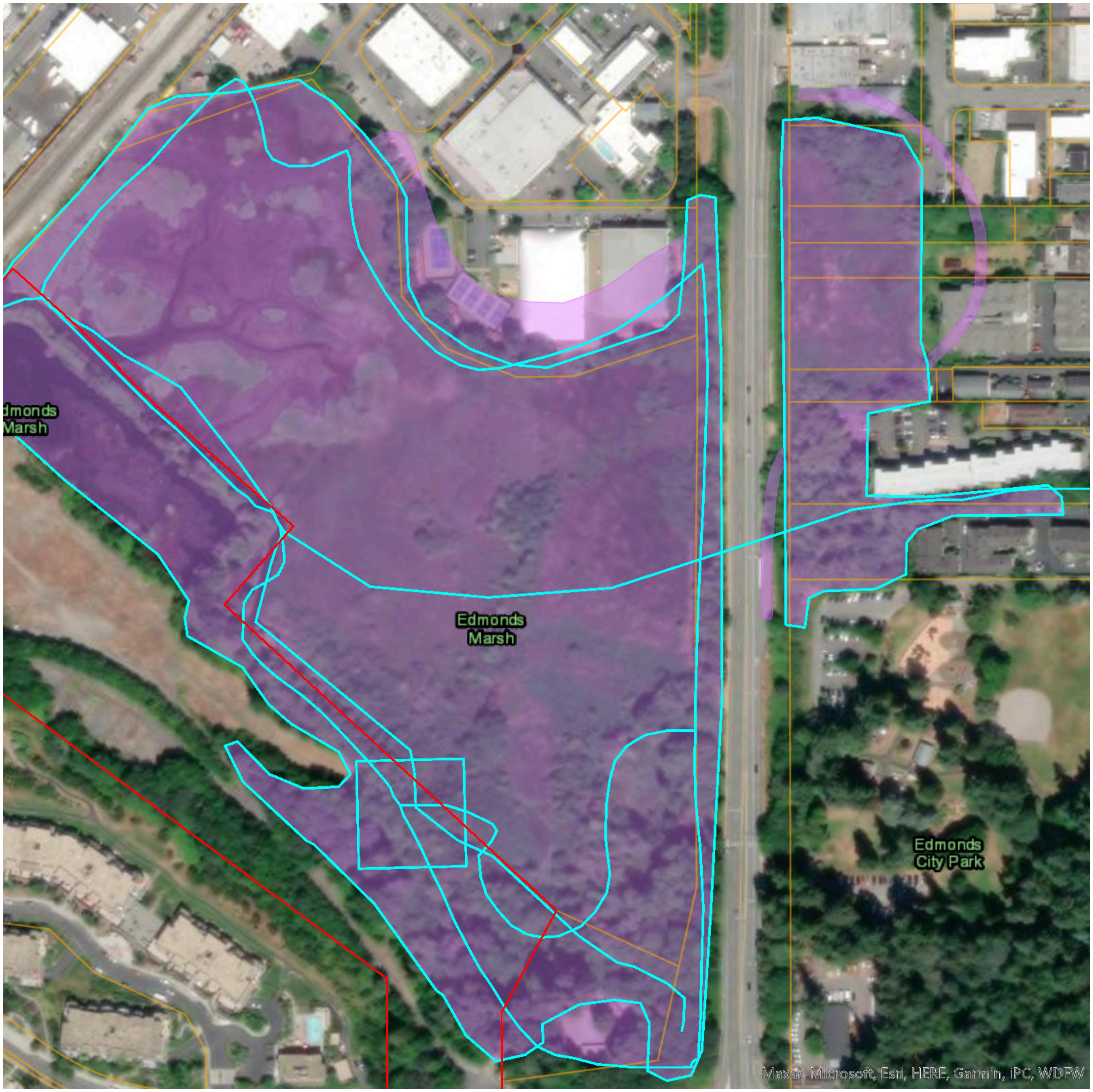
Photograph taken by:
Arcadis U.S., Inc.
Date: 12/6/2023

Appendix B – Draft Site-Specific Terrestrial Ecological Evaluation
Public Review Draft Final Feasibility Study Report Addendum
Former Union Oil Company of California Edmonds
Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

Attachment B-3

Priority Habitat and Species Report

Priority Habitats and Species on the Web



Report Date: 04/03/2024, Parcel ID: 27032600102400

PHS Species/Habitats Overview:

Occurence Name	Federal Status	State Status	Sensitive Location
Resident Coastal Cutthroat	N/A	N/A	No
Coho	N/A	N/A	No
Wetlands	N/A	N/A	No
Great blue heron	N/A	N/A	No
Freshwater Emergent Wetland	N/A	N/A	No
Freshwater Forested/Shrub Wetland	N/A	N/A	No

PHS Species/Habitats Details:

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Accuracy	NA
Notes	LLID: 1223836478067, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	44441
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	*Oncorhynchus clarki*
Priority Area	Occurrence/Migration
Site Name	Shelleberger Creek
Accuracy	NA
Notes	LLID: 1223911478066, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	44627
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	*Oncorhynchus kisutch*
Priority Area	Occurrence/Migration
Site Name	Shelleberger Creek
Accuracy	NA
Notes	LLID: 1223911478066, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	44628
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Wetlands	
Priority Area	Aquatic Habitat
Site Name	EDMONDS WILDLIFE SANCUTARY
Accuracy	1/4 mile (Quarter Section)
Notes	SCRUB-SHRUB WETLAND AT MOUTH OF SHELLBURGER CREEK IN DOWNTOWN EDMONDS.
Source Record	902704
Source Dataset	PHSREGION
Source Name	OPPERMANN, TONY
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Great blue heron	
Scientific Name	*Ardea herodias*
Priority Area	Breeding Area
Site Name	EDMONDS MARSH
Accuracy	Standard buffer
Notes	GREAT BLUE HERON COLONY. 3 NESTS SEEN IN SUBOPTIMAL (SMALL) TREES. NOT OCCUPIED. COLONY ALSO INCLUDES HILLSIDE SECTION (SEQNO 2). VISITORS AND UNOCAL EMPLOYEES SAY COLONY HAD UP TO 17 BIRDS IN PAST YEARS.
Source Record	381
Source Dataset	WS_OccurPolygon
Source Date	WS_OccurPolygon
Source Name	CYRA, T/WDFW
Source Entity	WA Dept. of Fish and Wildlife
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS LISTED OCCURRENCE
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://wdfw.wa.gov/publications/pub.php?id=00026
Geometry Type	Polygons

Freshwater Emergent Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Emergent Wetland - NWI Code: PEM1C
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Freshwater Forested/Shrub Wetland	
Priority Area	Aquatic Habitat
Site Name	N/A
Accuracy	NA
Notes	Wetland System: Freshwater Forested/Shrub Wetland - NWI Code: PFOC
Source Dataset	NWIWetlands
Source Name	Not Given
Source Entity	US Fish and Wildlife Service
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
ManagementRecommendations	http://www.ecy.wa.gov/programs/sea/wetlands/bas/index.html
Geometry Type	Polygons

Attachment B-4

ProUCL Output

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Arsenic	1.64	1.64	1	DB1-A-10wall-2	2	10/8/2003
Arsenic	3.97	3.97	1	DB1-A-11wall-2	2	10/8/2003
Arsenic	2.74	2.74	1	DB1-A-12wall-2	2	10/8/2003
Arsenic	4.26	4.26	1	DB1-A-13wall-2	2	10/8/2003
Arsenic	4.94	4.94	1	DB1-A-19Wall-2.5	2.5	10/9/2003
Arsenic	2.42	2.42	1	DB1-A-23wall-3	3	10/10/2003
Arsenic	1.76	1.76	1	DB1-A-24wall-3	3	10/10/2003
Arsenic	3.22	3.22	1	DB1-A-25wall-3	3	10/10/2003
Arsenic	3.45	3.45	1	DB1-A-27wall1-3	3	9/3/2003
Arsenic	6.43	6.43	1	DB1-A-27wall2-7	7	9/3/2003
Arsenic	5.27	5.27	1	DB1-A-28wall-3	3	9/3/2003
Arsenic	4.78	4.78	1	DB1-A-29wall1-2	2	9/2/2003
Arsenic	2.14	2.14	1	DB1-A-2wall-3	3	9/12/2003
Arsenic	10.6	10.6	1	DB1-A-30wall-3	3	9/3/2003
Arsenic	9.82	9.82	1	DB1-A-31wall1-3	3	9/3/2003
Arsenic	3.82	3.82	1	DB1-A-31wall2-7	7	9/3/2003
Arsenic	2.98	2.98	1	DB1-A-3wall2-2.5	2.5	9/23/2003
Arsenic	3.13	3.13	1	DB1-A-4wall-2.5	2.5	9/22/2003
Arsenic	4	4	1	DB1-A-5wall-2	2	10/6/2003
Arsenic	6.5	6.5	1	DB1-A-7wall-2.5	2.5	9/24/2003
Arsenic	1.92	1.92	1	DB1-A-8wall-2.5	2.5	10/6/2003
Arsenic	1.94	1.94	1	DB1-A-9wall-2.5	2.5	10/6/2003
Arsenic	2	2	1	DB1-B-31wall-3	3	9/4/2003
Arsenic	2.93	2.93	1	SWLY-A-10wall-3.75	3.75	11/11/2003
Arsenic	1.92	1.92	1	SWLY-A-18wall-3.75	3.75	12/2/2003
Arsenic	3.14	3.14	1	SWLY-A-19wall-3.75	3.75	12/2/2003
Arsenic	3.92	3.92	1	SWLY-A-1Wall-3.75	3.75	10/14/2003
Arsenic	2.26	2.26	1	SWLY-A-2Wall-3.75	3.75	10/14/2003
Arsenic	3.4	3.4	1	SWLY-A-3Wall-3.75	3.75	10/14/2003
Arsenic	9.17	9.17	1	SWLY-A-4Wall-3.75	3.75	10/16/2003
Arsenic	2.5	2.5	1	SWLY-A-7WALL-3.75	3.75	11/6/2003
Arsenic	2.35	2.35	1	SWLY-A-8WALL-3.75	3.75	11/6/2003
Arsenic	2.34	2.34	1	SWLY-C-1Wall-3.75	3.75	10/16/2003
Arsenic	2.47	2.47	1	SWLY-D-1Wall-3.75	3.75	10/16/2003
Arsenic	1.38	1.38	1	SWLY-D-2Wall-3.75	3.75	10/16/2003
Arsenic	2.13	2.13	1	SWLY-D-3Wall-3.75	3.75	10/17/2003
Arsenic	1.8	1.8	1	SWLY-D-4Wall-3.75	3.75	10/21/2003
Arsenic	3.46	3.46	1	SWLY-D-5WALL-3.75	3.75	11/6/2003
Arsenic	3.41	3.41	1	SWLY-D-6WALL-3.75	3.75	11/6/2003
Arsenic	5.68	5.68	1	SWLY-D-7Wall-3.75	3.75	11/10/2003
Arsenic	2.25	2.25	1	SWLY-D-7-Wall-3.75	3.75	11/7/2003
Arsenic	2.02	2.02	1	SWLY-E-10-3.75	3.75	11/12/2003
Arsenic	1.4	1.4	1	SWLY-E-11-3.75	3.75	11/13/2003
Arsenic	1.76	1.76	1	SWLY-E-8wall-3.75	3.75	11/11/2003
Arsenic	1.86	1.86	1	SWLY-E-9wall-3.75	3.75	11/11/2003
Arsenic	1.63	1.63	1	SWLY-F-12-3.75	3.75	11/14/2003
Arsenic	2.2	2.2	1	SWLY-F-13-3.75	3.75	11/14/2003
Arsenic	5.08	5.08	1	EX-B19-YY-3-1	1	3/5/2008
Arsenic	9.84	9.84	1	EX-B19-YY-2-1	1	3/5/2008
Arsenic	5.45	5.45	1	EX-B19-YY-1-1	1	3/5/2008
Arsenic	25.0 [30.9]	30.9	1	EX-B19-ZZ-1-1	1	3/5/2008
Arsenic	8.56	8.56	1	EX-B19-ZZ-2-1	1	3/5/2008
Arsenic	5.54	5.54	1	EX-B19-ZZ-3-1	1	3/5/2008
Arsenic	30.7	30.7	1	EX-B19-ZZ-1-2	2	3/7/2008
Arsenic	<5.54	5.54	0	EX-B19-ZZ-1-2.5	2.5	3/12/2008
Arsenic	2.89	2.89	1	SWLY-A-5wall-3.75	3.75	10/16/2003
Arsenic	2.67	2.67	1	SWLY-A-6wall-3.75	3.75	10/22/2003
Arsenic	4.43	4.43	1	SWLY-A-9wall-3.75	3.75	11/10/2003
Arsenic	4.83	4.83	1	SWLY-B-1wall-3.75	3.75	10/14/2003

ARCADIS

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.17	0.17	1	B1-14-14.5	14-14.5	8/22/2011
Benzene1	0.033 U W	0.033	0	B12-0.5-1	0.5-1	8/24/2011
Benzene1	0.038 U W	0.038	0	B12-1-1.5	1-1.5	8/24/2011
Benzene1	0.051 U W	0.051	0	B12-2.5-3	2.5-3	8/24/2011
Benzene1	0.0028 U	0.0028	0	B12-3.5-4	3.5-4	8/24/2011
Benzene1	0.0022 U	0.0022	0	B1-4.5-5	4.5-5	8/22/2011
Benzene1	0.11 U W	0.11	0	B14-0.5-1	0.5-1	8/25/2011
Benzene1	0.023 U W	0.023	0	B14-1.5-2	1.5-2	8/25/2011
Benzene1	0.051 U W	0.051	0	B14-2.5-3	2.5-3	8/25/2011
Benzene1	0.058 U W	0.058	0	B14-3.5-4	3.5-4	8/25/2011
Benzene1	0.029 U W	0.029	0	B15-11-11.5	11-11.5	8/23/2011
Benzene1	0.0025 U	0.0025	0	B15-4.5-5	4.5-5	8/23/2011
Benzene1	0.0026 U V	0.0026	0	B15-6.5-7	6.5-7	8/23/2011
Benzene1	0.0048 U V	0.0048	0	B15-8.5-9	8.5-9	8/23/2011
Benzene1	0.23 W	0.23	1	B1-9.5-10	9.5-10	8/22/2011
Benzene1	0.0020 U	0.002	0	B2-12-12.5	12-12.5	8/22/2011
Benzene1	0.0024 U	0.0024	0	B2-14.5-15	14.5-15	8/22/2011
Benzene1	0.018 UW	0.018	0	B2-4-4.5	4-4.5	8/22/2011
Benzene1	0.0020 U	0.002	0	B2-7-7.5	7-7.5	8/22/2011
Benzene1	0.0019 U	0.0019	0	B2-9.5-10	9.5-10	8/22/2011
Benzene1	0.0020 U	0.002	0	B3-12-12.5	12-12.5	8/22/2011
Benzene1	0.004	0.004	1	B3-14-14.5	14-14.5	8/22/2011
Benzene1	0.0022 U	0.0022	0	B3-4.5-5	4.5-5	8/22/2011
Benzene1	0.0021 U	0.0021	0	B3-7-7.5	7-7.5	8/22/2011
Benzene1	0.03 U	0.03	0	DB1-A-10wall-2	2	10/8/2003
Benzene1	0.03 U	0.03	0	DB1-A-11wall-2	2	10/8/2003
Benzene1	0.03 U	0.03	0	DB1-A-12wall-2	2	10/8/2003
Benzene1	0.03 U	0.03	0	DB1-A-13wall-2	2	10/8/2003
Benzene1	0.03 U	0.03	0	DB1-A-17Wall-2	2	10/9/2003
Benzene1	0.26	0.26	1	DB1-A-18Wall-2	2	10/9/2003
Benzene1	0.03 U	0.03	0	DB1-A-19Wall-2.5	2.5	10/9/2003
Benzene1	0.03 U	0.03	0	DB1-A-20wall-2	2	10/10/2003
Benzene1	0.03 U	0.03	0	DB1-A-23wall-3	3	10/10/2003
Benzene1	0.03 U	0.03	0	DB1-A-24wall-3	3	10/10/2003
Benzene1	0.05	0.05	1	DB1-A-25wall-3	3	10/10/2003
Benzene1	0.03 U	0.03	0	DB1-A-27wall1-3	3	9/3/2003
Benzene1	0.03 U	0.03	0	DB1-A-27wall2-7	7	9/3/2003
Benzene1	0.03 U	0.03	0	DB1-A-28wall-3	3	9/3/2003
Benzene1	0.03 U	0.03	0	DB1-A-29wall1-2	2	9/2/2003
Benzene1	0.04	0.04	1	DB1-A-2wall-3	3	9/12/2003
Benzene1	0.03 U	0.03	0	DB1-A-30wall-3	3	9/3/2003
Benzene1	0.03 U	0.03	0	DB1-A-31wall1-3	3	9/3/2003
Benzene1	0.03 U	0.03	0	DB1-A-31wall2-7	7	9/3/2003
Benzene1	0.03 U	0.03	0	DB1-A-3wall2-2.5	2.5	9/23/2003
Benzene1	0.03 U	0.03	0	DB1-A-4wall-2.5	2.5	9/22/2003
Benzene1	0.03 U	0.03	0	DB1-A-5wall-2	2	10/6/2003
Benzene1	0.03 U	0.03	0	DB1-A-7wall-2.5	2.5	9/24/2003
Benzene1	0.03 U	0.03	0	DB1-A-8wall-2.5	2.5	10/6/2003
Benzene1	0.03 U	0.03	0	DB1-A-9wall-2.5	2.5	10/6/2003
Benzene1	0.03 U	0.03	0	DB1-B-31wall-3	3	9/4/2003
Benzene1	0.0303 U	0.0303	0	EX-A1-C-16-7	7	11/15/2007
Benzene1	0.0301 U	0.0301	0	EX-A1-C-16-NSW-3	3	11/15/2007
Benzene1	0.0608	0.0608	1	EX-A1-C-17-3	3	11/15/2007
Benzene1	0.0299 U	0.0299	0	EX-A1-D-16-12	12	11/19/2007
Benzene1	0.0294 U	0.0294	0	EX-A1-D-17-12	12	11/15/2007
Benzene1	0.0272 U	0.0272	0	EX-A1-D-17-ESW-10	10	11/15/2007
Benzene1	0.0316 U	0.0316	0	EX-A1-D-17-ESW-5	5	11/15/2007
Benzene1	0.0299 U	0.0299	0	EX-A1-E-15-15	15	11/8/2007
Benzene1	0.0279 U [0.0311 U]	0.0279	0	EX-A1-E-16-15	15	11/8/2007
Benzene1	0.0291 U	0.0291	0	EX-A1-E-17-12	12	11/14/2007
Benzene1	0.0637	0.0637	1	EX-A1-E-17-ESW-4	4	11/15/2007
Benzene1	0.0270 U	0.027	0	EX-A1-F-15-15	15	11/8/2007
Benzene1	0.137	0.137	1	EX-A1-F-16-15	15	11/8/2007

ARCADIS

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0301 U	0.0301	0	EX-A1-F-17-12	12	11/14/2007
Benzene1	0.0267 U	0.0267	0	EX-A1-F-17-3	3	10/29/2007
Benzene1	0.0979 [0.0591]	0.0979	1	EX-A1-F-18-4	4	10/29/2007
Benzene1	0.0273 U [0.0291 U]	0.0273	0	EX-A1-F-18-5	5	11/5/2007
Benzene1	0.0289 U	0.0289	0	EX-A1-G-15-15	15	11/8/2007
Benzene1	0.0387	0.0387	1	EX-A1-G-16-15	15	10/31/2007
Benzene1	0.0291 U	0.0291	0	EX-A1-G-17-15	15	10/29/2007
Benzene1	0.0291 U	0.0291	0	EX-A1-H-15-15	15	11/8/2007
Benzene1	0.0303 U	0.0303	0	EX-A1-H-16-15	15	10/31/2007
Benzene1	0.0298 U [0.0282 U]	0.0282	0	EX-A1-H-17-15	15	10/29/2007
Benzene1	0.0285 U	0.0285	0	EX-A1-I-16-15	15	10/31/2007
Benzene1	0.0317 U	0.0317	0	EX-A1-I-17-15	15	10/29/2007
Benzene1	0.0306 U	0.0306	0	EX-A1-J-16-15	15	10/31/2007
Benzene1	0.0316 U	0.0316	0	EX-A1-J-17-15	15	10/29/2007
Benzene1	0.0312 U	0.0312	0	EX-A1-J-19-8	8	10/23/2007
Benzene1	0.0308 U	0.0308	0	EX-A1-K-17-15	15	10/30/2007
Benzene1	0.0278 U	0.0278	0	EX-A1-K-18-12	12	10/23/2007
Benzene1	0.0282 U	0.0282	0	EX-A1-K-18-SSW-3	3	10/30/2007
Benzene1	0.0291 U	0.0291	0	EX-A1-K-18-SSW-8	8	10/30/2007
Benzene1	0.0322 U	0.0322	0	EX-A1-K-19-3	3	10/30/2007
Benzene1	0.117	0.117	1	EX-A1-L-17-12	12	11/8/2007
Benzene1	0.0299 U	0.0299	0	EX-A2-O-10-10	10	1/28/2008
Benzene1	0.0270 U	0.027	0	EX-A2-O-11-10	10	1/28/2008
Benzene1	0.0305 U	0.0305	0	EX-A2-O-12-10	10	1/28/2008
Benzene1	0.0351 U	0.0351	0	EX-A2-O-13-10	10	1/28/2008
Benzene1	0.369 U [0.344 U]	0.344	0	EX-A2-O-9-10	10	1/28/2008
Benzene1	0.0350 U	0.035	0	EX-A2-P-10-11	11	1/30/2008
Benzene1	0.0301 U	0.0301	0	EX-A2-P-11-11	11	1/30/2008
Benzene1	0.0275 U	0.0275	0	EX-A2-P-12-10	10	1/30/2008
Benzene1	0.0318 U	0.0318	0	EX-A2-P-13-10	10	1/30/2008
Benzene1	0.0289 U	0.0289	0	EX-A2-P-9-15	15	1/30/2008
Benzene1	0.0364 U	0.0364	0	EX-A2-Q-10-12	12	2/1/2008
Benzene1	0.0366 U	0.0366	0	EX-A2-Q-11-12	12	2/1/2008
Benzene1	0.0324 U	0.0324	0	EX-A2-Q-12-13	13	2/1/2008
Benzene1	0.0333 U	0.0333	0	EX-A2-Q-9-12	12	2/1/2008
Benzene1	0.0422 U [0.0375 U]	0.0375	0	EX-A2-R-10-12	12	2/15/2008
Benzene1	0.0484 U	0.0484	0	EX-A2-R-11-12	12	2/15/2008
Benzene1	0.0380 U	0.038	0	EX-A2-R-12-12	12	2/15/2008
Benzene1	0.0433 U	0.0433	0	EX-A2-R-13-12	12	2/22/2008
Benzene1	0.0406 U	0.0406	0	EX-A2-S-12-12	12	2/22/2008
Benzene1	0.0356 U	0.0356	0	EX-A2-S-13-6	6	2/15/2008
Benzene1	0.0290 U	0.029	0	EX-A3-AA-5-10	10	9/26/2007
Benzene1	0.0309 U	0.0309	0	EX-A3-AA-6-10	10	9/21/2007
Benzene1	0.0333 U	0.0333	0	EX-A3-AA-7-10	10	9/21/2007
Benzene1	0.0307 U	0.0307	0	EX-A3-AA-7-ESW-4	4	9/20/2007
Benzene1	0.0296 U [0.0299 U]	0.0296	0	EX-A3-BB-6-10	10	9/21/2007
Benzene1	0.0703	0.0703	1	EX-A3-BB-7-10	10	9/21/2007
Benzene1	0.158	0.158	1	EX-A3-BB-7-ESW-4	4	9/21/2007
Benzene1	2.76	2.76	1	EX-A3-CC-6-10	10	10/1/2007
Benzene1	1.21 [1.73]	1.73	1	EX-A3-CC-7-10	10	10/1/2007
Benzene1	0.11	0.11	1	EX-A3-CC-7-ESW-4	4	10/2/2007
Benzene1	0.0878	0.0878	1	EX-A3-DD-6-10	10	10/2/2007
Benzene1	0.0214 U	0.0214	0	EX-A3-Y-4-8	8	9/21/2007
Benzene1	0.0267 U	0.0267	0	EX-A3-Y-4-NSW-4	4	9/20/2007
Benzene1	0.0114 U	0.0114	0	EX-A3-Y-4-WSW-4	4	9/20/2007
Benzene1	0.0275 U	0.0275	0	EX-A3-Y-5-8	8	9/21/2007
Benzene1	0.0498 U	0.0498	0	EX-A3-Y-5-NSW-4	4	9/20/2007
Benzene1	0.387	0.387	1	EX-A3-Y-6-10	10	39350
Benzene1	0.0232 U	0.0232	0	EX-A3-Y-6-NSW-4	4	9/20/2007
Benzene1	0.0294	0.0294	1	EX-A3-Z-4-10	10	9/21/2007
Benzene1	0.0275 U	0.0275	0	EX-A3-Z-5-10	10	9/21/2007
Benzene1	0.191	0.191	1	EX-A3-Z-6-10	10	9/21/2007
Benzene1	0.0503	0.0503	1	EX-A3-Z-7-10	10	9/21/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0207 U	0.0207	0	EX-A3-Z-7-ESW-4	4	9/20/2007
Benzene1	0.0646	0.0646	1	EX-A4-F-9-9	9	10/17/2007
Benzene1	0.0349 U	0.0349	0	EX-A4-F-9-ESW-4	4	10/17/2007
Benzene1	0.0307 U	0.0307	0	EX-A4-G-6-9	9	10/1/2007
Benzene1	0.0295 U	0.0295	0	EX-A4-G-7-9	9	9/27/2007
Benzene1	0.0311 U	0.0311	0	EX-A4-G-8-9	9	9/27/2007
Benzene1	0.0295 U	0.0295	0	EX-A4-G-9-9	9	10/17/2007
Benzene1	0.0290 U [0.0283 U]	0.0283	0	EX-A4-G-9-ESW-4	4	10/17/2007
Benzene1	0.0269 U [0.0295 U]	0.0269	0	EX-A4-H-6-9	9	9/27/2007
Benzene1	0.0318 U	0.0318	0	EX-A4-H-7-9	9	9/27/2007
Benzene1	0.0286 U	0.0286	0	EX-A4-H-8-4	4	9/12/2007
Benzene1	0.0885	0.0885	1	EX-A4-H-8-9	9	9/27/2007
Benzene1	0.323	0.323	1	EX-A4-H-9-9	9	10/17/2007
Benzene1	0.0273 U	0.0273	0	EX-A4-H-9-ESW-4	4	10/17/2007
Benzene1	0.0565 U	0.0565	0	EX-A4-I-6-9	9	9/21/2007
Benzene1	0.0372 U	0.0372	0	EX-A4-I-7-9	9	10/16/2007
Benzene1	0.0396 U	0.0396	0	EX-A4-I-8-9	9	10/16/2007
Benzene1	0.0288 U	0.0288	0	EX-A4-J-6-9	9	9/21/2007
Benzene1	0.0304 U	0.0304	0	EX-A4-J-6-SSW-9	9	9/21/2007
Benzene1	0.0299 U	0.0299	0	EX-A4-J-7-9	9	9/21/2007
Benzene1	0.0342 U	0.0342	0	EX-A4-J-7-SSW-4	4	9/21/2007
Benzene1	0.0340 U	0.034	0	EX-A4-J-8-9	9	10/16/2007
Benzene1	0.0367 U	0.0367	0	EX-A4-K-8-9	9	10/16/2007
Benzene1	0.0363 U	0.0363	0	EX-AW-E-23-5(2)	5	9/17/2008
Benzene1	0.0354 U	0.0354	0	EX-AW-E-24-10	10	9/11/2008
Benzene1	0.0363 U	0.0363	0	EX-AW-E-24-NSW-5	5	9/11/2008
Benzene1	0.0405 U	0.0405	0	EX-AW-E-25-10	10	9/11/2008
Benzene1	0.0327 U [0.0339 U]	0.0327	0	EX-AW-E-25-ESW-5	5	9/11/2008
Benzene1	0.0373 U	0.0373	0	EX-AW-E-25-NSW-5	5	9/11/2008
Benzene1	0.0339 U	0.0339	0	EX-AW-F-23-5(2)	5	9/12/2008
Benzene1	0.0345 U	0.0345	0	EX-AW-F-24-5	5	9/11/2008
Benzene1	0.0277 U	0.0277	0	EX-AW-F-25-5	5	9/11/2008
Benzene1	0.0372 U	0.0372	0	EX-AW-F-25-ESW-5	5	9/11/2008
Benzene1	0.0361 U	0.0361	0	EX-B10-N-6-10	10	2/8/2008
Benzene1	0.0352 U	0.0352	0	EX-B10-O-6-10	10	2/8/2008
Benzene1	0.0302 U [0.0330 U]	0.0302	0	EX-B10-O-7-12	12	1/16/2008
Benzene1	0.0316 U	0.0316	0	EX-B10-O-8-12	12	1/16/2008
Benzene1	0.0400 U	0.04	0	EX-B10-P-6-10	10	2/8/2008
Benzene1	0.0328 U	0.0328	0	EX-B10-P-7-15	15	1/30/2008
Benzene1	0.0322 U	0.0322	0	EX-B10-P-8-15	15	1/30/2008
Benzene1	0.0343 U	0.0343	0	EX-B10-Q-6-11	11	2/8/2008
Benzene1	0.0309 U	0.0309	0	EX-B10-Q-7-15	15	1/30/2008
Benzene1	0.0306 U [0.0317]	0.0317	1	EX-B11-Q-8-14	14	1/30/2008
Benzene1	0.0346 U [0.0340 U]	0.034	0	EX-B11-R-6-5	5	2/8/2008
Benzene1	0.0331	0.0331	1	EX-B11-R-7-12	12	1/22/2008
Benzene1	0.0303	0.0303	1	EX-B11-R-8-12	12	1/30/2008
Benzene1	0.0612	0.0612	1	EX-B11-R-9-12	12	2/12/2008
Benzene1	0.0408 U	0.0408	0	EX-B11-S-10-2	2	2/15/2008
Benzene1	0.0398 U	0.0398	0	EX-B11-S-11-12	12	2/14/2008
Benzene1	0.0402	0.0402	1	EX-B11-S-7-12	12	1/22/2008
Benzene1	0.0290 U	0.029	0	EX-B11-S-7-WSW-5	5	1/18/2008
Benzene1	0.0287 U	0.0287	0	EX-B11-S-8-12	12	1/30/2008
Benzene1	0.0413	0.0413	1	EX-B11-S-9-12	12	2/12/2008
Benzene1	0.0342 U	0.0342	0	EX-B11-T-10-10	10	2/14/2008
Benzene1	0.0306 U	0.0306	0	EX-B11-T-11-12	12	2/14/2008
Benzene1	0.0382 U	0.0382	0	EX-B11-T-11-ESW-6	6	2/15/2008
Benzene1	0.031	0.031	1	EX-B11-T-7-12	12	1/22/2008
Benzene1	0.0290 U	0.029	0	EX-B11-T-7-WSW-5	5	1/18/2008
Benzene1	0.231	0.231	1	EX-B11-T-8-12	12	1/30/2008
Benzene1	0.193	0.193	1	EX-B11-T-9-12	12	2/12/2008
Benzene1	0.0429 U	0.0429	0	EX-B11-U-11-5	5	2/12/2008
Benzene1	0.0290 U	0.029	0	EX-B11-U-7-5	5	1/18/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0346	0.0346	1	EX-B13-AA-2-10	10	9/26/2007
Benzene1	0.0306 U	0.0306	0	EX-B13-AA-2-NSW-4	4	9/19/2007
Benzene1	0.0303 U	0.0303	0	EX-B13-AA-2-WSW-4	4	9/19/2007
Benzene1	0.0322 U	0.0322	0	EX-B13-AA-3-10	10	9/26/2007
Benzene1	0.0265 U	0.0265	0	EX-B13-AA-3-NSW-4	4	9/19/2007
Benzene1	0.0313 U	0.0313	0	EX-B13-AA-4-10	10	9/26/2007
Benzene1	0.0336 U	0.0336	0	EX-B13-BB-2-10	10	9/25/2007
Benzene1	0.476	0.476	1	EX-B13-BB-2-WSW-4	4	9/19/2007
Benzene1	0.0281 U [0.0319 U]	0.0281	0	EX-B13-BB-3-10	10	9/25/2007
Benzene1	0.0283 U	0.0283	0	EX-B13-BB-4-10	10	9/25/2007
Benzene1	0.0295 U	0.0295	0	EX-B13-BB-5-10	10	9/27/2007
Benzene1	0.0432 U	0.0432	0	EX-B13-CC-1-4	4	10/10/2007
Benzene1	0.0278 U	0.0278	0	EX-B13-CC-2-10	10	10/8/2007
Benzene1	0.0285 U	0.0285	0	EX-B13-CC-3-10	10	9/27/2007
Benzene1	0.0279 U	0.0279	0	EX-B13-CC-4-10	10	9/27/2007
Benzene1	0.0299 U	0.0299	0	EX-B13-CC-5-10	10	9/27/2007
Benzene1	0.0408 U	0.0408	0	EX-B13-DD-1-4	4	10/8/2007
Benzene1	0.0291 U	0.0291	0	EX-B13-DD-2-10	10	10/8/2007
Benzene1	0.0279 U	0.0279	0	EX-B13-DD-3-10	10	10/2/2007
Benzene1	0.173	0.173	1	EX-B13-DD-4-10	10	10/2/2007
Benzene1	0.0637	0.0637	1	EX-B13-DD-5-10	10	10/2/2007
Benzene1	0.0283 U	0.0283	0	EX-B13-EE-1-4	4	10/8/2007
Benzene1	0.0272 U	0.0272	0	EX-B13-EE-2-10	10	10/8/2007
Benzene1	0.0298 U	0.0298	0	EX-B13-EE-3-10	10	10/5/2007
Benzene1	0.0509	0.0509	1	EX-B13-EE-3-SSW-4	4	10/5/2007
Benzene1	0.0296 U [0.0292 U]	0.0292	0	EX-B13-EE-4-10	10	10/5/2007
Benzene1	0.0314 U	0.0314	0	EX-B13-EE-4-SSW-4	4	10/5/2007
Benzene1	0.0302 U	0.0302	0	EX-B13-FF-2-4	4	10/9/2007
Benzene1	0.0447	0.0447	1	EX-B13-FF-3-10	10	10/9/2007
Benzene1	0.0289 U	0.0289	0	EX-B13-FF-3-ESW-4	4	10/9/2007
Benzene1	0.136	0.136	1	EX-B13-GG-3-4	4	10/9/2007
Benzene1	1.85	1.85	1	EX-B14-DD-7-2.5	2.5	8/23/2007
Benzene1	0.0999 [0.0912]	0.0999	1	EX-B14-DD-8-6	6	9/4/2007
Benzene1	0.0885 J [1.32 J]	1.32	1	EX-B14-DD-NSW-2.5	2.5	8/23/2007
Benzene1	0.404	0.404	1	EX-B14-EE-5-4	4	9/10/2007
Benzene1	0.239	0.239	1	EX-B14-EE-6-8	8	9/10/2007
Benzene1	0.0581 U	0.0581	0	EX-B14-EE-7-8	8	8/23/2007
Benzene1	0.255	0.255	1	EX-B14-EE-8-4	4	8/23/2007
Benzene1	0.213	0.213	1	EX-B14-FF-6-4	4	9/7/2007
Benzene1	0.0763 U	0.0763	0	EX-B14-FF-7-8	8	8/23/2007
Benzene1	0.0505 U	0.0505	0	EX-B14-FF-8-4SW	4	8/22/2007
Benzene1	0.1	0.1	1	EX-B14-FF-WSW-4	4	8/23/2007
Benzene1	0.0266 U	0.0266	0	EX-B14-GG-7-8	8	8/23/2007
Benzene1	0.0275 U	0.0275	0	EX-B14-GG-WSW-4	4	8/23/2007
Benzene1	0.0302 U [0.0285 U]	0.0285	0	EX-B14-HH-6-4	4	8/23/2007
Benzene1	0.0260 U	0.026	0	EX-B14-HH-6F	6	8/23/2007
Benzene1	0.0277 U	0.0277	0	EX-B14-HH-7-4SW	4	8/23/2007
Benzene1	0.0901	0.0901	1	EX-B15-HH-2-4	4	8/28/2007
Benzene1	0.0319 U	0.0319	0	EX-B15-HH-3-ESW-4	4	8/28/2007
Benzene1	0.356	0.356	1	EX-B15-HH-3-NSW-4	4	8/28/2007
Benzene1	0.0571	0.0571	1	EX-B15-II-2-8	8	8/28/2007
Benzene1	1.1	1.1	1	EX-B15-II-2-WSW-4	4	8/28/2007
Benzene1	0.0264 U	0.0264	0	EX-B15-II-3-8	8	8/28/2007
Benzene1	0.0316 U	0.0316	0	EX-B15-II-4-ESW-4	4	8/28/2007
Benzene1	0.305 U	0.305	0	EX-B16-MM-1-6SW	6	8/20/2007
Benzene1	0.0488 U	0.0488	0	EX-B17-RR-1-6SW	6	8/20/2007
Benzene1	0.0270 U	0.027	0	EX-B17-SS-1-6SW	6	8/20/2007
Benzene1	0.290 U [0.288 U]	0.288	0	EX-B18-UU-1-6SW	6	8/17/2007
Benzene1	1.56 U	1.56	0	EX-B18-VV-1-6SW	6	8/17/2007
Benzene1	0.0302 U	0.0302	0	EX-B1-C-46-4(2)	4	9/2/2008
Benzene1	0.0309 U	0.0309	0	EX-B1-C-47-4	4	8/8/2008
Benzene1	4.39	4.39	1	EX-B1-D-43-4	4	8/19/2008
Benzene1	0.121 U	0.121	0	EX-B1-D-44-12	12	8/18/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0508	0.0508	1	EX-B1-D-44-NSW-4(2)	4	9/2/2008
Benzene1	0.224 [0.0598 U]	0.224	1	EX-B1-D-45-12	12	8/14/2008
Benzene1	0.0316 U	0.0316	0	EX-B1-D-45-NSW-4	4	9/2/2008
Benzene1	0.113 U	0.113	0	EX-B1-D-46-12	12	8/11/2008
Benzene1	0.0349 U	0.0349	0	EX-B1-D-47-4	4	8/8/2008
Benzene1	0.0325 U	0.0325	0	EX-B1-E-41-8	8	8/27/2008
Benzene1	0.0314 U	0.0314	0	EX-B1-E-41-NSW-4	4	8/27/2008
Benzene1	0.0327 U	0.0327	0	EX-B1-E-42-8	8	8/27/2008
Benzene1	0.156	0.156	1	EX-B1-E-42-NSW-4	4	8/27/2008
Benzene1	0.259 U	0.259	0	EX-B1-E-43-12	12	8/21/2008
Benzene1	0.143 U	0.143	0	EX-B1-E-44-12	12	8/19/2008
Benzene1	0.106 U	0.106	0	EX-B1-E-45-12	12	8/14/2008
Benzene1	0.133 U	0.133	0	EX-B1-E-46-12	12	8/13/2008
Benzene1	0.0336 U	0.0336	0	EX-B1-E-47-4	4	8/8/2008
Benzene1	0.0280 U	0.028	0	EX-B1-E-47-SSW-4(2)	4	9/2/2008
Benzene1	0.0332 U	0.0332	0	EX-B1-F-42-8	8	8/27/2008
Benzene1	0.0327 U [0.0306 U]	0.0306	0	EX-B1-F-42-SSW-4	4	8/27/2008
Benzene1	0.0288 U	0.0288	0	EX-B1-F-43-4	4	8/21/2008
Benzene1	0.0671 U	0.0671	0	EX-B1-F-45-10	10	8/15/2008
Benzene1	0.0296 U	0.0296	0	EX-B1-F-45-SSW-4	4	8/18/2008
Benzene1	0.0291 U	0.0291	0	EX-B1-F-47-4(2)	4	9/2/2008
Benzene1	0.0538	0.0538	1	EX-B20-F-19-6	6	10/18/2007
Benzene1	0.0271 U	0.0271	0	EX-B20-F-19-NSW-3	3	10/26/2007
Benzene1	0.0290 U	0.029	0	EX-B20-F-20-10	10	10/30/2007
Benzene1	0.0286 U [0.0292 U]	0.0286	0	EX-B20-F-20-NSW-4	4	10/30/2007
Benzene1	0.0316 U	0.0316	0	EX-B20-F-21-4	4	10/17/2007
Benzene1	0.0268 U	0.0268	0	EX-B20-G-13-12	12	11/26/2007
Benzene1	0.0292 U	0.0292	0	EX-B20-G-14-12	12	11/20/2007
Benzene1	0.0299 U	0.0299	0	EX-B20-G-14-WSW-4	4	11/20/2007
Benzene1	0.0276 U	0.0276	0	EX-B20-G-18-15	15	10/18/2007
Benzene1	0.0377 U	0.0377	0	EX-B20-G-19-15	15	10/18/2007
Benzene1	0.0365	0.0365	1	EX-B20-G-20-15	15	10/18/2007
Benzene1	0.271 U	0.271	0	EX-B20-G-21-10	10	10/17/2007
Benzene1	0.0273 U	0.0273	0	EX-B20-G-21-ESW-5	5	10/26/2007
Benzene1	0.0291 U	0.0291	0	EX-B20-H-10-4	4	11/30/2007
Benzene1	0.0298 U	0.0298	0	EX-B20-H-11-4	4	11/29/2007
Benzene1	0.0284 U [0.0291 U]	0.0284	0	EX-B20-H-12-6	6	11/29/2007
Benzene1	0.0262 U	0.0262	0	EX-B20-H-12-NSW-2	2	11/29/2007
Benzene1	0.0330 U	0.033	0	EX-B20-H-13-12	12	11/26/2007
Benzene1	0.0319 U	0.0319	0	EX-B20-H-14-12	12	11/20/2007
Benzene1	0.0277 U [0.0306 U]	0.0277	0	EX-B20-H-14-WSW-4	4	11/20/2007
Benzene1	0.0299 U [0.0301 U]	0.0299	0	EX-B20-H-18-15	15	10/18/2007
Benzene1	0.0276 U	0.0276	0	EX-B20-H-19-15	15	10/18/2007
Benzene1	0.107	0.107	1	EX-B20-H-20-15	15	10/18/2007
Benzene1	0.0683 U	0.0683	0	EX-B20-H-21-10	10	10/18/2007
Benzene1	0.0271 U	0.0271	0	EX-B20-H-21-ESW-5	5	10/26/2007
Benzene1	0.0308 U	0.0308	0	EX-B20-I-10-10	10	11/29/2007
Benzene1	0.0329 U	0.0329	0	EX-B20-I-11-10	10	11/29/2007
Benzene1	0.0299 U	0.0299	0	EX-B20-I-11-NSW-6	6	11/29/2007
Benzene1	0.0296 U	0.0296	0	EX-B20-I-12-10	10	11/29/2007
Benzene1	0.0291 U	0.0291	0	EX-B20-I-13-12	12	11/26/2007
Benzene1	0.0314 U	0.0314	0	EX-B20-I-14-12	12	11/20/2007
Benzene1	0.0315 U	0.0315	0	EX-B20-I-15-15	15	11/5/2007
Benzene1	0.0392	0.0392	1	EX-B20-I-18-15	15	10/19/2007
Benzene1	0.0361 U [0.0326 U]	0.0326	0	EX-B20-I-19-15	15	10/18/2007
Benzene1	0.0303 U	0.0303	0	EX-B20-I-20-8	8	10/18/2007
Benzene1	0.0254 U	0.0254	0	EX-B20-I-21-4	4	10/30/2007
Benzene1	0.0440 U	0.044	0	EX-B20-I-9-9	9	10/17/2007
Benzene1	0.0340 U	0.034	0	EX-B20-J-10-10	10	11/29/2007
Benzene1	0.0301 U	0.0301	0	EX-B20-J-11-11	11	12/13/2007
Benzene1	0.0329	0.0329	1	EX-B20-J-12-10	10	11/28/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0304 U	0.0304	0	EX-B20-J-13-12	12	11/26/2007
Benzene1	0.0302 U	0.0302	0	EX-B20-J-14-12	12	11/20/2007
Benzene1	0.0346 U	0.0346	0	EX-B20-J-15-15	15	11/5/2007
Benzene1	0.0293 U	0.0293	0	EX-B20-J-18-15	15	10/19/2007
Benzene1	0.0355 U	0.0355	0	EX-B20-J-20-4	4	10/30/2007
Benzene1	0.0310 U	0.031	0	EX-B20-J-9-9	9	10/17/2007
Benzene1	0.0315 U	0.0315	0	EX-B20-K-10-10	10	11/30/2007
Benzene1	0.0290 U	0.029	0	EX-B20-K-11-10	10	11/29/2007
Benzene1	0.0310 U	0.031	0	EX-B20-K-12-12	12	11/29/2007
Benzene1	0.0305 U	0.0305	0	EX-B20-K-13-12	12	11/26/2007
Benzene1	0.0283 U	0.0283	0	EX-B20-K-14-12	12	11/20/2007
Benzene1	0.0282 U	0.0282	0	EX-B20-K-15-15	15	11/5/2007
Benzene1	0.0279 U	0.0279	0	EX-B20-K-16-15	15	10/31/2007
Benzene1	0.0349 U	0.0349	0	EX-B20-K-7-5	5	1/10/2008
Benzene1	0.0385 U	0.0385	0	EX-B20-K-9-9	9	10/16/2007
Benzene1	0.0310 U	0.031	0	EX-B20-L-10-10	10	11/30/2007
Benzene1	0.0322 U	0.0322	0	EX-B20-L-11-10	10	12/7/2007
Benzene1	0.0321 U	0.0321	0	EX-B20-L-12-12	12	11/29/2007
Benzene1	0.0295 U	0.0295	0	EX-B20-L-13-12	12	11/26/2007
Benzene1	0.0292 U	0.0292	0	EX-B20-L-14-12	12	11/20/2007
Benzene1	0.0282 U	0.0282	0	EX-B20-L-15-15	15	11/5/2007
Benzene1	0.0297 U	0.0297	0	EX-B20-L-16-15	15	10/31/2007
Benzene1	0.0256 U	0.0256	0	EX-B20-L-7-5	5	2/8/2008
Benzene1	0.0337 U	0.0337	0	EX-B20-L-8-10	10	12/11/2007
Benzene1	0.0410 [0.0430]	0.043	1	EX-B20-L-8-WSW5	5	1/7/2008
Benzene1	0.0320 U	0.032	0	EX-B20-L-9-10	10	12/11/2007
Benzene1	0.0363	0.0363	1	EX-B20-M-10-12	12	12/7/2007
Benzene1	0.0314 U	0.0314	0	EX-B20-M-11-12	12	12/7/2007
Benzene1	0.0299 U [0.0310 U]	0.0299	0	EX-B20-M-12-12	12	12/7/2007
Benzene1	0.0332 U	0.0332	0	EX-B20-M-13-14	14	12/7/2007
Benzene1	0.0306 U	0.0306	0	EX-B20-M-14-11	11	12/7/2007
Benzene1	0.0316 U	0.0316	0	EX-B20-M-15-11	11	12/7/2007
Benzene1	0.0376 U	0.0376	0	EX-B20-M-7-10	10	2/8/2008
Benzene1	0.0297 U	0.0297	0	EX-B20-M-8-12	12	1/16/2008
Benzene1	0.0319 U	0.0319	0	EX-B20-M-9-12	12	1/16/2008
Benzene1	0.0292 U	0.0292	0	EX-B20-N-10-12	12	1/8/2008
Benzene1	0.0292 U	0.0292	0	EX-B20-N-11-12	12	1/8/2008
Benzene1	0.0282 U	0.0282	0	EX-B20-N-12-12	12	1/8/2008
Benzene1	0.0310 U	0.031	0	EX-B20-N-13-12	12	1/8/2008
Benzene1	0.0308 U	0.0308	0	EX-B20-N-14-12	12	12/11/2007
Benzene1	0.0324 U	0.0324	0	EX-B20-N-7-8	8	1/16/2008
Benzene1	0.0293 U	0.0293	0	EX-B20-N-7-WSW-4	4	1/16/2008
Benzene1	0.0318 U	0.0318	0	EX-B20-N-8-12	12	1/16/2008
Benzene1	0.0313 U	0.0313	0	EX-B20-N-9-12	12	1/16/2008
Benzene1	0.0354 U	0.0354	0	EX-B21-ESW-2	2	10/11/2007
Benzene1	0.0303 U	0.0303	0	EX-B21-FLOOR-4	4	10/11/2007
Benzene1	0.0300 U	0.03	0	EX-B21-NSW-2	2	10/11/2007
Benzene1	0.0345 U	0.0345	0	EX-B2-E-33(2)-6	6	2/27/2008
Benzene1	0.0326 U	0.0326	0	EX-B2-E-33-6	6	2/25/2008
Benzene1	0.0331 U	0.0331	0	EX-B2-E-34-6	6	2/25/2008
Benzene1	0.0370 U	0.037	0	EX-B2-E-35(3)-6	6	3/5/2008
Benzene1	0.0336 U	0.0336	0	EX-B2-E-35-6	6	2/22/2008
Benzene1	0.0420 U	0.042	0	EX-B2-E-36-6	6	2/27/2008
Benzene1	0.0313 U	0.0313	0	EX-B2-E-40-4	4	1/23/2008
Benzene1	0.0289 U	0.0289	0	EX-B2-E-41(2)-5	5	2/4/2008
Benzene1	0.0262 U [0.0264 U]	0.0262	0	EX-B2-E-41-4	4	1/23/2008
Benzene1	0.108 U	0.108	0	EX-B2-F-32-12	12	3/3/2008
Benzene1	0.0656 U [0.0670 U]	0.0656	0	EX-B2-F-33-12	12	2/28/2008
Benzene1	0.0603 U	0.0603	0	EX-B2-F-34-11	11	2/28/2008
Benzene1	0.105 U	0.105	0	EX-B2-F-35-12	12	2/25/2008
Benzene1	0.0790 U	0.079	0	EX-B2-F-36-13	13	2/22/2008
Benzene1	0.0409 U	0.0409	0	EX-B2-F-36-NSW-6	6	2/22/2008
Benzene1	0.0705 U	0.0705	0	EX-B2-F-37-13	13	2/22/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0378 U	0.0378	0	EX-B2-F-37-NSW-6	6	2/22/2008
Benzene1	0.0570 U	0.057	0	EX-B2-F-38(2)-14	14	2/6/2008
Benzene1	0.0357 U	0.0357	0	EX-B2-F-38-8	8	1/31/2008
Benzene1	0.0350 J	0.035	1	EX-B2-F-38-NSW(2)-5	5	2/6/2008
Benzene1	0.0307 U	0.0307	0	EX-B2-F-38-NSW(2)-6	6	3/5/2008
Benzene1	0.0295 U [0.0212 U]	0.0212	0	EX-B2-F-38-NSW-4	4	1/31/2008
Benzene1	0.0291 U	0.0291	0	EX-B2-F-38-WSW-5	5	1/31/2008
Benzene1	0.0580 U	0.058	0	EX-B2-F-39(2)-12	12	2/5/2008
Benzene1	0.0290 U [0.0287 U]	0.0287	0	EX-B2-F-39-8	8	1/28/2008
Benzene1	0.0308 U	0.0308	0	EX-B2-F-39-NSW-4	4	1/28/2008
Benzene1	0.17	0.17	1	EX-B2-F-40-8	8	1/25/2008
Benzene1	0.0288 U	0.0288	0	EX-B2-F-41-8	8	1/23/2008
Benzene1	3.3	3.3	1	EX-B2-F-41-ESW(2)-5	5	2/4/2008
Benzene1	0.139 J	0.139	1	EX-B2-G-32-6	6	2/26/2008
Benzene1	0.0340 U	0.034	0	EX-B2-G-33(2)-6	6	2/28/2008
Benzene1	0.0308 U	0.0308	0	EX-B2-G-34-10	10	2/25/2008
Benzene1	0.0429 U	0.0429	0	EX-B2-G-34-SSW-6	6	2/25/2008
Benzene1	0.119 U	0.119	0	EX-B2-G-35-10	10	2/22/2008
Benzene1	0.0361 U [0.0404 U]	0.0361	0	EX-B2-G-35-SSW-6	6	2/22/2008
Benzene1	0.0423 U	0.0423	0	EX-B2-G-36-12	12	2/22/2008
Benzene1	0.0414 U	0.0414	0	EX-B2-G-37-13	13	2/22/2008
Benzene1	0.0332 U	0.0332	0	EX-B2-G-38(2)-13	13	2/6/2008
Benzene1	0.0279 U	0.0279	0	EX-B2-G-38-8	8	1/31/2008
Benzene1	0.0305 U	0.0305	0	EX-B2-G-38-WSW-5	5	1/31/2008
Benzene1	0.0662 U	0.0662	0	EX-B2-G-39(2)-11	11	2/5/2008
Benzene1	0.0271 U	0.0271	0	EX-B2-G-39-SSW-4	4	1/28/2008
Benzene1	0.0317 U	0.0317	0	EX-B2-G-40-8	8	1/25/2008
Benzene1	0.0287 U	0.0287	0	EX-B2-G-40-SSW-4	4	1/25/2008
Benzene1	0.0354 U	0.0354	0	EX-B2-G-41-8	8	1/24/2008
Benzene1	0.0356 U	0.0356	0	EX-B2-G-41-ESW-4	4	1/24/2008
Benzene1	0.0341 U	0.0341	0	EX-B2-G-41-SSW-4	4	1/24/2008
Benzene1	0.0833 U	0.0833	0	EX-B2-H-35-6	6	2/27/2008
Benzene1	0.0426 U	0.0426	0	EX-B2-H-36-6	6	2/22/2008
Benzene1	0.0349 U	0.0349	0	EX-B2-H-37(2)-6	6	3/5/2008
Benzene1	0.0293 U	0.0293	0	EX-B2-H-38(2)-10	10	2/6/2008
Benzene1	0.0329 U	0.0329	0	EX-B2-H-38-WSW(2)-5	5	2/6/2008
Benzene1	0.0474 U	0.0474	0	EX-B3-E-32-6	6	2/26/2008
Benzene1	0.0604 U	0.0604	0	EX-B3-F-31-12	12	3/10/2008
Benzene1	0.0306 U	0.0306	0	EX-B3-F-31-NSW-6	6	3/10/2008
Benzene1	0.0356 U	0.0356	0	EX-B3-G-29-5	5	3/11/2008
Benzene1	0.0313 U	0.0313	0	EX-B3-G-29-NSW-4	4	3/11/2008
Benzene1	0.0377 U [0.0345 U]	0.0345	0	EX-B3-G-29-SSW-5	5	3/11/2008
Benzene1	0.0352 U	0.0352	0	EX-B3-G-30-12	12	3/11/2008
Benzene1	0.108	0.108	1	EX-B3-G-30-NSW-6	6	3/11/2008
Benzene1	0.0322 U	0.0322	0	EX-B3-G-30-SSW-6	6	3/10/2008
Benzene1	0.0368 U	0.0368	0	EX-B3-G-31-12	12	3/10/2008
Benzene1	0.0427 U	0.0427	0	EX-B3-G-31-SSW-6	6	3/10/2008
Benzene1	0.0297 U [0.0321 U]	0.0297	0	EX-B4-B-23-6	6	2/25/2008
Benzene1	0.0366 U	0.0366	0	EX-B4-B-24-6	6	2/25/2008
Benzene1	0.0354 U	0.0354	0	EX-B5-B-20(2)-4	4	2/28/2008
Benzene1	0.0363 U	0.0363	0	EX-B5-B-20-4	4	2/22/2008
Benzene1	0.0335 U	0.0335	0	EX-B6-C-15-3	3	11/19/2007
Benzene1	0.0269 U	0.0269	0	EX-B6-D-13-3	3	11/19/2007
Benzene1	0.0321 U	0.0321	0	EX-B6-D-14-10	10	11/19/2007
Benzene1	0.0369 U	0.0369	0	EX-B6-D-14-NSW-3	3	11/19/2007
Benzene1	0.0332 U [0.0323 U]	0.0323	0	EX-B6-D-15-12	12	11/19/2007
Benzene1	0.0261 U [0.0270 U]	0.0261	0	EX-B6-E-13-4	4	11/19/2007
Benzene1	0.0312 U	0.0312	0	EX-B6-E-14-10	10	11/19/2007
Benzene1	0.0302 U	0.0302	0	EX-B6-F-14-10	10	11/19/2007
Benzene1	0.0275 U	0.0275	0	EX-B6-F-14-WSW-3	3	11/19/2007
Benzene1	0.0308 U	0.0308	0	EX-B8-G-4-9	9	10/1/2007
Benzene1	0.0271 U	0.0271	0	EX-B8-G-4-WSW-4	4	10/1/2007
Benzene1	0.0319 U	0.0319	0	EX-B8-G-5-9	9	10/1/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0385 U	0.0385	0	EX-B8-H-3-10	10	9/10/2008
Benzene1	0.0322 U	0.0322	0	EX-B8-H-3-NSW-5	5	9/10/2008
Benzene1	0.0427 U	0.0427	0	EX-B8-H-3-WSW-5	5	9/10/2008
Benzene1	0.0324 U	0.0324	0	EX-B8-H-4-9	9	10/1/2007
Benzene1	0.0353 U	0.0353	0	EX-B8-H-5-9	9	10/1/2007
Benzene1	0.0412 U	0.0412	0	EX-B8-I-3-10	10	9/10/2008
Benzene1	0.0525 U	0.0525	0	EX-B8-I-3-WSW-5(2)	5	9/11/2008
Benzene1	0.0817	0.0817	1	EX-B8-I-4-9	9	10/1/2007
Benzene1	0.0292 U	0.0292	0	EX-B8-I-5-9	9	10/1/2007
Benzene1	0.0369 U	0.0369	0	EX-B8-J-3-10	10	9/10/2008
Benzene1	0.0302 U [0.0338 U]	0.0302	0	EX-B8-J-3-SSW-5	5	9/10/2008
Benzene1	0.0302 U	0.0302	0	EX-B8-J-3-WSW-5	5	9/10/2008
Benzene1	0.0251 U	0.0251	0	EX-B8-J-4-5	5	10/23/2007
Benzene1	0.0331 U	0.0331	0	EX-B8-J-4-SSW-2.5	2.5	10/23/2007
Benzene1	0.0272 U	0.0272	0	EX-B8-J-5-4	4	10/1/2007
Benzene1	0.0366 U	0.0366	0	EX-B8-J-5-9	9	10/1/2007
Benzene1	0.0315 U	0.0315	0	EX-B9-M-4-11	11	2/20/2008
Benzene1	0.329 U	0.329	0	EX-B9-M-4-NSW-6	6	2/19/2008
Benzene1	0.336 U	0.336	0	EX-B9-M-4-WSW-6	6	2/19/2008
Benzene1	0.0411 U	0.0411	0	EX-B9-M-5-11	11	2/19/2008
Benzene1	0.0285 U	0.0285	0	EX-B9-M-5-NSW-6	6	2/19/2008
Benzene1	0.0364 U [0.0453 U]	0.0364	0	EX-B9-M-6-11	11	2/19/2008
Benzene1	0.0383 U	0.0383	0	EX-B9-M-6-NSW-6	6	2/19/2008
Benzene1	0.0331 U	0.0331	0	EX-B9-N-3-5	5	9/9/2008
Benzene1	0.0349 U	0.0349	0	EX-B9-N-4-11	11	2/20/2008
Benzene1	0.0338 U	0.0338	0	EX-B9-N-4-WSW-6	6	2/20/2008
Benzene1	0.0343 U	0.0343	0	EX-B9-N-5-12	12	2/13/2008
Benzene1	0.0353 U	0.0353	0	EX-B9-O-3-10	10	9/9/2008
Benzene1	0.0322 U	0.0322	0	EX-B9-O-3-WSW-5	5	9/9/2008
Benzene1	0.0373 U [0.0373 U]	0.0373	0	EX-B9-O-4-12	12	2/20/2008
Benzene1	0.0322 U	0.0322	0	EX-B9-O-4-WSW-6	6	2/20/2008
Benzene1	0.0365 U [0.0354 U]	0.0354	0	EX-B9-O-5-12	12	2/13/2008
Benzene1	0.0360 U	0.036	0	EX-B9-P-3-10	10	9/9/2008
Benzene1	0.0320 U	0.032	0	EX-B9-P-3-SSW-5	5	9/9/2008
Benzene1	0.0327 U	0.0327	0	EX-B9-P-3-WSW-5	5	9/9/2008
Benzene1	0.0396 U	0.0396	0	EX-B9-P-4-12	12	2/20/2008
Benzene1	0.332 U	0.332	0	EX-B9-P-4-SSW(2)-6	6	2/25/2008
Benzene1	0.295 U	0.295	0	EX-B9-P-4-SSW-6	6	2/20/2008
Benzene1	0.0333 U	0.0333	0	EX-B9-P-4-WSW-6	6	2/20/2008
Benzene1	0.0315 U	0.0315	0	EX-B9-P-5-12	12	2/13/2008
Benzene1	0.0175 U	0.0175	0	EX-B9-Q-5-6	6	2/13/2008
Benzene1	0.0552 U	0.0552	0	EX-RRT-ZZ-2-4	4	8/1/2008
Benzene1	0.0800 U	0.08	0	EX-RRT-ZZ-2-ESW-3	3	8/1/2008
Benzene1	0.0320 U	0.032	0	EX-SDTI-5-NSW-4	4	8/22/2007
Benzene1	0.0344 U	0.0344	0	EX-SDTI-5-SSW-4	4	8/22/2007
Benzene1	0.0400 U	0.04	0	EX-SDTI-ESW-4	4	8/22/2007
Benzene1	0.0333 U	0.0333	0	EX-SDTI-FF-S-8	8	8/22/2007
Benzene1	0.0304 U	0.0304	0	EX-SDTI-GG-ESW-4	4	8/22/2007
Benzene1	0.0286 U	0.0286	0	EX-SDTI-GG-S-8	8	8/22/2007
Benzene1	0.0322 U	0.0322	0	EX-SDTI-GG-WSW-4	4	8/22/2007
Benzene1	0.0757	0.0757	1	EX-SDTI-WSW-4	4	8/22/2007
Benzene1	0.0287 U	0.0287	0	EX-WW-G-27-2SW	2	8/7/2007
Benzene1	0.0299 U	0.0299	0	EX-WW-G-27-4	4	8/7/2007
Benzene1	0.0384 U	0.0384	0	EX-WW-H-27-2.5	2.5	8/7/2007
Benzene1	0.0294 U	0.0294	0	EX-WW-H-28-2	2	8/7/2007
Benzene1	0.0335 U	0.0335	0	EX-WW-H-29-1	1	8/7/2007
Benzene1	0.0254 U	0.0254	0	EX-WW-I-26-1	1	8/7/2007
Benzene1	0.0310 U	0.031	0	ISP-E-17-2	2	9/17/2008
Benzene1	0.0312 U	0.0312	0	ISP-E-18-2	2	9/17/2008
Benzene1	0.0337 U	0.0337	0	ISP-E-19-2	2	9/22/2008
Benzene1	0.0333 U	0.0333	0	ISP-E-20-2	2	9/22/2008
Benzene1	0.0318 U	0.0318	0	ISP-E-21-2	2	9/22/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0319 U	0.0319	0	ISP-F-17-2	2	9/17/2008
Benzene1	0.0267 U	0.0267	0	ISP-F-18-2	2	9/17/2008
Benzene1	0.0329 U	0.0329	0	ISP-F-19-2	2	9/22/2008
Benzene1	0.0351 U	0.0351	0	ISP-F-20-2	2	9/22/2008
Benzene1	0.0344 U	0.0344	0	ISP-F-21-2	2	9/22/2008
Benzene1	0.0314 U	0.0314	0	ISP-G-17-2	2	9/17/2008
Benzene1	0.0314 U	0.0314	0	ISP-G-18-2	2	9/17/2008
Benzene1	0.0344 U	0.0344	0	ISP-G-19-2(2)	2	9/25/2008
Benzene1	0.0328 U	0.0328	0	ISP-G-20-2	2	9/22/2008
Benzene1	0.0322 U	0.0322	0	ISP-G-21-2	2	9/22/2008
Benzene1	0.0303 U	0.0303	0	MW-129R-4.5	4.5	10/14/2008
Benzene1	0.0446 U	0.0446	0	MW-129R-7.0	7	10/14/2008
Benzene1	0.0337 U	0.0337	0	MW-502-6.0	6	10/14/2008
Benzene1	0.0378 U [0.0361 U]	0.0361	0	MW-511-8.5	8.5	10/14/2008
Benzene1	0.11 U W	0.11	0	MW-527-12	12	6/22/2012
Benzene1	0.11 U W	0.11	0	MW-527-13.5	13.5	6/22/2012
Benzene1	0.02	0.02	1	MW-527-8	8	6/14/2012
Benzene1	0.053 U W	0.053	0	MW-527-9	9	6/22/2012
Benzene1	0.025 U W	0.025	0	MW-528-15	15	6/22/2012
Benzene1	0.015	0.015	1	MW-528-8	8	6/14/2012
Benzene1	0.105 U	0.105	0	RRT-YY-2-6	6	8/4/2008
Benzene1	0.0397 U [0.0357 U]	0.0357	0	RRT-YY-2-WSW-3	3	8/4/2008
Benzene1	0.0349 U	0.0349	0	RRT-ZZ-2-NSW-3	3	8/4/2008
Benzene1	0.0382 U	0.0382	0	RRT-ZZ-3-NSW-3	3	8/4/2008
Benzene1	0.0341 U [0.0350 U]	0.0341	0	SB-10-11.0	11	4/4/2008
Benzene1	0.0304 U	0.0304	0	SB-1-11.5	11.5	4/3/2008
Benzene1	0.0556 U	0.0556	0	SB-11-11.0	11	4/4/2008
Benzene1	0.0348 U	0.0348	0	SB-12-11.5	11.5	4/4/2008
Benzene1	0.0465 U	0.0465	0	SB-13-11	11	4/11/2008
Benzene1	0.0385 U	0.0385	0	SB-14-11	11	4/11/2008
Benzene1	0.0354 U [0.0366 U]	0.0354	0	SB-15-10.5	10.5	4/14/2008
Benzene1	0.0312 U	0.0312	0	SB-16-9.5	9.5	4/14/2008
Benzene1	0.0321 U	0.0321	0	SB-17-11.5	11.5	4/14/2008
Benzene1	0.711	0.711	1	SB-18-11	11	4/11/2008
Benzene1	0.0292 U	0.0292	0	SB-19-12	12	4/11/2008
Benzene1	0.0323 U	0.0323	0	SB-20-9.5	9.5	4/14/2008
Benzene1	0.0609 U	0.0609	0	SB-2-11	11	4/3/2008
Benzene1	0.0348 U	0.0348	0	SB-21-10.5	10.5	4/14/2008
Benzene1	0.0371 U [0.0371 U]	0.0371	0	SB-22-10	10	4/11/2008
Benzene1	0.0357 U	0.0357	0	SB-23-11	11	4/11/2008
Benzene1	0.0398 U	0.0398	0	SB-24-10	10	4/11/2008
Benzene1	0.0359 U	0.0359	0	SB-25-11	11	4/11/2008
Benzene1	0.0339 U	0.0339	0	SB-26-10.5	10.5	4/14/2008
Benzene1	0.2	0.2	1	SB-27-10	10	4/14/2008
Benzene1	0.0313 U	0.0313	0	SB-28-9	9	4/11/2008
Benzene1	0.0708	0.0708	1	SB-29-9	9	4/8/2008
Benzene1	0.0343 U	0.0343	0	SB-30-9.5	9.5	4/10/2008
Benzene1	0.0335 U	0.0335	0	SB-3-10.5	10.5	4/3/2008
Benzene1	0.0372 U	0.0372	0	SB-3-12	12	4/3/2008
Benzene1	0.0420 U	0.042	0	SB-31-9.5	9.5	4/10/2008
Benzene1	0.0541 U [0.0538 U]	0.0538	0	SB-32-9.5	9.5	4/10/2008
Benzene1	0.0471 U	0.0471	0	SB-33-11	11	4/10/2008
Benzene1	0.0344 U	0.0344	0	SB-34-11	11	4/10/2008
Benzene1	0.0442 U	0.0442	0	SB-35-9	9	4/10/2008
Benzene1	0.0252 U	0.0252	0	SB-36-12	12	4/10/2008
Benzene1	0.224 [0.225]	0.225	1	SB-37-9	9	4/8/2008
Benzene1	0.108	0.108	1	SB-38-10	10	4/8/2008
Benzene1	0.0749	0.0749	1	SB-38-8.5	8.5	4/8/2008
Benzene1	0.0285 U	0.0285	0	SB-39-14	14	4/10/2008
Benzene1	0.0365 U	0.0365	0	SB-40-11	11	4/10/2008
Benzene1	0.0307 U	0.0307	0	SB-4-10.5	10.5	4/4/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0346 U	0.0346	0	SB-41-10	10	4/10/2008
Benzene1	0.0464 U [0.0821]	0.0821	1	SB-42-10	10	4/9/2008
Benzene1	0.0420 U	0.042	0	SB-43-11.5	11.5	4/9/2008
Benzene1	0.205	0.205	1	SB-44-11	11	4/9/2008
Benzene1	0.206	0.206	1	SB-45-10	10	4/8/2008
Benzene1	0.0311 U	0.0311	0	SB-46-10.5	10.5	4/8/2008
Benzene1	0.0323 U	0.0323	0	SB-46-6	6	4/8/2008
Benzene1	0.0437 U	0.0437	0	SB-47-10	10	4/9/2008
Benzene1	0.0459 U	0.0459	0	SB-48-11.5	11.5	4/9/2008
Benzene1	0.0333 U	0.0333	0	SB-49-10.5	10.5	4/9/2008
Benzene1	0.0350 U	0.035	0	SB-50-10.5	10.5	4/9/2008
Benzene1	0.0394	0.0394	1	SB-5-11.5	11.5	4/4/2008
Benzene1	0.0350 U	0.035	0	SB-51-9.5	9.5	4/8/2008
Benzene1	0.0317 U	0.0317	0	SB-52-9.5	9.5	4/8/2008
Benzene1	0.0309 U	0.0309	0	SB-53-10.5	10.5	4/9/2008
Benzene1	0.0373 U	0.0373	0	SB-54-10.5	10.5	4/9/2008
Benzene1	0.0606 U	0.0606	0	SB-55-11.5	11.5	4/7/2008
Benzene1	0.0337 U	0.0337	0	SB-56-14.5	14.5	4/8/2008
Benzene1	0.0307 U	0.0307	0	SB-57-10.5	10.5	4/7/2008
Benzene1	0.0359 U	0.0359	0	SB-58-11.0	11	4/7/2008
Benzene1	0.0311 U	0.0311	0	SB-59-5.5	5.5	4/8/2008
Benzene1	0.0825 [0.0864]	0.0864	1	SB-60-10.5	10.5	4/7/2008
Benzene1	0.0356 U	0.0356	0	SB-6-11.0	11	4/4/2008
Benzene1	0.0511 U	0.0511	0	SB-61-10.5	10.5	4/7/2008
Benzene1	0.0607 U	0.0607	0	SB-62-10.5	10.5	4/7/2008
Benzene1	0.157 J	0.157	1	SB-63-6.0	6	4/7/2008
Benzene1	0.139 J	0.139	1	SB-64-5.5	5.5	4/7/2008
Benzene1	0.325	0.325	1	SB-64-7.0	7	4/7/2008
Benzene1	0.0398 U	0.0398	0	SB-67-5.5	5.5	6/24/2008
Benzene1	0.0366 U	0.0366	0	SB-70-12.5	12.5	6/25/2008
Benzene1	0.0371 U	0.0371	0	SB-70-6.0	6	6/24/2008
Benzene1	0.0369 U	0.0369	0	SB-70-7.0	7	6/25/2008
Benzene1	0.0334 U	0.0334	0	SB-7-11.5	11.5	4/4/2008
Benzene1	0.0368 U	0.0368	0	SB-71-8.0	8	6/25/2008
Benzene1	0.0371 U	0.0371	0	SB-72-6.5	6.5	6/25/2008
Benzene1	0.0369 U	0.0369	0	SB-73-15.0	15	6/26/2008
Benzene1	0.0445 U	0.0445	0	SB-73-6.0	6	6/26/2008
Benzene1	0.0380 U	0.038	0	SB-74-15	15	6/26/2008
Benzene1	0.0375 U	0.0375	0	SB-74-6.0	6	6/26/2008
Benzene1	0.0398 U	0.0398	0	SB-75-15.0	15	6/26/2008
Benzene1	0.0406 U	0.0406	0	SB-75-6.0	6	6/26/2008
Benzene1	0.0501 U	0.0501	0	SB-76-10.5	10.5	6/30/2008
Benzene1	0.0288 U [0.0355 U]	0.0288	0	SB-76-14	14	6/30/2008
Benzene1	0.0389 U	0.0389	0	SB-76-4.5	4.5	6/30/2008
Benzene1	0.0336 U	0.0336	0	SB-77-14	14	6/30/2008
Benzene1	0.0392 U	0.0392	0	SB-77-6	6	6/30/2008
Benzene1	0.0325 U	0.0325	0	SB-78-10	10	6/30/2008
Benzene1	0.0353 U	0.0353	0	SB-78-12.5	12.5	6/30/2008
Benzene1	6.57 J	6.57	1	SB-78-5.5	5.5	6/30/2008
Benzene1	0.0351 U	0.0351	0	SB-78-8.5	8.5	6/30/2008
Benzene1	0.0550 U	0.055	0	SB-79-11.5	11.5	6/30/2008
Benzene1	0.0344 U	0.0344	0	SB-79-5	5	6/30/2008
Benzene1	0.0501	0.0501	1	SB-8-11.0	11	4/4/2008
Benzene1	0.0301 U	0.0301	0	SB-81-5	5	6/30/2008
Benzene1	0.0414 U	0.0414	0	SB-81-9.5	9.5	6/30/2008
Benzene1	0.0349 U	0.0349	0	SB-82-7	7	7/1/2008
Benzene1	0.0455 U	0.0455	0	SB-82-9	9	7/1/2008
Benzene1	0.0333 U	0.0333	0	SB-83-7	7	7/1/2008
Benzene1	0.0502 U	0.0502	0	SB-83-8.5	8.5	7/1/2008
Benzene1	0.0610 U	0.061	0	SB-84-6	6	7/1/2008
Benzene1	0.0745 U	0.0745	0	SB-84-8	8	7/1/2008
Benzene1	0.0357 U	0.0357	0	SB-85-5.5	5.5	7/2/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.114 U	0.114	0	SB-85-7.5	7.5	7/2/2008
Benzene1	0.0324 U	0.0324	0	SB-86-4.5	4.5	7/2/2008
Benzene1	0.0513 U	0.0513	0	SB-86-6.5	6.5	7/2/2008
Benzene1	0.0477	0.0477	1	SB-87-14.0	14	7/25/2008
Benzene1	0.06	0.06	1	SB-87-6.0	6	7/25/2008
Benzene1	0.0145 U	0.0145	0	SB-88-8.0	8	7/25/2008
Benzene1	0.0401	0.0401	1	SB-9-11.0	11	4/4/2008
Benzene1	0.03 U	0.03	0	STRM-1floor-8	8	10/24/2003
Benzene1	0.03 U	0.03	0	STRM-1wall-4	4	10/24/2003
Benzene1	0.03 U	0.03	0	STRM-2Floor-6	6	10/28/2003
Benzene1	0.03 U	0.03	0	STRM-2wallW-3	3	10/28/2003
Benzene1	0.03 U	0.03	0	STRM-3WallW-3	3	10/27/2003
Benzene1	0.03 U	0.03	0	STRM-4wallW-3	3	10/24/2003
Benzene1	0.03 U	0.03	0	SWLY-A-10wall-3.75	3.75	11/11/2003
Benzene1	0.03 U	0.03	0	SWLY-A-11WALL-3.75	3.75	11/25/2003
Benzene1	0.06 U	0.06	0	SWLY-A-12WALL-3.75	3.75	11/25/2003
Benzene1	0.03 U	0.03	0	SWLY-A-13WALL-3.75	3.75	11/25/2003
Benzene1	0.03 U	0.03	0	SWLY-A-15wall-3.75	3.75	12/1/2003
Benzene1	0.12 U	0.12	0	SWLY-A-17wall-3.75	3.75	12/1/2003
Benzene1	0.03 U	0.03	0	SWLY-A-18wall-3.75	3.75	12/2/2003
Benzene1	0.11	0.11	1	SWLY-A-19wall-3.75	3.75	12/2/2003
Benzene1	0.03 U	0.03	0	SWLY-A-1Wall-3.75	3.75	10/14/2003
Benzene1	0.03 U	0.03	0	SWLY-A-20WALL-3.75	3.75	12/4/2003
Benzene1	0.13	0.13	1	SWLY-A-21WALL-3.75	3.75	12/4/2003
Benzene1	0.03 U	0.03	0	SWLY-A-2Wall-3.75	3.75	10/14/2003
Benzene1	0.03 U	0.03	0	SWLY-A-3Wall-3.75	3.75	10/14/2003
Benzene1	0.03 U	0.03	0	SWLY-A-4Wall-3.75	3.75	10/16/2003
Benzene1	0.30 U	0.3	0	SWLY-A-7WALL-3.75	3.75	11/6/2003
Benzene1	0.06 U	0.06	0	SWLY-A-8WALL-3.75	3.75	11/6/2003
Benzene1	0.03 U	0.03	0	SWLY-C-1Wall-3.75	3.75	10/16/2003
Benzene1	0.03 U	0.03	0	SWLY-D-1Wall-3.75	3.75	10/16/2003
Benzene1	0.03 U	0.03	0	SWLY-D-21wall-3.75	3.75	12/5/2003
Benzene1	0.03 U	0.03	0	SWLY-D-2Wall-3.75	3.75	10/16/2003
Benzene1	4.47 D	4.47	1	SWLY-D-3Wall-3.75	3.75	10/17/2003
Benzene1	0.03 U	0.03	0	SWLY-D-4Wall-3.75	3.75	10/21/2003
Benzene1	0.03 U	0.03	0	SWLY-D-5WALL-3.75	3.75	11/6/2003
Benzene1	0.03 U	0.03	0	SWLY-D-6WALL-3.75	3.75	11/6/2003
Benzene1	0.03 U	0.03	0	SWLY-D-7Wall-3.75	3.75	11/10/2003
Benzene1	0.03 U	0.03	0	SWLY-D-7-Wall-3.75	3.75	11/7/2003
Benzene1	0.03 U	0.03	0	SWLY-E-10-3.75	3.75	11/12/2003
Benzene1	0.03 U	0.03	0	SWLY-E-11-3.75	3.75	11/13/2003
Benzene1	0.03 U	0.03	0	SWLY-E-21wall-3.75	3.75	12/5/2003
Benzene1	0.03 U	0.03	0	SWLY-E-8wall-3.75	3.75	11/11/2003
Benzene1	0.03 U	0.03	0	SWLY-E-9wall-3.75	3.75	11/11/2003
Benzene1	0.03 U	0.03	0	SWLY-F-12-3.75	3.75	11/14/2003
Benzene1	0.03 U	0.03	0	SWLY-F-13-3.75	3.75	11/14/2003
Benzene1	0.03 U	0.03	0	SWLY-F-21wall-3.75	3.75	11/24/2003
Benzene1	0.3	0.3	1	SWLY-G-14-3.75	3.75	11/17/2003
Benzene1	0.03 U	0.03	0	SWLY-G-15-3.75	3.75	11/20/2003
Benzene1	0.03 U	0.03	0	SWLY-G-16-3.75	3.75	11/20/2003
Benzene1	0.03 U	0.03	0	SWLY-G-17-3.75	3.75	11/20/2003
Benzene1	0.03 U	0.03	0	SWLY-G-21wall-3.75	3.75	11/24/2003
Benzene1	0.03 U	0.03	0	SWLY-H-18-3.75	3.75	11/21/2003
Benzene1	0.03 U	0.03	0	SWLY-H-19-3.75	3.75	11/21/2003
Benzene1	0.03 U	0.03	0	SWLY-H-21wall-3.75	3.75	11/24/2003
Benzene1	0.03 U [0.03 U]	0.03	0	SWLY-I-20wall-3.75	3.75	11/24/2003
Benzene1	0.03 U	0.03	0	SWLY-I-21wall-3.75	3.75	11/24/2003
Benzene1	0.0089 U	0.0089	0	DPE-PSS-N17-4	4	12/3/2018
Benzene1	0.0089 U	0.0089	0	DPE-PSS-N17-6	6	12/3/2018
Benzene1	0.0084 U	0.0084	0	DPE-PSS-O16-4	4	12/3/2018
Benzene1	0.008 U	0.008	0	DPE-PSS-O16-6	6	12/3/2018
Benzene1	0.016 U	0.016	0	DPE-PSS-P15-6	6	12/3/2018
Benzene1	0.0087 U	0.0087	0	DPE-PSS-P15-11	11	12/3/2018

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0085 U	0.0085	0	DPE-PSS-Q14-6	6	12/3/2018
Benzene1	0.0086 U	0.0086	0	DPE-PSS-Q14-14.5	14.5	12/3/2018
Benzene1	0.0076 U	0.0076	0	DPE-PSS-P16-1	1	12/4/2018
Benzene1	0.0093 U	0.0093	0	DPE-PSS-P16-2	2	12/4/2018
Benzene1	0.0087 U	0.0087	0	DPE-PSS-P16-6	6	12/4/2018
Benzene1	0.0076 U	0.0076	0	DPE-PSS-O17-3	3	12/4/2018
Benzene1	0.0088 U	0.0088	0	DPE-PSS-O17-6	6	12/4/2018
Benzene1	0.0077 U	0.0077	0	DPE-PSS-Q15-1	1	12/4/2018
Benzene1	0.009 U [0.01 U]	0.009	0	DPE-PSS-Q15-6	6	12/4/2018
Benzene1	0.0085 U	0.0085	0	DPE-PSS-T14-4	4	12/4/2018
Benzene1	0.0083 U	0.0083	0	DPE-PSS-T14-6	6	12/4/2018
Benzene1	0.0083 U	0.0083	0	DPE-PSS-U13-8.5	8.5	12/4/2018
Benzene1	0.009 U	0.009	0	DPE-PSS-U13-14.5	14.5	12/4/2018
Benzene1	0.072	0.072	1	DPE-PSS-W9-4	4	12/5/2018
Benzene1	0.13	0.13	1	DPE-PSS-W9-6	6	12/5/2018
Benzene1	0.67 [8.4]	8.4	1	DPE-PSS-V10-5	5	12/5/2018
Benzene1	3.4	3.4	1	DPE-PSS-V10-10	10	12/5/2018
Benzene1	0.0088 U	0.0088	0	DPE-PSS-V10-13	13	12/5/2018
Benzene1	0.016 J	0.016	1	DPE-PSS-V11-5	5	12/5/2018
Benzene1	0.0087 U	0.0087	0	DPE-PSS-V11-9.5	9.5	12/5/2018
Benzene1	0.0086 U	0.0086	0	DPE-PSS-W10-7	7	12/5/2018
Benzene1	0.0082 U	0.0082	0	DPE-PSS-W10-10	10	12/5/2018
Benzene1	0.0096 U	0.0096	0	DPE-PSS-W10-14.5	14.5	12/5/2018
Benzene1	0.0094 U F2 F1	0.0094	0	DPE-PSS-W11-2	2	12/6/2018
Benzene1	0.0084 U	0.0084	0	DPE-PSS-W11-3	3	12/6/2018
Benzene1	0.0081 U	0.0081	0	DPE-PSS-W11-6	6	12/6/2018
Benzene1	0.0091 U	0.0091	0	DPE-PSS-V12-4	4	12/6/2018
Benzene1	0.0094 U	0.0094	0	DPE-PSS-V12-6	6	12/6/2018
Benzene1	0.011 U	0.011	0	DPE-PSS-Y9-7.5	7.5	12/6/2018
Benzene1	0.011 U [0.01 U]	0.01	0	DPE-PSS-Y9-9	9	12/6/2018
Benzene1	0.013 U	0.013	0	DPE-PSS-Y9-14.5	14.5	12/6/2018
Benzene1	0.18	0.18	1	DPE-PSS-W8-6.5	6.5	12/6/2018
Benzene1	33	33	1	DPE-PSS-W8-8.5	8.5	12/6/2018
Benzene1	0.22 F2 F1	0.22	1	DPE-PSS-X9-7	7	12/7/2018
Benzene1	0.012 U	0.012	0	DPE-PSS-X9-14.5	14.5	12/7/2018
Benzene1	3.6	3.6	1	DPE-PSS-X8-7	7	12/7/2018
Benzene1	8.4	8.4	1	DPE-PSS-X8-12.5	12.5	12/7/2018
Benzene1	0.025 U	0.025	0	EX-DB2-A3-10	10	9/6/2017
Benzene1	0.024 U	0.024	0	EX-DB2-A4-10	10	9/7/2017
Benzene1	0.027 U	0.027	0	EX-DB2-A5-10	10	9/7/2017
Benzene1	0.029 U	0.029	0	EX-DB2-A6-10	10	9/7/2017
Benzene1	0.059 U	0.059	0	EX-DB2-A7-10	10	9/7/2017
Benzene1	0.035 U	0.035	0	EX-DB2-A8-10	10	9/7/2017
Benzene1	0.023 U	0.023	0	EX-DB2-A3-5-SW	5	9/8/2017
Benzene1	0.02 U	0.02	0	EX-DB2-A4-5-SW	5	9/8/2017
Benzene1	0.019 U [0.022 U]	0.019	0	EX-DB2-A5-5-SW	5	9/8/2017
Benzene1	0.021 U	0.021	0	EX-DB2-A6-5-SW	5	9/7/2017
Benzene1	0.018 U	0.018	0	EX-DB2-A7-5-SW	5	9/7/2017
Benzene1	0.021 U	0.021	0	EX-DB2-A8-5-SW	5	9/7/2017
Benzene1	0.024 U	0.024	0	EX-DB2-B3-10	10	9/12/2017
Benzene1	0.023 U	0.023	0	EX-DB2-B4-10	10	9/12/2017
Benzene1	0.027 U	0.027	0	EX-DB2-B5-10	10	9/12/2017
Benzene1	0.027 U	0.027	0	EX-DB2-B6-10	10	9/12/2017
Benzene1	0.024 U	0.024	0	EX-DB2-B7-10	10	9/12/2017
Benzene1	0.023 U	0.023	0	EX-DB2-B8-10	10	9/12/2017
Benzene1	0.024 U	0.024	0	EX-DB2-A2-10	10	9/13/2017
Benzene1	0.023 U	0.023	0	EX-DB2-B2-10	10	9/14/2017
Benzene1	0.024 U	0.024	0	EX-DB2-C2-10	10	9/14/2017
Benzene1	0.027 U	0.027	0	EX-DB2-A1-8-SW	8	9/15/2017
Benzene1	0.025 U	0.025	0	EX-DB2-B1-8-SW	8	9/15/2017
Benzene1	0.026 U	0.026	0	EX-DB2-C1-8-SW	8	9/18/2017
Benzene1	0.027 U	0.027	0	EX-DB2-D1-8-SW	8	9/18/2017
Benzene1	0.028 U	0.028	0	EX-DB2-D2-10	10	9/18/2017

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.029 U	0.029	0	EX-DB2-E0-1	1	9/18/2017
Benzene1	0.023 U	0.023	0	EX-DB2-E1-8-SW	8	9/19/2017
Benzene1	0.027 U [0.029 U]	0.027	0	EX-DB2-E1-10	10	9/19/2017
Benzene1	0.13 U	0.13	0	EX-DB2-F0-1	1	9/20/2017
Benzene1	0.024 U	0.024	0	EX-DB2-F1-10	10	9/20/2017
Benzene1	0.018 U	0.018	0	EX-DB2-F2-12	12	9/21/2017
Benzene1	0.023 U	0.023	0	EX-DB2-C3-10	10	9/22/2017
Benzene1	0.037 U	0.037	0	EX-DB2-C4-10	10	9/22/2017
Benzene1	0.027 U	0.027	0	EX-DB2-C5-10	10	9/22/2017
Benzene1	0.021 U	0.021	0	EX-DB2-C6-10	10	9/22/2017
Benzene1	0.025 U	0.025	0	EX-DB2-C7-11	11	9/22/2017
Benzene1	0.025 U	0.025	0	EX-DB2-C8-10	10	9/22/2017
Benzene1	0.025 U	0.025	0	EX-DB2-D3-10	10	9/22/2017
Benzene1	0.036 U	0.036	0	EX-DB2-A2-6-SW	6	9/25/2017
Benzene1	0.027 U	0.027	0	EX-DB2-E2-10	10	9/26/2017
Benzene1	0.029 U	0.029	0	EX-DB2-D4-10	10	9/27/2017
Benzene1	0.025 U	0.025	0	EX-DB2-D5-10	10	9/27/2017
Benzene1	0.026 U	0.026	0	EX-DB2-D6-10	10	9/27/2017
Benzene1	0.026 U	0.026	0	EX-DB2-D7-11	11	9/27/2017
Benzene1	0.025 U	0.025	0	EX-DB2-D8-10	10	9/27/2017
Benzene1	0.024 U	0.024	0	EX-DB2-E3-11	11	9/29/2017
Benzene1	0.024 U	0.024	0	EX-DB2-E4-10	10	9/29/2017
Benzene1	0.026 U	0.026	0	EX-DB2-E5-10	10	9/29/2017
Benzene1	0.024 U [0.028 U]	0.024	0	EX-DB2-E6-11	11	9/29/2017
Benzene1	0.02 U	0.02	0	SP-B1-B6-1	1	10/2/2017
Benzene1	0.02 U	0.02	0	SP-B1-B4-4	4	10/2/2017
Benzene1	0.02 U	0.02	0	SP-B1-I8-1	1	10/2/2017
Benzene1	0.019 U	0.019	0	SP-B1-C6-13	13	10/2/2017
Benzene1	0.013 U	0.013	0	SP-B1-H4-4	4	10/2/2017
Benzene1	0.019 U	0.019	0	SP-B1-B5-7	7	10/2/2017
Benzene1	0.018 U	0.018	0	SP-B1-D8-2	2	10/2/2017
Benzene1	0.027 U	0.027	0	EX-DB2-E7-10	10	10/2/2017

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Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	2.1 U	2.1	0	B1-14-14.5	14-14.5	8/22/2011
Gasoline Range Organics (GRO)	17 UW	17	0	B12-0.5-1	0.5-1	8/24/2011
Gasoline Range Organics (GRO)	34 W	34	1	B12-1-1.5	1-1.5	8/24/2011
Gasoline Range Organics (GRO)	25 UW	25	0	B12-2.5-3	2.5-3	8/24/2011
Gasoline Range Organics (GRO)	14 U	14	0	B12-3.5-4	3.5-4	8/24/2011
Gasoline Range Organics (GRO)	1.1 U	1.1	0	B1-4.5-5	4.5-5	8/22/2011
Gasoline Range Organics (GRO)	57 UW	57	0	B14-0.5-1	0.5-1	8/25/2011
Gasoline Range Organics (GRO)	11 UW	11	0	B14-1.5-2	1.5-2	8/25/2011
Gasoline Range Organics (GRO)	25 UW	25	0	B14-2.5-3	2.5-3	8/25/2011
Gasoline Range Organics (GRO)	29 UW	29	0	B14-3.5-4	3.5-4	8/25/2011
Gasoline Range Organics (GRO)	15 UW	15	0	B15-11-11.5	11-11.5	8/23/2011
Gasoline Range Organics (GRO)	1.3 U	1.3	0	B15-4.5-5	4.5-5	8/23/2011
Gasoline Range Organics (GRO)	1.3 U	1.3	0	B15-6.5-7	6.5-7	8/23/2011
Gasoline Range Organics (GRO)	2.4 U	2.4	0	B15-8.5-9	8.5-9	8/23/2011
Gasoline Range Organics (GRO)	25 W	25	1	B1-9.5-10	9.5-10	8/22/2011
Gasoline Range Organics (GRO)	2	2	1	B2-12-12.5	12-12.5	8/22/2011
Gasoline Range Organics (GRO)	1.2 U	1.2	0	B2-14.5-15	14.5-15	8/22/2011
Gasoline Range Organics (GRO)	9.2 UW	9.2	0	B2-4-4.5	4-4.5	8/22/2011
Gasoline Range Organics (GRO)	1 U	1	0	B2-7-7.5	7-7.5	8/22/2011
Gasoline Range Organics (GRO)	16	16	1	B2-9.5-10	9.5-10	8/22/2011
Gasoline Range Organics (GRO)	6.8	6.8	1	B3-12-12.5	12-12.5	8/22/2011
Gasoline Range Organics (GRO)	1.3	1.3	1	B3-14-14.5	14-14.5	8/22/2011
Gasoline Range Organics (GRO)	1.1 U	1.1	0	B3-4.5-5	4.5-5	8/22/2011
Gasoline Range Organics (GRO)	1.1 U	1.1	0	B3-7-7.5	7-7.5	8/22/2011
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-10wall-2	2	10/8/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-11wall-2	2	10/8/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-12wall-2	2	10/8/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-13wall-2	2	10/8/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-17Wall-2	2	10/9/2003
Gasoline Range Organics (GRO)	131	131	1	DB1-A-18Wall-2	2	10/9/2003
Gasoline Range Organics (GRO)	6.19	6.19	1	DB1-A-19Wall-2.5	2.5	10/9/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-20wall-2	2	10/10/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-23wall-3	3	10/10/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-24wall-3	3	10/10/2003
Gasoline Range Organics (GRO)	356	356	1	DB1-A-25wall-3	3	10/10/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-27wall1-3	3	9/3/2003
Gasoline Range Organics (GRO)	5	5	1	DB1-A-27wall2-7	7	9/3/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-28wall-3	3	9/3/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-29wall1-2	2	9/2/2003
Gasoline Range Organics (GRO)	5.47	5.47	1	DB1-A-2wall-3	3	9/12/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-30wall-3	3	9/3/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-31wall1-3	3	9/3/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-31wall2-7	7	9/3/2003
Gasoline Range Organics (GRO)	23.6	23.6	1	DB1-A-3wall2-2.5	2.5	9/23/2003
Gasoline Range Organics (GRO)	6.46	6.46	1	DB1-A-4wall-2.5	2.5	9/22/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-5wall-2	2	10/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-7wall-2.5	2.5	9/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-8wall-2.5	2.5	10/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-9wall-2.5	2.5	10/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-B-31wall-3	3	9/4/2003
Gasoline Range Organics (GRO)	5.04 U	5.04	0	EX-A1-C-16-7	7	11/15/2007
Gasoline Range Organics (GRO)	5.02 U	5.02	0	EX-A1-C-16-NSW-3	3	11/15/2007
Gasoline Range Organics (GRO)	19.5	19.5	1	EX-A1-C-17-3	3	11/15/2007
Gasoline Range Organics (GRO)	4.98 U	4.98	0	EX-A1-D-16-12	12	11/19/2007
Gasoline Range Organics (GRO)	4.9 U	4.9	0	EX-A1-D-17-12	12	11/15/2007
Gasoline Range Organics (GRO)	4.53 U	4.53	0	EX-A1-D-17-ESW-10	10	11/15/2007
Gasoline Range Organics (GRO)	5.26 U	5.26	0	EX-A1-D-17-ESW-5	5	11/15/2007
Gasoline Range Organics (GRO)	4.98 U	4.98	0	EX-A1-E-15-15	15	11/8/2007
Gasoline Range Organics (GRO)	4.65 U [5.18 U]	4.65	0	EX-A1-E-16-15	15	11/8/2007
Gasoline Range Organics (GRO)	4.85 U	4.85	0	EX-A1-E-17-12	12	11/14/2007
Gasoline Range Organics (GRO)	5.14 U	5.14	0	EX-A1-E-17-ESW-4	4	11/15/2007
Gasoline Range Organics (GRO)	4.51 U	4.51	0	EX-A1-F-15-15	15	11/8/2007
Gasoline Range Organics (GRO)	4.54 U	4.54	0	EX-A1-F-16-15	15	11/8/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	5.01 U	5.01	0	EX-A1-F-17-12	12	11/14/2007
Gasoline Range Organics (GRO)	4.44 U	4.44	0	EX-A1-F-17-3	3	10/29/2007
Gasoline Range Organics (GRO)	201 JZ [139 JZ]	201	1	EX-A1-F-18-4	4	10/29/2007
Gasoline Range Organics (GRO)	4.55 U[4.85 U]	4.55	0	EX-A1-F-18-5	5	11/5/2007
Gasoline Range Organics (GRO)	4.82 U	4.82	0	EX-A1-G-15-15	15	11/8/2007
Gasoline Range Organics (GRO)	4.94 U	4.94	0	EX-A1-G-16-15	15	10/31/2007
Gasoline Range Organics (GRO)	4.85 U	4.85	0	EX-A1-G-17-15	15	10/29/2007
Gasoline Range Organics (GRO)	4.86 U	4.86	0	EX-A1-H-15-15	15	11/8/2007
Gasoline Range Organics (GRO)	5.05 U	5.05	0	EX-A1-H-16-15	15	10/31/2007
Gasoline Range Organics (GRO)	4.97 U [4.70 U]	4.7	0	EX-A1-H-17-15	15	10/29/2007
Gasoline Range Organics (GRO)	4.74 U	4.74	0	EX-A1-I-16-15	15	10/31/2007
Gasoline Range Organics (GRO)	5.28 U	5.28	0	EX-A1-I-17-15	15	10/29/2007
Gasoline Range Organics (GRO)	5.11 U	5.11	0	EX-A1-J-16-15	15	10/31/2007
Gasoline Range Organics (GRO)	5.27 U	5.27	0	EX-A1-J-17-15	15	10/29/2007
Gasoline Range Organics (GRO)	5.19 U	5.19	0	EX-A1-J-19-8	8	10/23/2007
Gasoline Range Organics (GRO)	5.13 U	5.13	0	EX-A1-K-17-15	15	10/30/2007
Gasoline Range Organics (GRO)	4.63 U	4.63	0	EX-A1-K-18-12	12	10/23/2007
Gasoline Range Organics (GRO)	4.7 U	4.7	0	EX-A1-K-18-SSW-3	3	10/30/2007
Gasoline Range Organics (GRO)	4.86 U	4.86	0	EX-A1-K-18-SSW-8	8	10/30/2007
Gasoline Range Organics (GRO)	5.36 U	5.36	0	EX-A1-K-19-3	3	10/30/2007
Gasoline Range Organics (GRO)	4.65 U	4.65	0	EX-A1-L-17-12	12	11/8/2007
Gasoline Range Organics (GRO)	73.9 JZ	73.9	1	EX-A2-O-10-10	10	1/28/2008
Gasoline Range Organics (GRO)	4.5 U	4.5	0	EX-A2-O-11-10	10	1/28/2008
Gasoline Range Organics (GRO)	5.08 U	5.08	0	EX-A2-O-12-10	10	1/28/2008
Gasoline Range Organics (GRO)	5.85 U	5.85	0	EX-A2-O-13-10	10	1/28/2008
Gasoline Range Organics (GRO)	466 JZ [389 JZ]	466	1	EX-A2-O-9-10	10	1/28/2008
Gasoline Range Organics (GRO)	5.83 U	5.83	0	EX-A2-P-10-11	11	1/30/2008
Gasoline Range Organics (GRO)	5.01 U	5.01	0	EX-A2-P-11-11	11	1/30/2008
Gasoline Range Organics (GRO)	4.58 U	4.58	0	EX-A2-P-12-10	10	1/30/2008
Gasoline Range Organics (GRO)	5.31 U	5.31	0	EX-A2-P-13-10	10	1/30/2008
Gasoline Range Organics (GRO)	4.82 U	4.82	0	EX-A2-P-9-15	15	1/30/2008
Gasoline Range Organics (GRO)	6.06 U	6.06	0	EX-A2-Q-10-12	12	2/1/2008
Gasoline Range Organics (GRO)	6.1 U	6.1	0	EX-A2-Q-11-12	12	2/1/2008
Gasoline Range Organics (GRO)	5.39 U	5.39	0	EX-A2-Q-12-13	13	2/1/2008
Gasoline Range Organics (GRO)	5.55 U	5.55	0	EX-A2-Q-9-12	12	2/1/2008
Gasoline Range Organics (GRO)	7.04 U [6.26 U]	6.26	0	EX-A2-R-10-12	12	2/15/2008
Gasoline Range Organics (GRO)	8.06 U	8.06	0	EX-A2-R-11-12	12	2/15/2008
Gasoline Range Organics (GRO)	6.34 U	6.34	0	EX-A2-R-12-12	12	2/15/2008
Gasoline Range Organics (GRO)	7.21 U	7.21	0	EX-A2-R-13-12	12	2/22/2008
Gasoline Range Organics (GRO)	6.76 U	6.76	0	EX-A2-S-12-12	12	2/22/2008
Gasoline Range Organics (GRO)	194 JZ	194	1	EX-A2-S-13-6	6	2/15/2008
Gasoline Range Organics (GRO)	4.84 U	4.84	0	EX-A3-AA-5-10	10	9/26/2007
Gasoline Range Organics (GRO)	5.15 U	5.15	0	EX-A3-AA-6-10	10	9/21/2007
Gasoline Range Organics (GRO)	5.56 U	5.56	0	EX-A3-AA-7-10	10	9/21/2007
Gasoline Range Organics (GRO)	5.11 U	5.11	0	EX-A3-AA-7-ESW-4	4	9/20/2007
Gasoline Range Organics (GRO)	4.93 U [4.98 U]	4.93	0	EX-A3-BB-6-10	10	9/21/2007
Gasoline Range Organics (GRO)	5.27 U	5.27	0	EX-A3-BB-7-10	10	9/21/2007
Gasoline Range Organics (GRO)	88	88	1	EX-A3-BB-7-ESW-4	4	9/21/2007
Gasoline Range Organics (GRO)	7.09 J	7.09	1	EX-A3-CC-6-10	10	10/1/2007
Gasoline Range Organics (GRO)	6.71 U [5.90]	5.9	1	EX-A3-CC-7-10	10	10/1/2007
Gasoline Range Organics (GRO)	25.8	25.8	1	EX-A3-CC-7-ESW-4	4	10/2/2007
Gasoline Range Organics (GRO)	5.34 U	5.34	0	EX-A3-DD-6-10	10	10/2/2007
Gasoline Range Organics (GRO)	3.57 U	3.57	0	EX-A3-Y-4-8	8	9/21/2007
Gasoline Range Organics (GRO)	8.24 JZ	8.24	1	EX-A3-Y-4-NSW-4	4	9/20/2007
Gasoline Range Organics (GRO)	1.9 U	1.9	0	EX-A3-Y-4-WSW-4	4	9/20/2007
Gasoline Range Organics (GRO)	4.58 U	4.58	0	EX-A3-Y-5-8	8	9/21/2007
Gasoline Range Organics (GRO)	19.4 JZ	19.4	1	EX-A3-Y-5-NSW-4	4	9/20/2007
Gasoline Range Organics (GRO)	5.25	5.25	1	EX-A3-Y-6-10	10	39350
Gasoline Range Organics (GRO)	27.7 JZ	27.7	1	EX-A3-Y-6-NSW-4	4	9/20/2007
Gasoline Range Organics (GRO)	5.83	5.83	1	EX-A3-Z-4-10	10	9/21/2007
Gasoline Range Organics (GRO)	4.59 U	4.59	0	EX-A3-Z-5-10	10	9/21/2007
Gasoline Range Organics (GRO)	5.2 U	5.2	0	EX-A3-Z-6-10	10	9/21/2007
Gasoline Range Organics (GRO)	4.4 U	4.4	0	EX-A3-Z-7-10	10	9/21/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	3.45 U	3.45	0	EX-A3-Z-7-ESW-4	4	9/20/2007
Gasoline Range Organics (GRO)	20.1	20.1	1	EX-A4-F-9-9	9	10/17/2007
Gasoline Range Organics (GRO)	5.81 U	5.81	0	EX-A4-F-9-ESW-4	4	10/17/2007
Gasoline Range Organics (GRO)	5.12 U	5.12	0	EX-A4-G-6-9	9	10/1/2007
Gasoline Range Organics (GRO)	4.92 U	4.92	0	EX-A4-G-7-9	9	9/27/2007
Gasoline Range Organics (GRO)	5.19 U	5.19	0	EX-A4-G-8-9	9	9/27/2007
Gasoline Range Organics (GRO)	4.92 U	4.92	0	EX-A4-G-9-9	9	10/17/2007
Gasoline Range Organics (GRO)	9.59 JZ [4.72 U]	9.59	1	EX-A4-G-9-ESW-4	4	10/17/2007
Gasoline Range Organics (GRO)	4.48 U [4.91 U]	4.48	0	EX-A4-H-6-9	9	9/27/2007
Gasoline Range Organics (GRO)	5.3 U	5.3	0	EX-A4-H-7-9	9	9/27/2007
Gasoline Range Organics (GRO)	19.6 JZ	19.6	1	EX-A4-H-8-4	4	9/12/2007
Gasoline Range Organics (GRO)	4.99 U	4.99	0	EX-A4-H-8-9	9	9/27/2007
Gasoline Range Organics (GRO)	7.36 U	7.36	0	EX-A4-H-9-9	9	10/17/2007
Gasoline Range Organics (GRO)	4.55 U	4.55	0	EX-A4-H-9-ESW-4	4	10/17/2007
Gasoline Range Organics (GRO)	9.42 U	9.42	0	EX-A4-I-6-9	9	9/21/2007
Gasoline Range Organics (GRO)	6.2 U	6.2	0	EX-A4-I-7-9	9	10/16/2007
Gasoline Range Organics (GRO)	6.6 U	6.6	0	EX-A4-I-8-9	9	10/16/2007
Gasoline Range Organics (GRO)	4.79 U	4.79	0	EX-A4-J-6-9	9	9/21/2007
Gasoline Range Organics (GRO)	22.1	22.1	1	EX-A4-J-6-SSW-9	9	9/21/2007
Gasoline Range Organics (GRO)	4.98 U	4.98	0	EX-A4-J-7-9	9	9/21/2007
Gasoline Range Organics (GRO)	5.69 U	5.69	0	EX-A4-J-7-SSW-4	4	9/21/2007
Gasoline Range Organics (GRO)	5.66 U	5.66	0	EX-A4-J-8-9	9	10/16/2007
Gasoline Range Organics (GRO)	6.12 U	6.12	0	EX-A4-K-8-9	9	10/16/2007
Gasoline Range Organics (GRO)	6.05 U	6.05	0	EX-AW-E-23-5(2)	5	9/17/2008
Gasoline Range Organics (GRO)	5.9 U	5.9	0	EX-AW-E-24-10	10	9/11/2008
Gasoline Range Organics (GRO)	30 JZ	30	1	EX-AW-E-24-NSW-5	5	9/11/2008
Gasoline Range Organics (GRO)	6.75 U	6.75	0	EX-AW-E-25-10	10	9/11/2008
Gasoline Range Organics (GRO)	75.2 JZ [171 JZ]	171	1	EX-AW-E-25-ESW-5	5	9/11/2008
Gasoline Range Organics (GRO)	6.21 U	6.21	0	EX-AW-E-25-NSW-5	5	9/11/2008
Gasoline Range Organics (GRO)	5.65 U	5.65	0	EX-AW-F-23-5(2)	5	9/12/2008
Gasoline Range Organics (GRO)	12	12	1	EX-AW-F-24-5	5	9/11/2008
Gasoline Range Organics (GRO)	6.68 JZ	6.68	1	EX-AW-F-25-5	5	9/11/2008
Gasoline Range Organics (GRO)	6.2 U	6.2	0	EX-AW-F-25-ESW-5	5	9/11/2008
Gasoline Range Organics (GRO)	6.01 U	6.01	0	EX-B10-N-6-10	10	2/8/2008
Gasoline Range Organics (GRO)	5.86 U	5.86	0	EX-B10-O-6-10	10	2/8/2008
Gasoline Range Organics (GRO)	5.03 U [5.50 U]	5.03	0	EX-B10-O-7-12	12	1/16/2008
Gasoline Range Organics (GRO)	5.27 U	5.27	0	EX-B10-O-8-12	12	1/16/2008
Gasoline Range Organics (GRO)	8.23	8.23	1	EX-B10-P-6-10	10	2/8/2008
Gasoline Range Organics (GRO)	9.68	9.68	1	EX-B10-P-7-15	15	1/30/2008
Gasoline Range Organics (GRO)	5.36 U	5.36	0	EX-B10-P-8-15	15	1/30/2008
Gasoline Range Organics (GRO)	5.73	5.73	1	EX-B10-Q-6-11	11	2/8/2008
Gasoline Range Organics (GRO)	5.16 U	5.16	0	EX-B10-Q-7-15	15	1/30/2008
Gasoline Range Organics (GRO)	5.8 [4.96 U]	5.8	1	EX-B11-Q-8-14	14	1/30/2008
Gasoline Range Organics (GRO)	56.8 JZ [168 JZ]	168	1	EX-B11-R-6-5	5	2/8/2008
Gasoline Range Organics (GRO)	5.09 U	5.09	0	EX-B11-R-7-12	12	1/22/2008
Gasoline Range Organics (GRO)	13.9	13.9	1	EX-B11-R-8-12	12	1/30/2008
Gasoline Range Organics (GRO)	5.55 U	5.55	0	EX-B11-R-9-12	12	2/12/2008
Gasoline Range Organics (GRO)	6.8 U	6.8	0	EX-B11-S-10-2	2	2/15/2008
Gasoline Range Organics (GRO)	6.63 U	6.63	0	EX-B11-S-11-12	12	2/14/2008
Gasoline Range Organics (GRO)	6.08	6.08	1	EX-B11-S-7-12	12	1/22/2008
Gasoline Range Organics (GRO)	4.83 U	4.83	0	EX-B11-S-7-WSW-5	5	1/18/2008
Gasoline Range Organics (GRO)	8.58	8.58	1	EX-B11-S-8-12	12	1/30/2008
Gasoline Range Organics (GRO)	38.7 JZ	38.7	1	EX-B11-S-9-12	12	2/12/2008
Gasoline Range Organics (GRO)	5.7 U	5.7	0	EX-B11-T-10-10	10	2/14/2008
Gasoline Range Organics (GRO)	5.1 U	5.1	0	EX-B11-T-11-12	12	2/14/2008
Gasoline Range Organics (GRO)	6.37 U	6.37	0	EX-B11-T-11-ESW-6	6	2/15/2008
Gasoline Range Organics (GRO)	48.4 JZ	48.4	1	EX-B11-T-7-12	12	1/22/2008
Gasoline Range Organics (GRO)	9.95 JZ	9.95	1	EX-B11-T-7-WSW-5	5	1/18/2008
Gasoline Range Organics (GRO)	6.5	6.5	1	EX-B11-T-8-12	12	1/30/2008
Gasoline Range Organics (GRO)	6.36 U	6.36	0	EX-B11-T-9-12	12	2/12/2008
Gasoline Range Organics (GRO)	8.8 JZ	8.8	1	EX-B11-U-11-5	5	2/12/2008
Gasoline Range Organics (GRO)	4.84 U	4.84	0	EX-B11-U-7-5	5	1/18/2008
Gasoline Range Organics (GRO)	12.8	12.8	1	EX-B13-AA-2-10	10	9/26/2007

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Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	5.11 U	5.11	0	EX-B13-AA-2-NSW-4	4	9/19/2007
Gasoline Range Organics (GRO)	5.05 U	5.05	0	EX-B13-AA-2-WSW-4	4	9/19/2007
Gasoline Range Organics (GRO)	5.37 U	5.37	0	EX-B13-AA-3-10	10	9/26/2007
Gasoline Range Organics (GRO)	4.41 U	4.41	0	EX-B13-AA-3-NSW-4	4	9/19/2007
Gasoline Range Organics (GRO)	5.22 U	5.22	0	EX-B13-AA-4-10	10	9/26/2007
Gasoline Range Organics (GRO)	5.6 U	5.6	0	EX-B13-BB-2-10	10	9/25/2007
Gasoline Range Organics (GRO)	774 JZ	774	1	EX-B13-BB-2-WSW-4	4	9/19/2007
Gasoline Range Organics (GRO)	4.98 U [5.32 U]	4.98	0	EX-B13-BB-3-10	10	9/25/2007
Gasoline Range Organics (GRO)	4.72 U	4.72	0	EX-B13-BB-4-10	10	9/25/2007
Gasoline Range Organics (GRO)	4.91 U	4.91	0	EX-B13-BB-5-10	10	9/27/2007
Gasoline Range Organics (GRO)	20.2	20.2	1	EX-B13-CC-1-4	4	10/10/2007
Gasoline Range Organics (GRO)	4.63 U	4.63	0	EX-B13-CC-2-10	10	10/8/2007
Gasoline Range Organics (GRO)	4.75 U	4.75	0	EX-B13-CC-3-10	10	9/27/2007
Gasoline Range Organics (GRO)	4.65 U	4.65	0	EX-B13-CC-4-10	10	9/27/2007
Gasoline Range Organics (GRO)	4.98 U	4.98	0	EX-B13-CC-5-10	10	9/27/2007
Gasoline Range Organics (GRO)	6.79 U	6.79	0	EX-B13-DD-1-4	4	10/8/2007
Gasoline Range Organics (GRO)	4.84 U	4.84	0	EX-B13-DD-2-10	10	10/8/2007
Gasoline Range Organics (GRO)	4.65 U	4.65	0	EX-B13-DD-3-10	10	10/2/2007
Gasoline Range Organics (GRO)	4.61	4.61	1	EX-B13-DD-4-10	10	10/2/2007
Gasoline Range Organics (GRO)	4.51 U	4.51	0	EX-B13-DD-5-10	10	10/2/2007
Gasoline Range Organics (GRO)	4.72 U	4.72	0	EX-B13-EE-1-4	4	10/8/2007
Gasoline Range Organics (GRO)	4.53 U	4.53	0	EX-B13-EE-2-10	10	10/8/2007
Gasoline Range Organics (GRO)	4.96 U	4.96	0	EX-B13-EE-3-10	10	10/5/2007
Gasoline Range Organics (GRO)	6.85	6.85	1	EX-B13-EE-3-SSW-4	4	10/5/2007
Gasoline Range Organics (GRO)	4.94 U [4.87 U]	4.87	0	EX-B13-EE-4-10	10	10/5/2007
Gasoline Range Organics (GRO)	5.23 U	5.23	0	EX-B13-EE-4-SSW-4	4	10/5/2007
Gasoline Range Organics (GRO)	5.04 U	5.04	0	EX-B13-FF-2-4	4	10/9/2007
Gasoline Range Organics (GRO)	8.17	8.17	1	EX-B13-FF-3-10	10	10/9/2007
Gasoline Range Organics (GRO)	4.81 U	4.81	0	EX-B13-FF-3-ESW-4	4	10/9/2007
Gasoline Range Organics (GRO)	4.62 U	4.62	0	EX-B13-GG-3-4	4	10/9/2007
Gasoline Range Organics (GRO)	70.6	70.6	1	EX-B14-DD-7-2.5	2.5	8/23/2007
Gasoline Range Organics (GRO)	13.9 [11.9]	13.9	1	EX-B14-DD-8-6	6	9/4/2007
Gasoline Range Organics (GRO)	25 [72.9 JZ]	72.9	1	EX-B14-DD-NSW-2.5	2.5	8/23/2007
Gasoline Range Organics (GRO)	445 JZ	445	1	EX-B14-EE-5-4	4	9/10/2007
Gasoline Range Organics (GRO)	5.41 U	5.41	0	EX-B14-EE-6-8	8	9/10/2007
Gasoline Range Organics (GRO)	9.68 U	9.68	0	EX-B14-EE-7-8	8	8/23/2007
Gasoline Range Organics (GRO)	4.9 U	4.9	0	EX-B14-EE-8-4	4	8/23/2007
Gasoline Range Organics (GRO)	5.57	5.57	1	EX-B14-FF-6-4	4	9/7/2007
Gasoline Range Organics (GRO)	12.7 U	12.7	0	EX-B14-FF-7-8	8	8/23/2007
Gasoline Range Organics (GRO)	8.41 U	8.41	0	EX-B14-FF-8-4SW	4	8/22/2007
Gasoline Range Organics (GRO)	16.3	16.3	1	EX-B14-FF-WSW-4	4	8/23/2007
Gasoline Range Organics (GRO)	4.44 U	4.44	0	EX-B14-GG-7-8	8	8/23/2007
Gasoline Range Organics (GRO)	8.72	8.72	1	EX-B14-GG-WSW-4	4	8/23/2007
Gasoline Range Organics (GRO)	5.04 U [4.75 U]	4.75	0	EX-B14-HH-6-4	4	8/23/2007
Gasoline Range Organics (GRO)	4.33 U	4.33	0	EX-B14-HH-6F	6	8/23/2007
Gasoline Range Organics (GRO)	9.66 JZ	9.66	1	EX-B14-HH-7-4SW	4	8/23/2007
Gasoline Range Organics (GRO)	5.63 U	5.63	0	EX-B15-HH-2-4	4	8/28/2007
Gasoline Range Organics (GRO)	5.32 U	5.32	0	EX-B15-HH-3-ESW-4	4	8/28/2007
Gasoline Range Organics (GRO)	5.39 U	5.39	0	EX-B15-HH-3-NSW-4	4	8/28/2007
Gasoline Range Organics (GRO)	12.6	12.6	1	EX-B15-II-2-8	8	8/28/2007
Gasoline Range Organics (GRO)	29.2 U	29.2	0	EX-B15-II-2-WSW-4	4	8/28/2007
Gasoline Range Organics (GRO)	4.4 U	4.4	0	EX-B15-II-3-8	8	8/28/2007
Gasoline Range Organics (GRO)	209 JZ	209	1	EX-B15-II-4-ESW-4	4	8/28/2007
Gasoline Range Organics (GRO)	293 JZ	293	1	EX-B16-MM-1-6SW	6	8/20/2007
Gasoline Range Organics (GRO)	8.14 U	8.14	0	EX-B17-RR-1-6SW	6	8/20/2007
Gasoline Range Organics (GRO)	4.5 U	4.5	0	EX-B17-SS-1-6SW	6	8/20/2007
Gasoline Range Organics (GRO)	693 JZ [611 JZ]	693	1	EX-B18-UU-1-6SW	6	8/17/2007
Gasoline Range Organics (GRO)	2150 JZ	2150	1	EX-B18-VV-1-6SW	6	8/17/2007
Gasoline Range Organics (GRO)	5.03 U	5.03	0	EX-B1-C-46-4(2)	4	9/2/2008
Gasoline Range Organics (GRO)	51.8 JZ	51.8	1	EX-B1-C-47-4	4	8/8/2008
Gasoline Range Organics (GRO)	2000 J	2000	1	EX-B1-D-43-4	4	8/19/2008
Gasoline Range Organics (GRO)	20.2 U	20.2	0	EX-B1-D-44-12	12	8/18/2008
Gasoline Range Organics (GRO)	32.6	32.6	1	EX-B1-D-44-NSW-4(2)	4	9/2/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	76.1 JZ [9.96 UJ]	76.1	1	EX-B1-D-45-12	12	8/14/2008
Gasoline Range Organics (GRO)	28.8 JY	28.8	1	EX-B1-D-45-NSW-4	4	9/2/2008
Gasoline Range Organics (GRO)	18.9 U	18.9	0	EX-B1-D-46-12	12	8/11/2008
Gasoline Range Organics (GRO)	36.6 JZ	36.6	1	EX-B1-D-47-4	4	8/8/2008
Gasoline Range Organics (GRO)	9.58	9.58	1	EX-B1-E-41-8	8	8/27/2008
Gasoline Range Organics (GRO)	7.74	7.74	1	EX-B1-E-41-NSW-4	4	8/27/2008
Gasoline Range Organics (GRO)	13	13	1	EX-B1-E-42-8	8	8/27/2008
Gasoline Range Organics (GRO)	223	223	1	EX-B1-E-42-NSW-4	4	8/27/2008
Gasoline Range Organics (GRO)	43.1 U	43.1	0	EX-B1-E-43-12	12	8/21/2008
Gasoline Range Organics (GRO)	23.9 U	23.9	0	EX-B1-E-44-12	12	8/19/2008
Gasoline Range Organics (GRO)	17.7 U	17.7	0	EX-B1-E-45-12	12	8/14/2008
Gasoline Range Organics (GRO)	22.1 U	22.1	0	EX-B1-E-46-12	12	8/13/2008
Gasoline Range Organics (GRO)	5.61 U	5.61	0	EX-B1-E-47-4	4	8/8/2008
Gasoline Range Organics (GRO)	4.66 U	4.66	0	EX-B1-E-47-SSW-4(2)	4	9/2/2008
Gasoline Range Organics (GRO)	12.4	12.4	1	EX-B1-F-42-8	8	8/27/2008
Gasoline Range Organics (GRO)	5.46 U [5.11 U]	5.11	0	EX-B1-F-42-SSW-4	4	8/27/2008
Gasoline Range Organics (GRO)	35.6 JZ	35.6	1	EX-B1-F-43-4	4	8/21/2008
Gasoline Range Organics (GRO)	11.2 U	11.2	0	EX-B1-F-45-10	10	8/15/2008
Gasoline Range Organics (GRO)	21.4 JZ	21.4	1	EX-B1-F-45-SSW-4	4	8/18/2008
Gasoline Range Organics (GRO)	4.86 U	4.86	0	EX-B1-F-47-4(2)	4	9/2/2008
Gasoline Range Organics (GRO)	23	23	1	EX-B20-F-19-6	6	10/18/2007
Gasoline Range Organics (GRO)	4.51 U	4.51	0	EX-B20-F-19-NSW-3	3	10/26/2007
Gasoline Range Organics (GRO)	4.84 U	4.84	0	EX-B20-F-20-10	10	10/30/2007
Gasoline Range Organics (GRO)	4.76 U [4.86 U]	4.76	0	EX-B20-F-20-NSW-4	4	10/30/2007
Gasoline Range Organics (GRO)	5.26 U	5.26	0	EX-B20-F-21-4	4	10/17/2007
Gasoline Range Organics (GRO)	4.47 U	4.47	0	EX-B20-G-13-12	12	11/26/2007
Gasoline Range Organics (GRO)	4.86 U	4.86	0	EX-B20-G-14-12	12	11/20/2007
Gasoline Range Organics (GRO)	4.98 U	4.98	0	EX-B20-G-14-WSW-4	4	11/20/2007
Gasoline Range Organics (GRO)	5.04 U	5.04	0	EX-B20-G-18-15	15	10/18/2007
Gasoline Range Organics (GRO)	6.28 U	6.28	0	EX-B20-G-19-15	15	10/18/2007
Gasoline Range Organics (GRO)	4.88 U	4.88	0	EX-B20-G-20-15	15	10/18/2007
Gasoline Range Organics (GRO)	123 JZ	123	1	EX-B20-G-21-10	10	10/17/2007
Gasoline Range Organics (GRO)	4.55 U	4.55	0	EX-B20-G-21-ESW-5	5	10/26/2007
Gasoline Range Organics (GRO)	4.84 U	4.84	0	EX-B20-H-10-4	4	11/30/2007
Gasoline Range Organics (GRO)	4.97 U	4.97	0	EX-B20-H-11-4	4	11/29/2007
Gasoline Range Organics (GRO)	4.73 U [4.85 U]	4.73	0	EX-B20-H-12-6	6	11/29/2007
Gasoline Range Organics (GRO)	4.37 U	4.37	0	EX-B20-H-12-NSW-2	2	11/29/2007
Gasoline Range Organics (GRO)	5.5 U	5.5	0	EX-B20-H-13-12	12	11/26/2007
Gasoline Range Organics (GRO)	5.31 U	5.31	0	EX-B20-H-14-12	12	11/20/2007
Gasoline Range Organics (GRO)	4.61 U [5.10 U]	4.61	0	EX-B20-H-14-WSW-4	4	11/20/2007
Gasoline Range Organics (GRO)	4.98 U [5.02 U]	4.98	0	EX-B20-H-18-15	15	10/18/2007
Gasoline Range Organics (GRO)	4.6 U	4.6	0	EX-B20-H-19-15	15	10/18/2007
Gasoline Range Organics (GRO)	10.5	10.5	1	EX-B20-H-20-15	15	10/18/2007
Gasoline Range Organics (GRO)	11.4 U	11.4	0	EX-B20-H-21-10	10	10/18/2007
Gasoline Range Organics (GRO)	7.14 JZ	7.14	1	EX-B20-H-21-ESW-5	5	10/26/2007
Gasoline Range Organics (GRO)	5.14 U	5.14	0	EX-B20-I-10-10	10	11/29/2007
Gasoline Range Organics (GRO)	7.89	7.89	1	EX-B20-I-11-10	10	11/29/2007
Gasoline Range Organics (GRO)	5.84 JZ	5.84	1	EX-B20-I-11-NSW-6	6	11/29/2007
Gasoline Range Organics (GRO)	5.87	5.87	1	EX-B20-I-12-10	10	11/29/2007
Gasoline Range Organics (GRO)	4.85 U	4.85	0	EX-B20-I-13-12	12	11/26/2007
Gasoline Range Organics (GRO)	5.24 U	5.24	0	EX-B20-I-14-12	12	11/20/2007
Gasoline Range Organics (GRO)	5.25 U	5.25	0	EX-B20-I-15-15	15	11/5/2007
Gasoline Range Organics (GRO)	4.98 U	4.98	0	EX-B20-I-18-15	15	10/19/2007
Gasoline Range Organics (GRO)	6.01 U [5.43 U]	5.43	0	EX-B20-I-19-15	15	10/18/2007
Gasoline Range Organics (GRO)	5.05 U	5.05	0	EX-B20-I-20-8	8	10/18/2007
Gasoline Range Organics (GRO)	4.83 JZ	4.83	1	EX-B20-I-21-4	4	10/30/2007
Gasoline Range Organics (GRO)	7.33 U	7.33	0	EX-B20-I-9-9	9	10/17/2007
Gasoline Range Organics (GRO)	18.1	18.1	1	EX-B20-J-10-10	10	11/29/2007
Gasoline Range Organics (GRO)	5.02 U	5.02	0	EX-B20-J-11-11	11	12/13/2007
Gasoline Range Organics (GRO)	5.39 U	5.39	0	EX-B20-J-12-10	10	11/28/2007
Gasoline Range Organics (GRO)	5.07 U	5.07	0	EX-B20-J-13-12	12	11/26/2007
Gasoline Range Organics (GRO)	5.03 U	5.03	0	EX-B20-J-14-12	12	11/20/2007
Gasoline Range Organics (GRO)	5.77 U	5.77	0	EX-B20-J-15-15	15	11/5/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	4.89 U	4.89	0	EX-B20-J-18-15	15	10/19/2007
Gasoline Range Organics (GRO)	5.92 U	5.92	0	EX-B20-J-20-4	4	10/30/2007
Gasoline Range Organics (GRO)	37 JZ	37	1	EX-B20-J-9-9	9	10/17/2007
Gasoline Range Organics (GRO)	5.25 U	5.25	0	EX-B20-K-10-10	10	11/30/2007
Gasoline Range Organics (GRO)	4.83 U	4.83	0	EX-B20-K-11-10	10	11/29/2007
Gasoline Range Organics (GRO)	5.17 U	5.17	0	EX-B20-K-12-12	12	11/29/2007
Gasoline Range Organics (GRO)	5.08 U	5.08	0	EX-B20-K-13-12	12	11/26/2007
Gasoline Range Organics (GRO)	4.71 U	4.71	0	EX-B20-K-14-12	12	11/20/2007
Gasoline Range Organics (GRO)	4.7 U	4.7	0	EX-B20-K-15-15	15	11/5/2007
Gasoline Range Organics (GRO)	4.66 U	4.66	0	EX-B20-K-16-15	15	10/31/2007
Gasoline Range Organics (GRO)	65.1 JZ	65.1	1	EX-B20-K-7-5	5	1/10/2008
Gasoline Range Organics (GRO)	8.19	8.19	1	EX-B20-K-9-9	9	10/16/2007
Gasoline Range Organics (GRO)	5.16 U	5.16	0	EX-B20-L-10-10	10	11/30/2007
Gasoline Range Organics (GRO)	5.37 U	5.37	0	EX-B20-L-11-10	10	12/7/2007
Gasoline Range Organics (GRO)	5.36 U	5.36	0	EX-B20-L-12-12	12	11/29/2007
Gasoline Range Organics (GRO)	4.92 U	4.92	0	EX-B20-L-13-12	12	11/26/2007
Gasoline Range Organics (GRO)	4.86 U	4.86	0	EX-B20-L-14-12	12	11/20/2007
Gasoline Range Organics (GRO)	4.71 U	4.71	0	EX-B20-L-15-15	15	11/5/2007
Gasoline Range Organics (GRO)	4.96 U	4.96	0	EX-B20-L-16-15	15	10/31/2007
Gasoline Range Organics (GRO)	41.3 JZ	41.3	1	EX-B20-L-7-5	5	2/8/2008
Gasoline Range Organics (GRO)	6.07	6.07	1	EX-B20-L-8-10	10	12/11/2007
Gasoline Range Organics (GRO)	26.8 JZ [36.4 JZ]	36.4	1	EX-B20-L-8-WSW5	5	1/7/2008
Gasoline Range Organics (GRO)	5.34 U	5.34	0	EX-B20-L-9-10	10	12/11/2007
Gasoline Range Organics (GRO)	8.72	8.72	1	EX-B20-M-10-12	12	12/7/2007
Gasoline Range Organics (GRO)	5.23 U	5.23	0	EX-B20-M-11-12	12	12/7/2007
Gasoline Range Organics (GRO)	4.98 U [5.17 U]	4.98	0	EX-B20-M-12-12	12	12/7/2007
Gasoline Range Organics (GRO)	5.54 U	5.54	0	EX-B20-M-13-14	14	12/7/2007
Gasoline Range Organics (GRO)	5.1 U	5.1	0	EX-B20-M-14-11	11	12/7/2007
Gasoline Range Organics (GRO)	5.27 U	5.27	0	EX-B20-M-15-11	11	12/7/2007
Gasoline Range Organics (GRO)	6.27 U	6.27	0	EX-B20-M-7-10	10	2/8/2008
Gasoline Range Organics (GRO)	9.22	9.22	1	EX-B20-M-8-12	12	1/16/2008
Gasoline Range Organics (GRO)	9.88	9.88	1	EX-B20-M-9-12	12	1/16/2008
Gasoline Range Organics (GRO)	4.87 U	4.87	0	EX-B20-N-10-12	12	1/8/2008
Gasoline Range Organics (GRO)	5.56	5.56	1	EX-B20-N-11-12	12	1/8/2008
Gasoline Range Organics (GRO)	4.7 U	4.7	0	EX-B20-N-12-12	12	1/8/2008
Gasoline Range Organics (GRO)	5.17 U	5.17	0	EX-B20-N-13-12	12	1/8/2008
Gasoline Range Organics (GRO)	5.13 U	5.13	0	EX-B20-N-14-12	12	12/11/2007
Gasoline Range Organics (GRO)	8.29	8.29	1	EX-B20-N-7-8	8	1/16/2008
Gasoline Range Organics (GRO)	33.5 JZ	33.5	1	EX-B20-N-7-WSW-4	4	1/16/2008
Gasoline Range Organics (GRO)	5.3 U	5.3	0	EX-B20-N-8-12	12	1/16/2008
Gasoline Range Organics (GRO)	5.21 U	5.21	0	EX-B20-N-9-12	12	1/16/2008
Gasoline Range Organics (GRO)	5.91 U	5.91	0	EX-B21-ESW-2	2	10/11/2007
Gasoline Range Organics (GRO)	5.06 U	5.06	0	EX-B21-FLOOR-4	4	10/11/2007
Gasoline Range Organics (GRO)	5 U	5	0	EX-B21-NSW-2	2	10/11/2007
Gasoline Range Organics (GRO)	25.1 JZ	25.1	1	EX-B2-E-33(2)-6	6	2/27/2008
Gasoline Range Organics (GRO)	8.75 JZ	8.75	1	EX-B2-E-33-6	6	2/25/2008
Gasoline Range Organics (GRO)	32.2 JZ	32.2	1	EX-B2-E-34-6	6	2/25/2008
Gasoline Range Organics (GRO)	79.7 JZ	79.7	1	EX-B2-E-35(3)-6	6	3/5/2008
Gasoline Range Organics (GRO)	66.7 JZ	66.7	1	EX-B2-E-35-6	6	2/22/2008
Gasoline Range Organics (GRO)	20 JZ	20	1	EX-B2-E-36-6	6	2/27/2008
Gasoline Range Organics (GRO)	5.22 U	5.22	0	EX-B2-E-40-4	4	1/23/2008
Gasoline Range Organics (GRO)	7.34 JZ	7.34	1	EX-B2-E-41(2)-5	5	2/4/2008
Gasoline Range Organics (GRO)	13.5 JZ [13.3 JZ]	13.5	1	EX-B2-E-41-4	4	1/23/2008
Gasoline Range Organics (GRO)	18 U	18	0	EX-B2-F-32-12	12	3/3/2008
Gasoline Range Organics (GRO)	10.9 U [11.2 U]	10.9	0	EX-B2-F-33-12	12	2/28/2008
Gasoline Range Organics (GRO)	10.1 U	10.1	0	EX-B2-F-34-11	11	2/28/2008
Gasoline Range Organics (GRO)	17.5 U	17.5	0	EX-B2-F-35-12	12	2/25/2008
Gasoline Range Organics (GRO)	13.2 U	13.2	0	EX-B2-F-36-13	13	2/22/2008
Gasoline Range Organics (GRO)	69.9 JZ	69.9	1	EX-B2-F-36-NSW-6	6	2/22/2008
Gasoline Range Organics (GRO)	11.8 U	11.8	0	EX-B2-F-37-13	13	2/22/2008
Gasoline Range Organics (GRO)	8.43	8.43	1	EX-B2-F-37-NSW-6	6	2/22/2008
Gasoline Range Organics (GRO)	9.49 U	9.49	0	EX-B2-F-38(2)-14	14	2/6/2008
Gasoline Range Organics (GRO)	18.9 JZ	18.9	1	EX-B2-F-38-8	8	1/31/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	214 JZ	214	1	EX-B2-F-38-NSW(2)-5	5	2/6/2008
Gasoline Range Organics (GRO)	44.9 JZ	44.9	1	EX-B2-F-38-NSW(2)-6	6	3/5/2008
Gasoline Range Organics (GRO)	5.97 JZ [13.4 JZ]	13.4	1	EX-B2-F-38-NSW-4	4	1/31/2008
Gasoline Range Organics (GRO)	19.2 JZ	19.2	1	EX-B2-F-38-WSW-5	5	1/31/2008
Gasoline Range Organics (GRO)	9.66 U	9.66	0	EX-B2-F-39(2)-12	12	2/5/2008
Gasoline Range Organics (GRO)	5.35 JZ [5.58 JZ]	5.58	1	EX-B2-F-39-8	8	1/28/2008
Gasoline Range Organics (GRO)	5.14 U	5.14	0	EX-B2-F-39-NSW-4	4	1/28/2008
Gasoline Range Organics (GRO)	6.9	6.9	1	EX-B2-F-40-8	8	1/25/2008
Gasoline Range Organics (GRO)	19 JZ	19	1	EX-B2-F-41-8	8	1/23/2008
Gasoline Range Organics (GRO)	127	127	1	EX-B2-F-41-ESW(2)-5	5	2/4/2008
Gasoline Range Organics (GRO)	1090	1090	1	EX-B2-G-32-6	6	2/26/2008
Gasoline Range Organics (GRO)	13.1 JZ	13.1	1	EX-B2-G-33(2)-6	6	2/28/2008
Gasoline Range Organics (GRO)	5.13 U	5.13	0	EX-B2-G-34-10	10	2/25/2008
Gasoline Range Organics (GRO)	31.1 JZ	31.1	1	EX-B2-G-34-SSW-6	6	2/25/2008
Gasoline Range Organics (GRO)	19.8 U	19.8	0	EX-B2-G-35-10	10	2/22/2008
Gasoline Range Organics (GRO)	6.91 JZ [102 JZ]	102	1	EX-B2-G-35-SSW-6	6	2/22/2008
Gasoline Range Organics (GRO)	7.05 U	7.05	0	EX-B2-G-36-12	12	2/22/2008
Gasoline Range Organics (GRO)	6.9 U	6.9	0	EX-B2-G-37-13	13	2/22/2008
Gasoline Range Organics (GRO)	5.54 U	5.54	0	EX-B2-G-38(2)-13	13	2/6/2008
Gasoline Range Organics (GRO)	87 JZ	87	1	EX-B2-G-38-8	8	1/31/2008
Gasoline Range Organics (GRO)	100 JZ	100	1	EX-B2-G-38-WSW-5	5	1/31/2008
Gasoline Range Organics (GRO)	13.5	13.5	1	EX-B2-G-39(2)-11	11	2/5/2008
Gasoline Range Organics (GRO)	4.52 U	4.52	0	EX-B2-G-39-SSW-4	4	1/28/2008
Gasoline Range Organics (GRO)	5.29 U	5.29	0	EX-B2-G-40-8	8	1/25/2008
Gasoline Range Organics (GRO)	4.79 U	4.79	0	EX-B2-G-40-SSW-4	4	1/25/2008
Gasoline Range Organics (GRO)	61.1 JZ	61.1	1	EX-B2-G-41-8	8	1/24/2008
Gasoline Range Organics (GRO)	5.93 U	5.93	0	EX-B2-G-41-ESW-4	4	1/24/2008
Gasoline Range Organics (GRO)	5.68 U	5.68	0	EX-B2-G-41-SSW-4	4	1/24/2008
Gasoline Range Organics (GRO)	18.5	18.5	1	EX-B2-H-35-6	6	2/27/2008
Gasoline Range Organics (GRO)	70.4 JZ	70.4	1	EX-B2-H-36-6	6	2/22/2008
Gasoline Range Organics (GRO)	75 JZ	75	1	EX-B2-H-37(2)-6	6	3/5/2008
Gasoline Range Organics (GRO)	4.88 U	4.88	0	EX-B2-H-38(2)-10	10	2/6/2008
Gasoline Range Organics (GRO)	6.75 JZ	6.75	1	EX-B2-H-38-WSW(2)-5	5	2/6/2008
Gasoline Range Organics (GRO)	7.9 U	7.9	0	EX-B3-E-32-6	6	2/26/2008
Gasoline Range Organics (GRO)	10.1 U	10.1	0	EX-B3-F-31-12	12	3/10/2008
Gasoline Range Organics (GRO)	5.1 U	5.1	0	EX-B3-F-31-NSW-6	6	3/10/2008
Gasoline Range Organics (GRO)	5.94 U	5.94	0	EX-B3-G-29-5	5	3/11/2008
Gasoline Range Organics (GRO)	5.22 U	5.22	0	EX-B3-G-29-NSW-4	4	3/11/2008
Gasoline Range Organics (GRO)	6.29 U [5.75 U]	5.75	0	EX-B3-G-29-SSW-5	5	3/11/2008
Gasoline Range Organics (GRO)	5.86 U	5.86	0	EX-B3-G-30-12	12	3/11/2008
Gasoline Range Organics (GRO)	12.8 JZ	12.8	1	EX-B3-G-30-NSW-6	6	3/11/2008
Gasoline Range Organics (GRO)	5.36 U	5.36	0	EX-B3-G-30-SSW-6	6	3/10/2008
Gasoline Range Organics (GRO)	6.13 U	6.13	0	EX-B3-G-31-12	12	3/10/2008
Gasoline Range Organics (GRO)	27.4	27.4	1	EX-B3-G-31-SSW-6	6	3/10/2008
Gasoline Range Organics (GRO)	4.94 U [5.35 U]	4.94	0	EX-B4-B-23-6	6	2/25/2008
Gasoline Range Organics (GRO)	6.1 U	6.1	0	EX-B4-B-24-6	6	2/25/2008
Gasoline Range Organics (GRO)	5.9 U	5.9	0	EX-B5-B-20(2)-4	4	2/28/2008
Gasoline Range Organics (GRO)	6.05 U	6.05	0	EX-B5-B-20-4	4	2/22/2008
Gasoline Range Organics (GRO)	5.59 U	5.59	0	EX-B6-C-15-3	3	11/19/2007
Gasoline Range Organics (GRO)	12.1	12.1	1	EX-B6-D-13-3	3	11/19/2007
Gasoline Range Organics (GRO)	6.31	6.31	1	EX-B6-D-14-10	10	11/19/2007
Gasoline Range Organics (GRO)	6.16 U	6.16	0	EX-B6-D-14-NSW-3	3	11/19/2007
Gasoline Range Organics (GRO)	5.54 U [5.79]	5.79	1	EX-B6-D-15-12	12	11/19/2007
Gasoline Range Organics (GRO)	4.35 U [4.49 U]	4.35	0	EX-B6-E-13-4	4	11/19/2007
Gasoline Range Organics (GRO)	5.2 U	5.2	0	EX-B6-E-14-10	10	11/19/2007
Gasoline Range Organics (GRO)	5.04 U	5.04	0	EX-B6-F-14-10	10	11/19/2007
Gasoline Range Organics (GRO)	4.59 U	4.59	0	EX-B6-F-14-WSW-3	3	11/19/2007
Gasoline Range Organics (GRO)	5.14 U	5.14	0	EX-B8-G-4-9	9	10/1/2007
Gasoline Range Organics (GRO)	5.76 JZ	5.76	1	EX-B8-G-4-WSW-4	4	10/1/2007
Gasoline Range Organics (GRO)	5.32 U	5.32	0	EX-B8-G-5-9	9	10/1/2007
Gasoline Range Organics (GRO)	6.42 U	6.42	0	EX-B8-H-3-10	10	9/10/2008
Gasoline Range Organics (GRO)	5.37 U	5.37	0	EX-B8-H-3-NSW-5	5	9/10/2008
Gasoline Range Organics (GRO)	7.12 U	7.12	0	EX-B8-H-3-WSW-5	5	9/10/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	5.4 U	5.4	0	EX-B8-H-4-9	9	10/1/2007
Gasoline Range Organics (GRO)	5.88 U	5.88	0	EX-B8-H-5-9	9	10/1/2007
Gasoline Range Organics (GRO)	6.86 U	6.86	0	EX-B8-I-3-10	10	9/10/2008
Gasoline Range Organics (GRO)	8.75 U	8.75	0	EX-B8-I-3-WSW-5(2)	5	9/11/2008
Gasoline Range Organics (GRO)	4.98 U	4.98	0	EX-B8-I-4-9	9	10/1/2007
Gasoline Range Organics (GRO)	4.86 U	4.86	0	EX-B8-I-5-9	9	10/1/2007
Gasoline Range Organics (GRO)	6.16 U	6.16	0	EX-B8-J-3-10	10	9/10/2008
Gasoline Range Organics (GRO)	9.14 [5.64 U]	9.14	1	EX-B8-J-3-SSW-5	5	9/10/2008
Gasoline Range Organics (GRO)	5.03 U	5.03	0	EX-B8-J-3-WSW-5	5	9/10/2008
Gasoline Range Organics (GRO)	4.19 U	4.19	0	EX-B8-J-4-5	5	10/23/2007
Gasoline Range Organics (GRO)	5.52 U	5.52	0	EX-B8-J-4-SSW-2.5	2.5	10/23/2007
Gasoline Range Organics (GRO)	4.53 U	4.53	0	EX-B8-J-5-4	4	10/1/2007
Gasoline Range Organics (GRO)	6.1 U	6.1	0	EX-B8-J-5-9	9	10/1/2007
Gasoline Range Organics (GRO)	5.24 U	5.24	0	EX-B9-M-4-11	11	2/20/2008
Gasoline Range Organics (GRO)	755 JZ	755	1	EX-B9-M-4-NSW-6	6	2/19/2008
Gasoline Range Organics (GRO)	816 JZ	816	1	EX-B9-M-4-WSW-6	6	2/19/2008
Gasoline Range Organics (GRO)	6.85 U	6.85	0	EX-B9-M-5-11	11	2/19/2008
Gasoline Range Organics (GRO)	98.5 JZ	98.5	1	EX-B9-M-5-NSW-6	6	2/19/2008
Gasoline Range Organics (GRO)	6.06 U [7.55 U]	6.06	0	EX-B9-M-6-11	11	2/19/2008
Gasoline Range Organics (GRO)	16.2	16.2	1	EX-B9-M-6-NSW-6	6	2/19/2008
Gasoline Range Organics (GRO)	5.51 U	5.51	0	EX-B9-N-3-5	5	9/9/2008
Gasoline Range Organics (GRO)	5.82 U	5.82	0	EX-B9-N-4-11	11	2/20/2008
Gasoline Range Organics (GRO)	276 JZ	276	1	EX-B9-N-4-WSW-6	6	2/20/2008
Gasoline Range Organics (GRO)	5.72 U	5.72	0	EX-B9-N-5-12	12	2/13/2008
Gasoline Range Organics (GRO)	9.57	9.57	1	EX-B9-O-3-10	10	9/9/2008
Gasoline Range Organics (GRO)	5.37 U	5.37	0	EX-B9-O-3-WSW-5	5	9/9/2008
Gasoline Range Organics (GRO)	20.2 [15.9]	20.2	1	EX-B9-O-4-12	12	2/20/2008
Gasoline Range Organics (GRO)	50.7 JZ	50.7	1	EX-B9-O-4-WSW-6	6	2/20/2008
Gasoline Range Organics (GRO)	6.09 U [5.91 U]	5.91	0	EX-B9-O-5-12	12	2/13/2008
Gasoline Range Organics (GRO)	11.4	11.4	1	EX-B9-P-3-10	10	9/9/2008
Gasoline Range Organics (GRO)	5.33 U	5.33	0	EX-B9-P-3-SSW-5	5	9/9/2008
Gasoline Range Organics (GRO)	5.45 U	5.45	0	EX-B9-P-3-WSW-5	5	9/9/2008
Gasoline Range Organics (GRO)	8.18	8.18	1	EX-B9-P-4-12	12	2/20/2008
Gasoline Range Organics (GRO)	967 JZ	967	1	EX-B9-P-4-SSW(2)-6	6	2/25/2008
Gasoline Range Organics (GRO)	898 JZ	898	1	EX-B9-P-4-SSW-6	6	2/20/2008
Gasoline Range Organics (GRO)	5.56 U	5.56	0	EX-B9-P-4-WSW-6	6	2/20/2008
Gasoline Range Organics (GRO)	5.25 U	5.25	0	EX-B9-P-5-12	12	2/13/2008
Gasoline Range Organics (GRO)	2.91 U	2.91	0	EX-B9-Q-5-6	6	2/13/2008
Gasoline Range Organics (GRO)	20.3	20.3	1	EX-RRT-ZZ-2-4	4	8/1/2008
Gasoline Range Organics (GRO)	46.4 J	46.4	1	EX-RRT-ZZ-2-ESW-3	3	8/1/2008
Gasoline Range Organics (GRO)	5.33 U	5.33	0	EX-SDTI-5-NSW-4	4	8/22/2007
Gasoline Range Organics (GRO)	5.74 U	5.74	0	EX-SDTI-5-SSW-4	4	8/22/2007
Gasoline Range Organics (GRO)	6.67 U	6.67	0	EX-SDTI-ESW-4	4	8/22/2007
Gasoline Range Organics (GRO)	5.56 U	5.56	0	EX-SDTI-FF-S-8	8	8/22/2007
Gasoline Range Organics (GRO)	5.07 U	5.07	0	EX-SDTI-GG-ESW-4	4	8/22/2007
Gasoline Range Organics (GRO)	4.77 U	4.77	0	EX-SDTI-GG-S-8	8	8/22/2007
Gasoline Range Organics (GRO)	5.37 U	5.37	0	EX-SDTI-GG-WSW-4	4	8/22/2007
Gasoline Range Organics (GRO)	9.4	9.4	1	EX-SDTI-WSW-4	4	8/22/2007
Gasoline Range Organics (GRO)	4.79 U	4.79	0	EX-WW-G-27-2SW	2	8/7/2007
Gasoline Range Organics (GRO)	4.89 U	4.89	0	EX-WW-G-27-4	4	8/7/2007
Gasoline Range Organics (GRO)	6.39 U	6.39	0	EX-WW-H-27-2.5	2.5	8/7/2007
Gasoline Range Organics (GRO)	6.07	6.07	1	EX-WW-H-28-2	2	8/7/2007
Gasoline Range Organics (GRO)	4.59 U	4.59	0	EX-WW-H-29-1	1	8/7/2007
Gasoline Range Organics (GRO)	4.24 U	4.24	0	EX-WW-I-26-1	1	8/7/2007
Gasoline Range Organics (GRO)	5.16 U	5.16	0	ISP-E-17-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.19 U	5.19	0	ISP-E-18-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.62 U	5.62	0	ISP-E-19-2	2	9/22/2008
Gasoline Range Organics (GRO)	7.17 JZ	7.17	1	ISP-E-20-2	2	9/22/2008
Gasoline Range Organics (GRO)	25 JZ	25	1	ISP-E-21-2	2	9/22/2008
Gasoline Range Organics (GRO)	5.32 U	5.32	0	ISP-F-17-2	2	9/17/2008
Gasoline Range Organics (GRO)	4.45 U	4.45	0	ISP-F-18-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.49 U	5.49	0	ISP-F-19-2	2	9/22/2008
Gasoline Range Organics (GRO)	5.85 U	5.85	0	ISP-F-20-2	2	9/22/2008

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Gasoline Range Organics (GRO)	5.74 U	5.74	0	ISP-F-21-2	2	9/22/2008
Gasoline Range Organics (GRO)	5.24 U	5.24	0	ISP-G-17-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.23 U	5.23	0	ISP-G-18-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.73 U	5.73	0	ISP-G-19-2(2)	2	9/25/2008
Gasoline Range Organics (GRO)	5.46 U	5.46	0	ISP-G-20-2	2	9/22/2008
Gasoline Range Organics (GRO)	9.03 JZ	9.03	1	ISP-G-21-2	2	9/22/2008
Gasoline Range Organics (GRO)	24.4 JZ	24.4	1	MW-129R-4.5	4.5	10/14/2008
Gasoline Range Organics (GRO)	7.43 U	7.43	0	MW-129R-7.0	7	10/14/2008
Gasoline Range Organics (GRO)	5.62 U	5.62	0	MW-502-6.0	6	10/14/2008
Gasoline Range Organics (GRO)	5.62 U	5.62	0	MW-511-8.5	8.5	10/14/2008
Gasoline Range Organics (GRO)	96	96	1	MW-527-12	12	6/22/2012
Gasoline Range Organics (GRO)	21 UW	21	0	MW-527-13.5	13.5	6/22/2012
Gasoline Range Organics (GRO)	2.4	2.4	1	MW-527-8	8	6/14/2012
Gasoline Range Organics (GRO)	11 UW	11	0	MW-527-9	9	6/22/2012
Gasoline Range Organics (GRO)	70	70	1	MW-528-15	15	6/22/2012
Gasoline Range Organics (GRO)	1.1 U	1.1	0	MW-528-8	8	6/14/2012
Gasoline Range Organics (GRO)	39.9 J	39.9	1	RRT-YY-2-6	6	8/4/2008
Gasoline Range Organics (GRO)	6.61 U [5.95 U]	5.95	0	RRT-YY-2-WSW-3	3	8/4/2008
Gasoline Range Organics (GRO)	5.81 U	5.81	0	RRT-ZZ-2-NSW-3	3	8/4/2008
Gasoline Range Organics (GRO)	6.37 U	6.37	0	RRT-ZZ-3-NSW-3	3	8/4/2008
Gasoline Range Organics (GRO)	5.69 U [5.84 U]	5.69	0	SB-10-11.0	11	4/4/2008
Gasoline Range Organics (GRO)	5.07 U	5.07	0	SB-1-11.5	11.5	4/3/2008
Gasoline Range Organics (GRO)	9.27 U	9.27	0	SB-11-11.0	11	4/4/2008
Gasoline Range Organics (GRO)	5.8 U	5.8	0	SB-12-11.5	11.5	4/4/2008
Gasoline Range Organics (GRO)	7.76 U	7.76	0	SB-13-11	11	4/11/2008
Gasoline Range Organics (GRO)	6.42 U	6.42	0	SB-14-11	11	4/11/2008
Gasoline Range Organics (GRO)	5.9 U [6.11 U]	5.9	0	SB-15-10.5	10.5	4/14/2008
Gasoline Range Organics (GRO)	5.19 U	5.19	0	SB-16-9.5	9.5	4/14/2008
Gasoline Range Organics (GRO)	5.35 U	5.35	0	SB-17-11.5	11.5	4/14/2008
Gasoline Range Organics (GRO)	1070 JZ	1070	1	SB-18-11	11	4/11/2008
Gasoline Range Organics (GRO)	4.86 U	4.86	0	SB-19-12	12	4/11/2008
Gasoline Range Organics (GRO)	5.38 U	5.38	0	SB-20-9.5	9.5	4/14/2008
Gasoline Range Organics (GRO)	10.2 U	10.2	0	SB-2-11	11	4/3/2008
Gasoline Range Organics (GRO)	5.81 U	5.81	0	SB-21-10.5	10.5	4/14/2008
Gasoline Range Organics (GRO)	6.18 U [6.19 U]	6.18	0	SB-22-10	10	4/11/2008
Gasoline Range Organics (GRO)	5.95 U	5.95	0	SB-23-11	11	4/11/2008
Gasoline Range Organics (GRO)	6.63 U	6.63	0	SB-24-10	10	4/11/2008
Gasoline Range Organics (GRO)	5.98 U	5.98	0	SB-25-11	11	4/11/2008
Gasoline Range Organics (GRO)	5.65 U	5.65	0	SB-26-10.5	10.5	4/14/2008
Gasoline Range Organics (GRO)	13.8 JZ	13.8	1	SB-27-10	10	4/14/2008
Gasoline Range Organics (GRO)	6.59	6.59	1	SB-28-9	9	4/11/2008
Gasoline Range Organics (GRO)	10.7	10.7	1	SB-29-9	9	4/8/2008
Gasoline Range Organics (GRO)	5.72 U	5.72	0	SB-30-9.5	9.5	4/10/2008
Gasoline Range Organics (GRO)	5.59 U	5.59	0	SB-3-10.5	10.5	4/3/2008
Gasoline Range Organics (GRO)	6.2 U	6.2	0	SB-3-12	12	4/3/2008
Gasoline Range Organics (GRO)	6.99 U	6.99	0	SB-31-9.5	9.5	4/10/2008
Gasoline Range Organics (GRO)	9.02 U [8.97 U]	8.97	0	SB-32-9.5	9.5	4/10/2008
Gasoline Range Organics (GRO)	7.86 U	7.86	0	SB-33-11	11	4/10/2008
Gasoline Range Organics (GRO)	5.74 U	5.74	0	SB-34-11	11	4/10/2008
Gasoline Range Organics (GRO)	7.36 U	7.36	0	SB-35-9	9	4/10/2008
Gasoline Range Organics (GRO)	4.2 U	4.2	0	SB-36-12	12	4/10/2008
Gasoline Range Organics (GRO)	5.66 U [6.47 U]	5.66	0	SB-37-9	9	4/8/2008
Gasoline Range Organics (GRO)	5.85 U	5.85	0	SB-38-10	10	4/8/2008
Gasoline Range Organics (GRO)	6.34 U	6.34	0	SB-38-8.5	8.5	4/8/2008
Gasoline Range Organics (GRO)	4.75 U	4.75	0	SB-39-14	14	4/10/2008
Gasoline Range Organics (GRO)	6.09 U	6.09	0	SB-40-11	11	4/10/2008
Gasoline Range Organics (GRO)	5.11 U	5.11	0	SB-4-10.5	10.5	4/4/2008
Gasoline Range Organics (GRO)	5.76 U	5.76	0	SB-41-10	10	4/10/2008
Gasoline Range Organics (GRO)	7.74 U [8.22 U]	7.74	0	SB-42-10	10	4/9/2008
Gasoline Range Organics (GRO)	6.99 U	6.99	0	SB-43-11.5	11.5	4/9/2008
Gasoline Range Organics (GRO)	5.48 U	5.48	0	SB-44-11	11	4/9/2008
Gasoline Range Organics (GRO)	5.91 U	5.91	0	SB-45-10	10	4/8/2008
Gasoline Range Organics (GRO)	5.18 U	5.18	0	SB-46-10.5	10.5	4/8/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	5.38 U	5.38	0	SB-46-6	6	4/8/2008
Gasoline Range Organics (GRO)	7.29 U	7.29	0	SB-47-10	10	4/9/2008
Gasoline Range Organics (GRO)	7.65 U	7.65	0	SB-48-11.5	11.5	4/9/2008
Gasoline Range Organics (GRO)	5.55 U	5.55	0	SB-49-10.5	10.5	4/9/2008
Gasoline Range Organics (GRO)	5.83 U	5.83	0	SB-50-10.5	10.5	4/9/2008
Gasoline Range Organics (GRO)	5.13 U	5.13	0	SB-5-11.5	11.5	4/4/2008
Gasoline Range Organics (GRO)	5.83 U	5.83	0	SB-51-9.5	9.5	4/8/2008
Gasoline Range Organics (GRO)	5.28 U	5.28	0	SB-52-9.5	9.5	4/8/2008
Gasoline Range Organics (GRO)	14.8	14.8	1	SB-53-10.5	10.5	4/9/2008
Gasoline Range Organics (GRO)	6.22 U	6.22	0	SB-54-10.5	10.5	4/9/2008
Gasoline Range Organics (GRO)	10.1 U	10.1	0	SB-55-11.5	11.5	4/7/2008
Gasoline Range Organics (GRO)	5.61 U	5.61	0	SB-56-14.5	14.5	4/8/2008
Gasoline Range Organics (GRO)	5.11 U	5.11	0	SB-57-10.5	10.5	4/7/2008
Gasoline Range Organics (GRO)	5.98 U	5.98	0	SB-58-11.0	11	4/7/2008
Gasoline Range Organics (GRO)	5.18 U	5.18	0	SB-59-5.5	5.5	4/8/2008
Gasoline Range Organics (GRO)	7.41 U [6.37 U]	6.37	0	SB-60-10.5	10.5	4/7/2008
Gasoline Range Organics (GRO)	5.94 U	5.94	0	SB-6-11.0	11	4/4/2008
Gasoline Range Organics (GRO)	8.52 U	8.52	0	SB-61-10.5	10.5	4/7/2008
Gasoline Range Organics (GRO)	10.1 U	10.1	0	SB-62-10.5	10.5	4/7/2008
Gasoline Range Organics (GRO)	978 JZ	978	1	SB-63-6.0	6	4/7/2008
Gasoline Range Organics (GRO)	534 JZ	534	1	SB-64-5.5	5.5	4/7/2008
Gasoline Range Organics (GRO)	63.1	63.1	1	SB-64-7.0	7	4/7/2008
Gasoline Range Organics (GRO)	6.63 U	6.63	0	SB-67-5.5	5.5	6/24/2008
Gasoline Range Organics (GRO)	6.11 U	6.11	0	SB-70-12.5	12.5	6/25/2008
Gasoline Range Organics (GRO)	6.18 U	6.18	0	SB-70-6.0	6	6/24/2008
Gasoline Range Organics (GRO)	6.16 U	6.16	0	SB-70-7.0	7	6/25/2008
Gasoline Range Organics (GRO)	5.56 U	5.56	0	SB-7-11.5	11.5	4/4/2008
Gasoline Range Organics (GRO)	6.14 U	6.14	0	SB-71-8.0	8	6/25/2008
Gasoline Range Organics (GRO)	6.19 U	6.19	0	SB-72-6.5	6.5	6/25/2008
Gasoline Range Organics (GRO)	6.15 U	6.15	0	SB-73-15.0	15	6/26/2008
Gasoline Range Organics (GRO)	7.41 U	7.41	0	SB-73-6.0	6	6/26/2008
Gasoline Range Organics (GRO)	6.34 U	6.34	0	SB-74-15	15	6/26/2008
Gasoline Range Organics (GRO)	6.25 U	6.25	0	SB-74-6.0	6	6/26/2008
Gasoline Range Organics (GRO)	6.63 U	6.63	0	SB-75-15.0	15	6/26/2008
Gasoline Range Organics (GRO)	6.77 U	6.77	0	SB-75-6.0	6	6/26/2008
Gasoline Range Organics (GRO)	40.1 JZ	40.1	1	SB-76-10.5	10.5	6/30/2008
Gasoline Range Organics (GRO)	4.8 U [5.91 U]	4.8	0	SB-76-14	14	6/30/2008
Gasoline Range Organics (GRO)	9.14	9.14	1	SB-76-4.5	4.5	6/30/2008
Gasoline Range Organics (GRO)	5.61 U	5.61	0	SB-77-14	14	6/30/2008
Gasoline Range Organics (GRO)	6.53 U	6.53	0	SB-77-6	6	6/30/2008
Gasoline Range Organics (GRO)	15.1 JZ	15.1	1	SB-78-10	10	6/30/2008
Gasoline Range Organics (GRO)	5.89 U	5.89	0	SB-78-12.5	12.5	6/30/2008
Gasoline Range Organics (GRO)	693	693	1	SB-78-5.5	5.5	6/30/2008
Gasoline Range Organics (GRO)	5.85 U	5.85	0	SB-78-8.5	8.5	6/30/2008
Gasoline Range Organics (GRO)	9.16 U	9.16	0	SB-79-11.5	11.5	6/30/2008
Gasoline Range Organics (GRO)	5.73 U	5.73	0	SB-79-5	5	6/30/2008
Gasoline Range Organics (GRO)	5.05 U	5.05	0	SB-8-11.0	11	4/4/2008
Gasoline Range Organics (GRO)	21.1 JZ	21.1	1	SB-81-5	5	6/30/2008
Gasoline Range Organics (GRO)	6.91 U	6.91	0	SB-81-9.5	9.5	6/30/2008
Gasoline Range Organics (GRO)	5.81 U	5.81	0	SB-82-7	7	7/1/2008
Gasoline Range Organics (GRO)	7.58 U	7.58	0	SB-82-9	9	7/1/2008
Gasoline Range Organics (GRO)	5.55 U	5.55	0	SB-83-7	7	7/1/2008
Gasoline Range Organics (GRO)	8.37 U	8.37	0	SB-83-8.5	8.5	7/1/2008
Gasoline Range Organics (GRO)	10.2 U	10.2	0	SB-84-6	6	7/1/2008
Gasoline Range Organics (GRO)	12.4 U	12.4	0	SB-84-8	8	7/1/2008
Gasoline Range Organics (GRO)	5.96 U	5.96	0	SB-85-5.5	5.5	7/2/2008
Gasoline Range Organics (GRO)	177 J	177	1	SB-85-7.5	7.5	7/2/2008
Gasoline Range Organics (GRO)	5.4 U	5.4	0	SB-86-4.5	4.5	7/2/2008
Gasoline Range Organics (GRO)	8.56 U	8.56	0	SB-86-6.5	6.5	7/2/2008
Gasoline Range Organics (GRO)	6.86 U	6.86	0	SB-87-14.0	14	7/25/2008
Gasoline Range Organics (GRO)	74.2 JZ	74.2	1	SB-87-6.0	6	7/25/2008
Gasoline Range Organics (GRO)	2.59	2.59	1	SB-88-8.0	8	7/25/2008
Gasoline Range Organics (GRO)	5.43 U	5.43	0	SB-9-11.0	11	4/4/2008

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Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	5 U	5	0	STRM-1floor-8	8	10/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	STRM-1wall-4	4	10/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	STRM-2Floor-6	6	10/28/2003
Gasoline Range Organics (GRO)	200 D	200	1	STRM-2wallW-3	3	10/28/2003
Gasoline Range Organics (GRO)	5 U	5	0	STRM-3WallW-3	3	10/27/2003
Gasoline Range Organics (GRO)	5 U	5	0	STRM-4wallW-3	3	10/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-10wall-3.75	3.75	11/11/2003
Gasoline Range Organics (GRO)	9.24	9.24	1	SWLY-A-11WALL-3.75	3.75	11/25/2003
Gasoline Range Organics (GRO)	114 D	114	1	SWLY-A-12WALL-3.75	3.75	11/25/2003
Gasoline Range Organics (GRO)	17	17	1	SWLY-A-13WALL-3.75	3.75	11/25/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-15wall-3.75	3.75	12/1/2003
Gasoline Range Organics (GRO)	428 DJ	428	1	SWLY-A-17wall-3.75	3.75	12/1/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-18wall-3.75	3.75	12/2/2003
Gasoline Range Organics (GRO)	114 J	114	1	SWLY-A-19wall-3.75	3.75	12/2/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-1Wall-3.75	3.75	10/14/2003
Gasoline Range Organics (GRO)	16.4	16.4	1	SWLY-A-20WALL-3.75	3.75	12/4/2003
Gasoline Range Organics (GRO)	41.5	41.5	1	SWLY-A-21WALL-3.75	3.75	12/4/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-2Wall-3.75	3.75	10/14/2003
Gasoline Range Organics (GRO)	29.1	29.1	1	SWLY-A-3Wall-3.75	3.75	10/14/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-4Wall-3.75	3.75	10/16/2003
Gasoline Range Organics (GRO)	549 DJ	549	1	SWLY-A-7WALL-3.75	3.75	11/6/2003
Gasoline Range Organics (GRO)	527 DJ	527	1	SWLY-A-8WALL-3.75	3.75	11/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-C-1Wall-3.75	3.75	10/16/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-1Wall-3.75	3.75	10/16/2003
Gasoline Range Organics (GRO)	17.4	17.4	1	SWLY-D-21wall-3.75	3.75	12/5/2003
Gasoline Range Organics (GRO)	17.8	17.8	1	SWLY-D-2Wall-3.75	3.75	10/16/2003
Gasoline Range Organics (GRO)	2440 D	2440	1	SWLY-D-3Wall-3.75	3.75	10/17/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-4Wall-3.75	3.75	10/21/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-5WALL-3.75	3.75	11/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-6WALL-3.75	3.75	11/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-7Wall-3.75	3.75	11/10/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-7-Wall-3.75	3.75	11/7/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-10-3.75	3.75	11/12/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-11-3.75	3.75	11/13/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-21wall-3.75	3.75	12/5/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-8wall-3.75	3.75	11/11/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-9wall-3.75	3.75	11/11/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-F-12-3.75	3.75	11/14/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-F-13-3.75	3.75	11/14/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-F-21wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-G-14-3.75	3.75	11/17/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-G-15-3.75	3.75	11/20/2003
Gasoline Range Organics (GRO)	12.2	12.2	1	SWLY-G-16-3.75	3.75	11/20/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-G-17-3.75	3.75	11/20/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-G-21wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-H-18-3.75	3.75	11/21/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-H-19-3.75	3.75	11/21/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-H-21wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	5 U [17.8]	17.8	1	SWLY-I-20wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	60.9	60.9	1	SWLY-I-21wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	620	620	1	DPE-PSS-N17-4	4	12/3/2018
Gasoline Range Organics (GRO)	3.4 J	3.4	1	DPE-PSS-N17-6	6	12/3/2018
Gasoline Range Organics (GRO)	570	570	1	DPE-PSS-O16-4	4	12/3/2018
Gasoline Range Organics (GRO)	8.5	8.5	1	DPE-PSS-O16-6	6	12/3/2018
Gasoline Range Organics (GRO)	1400	1400	1	DPE-PSS-P15-6	6	12/3/2018
Gasoline Range Organics (GRO)	2.6 J	2.6	1	DPE-PSS-P15-11	11	12/3/2018
Gasoline Range Organics (GRO)	870	870	1	DPE-PSS-Q14-6	6	12/3/2018
Gasoline Range Organics (GRO)	2.6	2.6	1	DPE-PSS-Q14-14.5	14.5	12/3/2018
Gasoline Range Organics (GRO)	720	720	1	DPE-PSS-P16-1	1	12/4/2018
Gasoline Range Organics (GRO)	100	100	1	DPE-PSS-P16-2	2	12/4/2018
Gasoline Range Organics (GRO)	28	28	1	DPE-PSS-P16-6	6	12/4/2018
Gasoline Range Organics (GRO)	120	120	1	DPE-PSS-O17-3	3	12/4/2018
Gasoline Range Organics (GRO)	14	14	1	DPE-PSS-O17-6	6	12/4/2018

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	210	210	1	DPE-PSS-Q15-1	1	12/4/2018
Gasoline Range Organics (GRO)	18 [10]	18	1	DPE-PSS-Q15-6	6	12/4/2018
Gasoline Range Organics (GRO)	5.6	5.6	1	DPE-PSS-T14-4	4	12/4/2018
Gasoline Range Organics (GRO)	3.1 J	3.1	1	DPE-PSS-T14-6	6	12/4/2018
Gasoline Range Organics (GRO)	370	370	1	DPE-PSS-U13-8.5	8.5	12/4/2018
Gasoline Range Organics (GRO)	31	31	1	DPE-PSS-U13-14.5	14.5	12/4/2018
Gasoline Range Organics (GRO)	78	78	1	DPE-PSS-W9-4	4	12/5/2018
Gasoline Range Organics (GRO)	960	960	1	DPE-PSS-W9-6	6	12/5/2018
Gasoline Range Organics (GRO)	240 [1000]	1000	1	DPE-PSS-V10-5	5	12/5/2018
Gasoline Range Organics (GRO)	1100	1100	1	DPE-PSS-V10-10	10	12/5/2018
Gasoline Range Organics (GRO)	2.7 U	2.7	0	DPE-PSS-V10-13	13	12/5/2018
Gasoline Range Organics (GRO)	39	39	1	DPE-PSS-V11-5	5	12/5/2018
Gasoline Range Organics (GRO)	2.6 U	2.6	0	DPE-PSS-V11-9.5	9.5	12/5/2018
Gasoline Range Organics (GRO)	17	17	1	DPE-PSS-W10-7	7	12/5/2018
Gasoline Range Organics (GRO)	46	46	1	DPE-PSS-W10-10	10	12/5/2018
Gasoline Range Organics (GRO)	2.9 U	2.9	0	DPE-PSS-W10-14.5	14.5	12/5/2018
Gasoline Range Organics (GRO)	110	110	1	DPE-PSS-W11-2	2	12/6/2018
Gasoline Range Organics (GRO)	5 J	5	1	DPE-PSS-W11-3	3	12/6/2018
Gasoline Range Organics (GRO)	2.4 U	2.4	0	DPE-PSS-W11-6	6	12/6/2018
Gasoline Range Organics (GRO)	6.4	6.4	1	DPE-PSS-V12-4	4	12/6/2018
Gasoline Range Organics (GRO)	3.9 J	3.9	1	DPE-PSS-V12-6	6	12/6/2018
Gasoline Range Organics (GRO)	5.6 J	5.6	1	DPE-PSS-Y9-7.5	7.5	12/6/2018
Gasoline Range Organics (GRO)	980 [1000]	1000	1	DPE-PSS-Y9-9	9	12/6/2018
Gasoline Range Organics (GRO)	3.8 U	3.8	0	DPE-PSS-Y9-14.5	14.5	12/6/2018
Gasoline Range Organics (GRO)	2800	2800	1	DPE-PSS-W8-6.5	6.5	12/6/2018
Gasoline Range Organics (GRO)	3100	3100	1	DPE-PSS-W8-8.5	8.5	12/6/2018
Gasoline Range Organics (GRO)	150	150	1	DPE-PSS-X9-7	7	12/7/2018

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	7 J	7	1	DPE-PSS-X9-14.5	14.5	12/7/2018
Gasoline Range Organics (GRO)	1000	1000	1	DPE-PSS-X8-7	7	12/7/2018
Gasoline Range Organics (GRO)	1200 H	1200	1	DPE-PSS-X8-12.5	12.5	12/7/2018
Gasoline Range Organics (GRO)	14 B	14	1	EX-DB2-A3-10	10	9/6/2017
Gasoline Range Organics (GRO)	4.7 U	4.7	0	EX-DB2-A4-10	10	9/7/2017
Gasoline Range Organics (GRO)	5.5 U	5.5	0	EX-DB2-A5-10	10	9/7/2017
Gasoline Range Organics (GRO)	0.68 U	0.68	0	EX-DB2-A6-10	10	9/7/2017
Gasoline Range Organics (GRO)	12 U	12	0	EX-DB2-A7-10	10	9/7/2017
Gasoline Range Organics (GRO)	6.9 U	6.9	0	EX-DB2-A8-10	10	9/7/2017
Gasoline Range Organics (GRO)	4.6 U	4.6	0	EX-DB2-A3-5-SW	5	9/8/2017
Gasoline Range Organics (GRO)	4 U	4	0	EX-DB2-A4-5-SW	5	9/8/2017
Gasoline Range Organics (GRO)	4.3 U [3.9 U]	3.9	0	EX-DB2-A5-5-SW	5	9/8/2017
Gasoline Range Organics (GRO)	0.49 U	0.49	0	EX-DB2-A6-5-SW	5	9/7/2017
Gasoline Range Organics (GRO)	3.6 U	3.6	0	EX-DB2-A7-5-SW	5	9/7/2017
Gasoline Range Organics (GRO)	4.2 U	4.2	0	EX-DB2-A8-5-SW	5	9/7/2017
Gasoline Range Organics (GRO)	4.8 U	4.8	0	EX-DB2-B3-10	10	9/12/2017
Gasoline Range Organics (GRO)	4.5 U	4.5	0	EX-DB2-B4-10	10	9/12/2017
Gasoline Range Organics (GRO)	5.3 U	5.3	0	EX-DB2-B5-10	10	9/12/2017
Gasoline Range Organics (GRO)	5.4 U	5.4	0	EX-DB2-B6-10	10	9/12/2017
Gasoline Range Organics (GRO)	4.9 U	4.9	0	EX-DB2-B7-10	10	9/12/2017
Gasoline Range Organics (GRO)	4.7 U	4.7	0	EX-DB2-B8-10	10	9/12/2017
Gasoline Range Organics (GRO)	4.9 U	4.9	0	EX-DB2-A2-10	10	9/13/2017
Gasoline Range Organics (GRO)	4.6 U	4.6	0	EX-DB2-B2-10	10	9/14/2017
Gasoline Range Organics (GRO)	4.8 U	4.8	0	EX-DB2-C2-10	10	9/14/2017
Gasoline Range Organics (GRO)	5.3 U	5.3	0	EX-DB2-A1-8-SW	8	9/15/2017
Gasoline Range Organics (GRO)	5 U	5	0	EX-DB2-B1-8-SW	8	9/15/2017
Gasoline Range Organics (GRO)	5.2 U	5.2	0	EX-DB2-C1-8-SW	8	9/18/2017
Gasoline Range Organics (GRO)	5.4 U	5.4	0	EX-DB2-D1-8-SW	8	9/18/2017
Gasoline Range Organics (GRO)	5.6 U	5.6	0	EX-DB2-D2-10	10	9/18/2017
Gasoline Range Organics (GRO)	22	22	1	EX-DB2-E0-1	1	9/18/2017
Gasoline Range Organics (GRO)	4.7 U	4.7	0	EX-DB2-E1-8-SW	8	9/19/2017
Gasoline Range Organics (GRO)	5.7 U [5.4 U]	5.4	0	EX-DB2-E1-10	10	9/19/2017
Gasoline Range Organics (GRO)	26 U	26	0	EX-DB2-F0-1	1	9/20/2017
Gasoline Range Organics (GRO)	4.9 U	4.9	0	EX-DB2-F1-10	10	9/20/2017
Gasoline Range Organics (GRO)	2.1 J	2.1	1	EX-DB2-F2-12	12	9/21/2017
Gasoline Range Organics (GRO)	4.5 U	4.5	0	EX-DB2-C3-10	10	9/22/2017
Gasoline Range Organics (GRO)	7.4 U	7.4	0	EX-DB2-C4-10	10	9/22/2017
Gasoline Range Organics (GRO)	5.5 U	5.5	0	EX-DB2-C5-10	10	9/22/2017
Gasoline Range Organics (GRO)	4.3 U	4.3	0	EX-DB2-C6-10	10	9/22/2017
Gasoline Range Organics (GRO)	4.9 U	4.9	0	EX-DB2-C7-11	11	9/22/2017
Gasoline Range Organics (GRO)	5 U	5	0	EX-DB2-C8-10	10	9/22/2017
Gasoline Range Organics (GRO)	5 U	5	0	EX-DB2-D3-10	10	9/22/2017
Gasoline Range Organics (GRO)	7.2 U	7.2	0	EX-DB2-A2-6-SW	6	9/25/2017
Gasoline Range Organics (GRO)	5.4 U	5.4	0	EX-DB2-E2-10	10	9/26/2017
Gasoline Range Organics (GRO)	5.8 U	5.8	0	EX-DB2-D4-10	10	9/27/2017
Gasoline Range Organics (GRO)	5 U	5	0	EX-DB2-D5-10	10	9/27/2017
Gasoline Range Organics (GRO)	5.2 U	5.2	0	EX-DB2-D6-10	10	9/27/2017
Gasoline Range Organics (GRO)	5.2 U	5.2	0	EX-DB2-D7-11	11	9/27/2017
Gasoline Range Organics (GRO)	5 U	5	0	EX-DB2-D8-10	10	9/27/2017
Gasoline Range Organics (GRO)	4.9 U	4.9	0	EX-DB2-E3-11	11	9/29/2017
Gasoline Range Organics (GRO)	4.9 U	4.9	0	EX-DB2-E4-10	10	9/29/2017
Gasoline Range Organics (GRO)	5.2 U	5.2	0	EX-DB2-E5-10	10	9/29/2017
Gasoline Range Organics (GRO)	5.6 U [4.8 U]	4.8	0	EX-DB2-E6-11	11	9/29/2017
Gasoline Range Organics (GRO)	4 U	4	0	SP-B1-B6-1	1	10/2/2017
Gasoline Range Organics (GRO)	4 U	4	0	SP-B1-B4-4	4	10/2/2017
Gasoline Range Organics (GRO)	3.9 U	3.9	0	SP-B1-I8-1	1	10/2/2017
Gasoline Range Organics (GRO)	3.9 U	3.9	0	SP-B1-C6-13	13	10/2/2017
Gasoline Range Organics (GRO)	1.7 J	1.7	1	SP-B1-H4-4	4	10/2/2017
Gasoline Range Organics (GRO)	3.8 U	3.8	0	SP-B1-B5-7	7	10/2/2017
Gasoline Range Organics (GRO)	43	43	1	SP-B1-D8-2	2	10/2/2017
Gasoline Range Organics (GRO)	4.6 J	4.6	1	EX-DB2-E7-10	10	10/2/2017

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	10.4 U	10.4	0	B1-14-14.5	14-14.5	8/22/2011
HO+DRO	290	290	1	B12-0.5-1	0.5-1	8/24/2011
HO+DRO	220	220	1	B12-1-1.5	1-1.5	8/24/2011
HO+DRO	235	235	1	B12-2.5-3	2.5-3	8/24/2011
HO+DRO	32.1	32.1	1	B12-3.5-4	3.5-4	8/24/2011
HO+DRO	15.55	15.55	1	B1-4.5-5	4.5-5	8/22/2011
HO+DRO	126	126	1	B14-0.5-1	0.5-1	8/25/2011
HO+DRO	11 U	11	0	B14-2.5-3	2.5-3	8/25/2011
HO+DRO	83.4	83.4	1	B14-3.5-4	3.5-4	8/25/2011
HO+DRO	8.5 U	8.5	0	B15-11-11.5	11-11.5	8/23/2011
HO+DRO	21.5	21.5	1	B15-4.5-5	4.5-5	8/23/2011
HO+DRO	19.8	19.8	1	B15-6.5-7	6.5-7	8/23/2011
HO+DRO	61.8	61.8	1	B15-8.5-9	8.5-9	8/23/2011
HO+DRO	47.3	47.3	1	B1-9.5-10	9.5-10	8/22/2011
HO+DRO	660	660	1	B2-12-12.5	12-12.5	8/22/2011
HO+DRO	7.2 U	7.2	0	B2-14.5-15	14.5-15	8/22/2011
HO+DRO	1340	1340	1	B2-4-4.5	4-4.5	8/22/2011
HO+DRO	67	67	1	B2-7-7.5	7-7.5	8/22/2011
HO+DRO	200	200	1	B2-9.5-10	9.5-10	8/22/2011
HO+DRO	89	89	1	B3-12-12.5	12-12.5	8/22/2011
HO+DRO	7.15 U	7.15	0	B3-14-14.5	14-14.5	8/22/2011
HO+DRO	7.1 U	7.1	0	B3-4.5-5	4.5-5	8/22/2011
HO+DRO	180	180	1	B3-7-7.5	7-7.5	8/22/2011
HO+DRO	17.5 U	17.5	0	DB1-A-10wall-2	2	10/8/2003
HO+DRO	17.5 U	17.5	0	DB1-A-11wall-2	2	10/8/2003
HO+DRO	17.5 U	17.5	0	DB1-A-12wall-2	2	10/8/2003
HO+DRO	17.5 U	17.5	0	DB1-A-13wall-2	2	10/8/2003
HO+DRO	17.5 U	17.5	0	DB1-A-17Wall-2	2	10/9/2003
HO+DRO	36.7	36.7	1	DB1-A-18Wall-2	2	10/9/2003
HO+DRO	24.3	24.3	1	DB1-A-19Wall-2.5	2.5	10/9/2003
HO+DRO	26.4	26.4	1	DB1-A-20wall-2	2	10/10/2003
HO+DRO	1301	1301	1	DB1-A-23wall-3	3	10/10/2003
HO+DRO	17.5 U	17.5	0	DB1-A-24wall-3	3	10/10/2003
HO+DRO	2288	2288	1	DB1-A-25wall-3	3	10/10/2003
HO+DRO	17.5 U	17.5	0	DB1-A-27wall1-3	3	9/3/2003
HO+DRO	35	35	1	DB1-A-27wall2-7	7	9/3/2003
HO+DRO	383.8	383.8	1	DB1-A-28wall-3	3	9/3/2003
HO+DRO	22.9	22.9	1	DB1-A-29wall1-2	2	9/2/2003
HO+DRO	58.6	58.6	1	DB1-A-2wall-3	3	9/12/2003
HO+DRO	120.2	120.2	1	DB1-A-30wall-3	3	9/3/2003
HO+DRO	504	504	1	DB1-A-31wall1-3	3	9/3/2003
HO+DRO	17.5 U	17.5	0	DB1-A-31wall2-7	7	9/3/2003
HO+DRO	1179	1179	1	DB1-A-3wall2-2.5	2.5	9/23/2003
HO+DRO	429	429	1	DB1-A-4wall-2.5	2.5	9/22/2003
HO+DRO	30.1	30.1	1	DB1-A-5wall-2	2	10/6/2003
HO+DRO	72.9	72.9	1	DB1-A-7wall-2.5	2.5	9/24/2003
HO+DRO	17.5 U	17.5	0	DB1-A-8wall-2.5	2.5	10/6/2003
HO+DRO	17.5 U	17.5	0	DB1-A-9wall-2.5	2.5	10/6/2003
HO+DRO	17.5 U	17.5	0	DB1-B-31wall-3	3	9/4/2003
HO+DRO	20.75 U	20.75	0	EX-A1-C-16-7	7	11/15/2007
HO+DRO	258.9	258.9	1	EX-A1-C-16-NSW-3	3	11/15/2007
HO+DRO	193.6	193.6	1	EX-A1-C-17-3	3	11/15/2007
HO+DRO	21.15 U	21.15	0	EX-A1-D-16-12	12	11/19/2007
HO+DRO	22.05 U	22.05	0	EX-A1-D-17-12	12	11/15/2007
HO+DRO	20.55 U	20.55	0	EX-A1-D-17-ESW-10	10	11/15/2007
HO+DRO	20.4 U	20.4	0	EX-A1-D-17-ESW-5	5	11/15/2007
HO+DRO	21.5 U	21.5	0	EX-A1-E-15-15	15	11/8/2007
HO+DRO	20.3 U	20.3	0	EX-A1-E-16-15	15	11/8/2007
HO+DRO	21.3 U	21.3	0	EX-A1-E-17-12	12	11/14/2007
HO+DRO	21.4 U	21.4	0	EX-A1-E-17-ESW-4	4	11/15/2007
HO+DRO	21.3 U	21.3	0	EX-A1-F-15-15	15	11/8/2007
HO+DRO	21.05 U	21.05	0	EX-A1-F-16-15	15	11/8/2007
HO+DRO	21.55 U	21.55	0	EX-A1-F-17-12	12	11/14/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	19.6 U	19.6	0	EX-A1-F-17-3	3	10/29/2007
HO+DRO	1359	1359	1	EX-A1-F-18-4	4	10/29/2007
HO+DRO	19.75 U	19.75	0	EX-A1-F-18-5	5	11/5/2007
HO+DRO	20.5 U	20.5	0	EX-A1-G-15-15	15	11/8/2007
HO+DRO	20.5 U	20.5	0	EX-A1-G-16-15	15	10/31/2007
HO+DRO	21.05 U	21.05	0	EX-A1-G-17-15	15	10/29/2007
HO+DRO	22.35 U	22.35	0	EX-A1-H-15-15	15	11/8/2007
HO+DRO	20.55 U	20.55	0	EX-A1-H-16-15	15	10/31/2007
HO+DRO	22.2 U	22.2	0	EX-A1-H-17-15	15	10/29/2007
HO+DRO	21.8 U	21.8	0	EX-A1-I-16-15	15	10/31/2007
HO+DRO	22.25 U	22.25	0	EX-A1-I-17-15	15	10/29/2007
HO+DRO	22.2 U	22.2	0	EX-A1-J-16-15	15	10/31/2007
HO+DRO	23.8 U	23.8	0	EX-A1-J-17-15	15	10/29/2007
HO+DRO	22.05 U	22.05	0	EX-A1-J-19-8	8	10/23/2007
HO+DRO	22.25 U	22.25	0	EX-A1-K-17-15	15	10/30/2007
HO+DRO	20.5 U	20.5	0	EX-A1-K-18-12	12	10/23/2007
HO+DRO	18.3 U	18.3	0	EX-A1-K-18-SSW-3	3	10/30/2007
HO+DRO	19.9 U	19.9	0	EX-A1-K-18-SSW-8	8	10/30/2007
HO+DRO	20.3 U	20.3	0	EX-A1-K-19-3	3	10/30/2007
HO+DRO	20.55 U	20.55	0	EX-A1-L-17-12	12	11/8/2007
HO+DRO	45.25	45.25	1	EX-A2-O-10-10	10	1/28/2008
HO+DRO	20.7 U	20.7	0	EX-A2-O-11-10	10	1/28/2008
HO+DRO	22.75 U	22.75	0	EX-A2-O-12-10	10	1/28/2008
HO+DRO	22.6 U	22.6	0	EX-A2-O-13-10	10	1/28/2008
HO+DRO	462.5	462.5	1	EX-A2-O-9-10	10	1/28/2008
HO+DRO	22.25 U	22.25	0	EX-A2-P-10-11	11	1/30/2008
HO+DRO	19.75 U	19.75	0	EX-A2-P-11-11	11	1/30/2008
HO+DRO	60.4	60.4	1	EX-A2-P-12-10	10	1/30/2008
HO+DRO	22.65 U	22.65	0	EX-A2-P-13-10	10	1/30/2008
HO+DRO	21.05 U	21.05	0	EX-A2-P-9-15	15	1/30/2008
HO+DRO	20.85 U	20.85	0	EX-A2-Q-10-12	12	2/1/2008
HO+DRO	21.35 U	21.35	0	EX-A2-Q-11-12	12	2/1/2008
HO+DRO	21.4 U	21.4	0	EX-A2-Q-12-13	13	2/1/2008
HO+DRO	20.65 U	20.65	0	EX-A2-Q-9-12	12	2/1/2008
HO+DRO	21.2 U	21.2	0	EX-A2-R-10-12	12	2/15/2008
HO+DRO	24.2 U	24.2	0	EX-A2-R-11-12	12	2/15/2008
HO+DRO	21.35 U	21.35	0	EX-A2-R-12-12	12	2/15/2008
HO+DRO	23.1 U	23.1	0	EX-A2-R-13-12	12	2/22/2008
HO+DRO	22.4 U	22.4	0	EX-A2-S-12-12	12	2/22/2008
HO+DRO	737.8	737.8	1	EX-A2-S-13-6	6	2/15/2008
HO+DRO	21.5 U	21.5	0	EX-A3-AA-5-10	10	9/26/2007
HO+DRO	19 U	19	0	EX-A3-AA-6-10	10	9/21/2007
HO+DRO	21.9 U	21.9	0	EX-A3-AA-7-10	10	9/21/2007
HO+DRO	22.25 U	22.25	0	EX-A3-AA-7-ESW-4	4	9/20/2007
HO+DRO	22.2 U	22.2	0	EX-A3-BB-6-10	10	9/21/2007
HO+DRO	20.8 U	20.8	0	EX-A3-BB-7-10	10	9/21/2007
HO+DRO	35.2	35.2	1	EX-A3-BB-7-ESW-4	4	9/21/2007
HO+DRO	21.6 U	21.6	0	EX-A3-CC-6-10	10	10/1/2007
HO+DRO	21.2 U	21.2	0	EX-A3-CC-7-10	10	10/1/2007
HO+DRO	130.3	130.3	1	EX-A3-CC-7-ESW-4	4	10/2/2007
HO+DRO	20.75 U	20.75	0	EX-A3-DD-6-10	10	10/2/2007
HO+DRO	18.15 U	18.15	0	EX-A3-Y-4-8	8	9/21/2007
HO+DRO	309	309	1	EX-A3-Y-4-NSW-4	4	9/20/2007
HO+DRO	18.15 U	18.15	0	EX-A3-Y-4-WSW-4	4	9/20/2007
HO+DRO	18.1 U	18.1	0	EX-A3-Y-5-8	8	9/21/2007
HO+DRO	233	233	1	EX-A3-Y-5-NSW-4	4	9/20/2007
HO+DRO	21.35 U	21.35	0	EX-A3-Y-6-10	10	39350
HO+DRO	78.4	78.4	1	EX-A3-Y-6-NSW-4	4	9/20/2007
HO+DRO	19.9 U	19.9	0	EX-A3-Z-4-10	10	9/21/2007
HO+DRO	20.35 U	20.35	0	EX-A3-Z-5-10	10	9/21/2007
HO+DRO	34.8	34.8	1	EX-A3-Z-6-10	10	9/21/2007
HO+DRO	19.45 U	19.45	0	EX-A3-Z-7-10	10	9/21/2007
HO+DRO	18.5 U	18.5	0	EX-A3-Z-7-ESW-4	4	9/20/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	20.8 U	20.8	0	EX-A4-F-9-9	9	10/17/2007
HO+DRO	33.95	33.95	1	EX-A4-F-9-ESW-4	4	10/17/2007
HO+DRO	22.25 U	22.25	0	EX-A4-G-6-9	9	10/1/2007
HO+DRO	22.2 U	22.2	0	EX-A4-G-7-9	9	9/27/2007
HO+DRO	20.45 U	20.45	0	EX-A4-G-8-9	9	9/27/2007
HO+DRO	21.8 U	21.8	0	EX-A4-G-9-9	9	10/17/2007
HO+DRO	77.4	77.4	1	EX-A4-G-9-ESW-4	4	10/17/2007
HO+DRO	21.75 U	21.75	0	EX-A4-H-6-9	9	9/27/2007
HO+DRO	22.6 U	22.6	0	EX-A4-H-7-9	9	9/27/2007
HO+DRO	2038	2038	1	EX-A4-H-8-4	4	9/12/2007
HO+DRO	21.55 U	21.55	0	EX-A4-H-8-9	9	9/27/2007
HO+DRO	29.4 U	29.4	0	EX-A4-H-9-9	9	10/17/2007
HO+DRO	253.3	253.3	1	EX-A4-H-9-ESW-4	4	10/17/2007
HO+DRO	34.8 U	34.8	0	EX-A4-I-6-9	9	9/21/2007
HO+DRO	21.15 U	21.15	0	EX-A4-I-7-9	9	10/16/2007
HO+DRO	21.15 U	21.15	0	EX-A4-I-8-9	9	10/16/2007
HO+DRO	21.25 U	21.25	0	EX-A4-J-6-9	9	9/21/2007
HO+DRO	216	216	1	EX-A4-J-6-SSW-9	9	9/21/2007
HO+DRO	21.3 U	21.3	0	EX-A4-J-7-9	9	9/21/2007
HO+DRO	238	238	1	EX-A4-J-7-SSW-4	4	9/21/2007
HO+DRO	20.85 U	20.85	0	EX-A4-J-8-9	9	10/16/2007
HO+DRO	21.55 U	21.55	0	EX-A4-K-8-9	9	10/16/2007
HO+DRO	20.8 U	20.8	0	EX-AW-E-23-5(2)	5	9/17/2008
HO+DRO	42.6	42.6	1	EX-AW-E-24-10	10	9/11/2008
HO+DRO	491	491	1	EX-AW-E-24-NSW-5	5	9/11/2008
HO+DRO	118.4	118.4	1	EX-AW-E-25-10	10	9/11/2008
HO+DRO	38.35	38.35	1	EX-AW-E-25-ESW-5	5	9/11/2008
HO+DRO	30.95	30.95	1	EX-AW-E-25-NSW-5	5	9/11/2008
HO+DRO	20.35 U	20.35	0	EX-AW-F-23-5(2)	5	9/12/2008
HO+DRO	19.1 U	19.1	0	EX-AW-F-24-5	5	9/11/2008
HO+DRO	129.9	129.9	1	EX-AW-F-25-5	5	9/11/2008
HO+DRO	76.55	76.55	1	EX-AW-F-25-ESW-5	5	9/11/2008
HO+DRO	21.75 U	21.75	0	EX-B10-N-6-10	10	2/8/2008
HO+DRO	21.55 U	21.55	0	EX-B10-O-6-10	10	2/8/2008
HO+DRO	21.35 U	21.35	0	EX-B10-O-7-12	12	1/16/2008
HO+DRO	22.25 U	22.25	0	EX-B10-O-8-12	12	1/16/2008
HO+DRO	22.1 U	22.1	0	EX-B10-P-6-10	10	2/8/2008
HO+DRO	23.05 U	23.05	0	EX-B10-P-7-15	15	1/30/2008
HO+DRO	21.35 U	21.35	0	EX-B10-P-8-15	15	1/30/2008
HO+DRO	22.45 U	22.45	0	EX-B10-Q-6-11	11	2/8/2008
HO+DRO	21.9 U	21.9	0	EX-B10-Q-7-15	15	1/30/2008
HO+DRO	34.85	34.85	1	EX-B11-Q-8-14	14	1/30/2008
HO+DRO	1806	1806	1	EX-B11-R-6-5	5	2/8/2008
HO+DRO	21 U	21	0	EX-B11-R-7-12	12	1/22/2008
HO+DRO	20.7 U	20.7	0	EX-B11-R-8-12	12	1/30/2008
HO+DRO	20.5 U	20.5	0	EX-B11-R-9-12	12	2/12/2008
HO+DRO	22.25 U	22.25	0	EX-B11-S-10-2	2	2/15/2008
HO+DRO	21.5 U	21.5	0	EX-B11-S-11-12	12	2/14/2008
HO+DRO	21.15 U	21.15	0	EX-B11-S-7-12	12	1/22/2008
HO+DRO	19.05 U	19.05	0	EX-B11-S-7-WSW-5	5	1/18/2008
HO+DRO	21.15 U	21.15	0	EX-B11-S-8-12	12	1/30/2008
HO+DRO	83.15	83.15	1	EX-B11-S-9-12	12	2/12/2008
HO+DRO	21.45 U	21.45	0	EX-B11-T-10-10	10	2/14/2008
HO+DRO	20.45 U	20.45	0	EX-B11-T-11-12	12	2/14/2008
HO+DRO	21.95 U	21.95	0	EX-B11-T-11-ESW-6	6	2/15/2008
HO+DRO	67.1	67.1	1	EX-B11-T-7-12	12	1/22/2008
HO+DRO	19.05 U	19.05	0	EX-B11-T-7-WSW-5	5	1/18/2008
HO+DRO	20.9 U	20.9	0	EX-B11-T-8-12	12	1/30/2008
HO+DRO	21.95 U	21.95	0	EX-B11-T-9-12	12	2/12/2008
HO+DRO	554	554	1	EX-B11-U-11-5	5	2/12/2008
HO+DRO	19.25 U	19.25	0	EX-B11-U-7-5	5	1/18/2008
HO+DRO	21.8 U	21.8	0	EX-B13-AA-2-10	10	9/26/2007
HO+DRO	136.2	136.2	1	EX-B13-AA-2-NSW-4	4	9/19/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	19.25 U	19.25	0	EX-B13-AA-2-WSW-4	4	9/19/2007
HO+DRO	22.55 U	22.55	0	EX-B13-AA-3-10	10	9/26/2007
HO+DRO	18.35 U	18.35	0	EX-B13-AA-3-NSW-4	4	9/19/2007
HO+DRO	20.45 U	20.45	0	EX-B13-AA-4-10	10	9/26/2007
HO+DRO	20.65 U	20.65	0	EX-B13-BB-2-10	10	9/25/2007
HO+DRO	1135	1135	1	EX-B13-BB-2-WSW-4	4	9/19/2007
HO+DRO	18.7 U	18.7	0	EX-B13-BB-3-10	10	9/25/2007
HO+DRO	22.25 U	22.25	0	EX-B13-BB-4-10	10	9/25/2007
HO+DRO	19.95 U	19.95	0	EX-B13-BB-5-10	10	9/27/2007
HO+DRO	32.15 U	32.15	0	EX-B13-CC-1-4	4	10/10/2007
HO+DRO	19.7 U	19.7	0	EX-B13-CC-2-10	10	10/8/2007
HO+DRO	21.15 U	21.15	0	EX-B13-CC-3-10	10	9/27/2007
HO+DRO	21.05 U	21.05	0	EX-B13-CC-4-10	10	9/27/2007
HO+DRO	21.85 U	21.85	0	EX-B13-CC-5-10	10	9/27/2007
HO+DRO	25.7 U	25.7	0	EX-B13-DD-1-4	4	10/8/2007
HO+DRO	20.65 U	20.65	0	EX-B13-DD-2-10	10	10/8/2007
HO+DRO	19.45 U	19.45	0	EX-B13-DD-3-10	10	10/2/2007
HO+DRO	20.4 U	20.4	0	EX-B13-DD-4-10	10	10/2/2007
HO+DRO	20.25 U	20.25	0	EX-B13-DD-5-10	10	10/2/2007
HO+DRO	21.3 U	21.3	0	EX-B13-EE-1-4	4	10/8/2007
HO+DRO	20.25 U	20.25	0	EX-B13-EE-2-10	10	10/8/2007
HO+DRO	20.15 U	20.15	0	EX-B13-EE-3-10	10	10/5/2007
HO+DRO	21.4 U	21.4	0	EX-B13-EE-3-SSW-4	4	10/5/2007
HO+DRO	19.45 U	19.45	0	EX-B13-EE-4-10	10	10/5/2007
HO+DRO	22.05 U	22.05	0	EX-B13-EE-4-SSW-4	4	10/5/2007
HO+DRO	22.4 U	22.4	0	EX-B13-FF-2-4	4	10/9/2007
HO+DRO	20.55 U	20.55	0	EX-B13-FF-3-10	10	10/9/2007
HO+DRO	22.25 U	22.25	0	EX-B13-FF-3-ESW-4	4	10/9/2007
HO+DRO	22.55 U	22.55	0	EX-B13-GG-3-4	4	10/9/2007
HO+DRO	233	233	1	EX-B14-DD-7-2.5	2.5	8/23/2007
HO+DRO	145.9	145.9	1	EX-B14-DD-8-6	6	9/4/2007
HO+DRO	276.7	276.7	1	EX-B14-DD-NSW-2.5	2.5	8/23/2007
HO+DRO	21.2 U	21.2	0	EX-B14-EE-5-4	4	9/10/2007
HO+DRO	20.45 U	20.45	0	EX-B14-EE-6-8	8	9/10/2007
HO+DRO	31.3 U	31.3	0	EX-B14-EE-7-8	8	8/23/2007
HO+DRO	22.2 U	22.2	0	EX-B14-EE-8-4	4	8/23/2007
HO+DRO	22 U	22	0	EX-B14-FF-6-4	4	9/7/2007
HO+DRO	35.2 U	35.2	0	EX-B14-FF-7-8	8	8/23/2007
HO+DRO	667	667	1	EX-B14-FF-8-4SW	4	8/22/2007
HO+DRO	98.8	98.8	1	EX-B14-FF-WSW-4	4	8/23/2007
HO+DRO	21.25 U	21.25	0	EX-B14-GG-7-8	8	8/23/2007
HO+DRO	566	566	1	EX-B14-GG-WSW-4	4	8/23/2007
HO+DRO	135.1	135.1	1	EX-B14-HH-6-4	4	8/23/2007
HO+DRO	53	53	1	EX-B14-HH-6F	6	8/23/2007
HO+DRO	43.85	43.85	1	EX-B14-HH-7-4SW	4	8/23/2007
HO+DRO	23.1 U	23.1	0	EX-B15-HH-2-4	4	8/28/2007
HO+DRO	20.85 U	20.85	0	EX-B15-HH-3-ESW-4	4	8/28/2007
HO+DRO	22.7 U	22.7	0	EX-B15-HH-3-NSW-4	4	8/28/2007
HO+DRO	26.9 U	26.9	0	EX-B15-II-2-8	8	8/28/2007
HO+DRO	22.65 U	22.65	0	EX-B15-II-2-WSW-4	4	8/28/2007
HO+DRO	20.35 U	20.35	0	EX-B15-II-3-8	8	8/28/2007
HO+DRO	829	829	1	EX-B15-II-4-ESW-4	4	8/28/2007
HO+DRO	734.3	734.3	1	EX-B16-MM-1-6SW	6	8/20/2007
HO+DRO	123.7	123.7	1	EX-B17-RR-1-6SW	6	8/20/2007
HO+DRO	21.05 U	21.05	0	EX-B17-SS-1-6SW	6	8/20/2007
HO+DRO	1169.25	1169.25	1	EX-B18-UU-1-6SW	6	8/17/2007
HO+DRO	2826	2826	1	EX-B18-VV-1-6SW	6	8/17/2007
HO+DRO	139.5	139.5	1	EX-B1-C-46-4(2)	4	9/2/2008
HO+DRO	359	359	1	EX-B1-C-47-4	4	8/8/2008
HO+DRO	20.3 U	20.3	0	EX-B1-D-43-4	4	8/19/2008
HO+DRO	55.75	55.75	1	EX-B1-D-44-12	12	8/18/2008
HO+DRO	254	254	1	EX-B1-D-44-NSW-4(2)	4	9/2/2008
HO+DRO	25.5 U	25.5	0	EX-B1-D-45-12	12	8/14/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	71.63	71.63	1	EX-B1-D-45-NSW-4	4	9/2/2008
HO+DRO	227.6	227.6	1	EX-B1-D-46-12	12	8/11/2008
HO+DRO	240	240	1	EX-B1-D-47-4	4	8/8/2008
HO+DRO	326	326	1	EX-B1-E-41-8	8	8/27/2008
HO+DRO	18.6 U	18.6	0	EX-B1-E-41-NSW-4	4	8/27/2008
HO+DRO	252	252	1	EX-B1-E-42-8	8	8/27/2008
HO+DRO	159.9	159.9	1	EX-B1-E-42-NSW-4	4	8/27/2008
HO+DRO	71.4 U	71.4	0	EX-B1-E-43-12	12	8/21/2008
HO+DRO	48.95 U	48.95	0	EX-B1-E-44-12	12	8/19/2008
HO+DRO	34.7 U	34.7	0	EX-B1-E-45-12	12	8/14/2008
HO+DRO	40.3 U	40.3	0	EX-B1-E-46-12	12	8/13/2008
HO+DRO	34.55	34.55	1	EX-B1-E-47-4	4	8/8/2008
HO+DRO	18.9 U	18.9	0	EX-B1-E-47-SSW-4(2)	4	9/2/2008
HO+DRO	258	258	1	EX-B1-F-42-8	8	8/27/2008
HO+DRO	18.6 U	18.6	0	EX-B1-F-42-SSW-4	4	8/27/2008
HO+DRO	506	506	1	EX-B1-F-43-4	4	8/21/2008
HO+DRO	29.35 U	29.35	0	EX-B1-F-45-10	10	8/15/2008
HO+DRO	210.5	210.5	1	EX-B1-F-45-SSW-4	4	8/18/2008
HO+DRO	19.05 U	19.05	0	EX-B1-F-47-4(2)	4	9/2/2008
HO+DRO	21.75 U	21.75	0	EX-B20-F-19-6	6	10/18/2007
HO+DRO	19.45 U	19.45	0	EX-B20-F-19-NSW-3	3	10/26/2007
HO+DRO	68.95	68.95	1	EX-B20-F-20-10	10	10/30/2007
HO+DRO	19.45 U	19.45	0	EX-B20-F-20-NSW-4	4	10/30/2007
HO+DRO	21 U	21	0	EX-B20-F-21-4	4	10/17/2007
HO+DRO	113.65	113.65	1	EX-B20-G-13-12	12	11/26/2007
HO+DRO	21.2 U	21.2	0	EX-B20-G-14-12	12	11/20/2007
HO+DRO	81.4	81.4	1	EX-B20-G-14-WSW-4	4	11/20/2007
HO+DRO	21.2 U	21.2	0	EX-B20-G-18-15	15	10/18/2007
HO+DRO	21.05 U	21.05	0	EX-B20-G-19-15	15	10/18/2007
HO+DRO	20.6 U	20.6	0	EX-B20-G-20-15	15	10/18/2007
HO+DRO	1079	1079	1	EX-B20-G-21-10	10	10/17/2007
HO+DRO	50.65	50.65	1	EX-B20-G-21-ESW-5	5	10/26/2007
HO+DRO	343	343	1	EX-B20-H-10-4	4	11/30/2007
HO+DRO	19.25 U	19.25	0	EX-B20-H-11-4	4	11/29/2007
HO+DRO	49.5	49.5	1	EX-B20-H-12-6	6	11/29/2007
HO+DRO	19.8 U	19.8	0	EX-B20-H-12-NSW-2	2	11/29/2007
HO+DRO	21.5 U	21.5	0	EX-B20-H-13-12	12	11/26/2007
HO+DRO	86.7	86.7	1	EX-B20-H-14-12	12	11/20/2007
HO+DRO	40.9	40.9	1	EX-B20-H-14-WSW-4	4	11/20/2007
HO+DRO	21 U	21	0	EX-B20-H-18-15	15	10/18/2007
HO+DRO	21.15 U	21.15	0	EX-B20-H-19-15	15	10/18/2007
HO+DRO	24.15 U	24.15	0	EX-B20-H-20-15	15	10/18/2007
HO+DRO	578.1	578.1	1	EX-B20-H-21-10	10	10/18/2007
HO+DRO	73.25	73.25	1	EX-B20-H-21-ESW-5	5	10/26/2007
HO+DRO	22.25 U	22.25	0	EX-B20-I-10-10	10	11/29/2007
HO+DRO	21.4 U	21.4	0	EX-B20-I-11-10	10	11/29/2007
HO+DRO	77.05	77.05	1	EX-B20-I-11-NSW-6	6	11/29/2007
HO+DRO	21.7 U	21.7	0	EX-B20-I-12-10	10	11/29/2007
HO+DRO	20.6 U	20.6	0	EX-B20-I-13-12	12	11/26/2007
HO+DRO	22.75 U	22.75	0	EX-B20-I-14-12	12	11/20/2007
HO+DRO	23.8 U	23.8	0	EX-B20-I-15-15	15	11/5/2007
HO+DRO	22.1 U	22.1	0	EX-B20-I-18-15	15	10/19/2007
HO+DRO	23 U	23	0	EX-B20-I-19-15	15	10/18/2007
HO+DRO	22.2 U	22.2	0	EX-B20-I-20-8	8	10/18/2007
HO+DRO	87.5	87.5	1	EX-B20-I-21-4	4	10/30/2007
HO+DRO	27.35 U	27.35	0	EX-B20-I-9-9	9	10/17/2007
HO+DRO	22.25 U	22.25	0	EX-B20-J-10-10	10	11/29/2007
HO+DRO	22.1 U	22.1	0	EX-B20-J-11-11	11	12/13/2007
HO+DRO	21.55 U	21.55	0	EX-B20-J-12-10	10	11/28/2007
HO+DRO	21.3 U	21.3	0	EX-B20-J-13-12	12	11/26/2007
HO+DRO	44.25	44.25	1	EX-B20-J-14-12	12	11/20/2007
HO+DRO	23.05 U	23.05	0	EX-B20-J-15-15	15	11/5/2007
HO+DRO	21.35 U	21.35	0	EX-B20-J-18-15	15	10/19/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	24.35 U	24.35	0	EX-B20-J-20-4	4	10/30/2007
HO+DRO	27.8	27.8	1	EX-B20-J-9-9	9	10/17/2007
HO+DRO	22.6 U	22.6	0	EX-B20-K-10-10	10	11/30/2007
HO+DRO	21.7 U	21.7	0	EX-B20-K-11-10	10	11/29/2007
HO+DRO	22.45 U	22.45	0	EX-B20-K-12-12	12	11/29/2007
HO+DRO	22.95 U	22.95	0	EX-B20-K-13-12	12	11/26/2007
HO+DRO	21.55 U	21.55	0	EX-B20-K-14-12	12	11/20/2007
HO+DRO	21.35 U	21.35	0	EX-B20-K-15-15	15	11/5/2007
HO+DRO	21.7 U	21.7	0	EX-B20-K-16-15	15	10/31/2007
HO+DRO	57.2	57.2	1	EX-B20-K-7-5	5	1/10/2008
HO+DRO	21.6 U	21.6	0	EX-B20-K-9-9	9	10/16/2007
HO+DRO	22 U	22	0	EX-B20-L-10-10	10	11/30/2007
HO+DRO	22.9 U	22.9	0	EX-B20-L-11-10	10	12/7/2007
HO+DRO	21.2 U	21.2	0	EX-B20-L-12-12	12	11/29/2007
HO+DRO	22.4 U	22.4	0	EX-B20-L-13-12	12	11/26/2007
HO+DRO	21.35 U	21.35	0	EX-B20-L-14-12	12	11/20/2007
HO+DRO	21.55 U	21.55	0	EX-B20-L-15-15	15	11/5/2007
HO+DRO	22.2 U	22.2	0	EX-B20-L-16-15	15	10/31/2007
HO+DRO	149.6	149.6	1	EX-B20-L-7-5	5	2/8/2008
HO+DRO	23.9 U	23.9	0	EX-B20-L-8-10	10	12/11/2007
HO+DRO	356	356	1	EX-B20-L-8-WSW5	5	1/7/2008
HO+DRO	22.35 U	22.35	0	EX-B20-L-9-10	10	12/11/2007
HO+DRO	21.85 U	21.85	0	EX-B20-M-10-12	12	12/7/2007
HO+DRO	22.2 U	22.2	0	EX-B20-M-11-12	12	12/7/2007
HO+DRO	19.2 U	19.2	0	EX-B20-M-12-12	12	12/7/2007
HO+DRO	24.15 U	24.15	0	EX-B20-M-13-14	14	12/7/2007
HO+DRO	20.8 U	20.8	0	EX-B20-M-14-11	11	12/7/2007
HO+DRO	20.15 U	20.15	0	EX-B20-M-15-11	11	12/7/2007
HO+DRO	20.95 U	20.95	0	EX-B20-M-7-10	10	2/8/2008
HO+DRO	20.85 U	20.85	0	EX-B20-M-8-12	12	1/16/2008
HO+DRO	21.55 U	21.55	0	EX-B20-M-9-12	12	1/16/2008
HO+DRO	20.45 U	20.45	0	EX-B20-N-10-12	12	1/8/2008
HO+DRO	21.15 U	21.15	0	EX-B20-N-11-12	12	1/8/2008
HO+DRO	20.9 U	20.9	0	EX-B20-N-12-12	12	1/8/2008
HO+DRO	21.7 U	21.7	0	EX-B20-N-13-12	12	1/8/2008
HO+DRO	21.5 U	21.5	0	EX-B20-N-14-12	12	12/11/2007
HO+DRO	20.8 U	20.8	0	EX-B20-N-7-8	8	1/16/2008
HO+DRO	273	273	1	EX-B20-N-7-WSW-4	4	1/16/2008
HO+DRO	22.35 U	22.35	0	EX-B20-N-8-12	12	1/16/2008
HO+DRO	22.1 U	22.1	0	EX-B20-N-9-12	12	1/16/2008
HO+DRO	19.25 U	19.25	0	EX-B21-ESW-2	2	10/11/2007
HO+DRO	20.65 U	20.65	0	EX-B21-FLOOR-4	4	10/11/2007
HO+DRO	57	57	1	EX-B21-NSW-2	2	10/11/2007
HO+DRO	329	329	1	EX-B2-E-33(2)-6	6	2/27/2008
HO+DRO	215.6	215.6	1	EX-B2-E-33-6	6	2/25/2008
HO+DRO	155.2	155.2	1	EX-B2-E-34-6	6	2/25/2008
HO+DRO	1510	1510	1	EX-B2-E-35(3)-6	6	3/5/2008
HO+DRO	1957	1957	1	EX-B2-E-35-6	6	2/22/2008
HO+DRO	557	557	1	EX-B2-E-36-6	6	2/27/2008
HO+DRO	97.4	97.4	1	EX-B2-E-40-4	4	1/23/2008
HO+DRO	1010	1010	1	EX-B2-E-41(2)-5	5	2/4/2008
HO+DRO	390	390	1	EX-B2-E-41-4	4	1/23/2008
HO+DRO	36 U	36	0	EX-B2-F-32-12	12	3/3/2008
HO+DRO	27.35 U	27.35	0	EX-B2-F-33-12	12	2/28/2008
HO+DRO	27.45 U	27.45	0	EX-B2-F-34-11	11	2/28/2008
HO+DRO	29 U	29	0	EX-B2-F-35-12	12	2/25/2008
HO+DRO	436	436	1	EX-B2-F-36-13	13	2/22/2008
HO+DRO	285.9	285.9	1	EX-B2-F-36-NSW-6	6	2/22/2008
HO+DRO	29.55 U	29.55	0	EX-B2-F-37-13	13	2/22/2008
HO+DRO	40.65	40.65	1	EX-B2-F-37-NSW-6	6	2/22/2008
HO+DRO	26.75 U	26.75	0	EX-B2-F-38(2)-14	14	2/6/2008
HO+DRO	1908	1908	1	EX-B2-F-38-8	8	1/31/2008
HO+DRO	466	466	1	EX-B2-F-38-NSW(2)-5	5	2/6/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	561	561	1	EX-B2-F-38-NSW(2)-6	6	3/5/2008
HO+DRO	47.6	47.6	1	EX-B2-F-38-NSW-4	4	1/31/2008
HO+DRO	153.8	153.8	1	EX-B2-F-38-WSW-5	5	1/31/2008
HO+DRO	26.6 U	26.6	0	EX-B2-F-39(2)-12	12	2/5/2008
HO+DRO	1260	1260	1	EX-B2-F-39-8	8	1/28/2008
HO+DRO	53.7	53.7	1	EX-B2-F-39-NSW-4	4	1/28/2008
HO+DRO	110.3	110.3	1	EX-B2-F-40-8	8	1/25/2008
HO+DRO	175.3	175.3	1	EX-B2-F-41-8	8	1/23/2008
HO+DRO	991	991	1	EX-B2-F-41-ESW(2)-5	5	2/4/2008
HO+DRO	1310.5	1310.5	1	EX-B2-G-32-6	6	2/26/2008
HO+DRO	47.15	47.15	1	EX-B2-G-33(2)-6	6	2/28/2008
HO+DRO	19.3 U	19.3	0	EX-B2-G-34-10	10	2/25/2008
HO+DRO	60.8	60.8	1	EX-B2-G-34-SSW-6	6	2/25/2008
HO+DRO	39.25 U	39.25	0	EX-B2-G-35-10	10	2/22/2008
HO+DRO	78.4	78.4	1	EX-B2-G-35-SSW-6	6	2/22/2008
HO+DRO	54.35	54.35	1	EX-B2-G-36-12	12	2/22/2008
HO+DRO	22.4 U	22.4	0	EX-B2-G-37-13	13	2/22/2008
HO+DRO	20.7 U	20.7	0	EX-B2-G-38(2)-13	13	2/6/2008
HO+DRO	1355	1355	1	EX-B2-G-38-8	8	1/31/2008
HO+DRO	968	968	1	EX-B2-G-38-WSW-5	5	1/31/2008
HO+DRO	28.5 U	28.5	0	EX-B2-G-39(2)-11	11	2/5/2008
HO+DRO	55.1	55.1	1	EX-B2-G-39-SSW-4	4	1/28/2008
HO+DRO	102.9	102.9	1	EX-B2-G-40-8	8	1/25/2008
HO+DRO	54.9	54.9	1	EX-B2-G-40-SSW-4	4	1/25/2008
HO+DRO	235	235	1	EX-B2-G-41-8	8	1/24/2008
HO+DRO	799	799	1	EX-B2-G-41-ESW-4	4	1/24/2008
HO+DRO	77.2	77.2	1	EX-B2-G-41-SSW-4	4	1/24/2008
HO+DRO	61.75	61.75	1	EX-B2-H-35-6	6	2/27/2008
HO+DRO	701	701	1	EX-B2-H-36-6	6	2/22/2008
HO+DRO	825	825	1	EX-B2-H-37(2)-6	6	3/5/2008
HO+DRO	19.65 U	19.65	0	EX-B2-H-38(2)-10	10	2/6/2008
HO+DRO	224.1	224.1	1	EX-B2-H-38-WSW(2)-5	5	2/6/2008
HO+DRO	23.15 U	23.15	0	EX-B3-E-32-6	6	2/26/2008
HO+DRO	26.45 U	26.45	0	EX-B3-F-31-12	12	3/10/2008
HO+DRO	28.65	28.65	1	EX-B3-F-31-NSW-6	6	3/10/2008
HO+DRO	20.15 U	20.15	0	EX-B3-G-29-5	5	3/11/2008
HO+DRO	188.1	188.1	1	EX-B3-G-29-NSW-4	4	3/11/2008
HO+DRO	19.85 U	19.85	0	EX-B3-G-29-SSW-5	5	3/11/2008
HO+DRO	20.9 U	20.9	0	EX-B3-G-30-12	12	3/11/2008
HO+DRO	289	289	1	EX-B3-G-30-NSW-6	6	3/11/2008
HO+DRO	20.1 U	20.1	0	EX-B3-G-30-SSW-6	6	3/10/2008
HO+DRO	21.9 U	21.9	0	EX-B3-G-31-12	12	3/10/2008
HO+DRO	21.55 U	21.55	0	EX-B3-G-31-SSW-6	6	3/10/2008
HO+DRO	29.4	29.4	1	EX-B4-B-23-6	6	2/25/2008
HO+DRO	21.2 U	21.2	0	EX-B4-B-24-6	6	2/25/2008
HO+DRO	21.2 U	21.2	0	EX-B5-B-20(2)-4	4	2/28/2008
HO+DRO	1065	1065	1	EX-B5-B-20-4	4	2/22/2008
HO+DRO	22.05 U	22.05	0	EX-B6-C-15-3	3	11/19/2007
HO+DRO	75.45	75.45	1	EX-B6-D-13-3	3	11/19/2007
HO+DRO	21.35 U	21.35	0	EX-B6-D-14-10	10	11/19/2007
HO+DRO	26.2 U	26.2	0	EX-B6-D-14-NSW-3	3	11/19/2007
HO+DRO	22.1 U	22.1	0	EX-B6-D-15-12	12	11/19/2007
HO+DRO	259	259	1	EX-B6-E-13-4	4	11/19/2007
HO+DRO	21.15 U	21.15	0	EX-B6-E-14-10	10	11/19/2007
HO+DRO	22.05 U	22.05	0	EX-B6-F-14-10	10	11/19/2007
HO+DRO	56.4	56.4	1	EX-B6-F-14-WSW-3	3	11/19/2007
HO+DRO	33.45	33.45	1	EX-B8-G-4-9	9	10/1/2007
HO+DRO	378	378	1	EX-B8-G-4-WSW-4	4	10/1/2007
HO+DRO	23.25 U	23.25	0	EX-B8-G-5-9	9	10/1/2007
HO+DRO	21.35 U	21.35	0	EX-B8-H-3-10	10	9/10/2008
HO+DRO	36.65	36.65	1	EX-B8-H-3-NSW-5	5	9/10/2008
HO+DRO	400	400	1	EX-B8-H-3-WSW-5	5	9/10/2008
HO+DRO	20.85 U	20.85	0	EX-B8-H-4-9	9	10/1/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	21.3 U	21.3	0	EX-B8-H-5-9	9	10/1/2007
HO+DRO	21.7 U	21.7	0	EX-B8-I-3-10	10	9/10/2008
HO+DRO	706	706	1	EX-B8-I-3-WSW-5(2)	5	9/11/2008
HO+DRO	21.3 U	21.3	0	EX-B8-I-4-9	9	10/1/2007
HO+DRO	21.15 U	21.15	0	EX-B8-I-5-9	9	10/1/2007
HO+DRO	20.65 U	20.65	0	EX-B8-J-3-10	10	9/10/2008
HO+DRO	650	650	1	EX-B8-J-3-SSW-5	5	9/10/2008
HO+DRO	548	548	1	EX-B8-J-3-WSW-5	5	9/10/2008
HO+DRO	313	313	1	EX-B8-J-4-5	5	10/23/2007
HO+DRO	19.1 U	19.1	0	EX-B8-J-4-SSW-2.5	2.5	10/23/2007
HO+DRO	79.7	79.7	1	EX-B8-J-5-4	4	10/1/2007
HO+DRO	19.85 U	19.85	0	EX-B8-J-5-9	9	10/1/2007
HO+DRO	20.35 U	20.35	0	EX-B9-M-4-11	11	2/20/2008
HO+DRO	650	650	1	EX-B9-M-4-NSW-6	6	2/19/2008
HO+DRO	607.5	607.5	1	EX-B9-M-4-WSW-6	6	2/19/2008
HO+DRO	22.75 U	22.75	0	EX-B9-M-5-11	11	2/19/2008
HO+DRO	54.45	54.45	1	EX-B9-M-5-NSW-6	6	2/19/2008
HO+DRO	21.95 U	21.95	0	EX-B9-M-6-11	11	2/19/2008
HO+DRO	22.8 U	22.8	0	EX-B9-M-6-NSW-6	6	2/19/2008
HO+DRO	18.85 U	18.85	0	EX-B9-N-3-5	5	9/9/2008
HO+DRO	21.2 U	21.2	0	EX-B9-N-4-11	11	2/20/2008
HO+DRO	267	267	1	EX-B9-N-4-WSW-6	6	2/20/2008
HO+DRO	20.7 U	20.7	0	EX-B9-N-5-12	12	2/13/2008
HO+DRO	20.5 U	20.5	0	EX-B9-O-3-10	10	9/9/2008
HO+DRO	18.35 U	18.35	0	EX-B9-O-3-WSW-5	5	9/9/2008
HO+DRO	21.5 U	21.5	0	EX-B9-O-4-12	12	2/20/2008
HO+DRO	37.65	37.65	1	EX-B9-O-4-WSW-6	6	2/20/2008
HO+DRO	20.7 U	20.7	0	EX-B9-O-5-12	12	2/13/2008
HO+DRO	20.95 U	20.95	0	EX-B9-P-3-10	10	9/9/2008
HO+DRO	18.5 U	18.5	0	EX-B9-P-3-SSW-5	5	9/9/2008
HO+DRO	18.1 U	18.1	0	EX-B9-P-3-WSW-5	5	9/9/2008
HO+DRO	22.05 U	22.05	0	EX-B9-P-4-12	12	2/20/2008
HO+DRO	539	539	1	EX-B9-P-4-SSW(2)-6	6	2/25/2008
HO+DRO	1678	1678	1	EX-B9-P-4-SSW-6	6	2/20/2008
HO+DRO	20.65 U	20.65	0	EX-B9-P-4-WSW-6	6	2/20/2008
HO+DRO	20.3 U	20.3	0	EX-B9-P-5-12	12	2/13/2008
HO+DRO	91.9	91.9	1	EX-B9-Q-5-6	6	2/13/2008
HO+DRO	26.6 U	26.6	0	EX-RRT-ZZ-2-4	4	8/1/2008
HO+DRO	31.8 U	31.8	0	EX-RRT-ZZ-2-ESW-3	3	8/1/2008
HO+DRO	22.35 U	22.35	0	EX-SDTI-5-NSW-4	4	8/22/2007
HO+DRO	22.7 U	22.7	0	EX-SDTI-5-SSW-4	4	8/22/2007
HO+DRO	48.4	48.4	1	EX-SDTI-ESW-4	4	8/22/2007
HO+DRO	97	97	1	EX-SDTI-FF-S-8	8	8/22/2007
HO+DRO	21.45 U	21.45	0	EX-SDTI-GG-ESW-4	4	8/22/2007
HO+DRO	48.45	48.45	1	EX-SDTI-GG-S-8	8	8/22/2007
HO+DRO	52.55	52.55	1	EX-SDTI-GG-WSW-4	4	8/22/2007
HO+DRO	21.4 U	21.4	0	EX-SDTI-WSW-4	4	8/22/2007
HO+DRO	64.6	64.6	1	EX-WW-G-27-2SW	2	8/7/2007
HO+DRO	19.1 U	19.1	0	EX-WW-G-27-4	4	8/7/2007
HO+DRO	76.4	76.4	1	EX-WW-H-27-2.5	2.5	8/7/2007
HO+DRO	89.5	89.5	1	EX-WW-H-28-2	2	8/7/2007
HO+DRO	98.9	98.9	1	EX-WW-H-29-1	1	8/7/2007
HO+DRO	56.6	56.6	1	EX-WW-I-26-1	1	8/7/2007
HO+DRO	18.25 U	18.25	0	ISP-E-17-2	2	9/17/2008
HO+DRO	29.15	29.15	1	ISP-E-18-2	2	9/17/2008
HO+DRO	94.1	94.1	1	ISP-E-19-2	2	9/22/2008
HO+DRO	172.4	172.4	1	ISP-E-20-2	2	9/22/2008
HO+DRO	30.55	30.55	1	ISP-E-21-2	2	9/22/2008
HO+DRO	18.2 U	18.2	0	ISP-F-17-2	2	9/17/2008
HO+DRO	61.9	61.9	1	ISP-F-18-2	2	9/17/2008
HO+DRO	28.05	28.05	1	ISP-F-19-2	2	9/22/2008
HO+DRO	25.15	25.15	1	ISP-F-20-2	2	9/22/2008
HO+DRO	19.2 U	19.2	0	ISP-F-21-2	2	9/22/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	18.25 U	18.25	0	ISP-G-17-2	2	9/17/2008
HO+DRO	18.5 U	18.5	0	ISP-G-18-2	2	9/17/2008
HO+DRO	132.6	132.6	1	ISP-G-19-2(2)	2	9/25/2008
HO+DRO	24.95	24.95	1	ISP-G-20-2	2	9/22/2008
HO+DRO	109.1	109.1	1	ISP-G-21-2	2	9/22/2008
HO+DRO	1001	1001	1	MW-129R-4.5	4.5	10/14/2008
HO+DRO	3003	3003	1	MW-129R-7.0	7	10/14/2008
HO+DRO	20.3 U	20.3	0	MW-502-6.0	6	10/14/2008
HO+DRO	20.3 U	20.3	0	MW-511-8.5	8.5	10/14/2008
HO+DRO	620	620	1	MW-527-12	12	6/22/2012
HO+DRO	1610	1610	1	MW-527-13.5	13.5	6/22/2012
HO+DRO	350	350	1	MW-527-8	8	6/14/2012
HO+DRO	630	630	1	MW-527-9	9	6/22/2012
HO+DRO	370	370	1	MW-528-15	15	6/22/2012
HO+DRO	26	26	1	MW-528-8	8	6/14/2012
HO+DRO	36.4 U	36.4	0	RRT-YY-2-6	6	8/4/2008
HO+DRO	60	60	1	RRT-YY-2-WSW-3	3	8/4/2008
HO+DRO	90.6	90.6	1	RRT-ZZ-2-NSW-3	3	8/4/2008
HO+DRO	20.35 U	20.35	0	RRT-ZZ-3-NSW-3	3	8/4/2008
HO+DRO	35.4	35.4	1	SB-10-11.0	11	4/4/2008
HO+DRO	20 U	20	0	SB-1-11.5	11.5	4/3/2008
HO+DRO	24.85 U	24.85	0	SB-11-11.0	11	4/4/2008
HO+DRO	21.15 U	21.15	0	SB-12-11.5	11.5	4/4/2008
HO+DRO	22.95 U	22.95	0	SB-13-11	11	4/11/2008
HO+DRO	21.75 U	21.75	0	SB-14-11	11	4/11/2008
HO+DRO	20.8 U	20.8	0	SB-15-10.5	10.5	4/14/2008
HO+DRO	19.35 U	19.35	0	SB-16-9.5	9.5	4/14/2008
HO+DRO	20.6 U	20.6	0	SB-17-11.5	11.5	4/14/2008
HO+DRO	344	344	1	SB-18-11	11	4/11/2008
HO+DRO	20.05 U	20.05	0	SB-19-12	12	4/11/2008
HO+DRO	20.65 U	20.65	0	SB-20-9.5	9.5	4/14/2008
HO+DRO	27.25 U	27.25	0	SB-2-11	11	4/3/2008
HO+DRO	21.45 U	21.45	0	SB-21-10.5	10.5	4/14/2008
HO+DRO	21.45 U	21.45	0	SB-22-10	10	4/11/2008
HO+DRO	21.35 U	21.35	0	SB-23-11	11	4/11/2008
HO+DRO	22.6 U	22.6	0	SB-24-10	10	4/11/2008
HO+DRO	21 U	21	0	SB-25-11	11	4/11/2008
HO+DRO	20.35 U	20.35	0	SB-26-10.5	10.5	4/14/2008
HO+DRO	293.6	293.6	1	SB-27-10	10	4/14/2008
HO+DRO	26.25	26.25	1	SB-28-9	9	4/11/2008
HO+DRO	19.9 U	19.9	0	SB-29-9	9	4/8/2008
HO+DRO	20.35 U	20.35	0	SB-30-9.5	9.5	4/10/2008
HO+DRO	21 U	21	0	SB-3-10.5	10.5	4/3/2008
HO+DRO	20.8 U	20.8	0	SB-3-12	12	4/3/2008
HO+DRO	22.65 U	22.65	0	SB-31-9.5	9.5	4/10/2008
HO+DRO	25.2 U	25.2	0	SB-32-9.5	9.5	4/10/2008
HO+DRO	23.05 U	23.05	0	SB-33-11	11	4/10/2008
HO+DRO	20.65 U	20.65	0	SB-34-11	11	4/10/2008
HO+DRO	22.2 U	22.2	0	SB-35-9	9	4/10/2008
HO+DRO	19.05 U	19.05	0	SB-36-12	12	4/10/2008
HO+DRO	20.95 U	20.95	0	SB-37-9	9	4/8/2008
HO+DRO	21.55 U	21.55	0	SB-38-10	10	4/8/2008
HO+DRO	20.95 U	20.95	0	SB-38-8.5	8.5	4/8/2008
HO+DRO	19.85 U	19.85	0	SB-39-14	14	4/10/2008
HO+DRO	21.1 U	21.1	0	SB-40-11	11	4/10/2008
HO+DRO	19.7 U	19.7	0	SB-4-10.5	10.5	4/4/2008
HO+DRO	20.7 U	20.7	0	SB-41-10	10	4/10/2008
HO+DRO	24.65 U	24.65	0	SB-42-10	10	4/9/2008
HO+DRO	23.3 U	23.3	0	SB-43-11.5	11.5	4/9/2008
HO+DRO	20.6 U	20.6	0	SB-44-11	11	4/9/2008
HO+DRO	19.9 U	19.9	0	SB-45-10	10	4/8/2008
HO+DRO	19.95 U	19.95	0	SB-46-10.5	10.5	4/8/2008
HO+DRO	20.15 U	20.15	0	SB-46-6	6	4/8/2008

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	22.55 U	22.55	0	SB-47-10	10	4/9/2008
HO+DRO	23.85 U	23.85	0	SB-48-11.5	11.5	4/9/2008
HO+DRO	20.6 U	20.6	0	SB-49-10.5	10.5	4/9/2008
HO+DRO	21.15 U	21.15	0	SB-50-10.5	10.5	4/9/2008
HO+DRO	19.15 U	19.15	0	SB-5-11.5	11.5	4/4/2008
HO+DRO	21.2 U	21.2	0	SB-51-9.5	9.5	4/8/2008
HO+DRO	19.95 U	19.95	0	SB-52-9.5	9.5	4/8/2008
HO+DRO	18.95 U	18.95	0	SB-53-10.5	10.5	4/9/2008
HO+DRO	21.2 U	21.2	0	SB-54-10.5	10.5	4/9/2008
HO+DRO	27.45 U	27.45	0	SB-55-11.5	11.5	4/7/2008
HO+DRO	20.5 U	20.5	0	SB-56-14.5	14.5	4/8/2008
HO+DRO	19.75 U	19.75	0	SB-57-10.5	10.5	4/7/2008
HO+DRO	20.35 U	20.35	0	SB-58-11.0	11	4/7/2008
HO+DRO	19.95 U	19.95	0	SB-59-5.5	5.5	4/8/2008
HO+DRO	20.65 U	20.65	0	SB-60-10.5	10.5	4/7/2008
HO+DRO	20.65 U	20.65	0	SB-6-11.0	11	4/4/2008
HO+DRO	26.45 U	26.45	0	SB-61-10.5	10.5	4/7/2008
HO+DRO	27.65 U	27.65	0	SB-62-10.5	10.5	4/7/2008
HO+DRO	35.3 U	35.3	0	SB-63-6.0	6	4/7/2008
HO+DRO	476.2	476.2	1	SB-64-5.5	5.5	4/7/2008
HO+DRO	34.8 U	34.8	0	SB-64-7.0	7	4/7/2008
HO+DRO	20.8 U	20.8	0	SB-67-5.5	5.5	6/24/2008
HO+DRO	20.35 U	20.35	0	SB-70-12.5	12.5	6/25/2008
HO+DRO	19.05 U	19.05	0	SB-70-6.0	6	6/24/2008
HO+DRO	20.15 U	20.15	0	SB-70-7.0	7	6/25/2008
HO+DRO	20.15 U	20.15	0	SB-7-11.5	11.5	4/4/2008
HO+DRO	20.5 U	20.5	0	SB-71-8.0	8	6/25/2008
HO+DRO	20.5 U	20.5	0	SB-72-6.5	6.5	6/25/2008
HO+DRO	21.05 U	21.05	0	SB-73-15.0	15	6/26/2008
HO+DRO	22.8 U	22.8	0	SB-73-6.0	6	6/26/2008
HO+DRO	21.3 U	21.3	0	SB-74-15	15	6/26/2008
HO+DRO	21.3 U	21.3	0	SB-74-6.0	6	6/26/2008
HO+DRO	21.55 U	21.55	0	SB-75-15.0	15	6/26/2008
HO+DRO	21.35 U	21.35	0	SB-75-6.0	6	6/26/2008
HO+DRO	2499	2499	1	SB-76-10.5	10.5	6/30/2008
HO+DRO	20.85 U	20.85	0	SB-76-14	14	6/30/2008
HO+DRO	19.95 U	19.95	0	SB-76-4.5	4.5	6/30/2008
HO+DRO	20.15 U	20.15	0	SB-77-14	14	6/30/2008
HO+DRO	20.95 U	20.95	0	SB-77-6	6	6/30/2008
HO+DRO	20 U	20	0	SB-78-10	10	6/30/2008
HO+DRO	21.4 U	21.4	0	SB-78-12.5	12.5	6/30/2008
HO+DRO	613	613	1	SB-78-5.5	5.5	6/30/2008
HO+DRO	19.9 U	19.9	0	SB-78-8.5	8.5	6/30/2008
HO+DRO	22.9 U	22.9	0	SB-79-11.5	11.5	6/30/2008
HO+DRO	19.25 U	19.25	0	SB-79-5	5	6/30/2008
HO+DRO	19.95 U	19.95	0	SB-8-11.0	11	4/4/2008
HO+DRO	83.8	83.8	1	SB-81-5	5	6/30/2008
HO+DRO	22 U	22	0	SB-81-9.5	9.5	6/30/2008
HO+DRO	20.8 U	20.8	0	SB-82-7	7	7/1/2008
HO+DRO	23.75 U	23.75	0	SB-82-9	9	7/1/2008
HO+DRO	31.6	31.6	1	SB-83-7	7	7/1/2008
HO+DRO	36.5	36.5	1	SB-83-8.5	8.5	7/1/2008
HO+DRO	64	64	1	SB-84-6	6	7/1/2008
HO+DRO	30.8 U	30.8	0	SB-84-8	8	7/1/2008
HO+DRO	89.5	89.5	1	SB-85-5.5	5.5	7/2/2008
HO+DRO	37.05 U	37.05	0	SB-85-7.5	7.5	7/2/2008
HO+DRO	109	109	1	SB-86-4.5	4.5	7/2/2008
HO+DRO	24.8 U	24.8	0	SB-86-6.5	6.5	7/2/2008
HO+DRO	21.3 U	21.3	0	SB-87-14.0	14	7/25/2008
HO+DRO	168.4	168.4	1	SB-87-6.0	6	7/25/2008
HO+DRO	134.4	134.4	1	SB-88-8.0	8	7/25/2008
HO+DRO	20.1 U	20.1	0	SB-9-11.0	11	4/4/2008
HO+DRO	17.5 U	17.5	0	STRM-1floor-8	8	10/24/2003

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	17.5 U	17.5	0	STRM-1wall-4	4	10/24/2003
HO+DRO	17.5 U	17.5	0	STRM-2Floor-6	6	10/28/2003
HO+DRO	1342.5	1342.5	1	STRM-2wallW-3	3	10/28/2003
HO+DRO	17.5 U	17.5	0	STRM-3WallW-3	3	10/27/2003
HO+DRO	17.5 U	17.5	0	STRM-4wallW-3	3	10/24/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-10wall-3.75	3.75	11/11/2003
HO+DRO	26.6	26.6	1	SWLY-A-11WALL-3.75	3.75	11/25/2003
HO+DRO	1171.6	1171.6	1	SWLY-A-12WALL-3.75	3.75	11/25/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-13WALL-3.75	3.75	11/25/2003
HO+DRO	109.1	109.1	1	SWLY-A-15wall-3.75	3.75	12/1/2003
HO+DRO	1351	1351	1	SWLY-A-17wall-3.75	3.75	12/1/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-18wall-3.75	3.75	12/2/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-19wall-3.75	3.75	12/2/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-1Wall-3.75	3.75	10/14/2003
HO+DRO	39.6	39.6	1	SWLY-A-20WALL-3.75	3.75	12/4/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-21WALL-3.75	3.75	12/4/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-2Wall-3.75	3.75	10/14/2003
HO+DRO	193.3	193.3	1	SWLY-A-3Wall-3.75	3.75	10/14/2003
HO+DRO	553	553	1	SWLY-A-4Wall-3.75	3.75	10/16/2003
HO+DRO	629	629	1	SWLY-A-7WALL-3.75	3.75	11/6/2003
HO+DRO	222	222	1	SWLY-A-8WALL-3.75	3.75	11/6/2003
HO+DRO	17.5 U	17.5	0	SWLY-C-1Wall-3.75	3.75	10/16/2003
HO+DRO	17.5 U	17.5	0	SWLY-D-1Wall-3.75	3.75	10/16/2003
HO+DRO	146.2	146.2	1	SWLY-D-21wall-3.75	3.75	12/5/2003
HO+DRO	102.6	102.6	1	SWLY-D-2Wall-3.75	3.75	10/16/2003
HO+DRO	483.2	483.2	1	SWLY-D-3Wall-3.75	3.75	10/17/2003
HO+DRO	17.5 U	17.5	0	SWLY-D-4Wall-3.75	3.75	10/21/2003
HO+DRO	106.9	106.9	1	SWLY-D-5WALL-3.75	3.75	11/6/2003
HO+DRO	17.5 U	17.5	0	SWLY-D-6WALL-3.75	3.75	11/6/2003
HO+DRO	17.5 U	17.5	0	SWLY-D-7Wall-3.75	3.75	11/10/2003
HO+DRO	17.5 U	17.5	0	SWLY-D-7-Wall-3.75	3.75	11/7/2003
HO+DRO	90.6	90.6	1	SWLY-E-10-3.75	3.75	11/12/2003
HO+DRO	17.5 U	17.5	0	SWLY-E-11-3.75	3.75	11/13/2003
HO+DRO	160	160	1	SWLY-E-21wall-3.75	3.75	12/5/2003
HO+DRO	17.5 U	17.5	0	SWLY-E-8wall-3.75	3.75	11/11/2003
HO+DRO	17.5 U	17.5	0	SWLY-E-9wall-3.75	3.75	11/11/2003
HO+DRO	35.8	35.8	1	SWLY-F-12-3.75	3.75	11/14/2003
HO+DRO	17.5 U	17.5	0	SWLY-F-13-3.75	3.75	11/14/2003
HO+DRO	17.5 U	17.5	0	SWLY-F-21wall-3.75	3.75	11/24/2003
HO+DRO	17.5 U	17.5	0	SWLY-G-14-3.75	3.75	11/17/2003
HO+DRO	30	30	1	SWLY-G-15-3.75	3.75	11/20/2003
HO+DRO	24.7	24.7	1	SWLY-G-16-3.75	3.75	11/20/2003
HO+DRO	17.5 U	17.5	0	SWLY-G-17-3.75	3.75	11/20/2003
HO+DRO	17.5 U	17.5	0	SWLY-G-21wall-3.75	3.75	11/24/2003
HO+DRO	17.5 U	17.5	0	SWLY-H-18-3.75	3.75	11/21/2003
HO+DRO	17.5 U	17.5	0	SWLY-H-19-3.75	3.75	11/21/2003
HO+DRO	17.5 U	17.5	0	SWLY-H-21wall-3.75	3.75	11/24/2003
HO+DRO	50.5	50.5	1	SWLY-I-20wall-3.75	3.75	11/24/2003
HO+DRO	1195	1195	1	SWLY-I-21wall-3.75	3.75	11/24/2003
HO+DRO	9970	9970	1	DPE-PSS-N17-4	4	12/3/2018
HO+DRO	17.5 U	17.5	0	DPE-PSS-N17-6	6	12/3/2018
HO+DRO	4810	4810	1	DPE-PSS-O16-4	4	12/3/2018
HO+DRO	434	434	1	DPE-PSS-O16-6	6	12/3/2018
HO+DRO	4620	4620	1	DPE-PSS-P15-6	6	12/3/2018
HO+DRO	16.5 U	16.5	0	DPE-PSS-P15-11	11	12/3/2018
HO+DRO	8190	8190	1	DPE-PSS-Q14-6	6	12/3/2018
HO+DRO	17 U	17	0	DPE-PSS-Q14-14.5	14.5	12/3/2018
HO+DRO	102	102	1	DPE-PSS-P16-1	1	12/4/2018
HO+DRO	117	117	1	DPE-PSS-P16-2	2	12/4/2018
HO+DRO	41	41	1	DPE-PSS-P16-6	6	12/4/2018
HO+DRO	34.5	34.5	1	DPE-PSS-O17-3	3	12/4/2018
HO+DRO	16.5 U	16.5	0	DPE-PSS-O17-6	6	12/4/2018
HO+DRO	89	89	1	DPE-PSS-Q15-1	1	12/4/2018

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	16 U	16	0	DPE-PSS-Q15-6	6	12/4/2018
HO+DRO	98.5	98.5	1	DPE-PSS-T14-4	4	12/4/2018
HO+DRO	50.5	50.5	1	DPE-PSS-T14-6	6	12/4/2018
HO+DRO	1245	1245	1	DPE-PSS-U13-8.5	8.5	12/4/2018
HO+DRO	17.5 U	17.5	0	DPE-PSS-U13-14.5	14.5	12/4/2018
HO+DRO	1010	1010	1	DPE-PSS-W9-4	4	12/5/2018
HO+DRO	2110	2110	1	DPE-PSS-W9-6	6	12/5/2018
HO+DRO	14600	14600	1	DPE-PSS-V10-5	5	12/5/2018
HO+DRO	14400	14400	1	DPE-PSS-V10-10	10	12/5/2018
HO+DRO	29	29	1	DPE-PSS-V10-13	13	12/5/2018
HO+DRO	113	113	1	DPE-PSS-V11-5	5	12/5/2018
HO+DRO	18 U	18	0	DPE-PSS-V11-9.5	9.5	12/5/2018
HO+DRO	462.5	462.5	1	DPE-PSS-W10-7	7	12/5/2018
HO+DRO	1320	1320	1	DPE-PSS-W10-10	10	12/5/2018
HO+DRO	19.5 U	19.5	0	DPE-PSS-W10-14.5	14.5	12/5/2018
HO+DRO	2305	2305	1	DPE-PSS-W11-2	2	12/6/2018
HO+DRO	82.8	82.8	1	DPE-PSS-W11-3	3	12/6/2018
HO+DRO	12.5 U	12.5	0	DPE-PSS-W11-6	6	12/6/2018
HO+DRO	14.5 U	14.5	0	DPE-PSS-V12-4	4	12/6/2018
HO+DRO	17 U	17	0	DPE-PSS-V12-6	6	12/6/2018
HO+DRO	191	191	1	DPE-PSS-Y9-7.5	7.5	12/6/2018
HO+DRO	9900	9900	1	DPE-PSS-Y9-9	9	12/6/2018
HO+DRO	20.5 U	20.5	0	DPE-PSS-Y9-14.5	14.5	12/6/2018
HO+DRO	3600	3600	1	DPE-PSS-W8-6.5	6.5	12/6/2018
HO+DRO	190	190	1	DPE-PSS-W8-8.5	8.5	12/6/2018
HO+DRO	580	580	1	DPE-PSS-X9-7	7	12/7/2018
HO+DRO	770	770	1	DPE-PSS-X9-14.5	14.5	12/7/2018
HO+DRO	34	34	1	DPE-PSS-X8-7	7	12/7/2018
HO+DRO	2270	2270	1	DPE-PSS-X8-12.5	12.5	12/7/2018
HO+DRO	42.5	42.5	1	EX-DB2-A3-10	10	9/6/2017
HO+DRO	42.5	42.5	1	EX-DB2-A4-10	10	9/7/2017
HO+DRO	42	42	1	EX-DB2-A5-10	10	9/7/2017
HO+DRO	47	47	1	EX-DB2-A6-10	10	9/7/2017
HO+DRO	42.5	42.5	1	EX-DB2-A7-10	10	9/7/2017
HO+DRO	38.5	38.5	1	EX-DB2-A8-10	10	9/7/2017
HO+DRO	41.5	41.5	1	EX-DB2-A3-5-SW	5	9/8/2017
HO+DRO	60	60	1	EX-DB2-A4-5-SW	5	9/8/2017
HO+DRO	214	214	1	EX-DB2-A5-5-SW	5	9/8/2017
HO+DRO	121	121	1	EX-DB2-A6-5-SW	5	9/7/2017
HO+DRO	84	84	1	EX-DB2-A7-5-SW	5	9/7/2017
HO+DRO	129	129	1	EX-DB2-A8-5-SW	5	9/7/2017
HO+DRO	43.5	43.5	1	EX-DB2-B3-10	10	9/12/2017
HO+DRO	44.5	44.5	1	EX-DB2-B4-10	10	9/12/2017
HO+DRO	56	56	1	EX-DB2-B5-10	10	9/12/2017
HO+DRO	60.5	60.5	1	EX-DB2-B6-10	10	9/12/2017
HO+DRO	40	40	1	EX-DB2-B7-10	10	9/12/2017
HO+DRO	46.5	46.5	1	EX-DB2-B8-10	10	9/12/2017
HO+DRO	43	43	1	EX-DB2-A2-10	10	9/13/2017
HO+DRO	36	36	1	EX-DB2-B2-10	10	9/14/2017
HO+DRO	41.5	41.5	1	EX-DB2-C2-10	10	9/14/2017
HO+DRO	59	59	1	EX-DB2-A1-8-SW	8	9/15/2017
HO+DRO	49	49	1	EX-DB2-B1-8-SW	8	9/15/2017
HO+DRO	60 U	60	0	EX-DB2-C1-8-SW	8	9/18/2017
HO+DRO	65 U	65	0	EX-DB2-D1-8-SW	8	9/18/2017
HO+DRO	62 U	62	0	EX-DB2-D2-10	10	9/18/2017
HO+DRO	1440	1440	1	EX-DB2-E0-1	1	9/18/2017
HO+DRO	56 U	56	0	EX-DB2-E1-8-SW	8	9/19/2017
HO+DRO	49	49	1	EX-DB2-E1-10	10	9/19/2017
HO+DRO	650	650	1	EX-DB2-F0-1	1	9/20/2017
HO+DRO	62 U	62	0	EX-DB2-F1-10	10	9/20/2017
HO+DRO	166	166	1	EX-DB2-F2-12	12	9/21/2017
HO+DRO	60 U	60	0	EX-DB2-C3-10	10	9/22/2017
HO+DRO	54.5	54.5	1	EX-DB2-C4-10	10	9/22/2017

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	61 U	61	0	EX-DB2-C5-10	10	9/22/2017
HO+DRO	41	41	1	EX-DB2-C6-10	10	9/22/2017
HO+DRO	42.5	42.5	1	EX-DB2-C7-11	11	9/22/2017
HO+DRO	60 U	60	0	EX-DB2-C8-10	10	9/22/2017
HO+DRO	61 U	61	0	EX-DB2-D3-10	10	9/22/2017
HO+DRO	55.5	55.5	1	EX-DB2-A2-6-SW	6	9/25/2017
HO+DRO	63 U	63	0	EX-DB2-E2-10	10	9/26/2017
HO+DRO	60 U	60	0	EX-DB2-D4-10	10	9/27/2017
HO+DRO	35	35	1	EX-DB2-D5-10	10	9/27/2017
HO+DRO	44 U	44	0	EX-DB2-D6-10	10	9/27/2017
HO+DRO	58 U	58	0	EX-DB2-D7-11	11	9/27/2017
HO+DRO	58 U	58	0	EX-DB2-D8-10	10	9/27/2017
HO+DRO	56 U	56	0	EX-DB2-E3-11	11	9/29/2017
HO+DRO	59 U	59	0	EX-DB2-E4-10	10	9/29/2017
HO+DRO	64 U	64	0	EX-DB2-E5-10	10	9/29/2017
HO+DRO	61 U	61	0	EX-DB2-E6-11	11	9/29/2017
HO+DRO	49 U	49	0	SP-B1-B6-1	1	10/2/2017
HO+DRO	48	48	1	SP-B1-B4-4	4	10/2/2017
HO+DRO	52 U	52	0	SP-B1-I8-1	1	10/2/2017
HO+DRO	37	37	1	SP-B1-C6-13	13	10/2/2017
HO+DRO	63	63	1	SP-B1-H4-4	4	10/2/2017
HO+DRO	39	39	1	SP-B1-B5-7	7	10/2/2017
HO+DRO	147	147	1	SP-B1-D8-2	2	10/2/2017
HO+DRO	62 U	62	0	EX-DB2-E7-10	10	10/2/2017

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UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/16/2024 7:11:17 AM
From File	0-15 ft ProUCL Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (arsenic)

General Statistics

Total Number of Observations	59	Number of Distinct Observations	56
Number of Detects	58	Number of Non-Detects	1
Number of Distinct Detects	56	Number of Distinct Non-Detects	1
Minimum Detect	1.38	Minimum Non-Detect	5.54
Maximum Detect	30.9	Maximum Non-Detect	5.54
Variance Detects	29.77	Percent Non-Detects	1.695%
Mean Detects	4.69	SD Detects	5.456
Median Detects	3.135	CV Detects	1.163
Skewness Detects	3.997	Kurtosis Detects	17.39
Mean of Logged Detects	1.254	SD of Logged Detects	0.664

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.516	Normal GOF Test on Detected Observations Only
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.273	Lilliefors GOF Test
1% Lilliefors Critical Value	0.134	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	4.66	KM Standard Error of Mean	0.705
90KM SD	5.369	95% KM (BCA) UCL	6.069
95% KM (t) UCL	5.839	95% KM (Percentile Bootstrap) UCL	5.896
95% KM (z) UCL	5.82	95% KM Bootstrap t UCL	7.168
90% KM Chebyshev UCL	6.776	95% KM Chebyshev UCL	7.735
97.5% KM Chebyshev UCL	9.065	99% KM Chebyshev UCL	11.68

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.171	Anderson-Darling GOF Test
5% A-D Critical Value	0.764	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.161	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.118	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.867	k star (bias corrected MLE)	1.782
Theta hat (MLE)	2.512	Theta star (bias corrected MLE)	2.632
nu hat (MLE)	216.6	nu star (bias corrected)	206.7
Mean (detects)	4.69		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.38	Mean	4.656
Maximum	30.9	Median	3.13
SD	5.415	CV	1.163
k hat (MLE)	1.884	k star (bias corrected MLE)	1.799
Theta hat (MLE)	2.472	Theta star (bias corrected MLE)	2.588
nu hat (MLE)	222.3	nu star (bias corrected)	212.3
Adjusted Level of Significance (β)	0.0459		
Approximate Chi Square Value (212.31, α)	179.6	Adjusted Chi Square Value (212.31, β)	178.8
95% Gamma Approximate UCL	5.504	95% Gamma Adjusted UCL	5.527

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Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.66	SD (KM)	5.369
Variance (KM)	28.83	SE of Mean (KM)	0.705
k hat (KM)	0.753	k star (KM)	0.726
nu hat (KM)	88.88	nu star (KM)	85.69
theta hat (KM)	6.187	theta star (KM)	6.417
80% gamma percentile (KM)	7.65	90% gamma percentile (KM)	11.6
95% gamma percentile (KM)	15.65	99% gamma percentile (KM)	25.31

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (85.69, α)	65.35	Adjusted Chi Square Value (85.69, β)	64.91
95% KM Approximate Gamma UCL	6.11	95% KM Adjusted Gamma UCL	6.152

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.897	Shapiro Wilk GOF Test
10% Shapiro Wilk P Value	4.0174E-5	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.111	Lilliefors GOF Test
10% Lilliefors Critical Value	0.106	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.661	Mean in Log Scale	1.252
SD in Original Scale	5.413	SD in Log Scale	0.658
95% t UCL (assumes normality of ROS data)	5.839	95% Percentile Bootstrap UCL	5.882
95% BCA Bootstrap UCL	6.165	95% Bootstrap t UCL	7.177
95% H-UCL (Log ROS)	5.163		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.25	KM Geo Mean	3.491
KM SD (logged)	0.655	95% Critical H Value (KM-Log)	2.003
KM Standard Error of Mean (logged)	0.0862	95% H-UCL (KM -Log)	5.138
KM SD (logged)	0.655	95% Critical H Value (KM-Log)	2.003
KM Standard Error of Mean (logged)	0.0862		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.657	Mean in Log Scale	1.25
SD in Original Scale	5.415	SD in Log Scale	0.658
95% t UCL (Assumes normality)	5.835	95% H-Stat UCL	5.158

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 5.839

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (benzene1)

General Statistics

Total Number of Observations	781	Number of Distinct Observations	334
Number of Detects	106	Number of Non-Detects	675
Number of Distinct Detects	99	Number of Distinct Non-Detects	256
Minimum Detect	0.004	Minimum Non-Detect	0.0019
Maximum Detect	33	Maximum Non-Detect	1.56
Variance Detects	12.2	Percent Non-Detects	86.43%
Mean Detects	0.906	SD Detects	3.492
Median Detects	0.108	CV Detects	3.856
Skewness Detects	7.789	Kurtosis Detects	69.36
Mean of Logged Detects	-1.919	SD of Logged Detects	1.553

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.28	Normal GOF Test on Detected Observations Only
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.407	Lilliefors GOF Test
1% Lilliefors Critical Value	0.0998	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.126	KM Standard Error of Mean	0.0474
90KM SD	1.317	95% KM (BCA) UCL	0.22
95% KM (t) UCL	0.204	95% KM (Percentile Bootstrap) UCL	0.216
95% KM (z) UCL	0.204	95% KM Bootstrap t UCL	0.312
90% KM Chebyshev UCL	0.268	95% KM Chebyshev UCL	0.332
97.5% KM Chebyshev UCL	0.422	99% KM Chebyshev UCL	0.597

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	13.77	Anderson-Darling GOF Test
5% A-D Critical Value	0.851	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.314	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.0946	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.367	k star (bias corrected MLE)	0.363
Theta hat (MLE)	2.471	Theta star (bias corrected MLE)	2.499
nu hat (MLE)	77.72	nu star (bias corrected)	76.85
Mean (detects)	0.906		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.004	Mean	0.132
Maximum	33	Median	0.01
SD	1.318	CV	10.01
k hat (MLE)	0.31	k star (bias corrected MLE)	0.31
Theta hat (MLE)	0.424	Theta star (bias corrected MLE)	0.425
nu hat (MLE)	484.2	nu star (bias corrected)	483.7
Adjusted Level of Significance (β)	0.0497		
Approximate Chi Square Value (483.70, α)	433.7	Adjusted Chi Square Value (483.70, β)	433.6
95% Gamma Approximate UCL	0.147	95% Gamma Adjusted UCL	0.147

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.126	SD (KM)	1.317
Variance (KM)	1.735	SE of Mean (KM)	0.0474
k hat (KM)	0.00914	k star (KM)	0.00996
nu hat (KM)	14.28	nu star (KM)	15.56
theta hat (KM)	13.78	theta star (KM)	12.65
80% gamma percentile (KM)	1.3336E-9	90% gamma percentile (KM)	1.8228E-4
95% gamma percentile (KM)	0.0417	99% gamma percentile (KM)	3.334

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.56, α)	7.651	Adjusted Chi Square Value (15.56, β)	7.641
95% KM Approximate Gamma UCL	0.256	95% KM Adjusted Gamma UCL	0.256

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.899	Shapiro Wilk GOF Test	
10% Shapiro Wilk P Value	1.2419E-9	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.15	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.079	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.124	Mean in Log Scale	-7.301
SD in Original Scale	1.318	SD in Log Scale	2.771
95% t UCL (assumes normality of ROS data)	0.202	95% Percentile Bootstrap UCL	0.207
95% BCA Bootstrap UCL	0.245	95% Bootstrap t UCL	0.309
95% H-UCL (Log ROS)	0.0461		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.493	KM Geo Mean	0.00412
KM SD (logged)	1.63	95% Critical H Value (KM-Log)	2.652
KM Standard Error of Mean (logged)	0.0938	95% H-UCL (KM -Log)	0.0181
KM SD (logged)	1.63	95% Critical H Value (KM-Log)	2.652
KM Standard Error of Mean (logged)	0.0938		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.14	Mean in Log Scale	-3.863
SD in Original Scale	1.317	SD in Log Scale	1.118
95% t UCL (Assumes normality)	0.218	95% H-Stat UCL	0.0428

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.204

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

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Result (gasoline range organics (gro))

General Statistics

Total Number of Observations	781	Number of Distinct Observations	443
Number of Detects	240	Number of Non-Detects	541
Number of Distinct Detects	221	Number of Distinct Non-Detects	258
Minimum Detect	1.3	Minimum Non-Detect	0.49
Maximum Detect	3100	Maximum Non-Detect	57
Variance Detects	189095	Percent Non-Detects	69.27%
Mean Detects	180.1	SD Detects	434.9
Median Detects	20.15	CV Detects	2.414
Skewness Detects	3.987	Kurtosis Detects	18.69
Mean of Logged Detects	3.484	SD of Logged Detects	1.734

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.463	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.349	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0666	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	56.45	KM Standard Error of Mean	9.119
90KM SD	254.3	95% KM (BCA) UCL	73.03
95% KM (t) UCL	71.47	95% KM (Percentile Bootstrap) UCL	72.48
95% KM (z) UCL	71.45	95% KM Bootstrap t UCL	75.59
90% KM Chebyshev UCL	83.81	95% KM Chebyshev UCL	96.2
97.5% KM Chebyshev UCL	113.4	99% KM Chebyshev UCL	147.2

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	19.99	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.849	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.219	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0634	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.387	k star (bias corrected MLE)	0.385
Theta hat (MLE)	465.4	Theta star (bias corrected MLE)	467.9
nu hat (MLE)	185.8	nu star (bias corrected)	184.8
Mean (detects)	180.1		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	55.35
Maximum	3100	Median	0.01
SD	254.7	CV	4.601
k hat (MLE)	0.128	k star (bias corrected MLE)	0.129
Theta hat (MLE)	431.9	Theta star (bias corrected MLE)	430.7
nu hat (MLE)	200.2	nu star (bias corrected)	200.7
Adjusted Level of Significance (β)	0.0497		
Approximate Chi Square Value (200.73, α)	168.9	Adjusted Chi Square Value (200.73, β)	168.9
95% Gamma Approximate UCL	65.76	95% Gamma Adjusted UCL	65.79

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	56.45	SD (KM)	254.3
Variance (KM)	64651	SE of Mean (KM)	9.119
k hat (KM)	0.0493	k star (KM)	0.05
nu hat (KM)	76.99	nu star (KM)	78.03
theta hat (KM)	1145	theta star (KM)	1130
80% gamma percentile (KM)	7.632	90% gamma percentile (KM)	86.06
95% gamma percentile (KM)	300.1	99% gamma percentile (KM)	1228

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (78.03, α)	58.68	Adjusted Chi Square Value (78.03, β)	58.65
95% KM Approximate Gamma UCL	75.07	95% KM Adjusted Gamma UCL	75.1

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.912	Shapiro Wilk GOF Test	
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.12	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.0527	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	55.71	Mean in Log Scale	0.182
SD in Original Scale	254.6	SD in Log Scale	2.624
95% t UCL (assumes normality of ROS data)	70.71	95% Percentile Bootstrap UCL	71.77
95% BCA Bootstrap UCL	73.06	95% Bootstrap t UCL	74.51
95% H-UCL (Log ROS)	53.22		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.122	KM Geo Mean	3.072
KM SD (logged)	1.979	95% Critical H Value (KM-Log)	3.009
KM Standard Error of Mean (logged)	0.13	95% H-UCL (KM -Log)	26.95
KM SD (logged)	1.979	95% Critical H Value (KM-Log)	3.009
KM Standard Error of Mean (logged)	0.13		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	57.47	Mean in Log Scale	1.776
SD in Original Scale	254.2	SD in Log Scale	1.53
95% t UCL (Assumes normality)	72.45	95% H-Stat UCL	21.89

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	71.47

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (ho+dro)

General Statistics

Total Number of Observations	780	Number of Distinct Observations	432
Number of Detects	310	Number of Non-Detects	470
Number of Distinct Detects	290	Number of Distinct Non-Detects	157
Minimum Detect	15.55	Minimum Non-Detect	7.1
Maximum Detect	14600	Maximum Non-Detect	71.4
Variance Detects	2464351	Percent Non-Detects	60.26%
Mean Detects	565.9	SD Detects	1570
Median Detects	119.3	CV Detects	2.774
Skewness Detects	6.5	Kurtosis Detects	48.6
Mean of Logged Detects	5.105	SD of Logged Detects	1.413

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.351	Normal GOF Test on Detected Observations Only
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.363	Lilliefors GOF Test
1% Lilliefors Critical Value	0.0587	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	230	KM Standard Error of Mean	36.77
90KM SD	1025	95% KM (BCA) UCL	295.5
95% KM (t) UCL	290.6	95% KM (Percentile Bootstrap) UCL	294.3
95% KM (z) UCL	290.5	95% KM Bootstrap t UCL	310.4
90% KM Chebyshev UCL	340.3	95% KM Chebyshev UCL	390.3
97.5% KM Chebyshev UCL	459.6	99% KM Chebyshev UCL	595.8

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	19.11	Anderson-Darling GOF Test
5% A-D Critical Value	0.821	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.168	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.0543	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.513	k star (bias corrected MLE)	0.51
Theta hat (MLE)	1104	Theta star (bias corrected MLE)	1110
nu hat (MLE)	317.9	nu star (bias corrected)	316.2
Mean (detects)	565.9		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	224.9
Maximum	14600	Median	0.01
SD	1027	CV	4.565
k hat (MLE)	0.128	k star (bias corrected MLE)	0.128
Theta hat (MLE)	1763	Theta star (bias corrected MLE)	1757
nu hat (MLE)	199.1	nu star (bias corrected)	199.7
Adjusted Level of Significance (β)	0.0497		
Approximate Chi Square Value (199.65, α)	168	Adjusted Chi Square Value (199.65, β)	167.9
95% Gamma Approximate UCL	267.4	95% Gamma Adjusted UCL	267.5

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	230	SD (KM)	1025
Variance (KM)	1050701	SE of Mean (KM)	36.77
k hat (KM)	0.0504	k star (KM)	0.051
nu hat (KM)	78.55	nu star (KM)	79.59
theta hat (KM)	4568	theta star (KM)	4509
80% gamma percentile (KM)	33.47	90% gamma percentile (KM)	360.3
95% gamma percentile (KM)	1232	99% gamma percentile (KM)	4964

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (79.59, α)	60.03	Adjusted Chi Square Value (79.59, β)	60
95% KM Approximate Gamma UCL	304.9	95% KM Adjusted Gamma UCL	305.1

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.924	Shapiro Wilk GOF Test	
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.103	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.0464	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	228.1	Mean in Log Scale	2.749
SD in Original Scale	1026	SD in Log Scale	2.277
95% t UCL (assumes normality of ROS data)	288.6	95% Percentile Bootstrap UCL	290.7
95% BCA Bootstrap UCL	301.4	95% Bootstrap t UCL	314.7
95% H-UCL (Log ROS)	273.8		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.277	KM Geo Mean	26.48
KM SD (logged)	1.747	95% Critical H Value (KM-Log)	2.769
KM Standard Error of Mean (logged)	0.0793	95% H-UCL (KM -Log)	144.8
KM SD (logged)	1.747	95% Critical H Value (KM-Log)	2.769
KM Standard Error of Mean (logged)	0.0793		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	231.9	Mean in Log Scale	3.473
SD in Original Scale	1025	SD in Log Scale	1.612
95% t UCL (Assumes normality)	292.3	95% H-Stat UCL	137.5

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 290.6

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Arsenic	4.26	4.26	1	DB1-A-13wall-2	2	10/8/2003
Arsenic	4.94	4.94	1	DB1-A-19Wall-2.5	2.5	10/9/2003
Arsenic	2.42	2.42	1	DB1-A-23wall-3	3	10/10/2003
Arsenic	1.76	1.76	1	DB1-A-24wall-3	3	10/10/2003
Arsenic	3.22	3.22	1	DB1-A-25wall-3	3	10/10/2003
Arsenic	3.45	3.45	1	DB1-A-27wall1-3	3	9/3/2003
Arsenic	5.27	5.27	1	DB1-A-28wall-3	3	9/3/2003
Arsenic	4.78	4.78	1	DB1-A-29wall1-2	2	9/2/2003
Arsenic	2.14	2.14	1	DB1-A-2wall-3	3	9/12/2003
Arsenic	10.6	10.6	1	DB1-A-30wall-3	3	9/3/2003
Arsenic	9.82	9.82	1	DB1-A-31wall1-3	3	9/3/2003
Arsenic	2.98	2.98	1	DB1-A-3wall2-2.5	2.5	9/23/2003
Arsenic	3.13	3.13	1	DB1-A-4wall-2.5	2.5	9/22/2003
Arsenic	4	4	1	DB1-A-5wall-2	2	10/6/2003
Arsenic	6.5	6.5	1	DB1-A-7wall-2.5	2.5	9/24/2003
Arsenic	1.94	1.94	1	DB1-A-9wall-2.5	2.5	10/6/2003
Gasoline Range Organics (GRO)	17 UW	17	0	B12-0.5-1	0.5-1	8/24/2011
Gasoline Range Organics (GRO)	34 W	34	1	B12-1-1.5	1-1.5	8/24/2011
Gasoline Range Organics (GRO)	25 UW	25	0	B12-2.5-3	2.5-3	8/24/2011
Gasoline Range Organics (GRO)	14 U	14	0	B12-3.5-4	3.5-4	8/24/2011
Gasoline Range Organics (GRO)	57 UW	57	0	B14-0.5-1	0.5-1	8/25/2011
Gasoline Range Organics (GRO)	11 UW	11	0	B14-1.5-2	1.5-2	8/25/2011
Gasoline Range Organics (GRO)	25 UW	25	0	B14-2.5-3	2.5-3	8/25/2011
Gasoline Range Organics (GRO)	29 UW	29	0	B14-3.5-4	3.5-4	8/25/2011
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-13wall-2	2	10/8/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-17Wall-2	2	10/9/2003
Gasoline Range Organics (GRO)	131	131	1	DB1-A-18Wall-2	2	10/9/2003
Gasoline Range Organics (GRO)	6.19	6.19	1	DB1-A-19Wall-2.5	2.5	10/9/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-20wall-2	2	10/10/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-23wall-3	3	10/10/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-24wall-3	3	10/10/2003
Gasoline Range Organics (GRO)	356	356	1	DB1-A-25wall-3	3	10/10/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-27wall1-3	3	9/3/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-28wall-3	3	9/3/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-29wall1-2	2	9/2/2003
Gasoline Range Organics (GRO)	5.47	5.47	1	DB1-A-2wall-3	3	9/12/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-30wall-3	3	9/3/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-31wall1-3	3	9/3/2003
Gasoline Range Organics (GRO)	23.6	23.6	1	DB1-A-3wall2-2.5	2.5	9/23/2003
Gasoline Range Organics (GRO)	6.46	6.46	1	DB1-A-4wall-2.5	2.5	9/22/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-5wall-2	2	10/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-7wall-2.5	2.5	9/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-9wall-2.5	2.5	10/6/2003
Gasoline Range Organics (GRO)	5.02 U	5.02	0	EX-A1-C-16-NSW-3	3	11/15/2007
Gasoline Range Organics (GRO)	19.5	19.5	1	EX-A1-C-17-3	3	11/15/2007
Gasoline Range Organics (GRO)	5.03 U	5.03	0	EX-B1-C-46-4(2)	4	9/2/2008
Gasoline Range Organics (GRO)	51.8 JZ	51.8	1	EX-B1-C-47-4	4	8/8/2008
Gasoline Range Organics (GRO)	5.9 U	5.9	0	EX-B5-B-20(2)-4	4	2/28/2008
Gasoline Range Organics (GRO)	6.05 U	6.05	0	EX-B5-B-20-4	4	2/22/2008
Gasoline Range Organics (GRO)	5.59 U	5.59	0	EX-B6-C-15-3	3	11/19/2007
Gasoline Range Organics (GRO)	5.76 JZ	5.76	1	EX-B8-G-4-WSW-4	4	10/1/2007
Gasoline Range Organics (GRO)	5.52 U	5.52	0	EX-B8-J-4-SSW-2.5	2.5	10/23/2007
Gasoline Range Organics (GRO)	22	22	1	EX-DB2-E0-1	1	9/18/2017
Gasoline Range Organics (GRO)	26 U	26	0	EX-DB2-F0-1	1	9/20/2017

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	290	290	1	B12-0.5-1	0.5-1	8/24/2011
HO+DRO	220	220	1	B12-1-1.5	1-1.5	8/24/2011
HO+DRO	235	235	1	B12-2.5-3	2.5-3	8/24/2011
HO+DRO	32.1	32.1	1	B12-3.5-4	3.5-4	8/24/2011
HO+DRO	126	126	1	B14-0.5-1	0.5-1	8/25/2011
HO+DRO	11 U	11	0	B14-2.5-3	2.5-3	8/25/2011
HO+DRO	83.4	83.4	1	B14-3.5-4	3.5-4	8/25/2011
HO+DRO	17.5 U	17.5	0	DB1-A-13wall-2	2	10/8/2003
HO+DRO	17.5 U	17.5	0	DB1-A-17Wall-2	2	10/9/2003
HO+DRO	36.7	36.7	1	DB1-A-18Wall-2	2	10/9/2003
HO+DRO	24.3	24.3	1	DB1-A-19Wall-2.5	2.5	10/9/2003
HO+DRO	26.4	26.4	1	DB1-A-20wall-2	2	10/10/2003
HO+DRO	1301	1301	1	DB1-A-23wall-3	3	10/10/2003
HO+DRO	17.5 U	17.5	0	DB1-A-24wall-3	3	10/10/2003
HO+DRO	2288	2288	1	DB1-A-25wall-3	3	10/10/2003
HO+DRO	17.5 U	17.5	0	DB1-A-27wall1-3	3	9/3/2003
HO+DRO	383.8	383.8	1	DB1-A-28wall-3	3	9/3/2003
HO+DRO	22.9	22.9	1	DB1-A-29wall1-2	2	9/2/2003
HO+DRO	58.6	58.6	1	DB1-A-2wall-3	3	9/12/2003
HO+DRO	120.2	120.2	1	DB1-A-30wall-3	3	9/3/2003
HO+DRO	504	504	1	DB1-A-31wall1-3	3	9/3/2003
HO+DRO	1179	1179	1	DB1-A-3wall2-2.5	2.5	9/23/2003
HO+DRO	429	429	1	DB1-A-4wall-2.5	2.5	9/22/2003
HO+DRO	30.1	30.1	1	DB1-A-5wall-2	2	10/6/2003
HO+DRO	72.9	72.9	1	DB1-A-7wall-2.5	2.5	9/24/2003
HO+DRO	17.5 U	17.5	0	DB1-A-9wall-2.5	2.5	10/6/2003
HO+DRO	258.9	258.9	1	EX-A1-C-16-NSW-3	3	11/15/2007
HO+DRO	193.6	193.6	1	EX-A1-C-17-3	3	11/15/2007
HO+DRO	139.5	139.5	1	EX-B1-C-46-4(2)	4	9/2/2008
HO+DRO	359	359	1	EX-B1-C-47-4	4	8/8/2008
HO+DRO	21.2 U	21.2	0	EX-B5-B-20(2)-4	4	2/28/2008
HO+DRO	1065	1065	1	EX-B5-B-20-4	4	2/22/2008
HO+DRO	22.05 U	22.05	0	EX-B6-C-15-3	3	11/19/2007
HO+DRO	378	378	1	EX-B8-G-4-WSW-4	4	10/1/2007
HO+DRO	19.1 U	19.1	0	EX-B8-J-4-SSW-2.5	2.5	10/23/2007
HO+DRO	1440	1440	1	EX-DB2-E0-1	1	9/18/2017
HO+DRO	650	650	1	EX-DB2-F0-1	1	9/20/2017

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/16/2024 7:14:38 AM
From File	0-4 ft Buffer ProUCL Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (arsenic)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	1.76	Mean	4.451
Maximum	10.6	Median	3.725
SD	2.602	Std. Error of Mean	0.65
Coefficient of Variation	0.585	Skewness	1.437

Normal GOF Test

Shapiro Wilk Test Statistic	0.84	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.189	Lilliefors GOF Test
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	5.591	95% Adjusted-CLT UCL (Chen-1995)	5.77
		95% Modified-t UCL (Johnson-1978)	5.63

Gamma GOF Test

A-D Test Statistic	0.373	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.742	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.118	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.216	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.797	k star (bias corrected MLE)	3.127
Theta hat (MLE)	1.172	Theta star (bias corrected MLE)	1.424
nu hat (MLE)	121.5	nu star (bias corrected)	100
MLE Mean (bias corrected)	4.451	MLE Sd (bias corrected)	2.517
		Approximate Chi Square Value (0.05)	77.97
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	75.76

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.711	95% Adjusted Gamma UCL	5.878

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.962	Shapiro Wilk Lognormal GOF Test
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0935	Lilliefors Lognormal GOF Test
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.565	Mean of logged Data	1.356
Maximum of Logged Data	2.361	SD of logged Data	0.529

Assuming Lognormal Distribution

95% H-UCL	5.925	90% Chebyshev (MVUE) UCL	6.23
95% Chebyshev (MVUE) UCL	7.051	97.5% Chebyshev (MVUE) UCL	8.19
99% Chebyshev (MVUE) UCL	10.43		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	5.52	95% BCA Bootstrap UCL	5.716
95% Standard Bootstrap UCL	5.5	95% Bootstrap-t UCL	6.166
95% Hall's Bootstrap UCL	6.921	95% Percentile Bootstrap UCL	5.515
90% Chebyshev(Mean, Sd) UCL	6.402	95% Chebyshev(Mean, Sd) UCL	7.286
97.5% Chebyshev(Mean, Sd) UCL	8.513	99% Chebyshev(Mean, Sd) UCL	10.92

Suggested UCL to Use

95% Student's-t UCL	5.591

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (gasoline range organics (gro))

General Statistics

Total Number of Observations	38	Number of Distinct Observations	25
Number of Detects	11	Number of Non-Detects	27
Number of Distinct Detects	11	Number of Distinct Non-Detects	14
Minimum Detect	5.47	Minimum Non-Detect	5
Maximum Detect	356	Maximum Non-Detect	57
Variance Detects	10949	Percent Non-Detects	71.05%
Mean Detects	60.16	SD Detects	104.6
Median Detects	22	CV Detects	1.739
Skewness Detects	2.712	Kurtosis Detects	7.65
Mean of Logged Detects	3.144	SD of Logged Detects	1.367

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.582	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.792	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.35	Lilliefors GOF Test
1% Lilliefors Critical Value	0.291	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	21.29	KM Standard Error of Mean	10.08
90KM SD	59.18	95% KM (BCA) UCL	40.95
95% KM (t) UCL	38.29	95% KM (Percentile Bootstrap) UCL	38.58
95% KM (z) UCL	37.87	95% KM Bootstrap t UCL	102
90% KM Chebyshev UCL	51.52	95% KM Chebyshev UCL	65.22
97.5% KM Chebyshev UCL	84.23	99% KM Chebyshev UCL	121.6

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.81	Anderson-Darling GOF Test
5% A-D Critical Value	0.771	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.221	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.267	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.642	k star (bias corrected MLE)	0.528
Theta hat (MLE)	93.71	Theta star (bias corrected MLE)	114
nu hat (MLE)	14.12	nu star (bias corrected)	11.61
Mean (detects)	60.16		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	17.42
Maximum	356	Median	0.01
SD	61.02	CV	3.502
k hat (MLE)	0.148	k star (bias corrected MLE)	0.153
Theta hat (MLE)	118	Theta star (bias corrected MLE)	113.5
nu hat (MLE)	11.22	nu star (bias corrected)	11.66
Adjusted Level of Significance (β)	0.0434		
Approximate Chi Square Value (11.66, α)	5.007	Adjusted Chi Square Value (11.66, β)	4.827
95% Gamma Approximate UCL	40.59	95% Gamma Adjusted UCL	42.11

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	21.29	SD (KM)	59.18
Variance (KM)	3503	SE of Mean (KM)	10.08
k hat (KM)	0.129	k star (KM)	0.137
nu hat (KM)	9.834	nu star (KM)	10.39
theta hat (KM)	164.5	theta star (KM)	155.7
80% gamma percentile (KM)	21.36	90% gamma percentile (KM)	62.17
95% gamma percentile (KM)	119.2	99% gamma percentile (KM)	287.8

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (10.39, α)	4.187	Adjusted Chi Square Value (10.39, β)	4.025
95% KM Approximate Gamma UCL	52.83	95% KM Adjusted Gamma UCL	54.96

ARCADIS

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.902	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.876	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.189	Lilliefors GOF Test
10% Lilliefors Critical Value	0.231	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	17.95	Mean in Log Scale	0.383
SD in Original Scale	60.87	SD in Log Scale	2.148
95% t UCL (assumes normality of ROS data)	34.61	95% Percentile Bootstrap UCL	35.82
95% BCA Bootstrap UCL	44.11	95% Bootstrap t UCL	96.93
95% H-UCL (Log ROS)	59.82		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.084	KM Geo Mean	8.035
KM SD (logged)	0.993	95% Critical H Value (KM-Log)	2.387
KM Standard Error of Mean (logged)	0.172	95% H-UCL (KM -Log)	19.42
KM SD (logged)	0.993	95% Critical H Value (KM-Log)	2.387
KM Standard Error of Mean (logged)	0.172		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	21.39	Mean in Log Scale	1.895
SD in Original Scale	60.11	SD in Log Scale	1.242
95% t UCL (Assumes normality)	37.84	95% H-Stat UCL	24.9

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL 54.96

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (ho+dro)

General Statistics

Total Number of Observations	37	Number of Distinct Observations	33
Number of Detects	28	Number of Non-Detects	9
Number of Distinct Detects	28	Number of Distinct Non-Detects	5
Minimum Detect	22.9	Minimum Non-Detect	11
Maximum Detect	2288	Maximum Non-Detect	22.05
Variance Detects	298888	Percent Non-Detects	24.32%
Mean Detects	426.7	SD Detects	546.7
Median Detects	227.5	CV Detects	1.281
Skewness Detects	2.008	Kurtosis Detects	4.072
Mean of Logged Detects	5.268	SD of Logged Detects	1.367

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.734	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.896	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.248	Lilliefors GOF Test
1% Lilliefors Critical Value	0.191	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	325.6	KM Standard Error of Mean	83.69
90KM SD	499.9	95% KM (BCA) UCL	476.8
95% KM (t) UCL	466.9	95% KM (Percentile Bootstrap) UCL	470.2
95% KM (z) UCL	463.2	95% KM Bootstrap t UCL	534.8
90% KM Chebyshev UCL	576.7	95% KM Chebyshev UCL	690.4
97.5% KM Chebyshev UCL	848.2	99% KM Chebyshev UCL	1158

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.516	Anderson-Darling GOF Test
5% A-D Critical Value	0.784	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0976	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.172	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.759	k star (bias corrected MLE)	0.701
Theta hat (MLE)	562.3	Theta star (bias corrected MLE)	608.4
nu hat (MLE)	42.49	nu star (bias corrected)	39.27
Mean (detects)	426.7		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	322.9
Maximum	2288	Median	120.2
SD	508.5	CV	1.575
k hat (MLE)	0.245	k star (bias corrected MLE)	0.243
Theta hat (MLE)	1319	Theta star (bias corrected MLE)	1329
nu hat (MLE)	18.12	nu star (bias corrected)	17.98
Adjusted Level of Significance (β)	0.0431		
Approximate Chi Square Value (17.98, α)	9.379	Adjusted Chi Square Value (17.98, β)	9.108
95% Gamma Approximate UCL	619.2	95% Gamma Adjusted UCL	637.5

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	325.6	SD (KM)	499.9
Variance (KM)	249916	SE of Mean (KM)	83.69
k hat (KM)	0.424	k star (KM)	0.408
nu hat (KM)	31.39	nu star (KM)	30.18
theta hat (KM)	767.6	theta star (KM)	798.4
80% gamma percentile (KM)	526.6	90% gamma percentile (KM)	916.5
95% gamma percentile (KM)	1344	99% gamma percentile (KM)	2416

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (30.18, α)	18.63	Adjusted Chi Square Value (30.18, β)	18.24
95% KM Approximate Gamma UCL	527.3	95% KM Adjusted Gamma UCL	538.7

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.952	Shapiro Wilk GOF Test	
10% Shapiro Wilk Critical Value	0.936	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.103	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.151	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	325.2	Mean in Log Scale	4.507
SD in Original Scale	507.1	SD in Log Scale	1.819
95% t UCL (assumes normality of ROS data)	465.9	95% Percentile Bootstrap UCL	465.1
95% BCA Bootstrap UCL	489.3	95% Bootstrap t UCL	532.5
95% H-UCL (Log ROS)	1357		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	4.57	KM Geo Mean	96.56
KM SD (logged)	1.697	95% Critical H Value (KM-Log)	3.292
KM Standard Error of Mean (logged)	0.284	95% H-UCL (KM -Log)	1034
KM SD (logged)	1.697	95% Critical H Value (KM-Log)	3.292
KM Standard Error of Mean (logged)	0.284		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	325.1	Mean in Log Scale	4.516
SD in Original Scale	507.1	SD in Log Scale	1.795
95% t UCL (Assumes normality)	465.8	95% H-Stat UCL	1278

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL 538.7

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Arsenic	1.64	1.64	1	DB1-A-10wall-2	2	10/8/2003
Arsenic	3.97	3.97	1	DB1-A-11wall-2	2	10/8/2003
Arsenic	2.74	2.74	1	DB1-A-12wall-2	2	10/8/2003
Arsenic	1.92	1.92	1	DB1-A-8wall-2.5	2.5	10/6/2003
Arsenic	2	2	1	DB1-B-31wall-3	3	9/4/2003
Arsenic	2.93	2.93	1	SWLY-A-10wall-3.75	3.75	11/11/2003
Arsenic	1.92	1.92	1	SWLY-A-18wall-3.75	3.75	12/2/2003
Arsenic	3.14	3.14	1	SWLY-A-19wall-3.75	3.75	12/2/2003
Arsenic	3.92	3.92	1	SWLY-A-1Wall-3.75	3.75	10/14/2003
Arsenic	2.26	2.26	1	SWLY-A-2Wall-3.75	3.75	10/14/2003
Arsenic	3.4	3.4	1	SWLY-A-3Wall-3.75	3.75	10/14/2003
Arsenic	9.17	9.17	1	SWLY-A-4Wall-3.75	3.75	10/16/2003
Arsenic	2.5	2.5	1	SWLY-A-7WALL-3.75	3.75	11/6/2003
Arsenic	2.35	2.35	1	SWLY-A-8WALL-3.75	3.75	11/6/2003
Arsenic	2.34	2.34	1	SWLY-C-1Wall-3.75	3.75	10/16/2003
Arsenic	2.47	2.47	1	SWLY-D-1Wall-3.75	3.75	10/16/2003
Arsenic	1.38	1.38	1	SWLY-D-2Wall-3.75	3.75	10/16/2003
Arsenic	2.13	2.13	1	SWLY-D-3Wall-3.75	3.75	10/17/2003
Arsenic	1.8	1.8	1	SWLY-D-4Wall-3.75	3.75	10/21/2003
Arsenic	3.46	3.46	1	SWLY-D-5WALL-3.75	3.75	11/6/2003
Arsenic	3.41	3.41	1	SWLY-D-6WALL-3.75	3.75	11/6/2003
Arsenic	5.68	5.68	1	SWLY-D-7Wall-3.75	3.75	11/10/2003
Arsenic	2.25	2.25	1	SWLY-D-7-Wall-3.75	3.75	11/7/2003
Arsenic	2.02	2.02	1	SWLY-E-10-3.75	3.75	11/12/2003
Arsenic	1.4	1.4	1	SWLY-E-11-3.75	3.75	11/13/2003
Arsenic	1.76	1.76	1	SWLY-E-8wall-3.75	3.75	11/11/2003
Arsenic	1.86	1.86	1	SWLY-E-9wall-3.75	3.75	11/11/2003
Arsenic	1.63	1.63	1	SWLY-F-12-3.75	3.75	11/14/2003
Arsenic	2.2	2.2	1	SWLY-F-13-3.75	3.75	11/14/2003
Arsenic	5.08	5.08	1	EX-B19-YY-3-1	1	3/5/2008
Arsenic	9.84	9.84	1	EX-B19-YY-2-1	1	3/5/2008
Arsenic	5.45	5.45	1	EX-B19-YY-1-1	1	3/5/2008
Arsenic	25.0 [30.9]	30.9	1	EX-B19-ZZ-1-1	1	3/5/2008
Arsenic	8.56	8.56	1	EX-B19-ZZ-2-1	1	3/5/2008
Arsenic	5.54	5.54	1	EX-B19-ZZ-3-1	1	3/5/2008
Arsenic	30.7	30.7	1	EX-B19-ZZ-1-2	2	3/7/2008
Arsenic	<5.54	5.54	0	EX-B19-ZZ-1-2.5	2.5	3/12/2008
Arsenic	2.89	2.89	1	SWLY-A-5wall-3.75	3.75	10/16/2003
Arsenic	2.67	2.67	1	SWLY-A-6wall-3.75	3.75	10/22/2003
Arsenic	4.43	4.43	1	SWLY-A-9wall-3.75	3.75	11/10/2003
Arsenic	4.83	4.83	1	SWLY-B-1wall-3.75	3.75	10/14/2003

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.03 U	0.03	0	DB1-A-10wall-2	2	10/8/2003
Benzene1	0.03 U	0.03	0	DB1-A-11wall-2	2	10/8/2003
Benzene1	0.03 U	0.03	0	DB1-A-12wall-2	2	10/8/2003
Benzene1	0.03 U	0.03	0	DB1-A-8wall-2.5	2.5	10/6/2003
Benzene1	0.03 U	0.03	0	DB1-B-31wall-3	3	9/4/2003
Benzene1	0.0637	0.0637	1	EX-A1-E-17-ESW-4	4	11/15/2007
Benzene1	0.0267 U	0.0267	0	EX-A1-F-17-3	3	10/29/2007
Benzene1	0.0979 [0.0591]	0.0979	1	EX-A1-F-18-4	4	10/29/2007
Benzene1	0.0282 U	0.0282	0	EX-A1-K-18-SSW-3	3	10/30/2007
Benzene1	0.0322 U	0.0322	0	EX-A1-K-19-3	3	10/30/2007
Benzene1	0.0307 U	0.0307	0	EX-A3-AA-7-ESW-4	4	9/20/2007
Benzene1	0.158	0.158	1	EX-A3-BB-7-ESW-4	4	9/21/2007
Benzene1	0.11	0.11	1	EX-A3-CC-7-ESW-4	4	10/2/2007
Benzene1	0.0267 U	0.0267	0	EX-A3-Y-4-NSW-4	4	9/20/2007
Benzene1	0.0114 U	0.0114	0	EX-A3-Y-4-WSW-4	4	9/20/2007
Benzene1	0.0498 U	0.0498	0	EX-A3-Y-5-NSW-4	4	9/20/2007
Benzene1	0.0232 U	0.0232	0	EX-A3-Y-6-NSW-4	4	9/20/2007
Benzene1	0.0207 U	0.0207	0	EX-A3-Z-7-ESW-4	4	9/20/2007
Benzene1	0.0349 U	0.0349	0	EX-A4-F-9-ESW-4	4	10/17/2007
Benzene1	0.0290 U [0.0283 U]	0.0283	0	EX-A4-G-9-ESW-4	4	10/17/2007
Benzene1	0.0286 U	0.0286	0	EX-A4-H-8-4	4	9/12/2007
Benzene1	0.0273 U	0.0273	0	EX-A4-H-9-ESW-4	4	10/17/2007
Benzene1	0.0342 U	0.0342	0	EX-A4-J-7-SSW-4	4	9/21/2007
Benzene1	0.0408 U	0.0408	0	EX-B11-S-10-2	2	2/15/2008
Benzene1	0.0306 U	0.0306	0	EX-B13-AA-2-NSW-4	4	9/19/2007
Benzene1	0.0303 U	0.0303	0	EX-B13-AA-2-WSW-4	4	9/19/2007
Benzene1	0.0265 U	0.0265	0	EX-B13-AA-3-NSW-4	4	9/19/2007
Benzene1	0.476	0.476	1	EX-B13-BB-2-WSW-4	4	9/19/2007
Benzene1	0.0432 U	0.0432	0	EX-B13-CC-1-4	4	10/10/2007
Benzene1	0.0408 U	0.0408	0	EX-B13-DD-1-4	4	10/8/2007
Benzene1	0.0283 U	0.0283	0	EX-B13-EE-1-4	4	10/8/2007
Benzene1	0.0509	0.0509	1	EX-B13-EE-3-SSW-4	4	10/5/2007
Benzene1	0.0314 U	0.0314	0	EX-B13-EE-4-SSW-4	4	10/5/2007
Benzene1	0.0302 U	0.0302	0	EX-B13-FF-2-4	4	10/9/2007
Benzene1	0.0289 U	0.0289	0	EX-B13-FF-3-ESW-4	4	10/9/2007
Benzene1	0.136	0.136	1	EX-B13-GG-3-4	4	10/9/2007
Benzene1	1.85	1.85	1	EX-B14-DD-7-2.5	2.5	8/23/2007
Benzene1	0.0885 J [1.32 J]	1.32	1	EX-B14-DD-NSW-2.5	2.5	8/23/2007
Benzene1	0.404	0.404	1	EX-B14-EE-5-4	4	9/10/2007
Benzene1	0.255	0.255	1	EX-B14-EE-8-4	4	8/23/2007
Benzene1	0.213	0.213	1	EX-B14-FF-6-4	4	9/7/2007
Benzene1	0.0505 U	0.0505	0	EX-B14-FF-8-4SW	4	8/22/2007
Benzene1	0.1	0.1	1	EX-B14-FF-WSW-4	4	8/23/2007
Benzene1	0.0275 U	0.0275	0	EX-B14-GG-WSW-4	4	8/23/2007
Benzene1	0.0302 U [0.0285 U]	0.0285	0	EX-B14-HH-6-4	4	8/23/2007
Benzene1	0.0277 U	0.0277	0	EX-B14-HH-7-4SW	4	8/23/2007
Benzene1	0.0901	0.0901	1	EX-B15-HH-2-4	4	8/28/2007
Benzene1	0.0319 U	0.0319	0	EX-B15-HH-3-ESW-4	4	8/28/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.356	0.356	1	EX-B15-HH-3-NSW-4	4	8/28/2007
Benzene1	1.1	1.1	1	EX-B15-II-2-WSW-4	4	8/28/2007
Benzene1	0.0316 U	0.0316	0	EX-B15-II-4-ESW-4	4	8/28/2007
Benzene1	4.39	4.39	1	EX-B1-D-43-4	4	8/19/2008
Benzene1	0.0508	0.0508	1	EX-B1-D-44-NSW-4(2)	4	9/2/2008
Benzene1	0.0316 U	0.0316	0	EX-B1-D-45-NSW-4	4	9/2/2008
Benzene1	0.0349 U	0.0349	0	EX-B1-D-47-4	4	8/8/2008
Benzene1	0.0314 U	0.0314	0	EX-B1-E-41-NSW-4	4	8/27/2008
Benzene1	0.156	0.156	1	EX-B1-E-42-NSW-4	4	8/27/2008
Benzene1	0.0336 U	0.0336	0	EX-B1-E-47-4	4	8/8/2008
Benzene1	0.0280 U	0.028	0	EX-B1-E-47-SSW-4(2)	4	9/2/2008
Benzene1	0.0327 U [0.0306 U]	0.0306	0	EX-B1-F-42-SSW-4	4	8/27/2008
Benzene1	0.0288 U	0.0288	0	EX-B1-F-43-4	4	8/21/2008
Benzene1	0.0296 U	0.0296	0	EX-B1-F-45-SSW-4	4	8/18/2008
Benzene1	0.0291 U	0.0291	0	EX-B1-F-47-4(2)	4	9/2/2008
Benzene1	0.0271 U	0.0271	0	EX-B20-F-19-NSW-3	3	10/26/2007
Benzene1	0.0286 U [0.0292 U]	0.0286	0	EX-B20-F-20-NSW-4	4	10/30/2007
Benzene1	0.0316 U	0.0316	0	EX-B20-F-21-4	4	10/17/2007
Benzene1	0.0299 U	0.0299	0	EX-B20-G-14-WSW-4	4	11/20/2007
Benzene1	0.0291 U	0.0291	0	EX-B20-H-10-4	4	11/30/2007
Benzene1	0.0298 U	0.0298	0	EX-B20-H-11-4	4	11/29/2007
Benzene1	0.0262 U	0.0262	0	EX-B20-H-12-NSW-2	2	11/29/2007
Benzene1	0.0277 U [0.0306 U]	0.0277	0	EX-B20-H-14-WSW-4	4	11/20/2007
Benzene1	0.0254 U	0.0254	0	EX-B20-I-21-4	4	10/30/2007
Benzene1	0.0355 U	0.0355	0	EX-B20-J-20-4	4	10/30/2007
Benzene1	0.0293 U	0.0293	0	EX-B20-N-7-WSW-4	4	1/16/2008
Benzene1	0.0354 U	0.0354	0	EX-B21-ESW-2	2	10/11/2007
Benzene1	0.0303 U	0.0303	0	EX-B21-FLOOR-4	4	10/11/2007
Benzene1	0.0300 U	0.03	0	EX-B21-NSW-2	2	10/11/2007
Benzene1	0.0313 U	0.0313	0	EX-B2-E-40-4	4	1/23/2008
Benzene1	0.0262 U [0.0264 U]	0.0262	0	EX-B2-E-41-4	4	1/23/2008
Benzene1	0.0295 U [0.0212 U]	0.0212	0	EX-B2-F-38-NSW-4	4	1/31/2008
Benzene1	0.0308 U	0.0308	0	EX-B2-F-39-NSW-4	4	1/28/2008
Benzene1	0.0271 U	0.0271	0	EX-B2-G-39-SSW-4	4	1/28/2008
Benzene1	0.0287 U	0.0287	0	EX-B2-G-40-SSW-4	4	1/25/2008
Benzene1	0.0356 U	0.0356	0	EX-B2-G-41-ESW-4	4	1/24/2008
Benzene1	0.0341 U	0.0341	0	EX-B2-G-41-SSW-4	4	1/24/2008
Benzene1	0.0313 U	0.0313	0	EX-B3-G-29-NSW-4	4	3/11/2008
Benzene1	0.0269 U	0.0269	0	EX-B6-D-13-3	3	11/19/2007
Benzene1	0.0369 U	0.0369	0	EX-B6-D-14-NSW-3	3	11/19/2007
Benzene1	0.0261 U [0.0270 U]	0.0261	0	EX-B6-E-13-4	4	11/19/2007
Benzene1	0.0275 U	0.0275	0	EX-B6-F-14-WSW-3	3	11/19/2007
Benzene1	0.0272 U	0.0272	0	EX-B8-J-5-4	4	10/1/2007
Benzene1	0.0552 U	0.0552	0	EX-RRT-ZZ-2-4	4	8/1/2008
Benzene1	0.0800 U	0.08	0	EX-RRT-ZZ-2-ESW-3	3	8/1/2008
Benzene1	0.0320 U	0.032	0	EX-SDTI-5-NSW-4	4	8/22/2007
Benzene1	0.0344 U	0.0344	0	EX-SDTI-5-SSW-4	4	8/22/2007
Benzene1	0.0400 U	0.04	0	EX-SDTI-ESW-4	4	8/22/2007

Attachment B-4
ProUCL Input for Soil (0-4 ft Interior)
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.0304 U	0.0304	0	EX-SDTI-GG-ESW-4	4	8/22/2007
Benzene1	0.0322 U	0.0322	0	EX-SDTI-GG-WSW-4	4	8/22/2007
Benzene1	0.0757	0.0757	1	EX-SDTI-WSW-4	4	8/22/2007
Benzene1	0.0287 U	0.0287	0	EX-WW-G-27-2SW	2	8/7/2007
Benzene1	0.0299 U	0.0299	0	EX-WW-G-27-4	4	8/7/2007
Benzene1	0.0384 U	0.0384	0	EX-WW-H-27-2.5	2.5	8/7/2007
Benzene1	0.0294 U	0.0294	0	EX-WW-H-28-2	2	8/7/2007
Benzene1	0.0335 U	0.0335	0	EX-WW-H-29-1	1	8/7/2007
Benzene1	0.0254 U	0.0254	0	EX-WW-I-26-1	1	8/7/2007
Benzene1	0.0310 U	0.031	0	ISP-E-17-2	2	9/17/2008
Benzene1	0.0312 U	0.0312	0	ISP-E-18-2	2	9/17/2008
Benzene1	0.0337 U	0.0337	0	ISP-E-19-2	2	9/22/2008
Benzene1	0.0333 U	0.0333	0	ISP-E-20-2	2	9/22/2008
Benzene1	0.0318 U	0.0318	0	ISP-E-21-2	2	9/22/2008
Benzene1	0.0319 U	0.0319	0	ISP-F-17-2	2	9/17/2008
Benzene1	0.0267 U	0.0267	0	ISP-F-18-2	2	9/17/2008
Benzene1	0.0329 U	0.0329	0	ISP-F-19-2	2	9/22/2008
Benzene1	0.0351 U	0.0351	0	ISP-F-20-2	2	9/22/2008
Benzene1	0.0344 U	0.0344	0	ISP-F-21-2	2	9/22/2008
Benzene1	0.0314 U	0.0314	0	ISP-G-17-2	2	9/17/2008
Benzene1	0.0314 U	0.0314	0	ISP-G-18-2	2	9/17/2008
Benzene1	0.0344 U	0.0344	0	ISP-G-19-2(2)	2	9/25/2008
Benzene1	0.0328 U	0.0328	0	ISP-G-20-2	2	9/22/2008
Benzene1	0.0322 U	0.0322	0	ISP-G-21-2	2	9/22/2008
Benzene1	0.0397 U [0.0357 U]	0.0357	0	RRT-YY-2-WSW-3	3	8/4/2008
Benzene1	0.0349 U	0.0349	0	RRT-ZZ-2-NSW-3	3	8/4/2008
Benzene1	0.0382 U	0.0382	0	RRT-ZZ-3-NSW-3	3	8/4/2008
Benzene1	0.03 U	0.03	0	STRM-1wall-4	4	10/24/2003
Benzene1	0.03 U	0.03	0	STRM-2wallW-3	3	10/28/2003
Benzene1	0.03 U	0.03	0	STRM-3WallW-3	3	10/27/2003
Benzene1	0.03 U	0.03	0	STRM-4wallW-3	3	10/24/2003
Benzene1	0.03 U	0.03	0	SWLY-A-10wall-3.75	3.75	11/11/2003
Benzene1	0.03 U	0.03	0	SWLY-A-11WALL-3.75	3.75	11/25/2003
Benzene1	0.06 U	0.06	0	SWLY-A-12WALL-3.75	3.75	11/25/2003
Benzene1	0.03 U	0.03	0	SWLY-A-13WALL-3.75	3.75	11/25/2003
Benzene1	0.03 U	0.03	0	SWLY-A-15wall-3.75	3.75	12/1/2003
Benzene1	0.12 U	0.12	0	SWLY-A-17wall-3.75	3.75	12/1/2003
Benzene1	0.03 U	0.03	0	SWLY-A-18wall-3.75	3.75	12/2/2003
Benzene1	0.11	0.11	1	SWLY-A-19wall-3.75	3.75	12/2/2003
Benzene1	0.03 U	0.03	0	SWLY-A-1Wall-3.75	3.75	10/14/2003
Benzene1	0.03 U	0.03	0	SWLY-A-20WALL-3.75	3.75	12/4/2003
Benzene1	0.13	0.13	1	SWLY-A-21WALL-3.75	3.75	12/4/2003
Benzene1	0.03 U	0.03	0	SWLY-A-2Wall-3.75	3.75	10/14/2003
Benzene1	0.03 U	0.03	0	SWLY-A-3Wall-3.75	3.75	10/14/2003
Benzene1	0.03 U	0.03	0	SWLY-A-4Wall-3.75	3.75	10/16/2003
Benzene1	0.30 U	0.3	0	SWLY-A-7WALL-3.75	3.75	11/6/2003
Benzene1	0.06 U	0.06	0	SWLY-A-8WALL-3.75	3.75	11/6/2003
Benzene1	0.03 U	0.03	0	SWLY-C-1Wall-3.75	3.75	10/16/2003

Attachment B-4
ProUCL Input for Soil (0-4 ft Interior)
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Benzene1	0.03 U	0.03	0	SWLY-D-1Wall-3.75	3.75	10/16/2003
Benzene1	0.03 U	0.03	0	SWLY-D-21wall-3.75	3.75	12/5/2003
Benzene1	0.03 U	0.03	0	SWLY-D-2Wall-3.75	3.75	10/16/2003
Benzene1	4.47 D	4.47	1	SWLY-D-3Wall-3.75	3.75	10/17/2003
Benzene1	0.03 U	0.03	0	SWLY-D-4Wall-3.75	3.75	10/21/2003
Benzene1	0.03 U	0.03	0	SWLY-D-5WALL-3.75	3.75	11/6/2003
Benzene1	0.03 U	0.03	0	SWLY-D-6WALL-3.75	3.75	11/6/2003
Benzene1	0.03 U	0.03	0	SWLY-D-7Wall-3.75	3.75	11/10/2003
Benzene1	0.03 U	0.03	0	SWLY-D-7-Wall-3.75	3.75	11/7/2003
Benzene1	0.03 U	0.03	0	SWLY-E-10-3.75	3.75	11/12/2003
Benzene1	0.03 U	0.03	0	SWLY-E-11-3.75	3.75	11/13/2003
Benzene1	0.03 U	0.03	0	SWLY-E-21wall-3.75	3.75	12/5/2003
Benzene1	0.03 U	0.03	0	SWLY-E-8wall-3.75	3.75	11/11/2003
Benzene1	0.03 U	0.03	0	SWLY-E-9wall-3.75	3.75	11/11/2003
Benzene1	0.03 U	0.03	0	SWLY-F-12-3.75	3.75	11/14/2003
Benzene1	0.03 U	0.03	0	SWLY-F-13-3.75	3.75	11/14/2003
Benzene1	0.03 U	0.03	0	SWLY-F-21wall-3.75	3.75	11/24/2003
Benzene1	0.3	0.3	1	SWLY-G-14-3.75	3.75	11/17/2003
Benzene1	0.03 U	0.03	0	SWLY-G-15-3.75	3.75	11/20/2003
Benzene1	0.03 U	0.03	0	SWLY-G-16-3.75	3.75	11/20/2003
Benzene1	0.03 U	0.03	0	SWLY-G-17-3.75	3.75	11/20/2003
Benzene1	0.03 U	0.03	0	SWLY-G-21wall-3.75	3.75	11/24/2003
Benzene1	0.03 U	0.03	0	SWLY-H-18-3.75	3.75	11/21/2003
Benzene1	0.03 U	0.03	0	SWLY-H-19-3.75	3.75	11/21/2003
Benzene1	0.03 U	0.03	0	SWLY-H-21wall-3.75	3.75	11/24/2003
Benzene1	0.03 U [0.03 U]	0.03	0	SWLY-I-20wall-3.75	3.75	11/24/2003
Benzene1	0.03 U	0.03	0	SWLY-I-21wall-3.75	3.75	11/24/2003
Benzene1	0.0089 U	0.0089	0	DPE-PSS-N17-4	4	12/3/2018
Benzene1	0.0084 U	0.0084	0	DPE-PSS-O16-4	4	12/3/2018
Benzene1	0.0076 U	0.0076	0	DPE-PSS-P16-1	1	12/4/2018
Benzene1	0.0093 U	0.0093	0	DPE-PSS-P16-2	2	12/4/2018
Benzene1	0.0076 U	0.0076	0	DPE-PSS-O17-3	3	12/4/2018
Benzene1	0.0077 U	0.0077	0	DPE-PSS-Q15-1	1	12/4/2018
Benzene1	0.0085 U	0.0085	0	DPE-PSS-T14-4	4	12/4/2018
Benzene1	0.072	0.072	1	DPE-PSS-W9-4	4	12/5/2018
Benzene1	0.0094 U F2 F1	0.0094	0	DPE-PSS-W11-2	2	12/6/2018
Benzene1	0.0084 U	0.0084	0	DPE-PSS-W11-3	3	12/6/2018
Benzene1	0.0091 U	0.0091	0	DPE-PSS-V12-4	4	12/6/2018
Benzene1	0.02 U	0.02	0	SP-B1-B6-1	1	10/2/2017
Benzene1	0.02 U	0.02	0	SP-B1-B4-4	4	10/2/2017
Benzene1	0.02 U	0.02	0	SP-B1-I8-1	1	10/2/2017
Benzene1	0.013 U	0.013	0	SP-B1-H4-4	4	10/2/2017
Benzene1	0.018 U	0.018	0	SP-B1-D8-2	2	10/2/2017

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-10wall-2	2	10/8/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-11wall-2	2	10/8/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-12wall-2	2	10/8/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-A-8wall-2.5	2.5	10/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	DB1-B-31wall-3	3	9/4/2003
Gasoline Range Organics (GRO)	5.14 U	5.14	0	EX-A1-E-17-ESW-4	4	11/15/2007
Gasoline Range Organics (GRO)	4.44 U	4.44	0	EX-A1-F-17-3	3	10/29/2007
Gasoline Range Organics (GRO)	201 JZ [139 JZ]	201	1	EX-A1-F-18-4	4	10/29/2007
Gasoline Range Organics (GRO)	4.7 U	4.7	0	EX-A1-K-18-SSW-3	3	10/30/2007
Gasoline Range Organics (GRO)	5.36 U	5.36	0	EX-A1-K-19-3	3	10/30/2007
Gasoline Range Organics (GRO)	5.11 U	5.11	0	EX-A3-AA-7-ESW-4	4	9/20/2007
Gasoline Range Organics (GRO)	88	88	1	EX-A3-BB-7-ESW-4	4	9/21/2007
Gasoline Range Organics (GRO)	25.8	25.8	1	EX-A3-CC-7-ESW-4	4	10/2/2007
Gasoline Range Organics (GRO)	8.24 JZ	8.24	1	EX-A3-Y-4-NSW-4	4	9/20/2007
Gasoline Range Organics (GRO)	1.9 U	1.9	0	EX-A3-Y-4-WSW-4	4	9/20/2007
Gasoline Range Organics (GRO)	19.4 JZ	19.4	1	EX-A3-Y-5-NSW-4	4	9/20/2007
Gasoline Range Organics (GRO)	27.7 JZ	27.7	1	EX-A3-Y-6-NSW-4	4	9/20/2007
Gasoline Range Organics (GRO)	3.45 U	3.45	0	EX-A3-Z-7-ESW-4	4	9/20/2007
Gasoline Range Organics (GRO)	5.81 U	5.81	0	EX-A4-F-9-ESW-4	4	10/17/2007
Gasoline Range Organics (GRO)	9.59 JZ [4.72 U]	9.59	1	EX-A4-G-9-ESW-4	4	10/17/2007
Gasoline Range Organics (GRO)	19.6 JZ	19.6	1	EX-A4-H-8-4	4	9/12/2007
Gasoline Range Organics (GRO)	4.55 U	4.55	0	EX-A4-H-9-ESW-4	4	10/17/2007
Gasoline Range Organics (GRO)	5.69 U	5.69	0	EX-A4-J-7-SSW-4	4	9/21/2007
Gasoline Range Organics (GRO)	6.8 U	6.8	0	EX-B11-S-10-2	2	2/15/2008
Gasoline Range Organics (GRO)	5.11 U	5.11	0	EX-B13-AA-2-NSW-4	4	9/19/2007
Gasoline Range Organics (GRO)	5.05 U	5.05	0	EX-B13-AA-2-WSW-4	4	9/19/2007
Gasoline Range Organics (GRO)	4.41 U	4.41	0	EX-B13-AA-3-NSW-4	4	9/19/2007
Gasoline Range Organics (GRO)	774 JZ	774	1	EX-B13-BB-2-WSW-4	4	9/19/2007
Gasoline Range Organics (GRO)	20.2	20.2	1	EX-B13-CC-1-4	4	10/10/2007
Gasoline Range Organics (GRO)	6.79 U	6.79	0	EX-B13-DD-1-4	4	10/8/2007
Gasoline Range Organics (GRO)	4.72 U	4.72	0	EX-B13-EE-1-4	4	10/8/2007
Gasoline Range Organics (GRO)	6.85	6.85	1	EX-B13-EE-3-SSW-4	4	10/5/2007
Gasoline Range Organics (GRO)	5.23 U	5.23	0	EX-B13-EE-4-SSW-4	4	10/5/2007
Gasoline Range Organics (GRO)	5.04 U	5.04	0	EX-B13-FF-2-4	4	10/9/2007
Gasoline Range Organics (GRO)	4.81 U	4.81	0	EX-B13-FF-3-ESW-4	4	10/9/2007
Gasoline Range Organics (GRO)	4.62 U	4.62	0	EX-B13-GG-3-4	4	10/9/2007
Gasoline Range Organics (GRO)	70.6	70.6	1	EX-B14-DD-7-2.5	2.5	8/23/2007
Gasoline Range Organics (GRO)	25 [72.9 JZ]	72.9	1	EX-B14-DD-NSW-2.5	2.5	8/23/2007
Gasoline Range Organics (GRO)	445 JZ	445	1	EX-B14-EE-5-4	4	9/10/2007
Gasoline Range Organics (GRO)	4.9 U	4.9	0	EX-B14-EE-8-4	4	8/23/2007
Gasoline Range Organics (GRO)	5.57	5.57	1	EX-B14-FF-6-4	4	9/7/2007
Gasoline Range Organics (GRO)	8.41 U	8.41	0	EX-B14-FF-8-4SW	4	8/22/2007
Gasoline Range Organics (GRO)	16.3	16.3	1	EX-B14-FF-WSW-4	4	8/23/2007
Gasoline Range Organics (GRO)	8.72	8.72	1	EX-B14-GG-WSW-4	4	8/23/2007
Gasoline Range Organics (GRO)	5.04 U [4.75 U]	4.75	0	EX-B14-HH-6-4	4	8/23/2007
Gasoline Range Organics (GRO)	9.66 JZ	9.66	1	EX-B14-HH-7-4SW	4	8/23/2007
Gasoline Range Organics (GRO)	5.63 U	5.63	0	EX-B15-HH-2-4	4	8/28/2007
Gasoline Range Organics (GRO)	5.32 U	5.32	0	EX-B15-HH-3-ESW-4	4	8/28/2007

Attachment B-4
ProUCL Input for Soil (0-4 ft Interior)
Former Union Oil Company of California Edmonds Bulk Fuel Terminal
11720 Unoco Road, Edmonds, Washington

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	5.39 U	5.39	0	EX-B15-HH-3-NSW-4	4	8/28/2007
Gasoline Range Organics (GRO)	29.2 U	29.2	0	EX-B15-II-2-WSW-4	4	8/28/2007
Gasoline Range Organics (GRO)	209 JZ	209	1	EX-B15-II-4-ESW-4	4	8/28/2007
Gasoline Range Organics (GRO)	2000 J	2000	1	EX-B1-D-43-4	4	8/19/2008
Gasoline Range Organics (GRO)	32.6	32.6	1	EX-B1-D-44-NSW-4(2)	4	9/2/2008
Gasoline Range Organics (GRO)	28.8 JY	28.8	1	EX-B1-D-45-NSW-4	4	9/2/2008
Gasoline Range Organics (GRO)	36.6 JZ	36.6	1	EX-B1-D-47-4	4	8/8/2008
Gasoline Range Organics (GRO)	7.74	7.74	1	EX-B1-E-41-NSW-4	4	8/27/2008
Gasoline Range Organics (GRO)	223	223	1	EX-B1-E-42-NSW-4	4	8/27/2008
Gasoline Range Organics (GRO)	5.61 U	5.61	0	EX-B1-E-47-4	4	8/8/2008
Gasoline Range Organics (GRO)	4.66 U	4.66	0	EX-B1-E-47-SSW-4(2)	4	9/2/2008
Gasoline Range Organics (GRO)	5.46 U [5.11 U]	5.11	0	EX-B1-F-42-SSW-4	4	8/27/2008
Gasoline Range Organics (GRO)	35.6 JZ	35.6	1	EX-B1-F-43-4	4	8/21/2008
Gasoline Range Organics (GRO)	21.4 JZ	21.4	1	EX-B1-F-45-SSW-4	4	8/18/2008
Gasoline Range Organics (GRO)	4.86 U	4.86	0	EX-B1-F-47-4(2)	4	9/2/2008
Gasoline Range Organics (GRO)	4.51 U	4.51	0	EX-B20-F-19-NSW-3	3	10/26/2007
Gasoline Range Organics (GRO)	4.76 U [4.86 U]	4.76	0	EX-B20-F-20-NSW-4	4	10/30/2007
Gasoline Range Organics (GRO)	5.26 U	5.26	0	EX-B20-F-21-4	4	10/17/2007
Gasoline Range Organics (GRO)	4.98 U	4.98	0	EX-B20-G-14-WSW-4	4	11/20/2007
Gasoline Range Organics (GRO)	4.84 U	4.84	0	EX-B20-H-10-4	4	11/30/2007
Gasoline Range Organics (GRO)	4.97 U	4.97	0	EX-B20-H-11-4	4	11/29/2007
Gasoline Range Organics (GRO)	4.37 U	4.37	0	EX-B20-H-12-NSW-2	2	11/29/2007
Gasoline Range Organics (GRO)	4.61 U [5.10 U]	4.61	0	EX-B20-H-14-WSW-4	4	11/20/2007
Gasoline Range Organics (GRO)	4.83 JZ	4.83	1	EX-B20-I-21-4	4	10/30/2007
Gasoline Range Organics (GRO)	5.92 U	5.92	0	EX-B20-J-20-4	4	10/30/2007
Gasoline Range Organics (GRO)	33.5 JZ	33.5	1	EX-B20-N-7-WSW-4	4	1/16/2008
Gasoline Range Organics (GRO)	5.91 U	5.91	0	EX-B21-ESW-2	2	10/11/2007
Gasoline Range Organics (GRO)	5.06 U	5.06	0	EX-B21-FLOOR-4	4	10/11/2007
Gasoline Range Organics (GRO)	5 U	5	0	EX-B21-NSW-2	2	10/11/2007
Gasoline Range Organics (GRO)	5.22 U	5.22	0	EX-B2-E-40-4	4	1/23/2008
Gasoline Range Organics (GRO)	13.5 JZ [13.3 JZ]	13.5	1	EX-B2-E-41-4	4	1/23/2008
Gasoline Range Organics (GRO)	5.97 JZ [13.4 JZ]	13.4	1	EX-B2-F-38-NSW-4	4	1/31/2008
Gasoline Range Organics (GRO)	5.14 U	5.14	0	EX-B2-F-39-NSW-4	4	1/28/2008
Gasoline Range Organics (GRO)	4.52 U	4.52	0	EX-B2-G-39-SSW-4	4	1/28/2008
Gasoline Range Organics (GRO)	4.79 U	4.79	0	EX-B2-G-40-SSW-4	4	1/25/2008
Gasoline Range Organics (GRO)	5.93 U	5.93	0	EX-B2-G-41-ESW-4	4	1/24/2008
Gasoline Range Organics (GRO)	5.68 U	5.68	0	EX-B2-G-41-SSW-4	4	1/24/2008
Gasoline Range Organics (GRO)	5.22 U	5.22	0	EX-B3-G-29-NSW-4	4	3/11/2008
Gasoline Range Organics (GRO)	12.1	12.1	1	EX-B6-D-13-3	3	11/19/2007
Gasoline Range Organics (GRO)	6.16 U	6.16	0	EX-B6-D-14-NSW-3	3	11/19/2007
Gasoline Range Organics (GRO)	4.35 U [4.49 U]	4.35	0	EX-B6-E-13-4	4	11/19/2007
Gasoline Range Organics (GRO)	4.59 U	4.59	0	EX-B6-F-14-WSW-3	3	11/19/2007
Gasoline Range Organics (GRO)	4.53 U	4.53	0	EX-B8-J-5-4	4	10/1/2007
Gasoline Range Organics (GRO)	20.3	20.3	1	EX-RRT-ZZ-2-4	4	8/1/2008
Gasoline Range Organics (GRO)	46.4 J	46.4	1	EX-RRT-ZZ-2-ESW-3	3	8/1/2008
Gasoline Range Organics (GRO)	5.33 U	5.33	0	EX-SDTI-5-NSW-4	4	8/22/2007
Gasoline Range Organics (GRO)	5.74 U	5.74	0	EX-SDTI-5-SSW-4	4	8/22/2007
Gasoline Range Organics (GRO)	6.67 U	6.67	0	EX-SDTI-ESW-4	4	8/22/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	5.07 U	5.07	0	EX-SDTI-GG-ESW-4	4	8/22/2007
Gasoline Range Organics (GRO)	5.37 U	5.37	0	EX-SDTI-GG-WSW-4	4	8/22/2007
Gasoline Range Organics (GRO)	9.4	9.4	1	EX-SDTI-WSW-4	4	8/22/2007
Gasoline Range Organics (GRO)	4.79 U	4.79	0	EX-WW-G-27-2SW	2	8/7/2007
Gasoline Range Organics (GRO)	4.89 U	4.89	0	EX-WW-G-27-4	4	8/7/2007
Gasoline Range Organics (GRO)	6.39 U	6.39	0	EX-WW-H-27-2.5	2.5	8/7/2007
Gasoline Range Organics (GRO)	6.07	6.07	1	EX-WW-H-28-2	2	8/7/2007
Gasoline Range Organics (GRO)	4.59 U	4.59	0	EX-WW-H-29-1	1	8/7/2007
Gasoline Range Organics (GRO)	4.24 U	4.24	0	EX-WW-I-26-1	1	8/7/2007
Gasoline Range Organics (GRO)	5.16 U	5.16	0	ISP-E-17-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.19 U	5.19	0	ISP-E-18-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.62 U	5.62	0	ISP-E-19-2	2	9/22/2008
Gasoline Range Organics (GRO)	7.17 JZ	7.17	1	ISP-E-20-2	2	9/22/2008
Gasoline Range Organics (GRO)	25 JZ	25	1	ISP-E-21-2	2	9/22/2008
Gasoline Range Organics (GRO)	5.32 U	5.32	0	ISP-F-17-2	2	9/17/2008
Gasoline Range Organics (GRO)	4.45 U	4.45	0	ISP-F-18-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.49 U	5.49	0	ISP-F-19-2	2	9/22/2008
Gasoline Range Organics (GRO)	5.85 U	5.85	0	ISP-F-20-2	2	9/22/2008
Gasoline Range Organics (GRO)	5.74 U	5.74	0	ISP-F-21-2	2	9/22/2008
Gasoline Range Organics (GRO)	5.24 U	5.24	0	ISP-G-17-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.23 U	5.23	0	ISP-G-18-2	2	9/17/2008
Gasoline Range Organics (GRO)	5.73 U	5.73	0	ISP-G-19-2(2)	2	9/25/2008
Gasoline Range Organics (GRO)	5.46 U	5.46	0	ISP-G-20-2	2	9/22/2008
Gasoline Range Organics (GRO)	9.03 JZ	9.03	1	ISP-G-21-2	2	9/22/2008
Gasoline Range Organics (GRO)	6.61 U [5.95 U]	5.95	0	RRT-YY-2-WSW-3	3	8/4/2008
Gasoline Range Organics (GRO)	5.81 U	5.81	0	RRT-ZZ-2-NSW-3	3	8/4/2008
Gasoline Range Organics (GRO)	6.37 U	6.37	0	RRT-ZZ-3-NSW-3	3	8/4/2008
Gasoline Range Organics (GRO)	5 U	5	0	STRM-1wall-4	4	10/24/2003
Gasoline Range Organics (GRO)	200 D	200	1	STRM-2wallW-3	3	10/28/2003
Gasoline Range Organics (GRO)	5 U	5	0	STRM-3WallW-3	3	10/27/2003
Gasoline Range Organics (GRO)	5 U	5	0	STRM-4wallW-3	3	10/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-10wall-3.75	3.75	11/11/2003
Gasoline Range Organics (GRO)	9.24	9.24	1	SWLY-A-11WALL-3.75	3.75	11/25/2003
Gasoline Range Organics (GRO)	114 D	114	1	SWLY-A-12WALL-3.75	3.75	11/25/2003
Gasoline Range Organics (GRO)	17	17	1	SWLY-A-13WALL-3.75	3.75	11/25/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-15wall-3.75	3.75	12/1/2003
Gasoline Range Organics (GRO)	428 DJ	428	1	SWLY-A-17wall-3.75	3.75	12/1/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-18wall-3.75	3.75	12/2/2003
Gasoline Range Organics (GRO)	114 J	114	1	SWLY-A-19wall-3.75	3.75	12/2/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-1Wall-3.75	3.75	10/14/2003
Gasoline Range Organics (GRO)	16.4	16.4	1	SWLY-A-20WALL-3.75	3.75	12/4/2003
Gasoline Range Organics (GRO)	41.5	41.5	1	SWLY-A-21WALL-3.75	3.75	12/4/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-2Wall-3.75	3.75	10/14/2003
Gasoline Range Organics (GRO)	29.1	29.1	1	SWLY-A-3Wall-3.75	3.75	10/14/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-A-4Wall-3.75	3.75	10/16/2003
Gasoline Range Organics (GRO)	549 DJ	549	1	SWLY-A-7WALL-3.75	3.75	11/6/2003
Gasoline Range Organics (GRO)	527 DJ	527	1	SWLY-A-8WALL-3.75	3.75	11/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-C-1Wall-3.75	3.75	10/16/2003

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-1Wall-3.75	3.75	10/16/2003
Gasoline Range Organics (GRO)	17.4	17.4	1	SWLY-D-21wall-3.75	3.75	12/5/2003
Gasoline Range Organics (GRO)	17.8	17.8	1	SWLY-D-2Wall-3.75	3.75	10/16/2003
Gasoline Range Organics (GRO)	2440 D	2440	1	SWLY-D-3Wall-3.75	3.75	10/17/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-4Wall-3.75	3.75	10/21/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-5WALL-3.75	3.75	11/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-6WALL-3.75	3.75	11/6/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-7Wall-3.75	3.75	11/10/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-D-7-Wall-3.75	3.75	11/7/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-10-3.75	3.75	11/12/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-11-3.75	3.75	11/13/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-21wall-3.75	3.75	12/5/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-8wall-3.75	3.75	11/11/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-E-9wall-3.75	3.75	11/11/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-F-12-3.75	3.75	11/14/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-F-13-3.75	3.75	11/14/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-F-21wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-G-14-3.75	3.75	11/17/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-G-15-3.75	3.75	11/20/2003
Gasoline Range Organics (GRO)	12.2	12.2	1	SWLY-G-16-3.75	3.75	11/20/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-G-17-3.75	3.75	11/20/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-G-21wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-H-18-3.75	3.75	11/21/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-H-19-3.75	3.75	11/21/2003
Gasoline Range Organics (GRO)	5 U	5	0	SWLY-H-21wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	5 U [17.8]	17.8	1	SWLY-I-20wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	60.9	60.9	1	SWLY-I-21wall-3.75	3.75	11/24/2003
Gasoline Range Organics (GRO)	620	620	1	DPE-PSS-N17-4	4	12/3/2018
Gasoline Range Organics (GRO)	570	570	1	DPE-PSS-O16-4	4	12/3/2018
Gasoline Range Organics (GRO)	720	720	1	DPE-PSS-P16-1	1	12/4/2018
Gasoline Range Organics (GRO)	100	100	1	DPE-PSS-P16-2	2	12/4/2018
Gasoline Range Organics (GRO)	120	120	1	DPE-PSS-O17-3	3	12/4/2018
Gasoline Range Organics (GRO)	210	210	1	DPE-PSS-Q15-1	1	12/4/2018
Gasoline Range Organics (GRO)	5.6	5.6	1	DPE-PSS-T14-4	4	12/4/2018
Gasoline Range Organics (GRO)	78	78	1	DPE-PSS-W9-4	4	12/5/2018
Gasoline Range Organics (GRO)	110	110	1	DPE-PSS-W11-2	2	12/6/2018
Gasoline Range Organics (GRO)	5 J	5	1	DPE-PSS-W11-3	3	12/6/2018
Gasoline Range Organics (GRO)	6.4	6.4	1	DPE-PSS-V12-4	4	12/6/2018
Gasoline Range Organics (GRO)	4 U	4	0	SP-B1-B6-1	1	10/2/2017
Gasoline Range Organics (GRO)	4 U	4	0	SP-B1-B4-4	4	10/2/2017
Gasoline Range Organics (GRO)	3.9 U	3.9	0	SP-B1-I8-1	1	10/2/2017
Gasoline Range Organics (GRO)	1.7 J	1.7	1	SP-B1-H4-4	4	10/2/2017
Gasoline Range Organics (GRO)	43	43	1	SP-B1-D8-2	2	10/2/2017

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	17.5 U	17.5	0	DB1-A-10wall-2	2	10/8/2003
HO+DRO	17.5 U	17.5	0	DB1-A-11wall-2	2	10/8/2003
HO+DRO	17.5 U	17.5	0	DB1-A-12wall-2	2	10/8/2003
HO+DRO	17.5 U	17.5	0	DB1-A-8wall-2.5	2.5	10/6/2003
HO+DRO	17.5 U	17.5	0	DB1-B-31wall-3	3	9/4/2003
HO+DRO	21.4 U	21.4	0	EX-A1-E-17-ESW-4	4	11/15/2007
HO+DRO	19.6 U	19.6	0	EX-A1-F-17-3	3	10/29/2007
HO+DRO	1359	1359	1	EX-A1-F-18-4	4	10/29/2007
HO+DRO	18.3 U	18.3	0	EX-A1-K-18-SSW-3	3	10/30/2007
HO+DRO	20.3 U	20.3	0	EX-A1-K-19-3	3	10/30/2007
HO+DRO	22.25 U	22.25	0	EX-A3-AA-7-ESW-4	4	9/20/2007
HO+DRO	35.2	35.2	1	EX-A3-BB-7-ESW-4	4	9/21/2007
HO+DRO	130.3	130.3	1	EX-A3-CC-7-ESW-4	4	10/2/2007
HO+DRO	309	309	1	EX-A3-Y-4-NSW-4	4	9/20/2007
HO+DRO	18.15 U	18.15	0	EX-A3-Y-4-WSW-4	4	9/20/2007
HO+DRO	233	233	1	EX-A3-Y-5-NSW-4	4	9/20/2007
HO+DRO	78.4	78.4	1	EX-A3-Y-6-NSW-4	4	9/20/2007
HO+DRO	18.5 U	18.5	0	EX-A3-Z-7-ESW-4	4	9/20/2007
HO+DRO	33.95	33.95	1	EX-A4-F-9-ESW-4	4	10/17/2007
HO+DRO	77.4	77.4	1	EX-A4-G-9-ESW-4	4	10/17/2007
HO+DRO	2038	2038	1	EX-A4-H-8-4	4	9/12/2007
HO+DRO	253.3	253.3	1	EX-A4-H-9-ESW-4	4	10/17/2007
HO+DRO	238	238	1	EX-A4-J-7-SSW-4	4	9/21/2007
HO+DRO	22.25 U	22.25	0	EX-B11-S-10-2	2	2/15/2008
HO+DRO	136.2	136.2	1	EX-B13-AA-2-NSW-4	4	9/19/2007
HO+DRO	19.25 U	19.25	0	EX-B13-AA-2-WSW-4	4	9/19/2007
HO+DRO	18.35 U	18.35	0	EX-B13-AA-3-NSW-4	4	9/19/2007
HO+DRO	1135	1135	1	EX-B13-BB-2-WSW-4	4	9/19/2007
HO+DRO	32.15 U	32.15	0	EX-B13-CC-1-4	4	10/10/2007
HO+DRO	25.7 U	25.7	0	EX-B13-DD-1-4	4	10/8/2007
HO+DRO	21.3 U	21.3	0	EX-B13-EE-1-4	4	10/8/2007
HO+DRO	21.4 U	21.4	0	EX-B13-EE-3-SSW-4	4	10/5/2007
HO+DRO	22.05 U	22.05	0	EX-B13-EE-4-SSW-4	4	10/5/2007
HO+DRO	22.4 U	22.4	0	EX-B13-FF-2-4	4	10/9/2007
HO+DRO	22.25 U	22.25	0	EX-B13-FF-3-ESW-4	4	10/9/2007
HO+DRO	22.55 U	22.55	0	EX-B13-GG-3-4	4	10/9/2007
HO+DRO	233	233	1	EX-B14-DD-7-2.5	2.5	8/23/2007
HO+DRO	276.7	276.7	1	EX-B14-DD-NSW-2.5	2.5	8/23/2007
HO+DRO	21.2 U	21.2	0	EX-B14-EE-5-4	4	9/10/2007
HO+DRO	22.2 U	22.2	0	EX-B14-EE-8-4	4	8/23/2007
HO+DRO	22 U	22	0	EX-B14-FF-6-4	4	9/7/2007
HO+DRO	667	667	1	EX-B14-FF-8-4SW	4	8/22/2007
HO+DRO	98.8	98.8	1	EX-B14-FF-WSW-4	4	8/23/2007
HO+DRO	566	566	1	EX-B14-GG-WSW-4	4	8/23/2007
HO+DRO	135.1	135.1	1	EX-B14-HH-6-4	4	8/23/2007
HO+DRO	43.85	43.85	1	EX-B14-HH-7-4SW	4	8/23/2007
HO+DRO	23.1 U	23.1	0	EX-B15-HH-2-4	4	8/28/2007
HO+DRO	20.85 U	20.85	0	EX-B15-HH-3-ESW-4	4	8/28/2007

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	22.7 U	22.7	0	EX-B15-HH-3-NSW-4	4	8/28/2007
HO+DRO	22.65 U	22.65	0	EX-B15-II-2-WSW-4	4	8/28/2007
HO+DRO	829	829	1	EX-B15-II-4-ESW-4	4	8/28/2007
HO+DRO	20.3 U	20.3	0	EX-B1-D-43-4	4	8/19/2008
HO+DRO	254	254	1	EX-B1-D-44-NSW-4(2)	4	9/2/2008
HO+DRO	71.63	71.63	1	EX-B1-D-45-NSW-4	4	9/2/2008
HO+DRO	240	240	1	EX-B1-D-47-4	4	8/8/2008
HO+DRO	18.6 U	18.6	0	EX-B1-E-41-NSW-4	4	8/27/2008
HO+DRO	159.9	159.9	1	EX-B1-E-42-NSW-4	4	8/27/2008
HO+DRO	34.55	34.55	1	EX-B1-E-47-4	4	8/8/2008
HO+DRO	18.9 U	18.9	0	EX-B1-E-47-SSW-4(2)	4	9/2/2008
HO+DRO	18.6 U	18.6	0	EX-B1-F-42-SSW-4	4	8/27/2008
HO+DRO	506	506	1	EX-B1-F-43-4	4	8/21/2008
HO+DRO	210.5	210.5	1	EX-B1-F-45-SSW-4	4	8/18/2008
HO+DRO	19.05 U	19.05	0	EX-B1-F-47-4(2)	4	9/2/2008
HO+DRO	19.45 U	19.45	0	EX-B20-F-19-NSW-3	3	10/26/2007
HO+DRO	19.45 U	19.45	0	EX-B20-F-20-NSW-4	4	10/30/2007
HO+DRO	21 U	21	0	EX-B20-F-21-4	4	10/17/2007
HO+DRO	81.4	81.4	1	EX-B20-G-14-WSW-4	4	11/20/2007
HO+DRO	343	343	1	EX-B20-H-10-4	4	11/30/2007
HO+DRO	19.25 U	19.25	0	EX-B20-H-11-4	4	11/29/2007
HO+DRO	19.8 U	19.8	0	EX-B20-H-12-NSW-2	2	11/29/2007
HO+DRO	40.9	40.9	1	EX-B20-H-14-WSW-4	4	11/20/2007
HO+DRO	87.5	87.5	1	EX-B20-I-21-4	4	10/30/2007
HO+DRO	24.35 U	24.35	0	EX-B20-J-20-4	4	10/30/2007
HO+DRO	273	273	1	EX-B20-N-7-WSW-4	4	1/16/2008
HO+DRO	19.25 U	19.25	0	EX-B21-ESW-2	2	10/11/2007
HO+DRO	20.65 U	20.65	0	EX-B21-FLOOR-4	4	10/11/2007
HO+DRO	57	57	1	EX-B21-NSW-2	2	10/11/2007
HO+DRO	97.4	97.4	1	EX-B2-E-40-4	4	1/23/2008
HO+DRO	390	390	1	EX-B2-E-41-4	4	1/23/2008
HO+DRO	47.6	47.6	1	EX-B2-F-38-NSW-4	4	1/31/2008
HO+DRO	53.7	53.7	1	EX-B2-F-39-NSW-4	4	1/28/2008
HO+DRO	55.1	55.1	1	EX-B2-G-39-SSW-4	4	1/28/2008
HO+DRO	54.9	54.9	1	EX-B2-G-40-SSW-4	4	1/25/2008
HO+DRO	799	799	1	EX-B2-G-41-ESW-4	4	1/24/2008
HO+DRO	77.2	77.2	1	EX-B2-G-41-SSW-4	4	1/24/2008
HO+DRO	188.1	188.1	1	EX-B3-G-29-NSW-4	4	3/11/2008
HO+DRO	75.45	75.45	1	EX-B6-D-13-3	3	11/19/2007
HO+DRO	26.2 U	26.2	0	EX-B6-D-14-NSW-3	3	11/19/2007
HO+DRO	259	259	1	EX-B6-E-13-4	4	11/19/2007
HO+DRO	56.4	56.4	1	EX-B6-F-14-WSW-3	3	11/19/2007
HO+DRO	79.7	79.7	1	EX-B8-J-5-4	4	10/1/2007
HO+DRO	26.6 U	26.6	0	EX-RRT-ZZ-2-4	4	8/1/2008
HO+DRO	31.8 U	31.8	0	EX-RRT-ZZ-2-ESW-3	3	8/1/2008
HO+DRO	22.35 U	22.35	0	EX-SDTI-5-NSW-4	4	8/22/2007
HO+DRO	22.7 U	22.7	0	EX-SDTI-5-SSW-4	4	8/22/2007
HO+DRO	48.4	48.4	1	EX-SDTI-ESW-4	4	8/22/2007

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Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	21.45 U	21.45	0	EX-SDTI-GG-ESW-4	4	8/22/2007
HO+DRO	52.55	52.55	1	EX-SDTI-GG-WSW-4	4	8/22/2007
HO+DRO	21.4 U	21.4	0	EX-SDTI-WSW-4	4	8/22/2007
HO+DRO	64.6	64.6	1	EX-WW-G-27-2SW	2	8/7/2007
HO+DRO	19.1 U	19.1	0	EX-WW-G-27-4	4	8/7/2007
HO+DRO	76.4	76.4	1	EX-WW-H-27-2.5	2.5	8/7/2007
HO+DRO	89.5	89.5	1	EX-WW-H-28-2	2	8/7/2007
HO+DRO	98.9	98.9	1	EX-WW-H-29-1	1	8/7/2007
HO+DRO	56.6	56.6	1	EX-WW-I-26-1	1	8/7/2007
HO+DRO	18.25 U	18.25	0	ISP-E-17-2	2	9/17/2008
HO+DRO	29.15	29.15	1	ISP-E-18-2	2	9/17/2008
HO+DRO	94.1	94.1	1	ISP-E-19-2	2	9/22/2008
HO+DRO	172.4	172.4	1	ISP-E-20-2	2	9/22/2008
HO+DRO	30.55	30.55	1	ISP-E-21-2	2	9/22/2008
HO+DRO	18.2 U	18.2	0	ISP-F-17-2	2	9/17/2008
HO+DRO	61.9	61.9	1	ISP-F-18-2	2	9/17/2008
HO+DRO	28.05	28.05	1	ISP-F-19-2	2	9/22/2008
HO+DRO	25.15	25.15	1	ISP-F-20-2	2	9/22/2008
HO+DRO	19.2 U	19.2	0	ISP-F-21-2	2	9/22/2008
HO+DRO	18.25 U	18.25	0	ISP-G-17-2	2	9/17/2008
HO+DRO	18.5 U	18.5	0	ISP-G-18-2	2	9/17/2008
HO+DRO	132.6	132.6	1	ISP-G-19-2(2)	2	9/25/2008
HO+DRO	24.95	24.95	1	ISP-G-20-2	2	9/22/2008
HO+DRO	109.1	109.1	1	ISP-G-21-2	2	9/22/2008
HO+DRO	60	60	1	RRT-YY-2-WSW-3	3	8/4/2008
HO+DRO	90.6	90.6	1	RRT-ZZ-2-NSW-3	3	8/4/2008
HO+DRO	20.35 U	20.35	0	RRT-ZZ-3-NSW-3	3	8/4/2008
HO+DRO	17.5 U	17.5	0	STRM-1wall-4	4	10/24/2003
HO+DRO	1342.5	1342.5	1	STRM-2wallW-3	3	10/28/2003
HO+DRO	17.5 U	17.5	0	STRM-3WallW-3	3	10/27/2003
HO+DRO	17.5 U	17.5	0	STRM-4wallW-3	3	10/24/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-10wall-3.75	3.75	11/11/2003
HO+DRO	26.6	26.6	1	SWLY-A-11WALL-3.75	3.75	11/25/2003
HO+DRO	1171.6	1171.6	1	SWLY-A-12WALL-3.75	3.75	11/25/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-13WALL-3.75	3.75	11/25/2003
HO+DRO	109.1	109.1	1	SWLY-A-15wall-3.75	3.75	12/1/2003
HO+DRO	1351	1351	1	SWLY-A-17wall-3.75	3.75	12/1/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-18wall-3.75	3.75	12/2/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-19wall-3.75	3.75	12/2/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-1Wall-3.75	3.75	10/14/2003
HO+DRO	39.6	39.6	1	SWLY-A-20WALL-3.75	3.75	12/4/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-21WALL-3.75	3.75	12/4/2003
HO+DRO	17.5 U	17.5	0	SWLY-A-2Wall-3.75	3.75	10/14/2003
HO+DRO	193.3	193.3	1	SWLY-A-3Wall-3.75	3.75	10/14/2003
HO+DRO	553	553	1	SWLY-A-4Wall-3.75	3.75	10/16/2003
HO+DRO	629	629	1	SWLY-A-7WALL-3.75	3.75	11/6/2003
HO+DRO	222	222	1	SWLY-A-8WALL-3.75	3.75	11/6/2003
HO+DRO	17.5 U	17.5	0	SWLY-C-1Wall-3.75	3.75	10/16/2003

Constituent	Original Data	Result	Detect Result	Sample ID	Sample Depth	Sample Date
HO+DRO	17.5 U	17.5	0	SWLY-D-1Wall-3.75	3.75	10/16/2003
HO+DRO	146.2	146.2	1	SWLY-D-21wall-3.75	3.75	12/5/2003
HO+DRO	102.6	102.6	1	SWLY-D-2Wall-3.75	3.75	10/16/2003
HO+DRO	483.2	483.2	1	SWLY-D-3Wall-3.75	3.75	10/17/2003
HO+DRO	17.5 U	17.5	0	SWLY-D-4Wall-3.75	3.75	10/21/2003
HO+DRO	106.9	106.9	1	SWLY-D-5WALL-3.75	3.75	11/6/2003
HO+DRO	17.5 U	17.5	0	SWLY-D-6WALL-3.75	3.75	11/6/2003
HO+DRO	17.5 U	17.5	0	SWLY-D-7Wall-3.75	3.75	11/10/2003
HO+DRO	17.5 U	17.5	0	SWLY-D-7-Wall-3.75	3.75	11/7/2003
HO+DRO	90.6	90.6	1	SWLY-E-10-3.75	3.75	11/12/2003
HO+DRO	17.5 U	17.5	0	SWLY-E-11-3.75	3.75	11/13/2003
HO+DRO	160	160	1	SWLY-E-21wall-3.75	3.75	12/5/2003
HO+DRO	17.5 U	17.5	0	SWLY-E-8wall-3.75	3.75	11/11/2003
HO+DRO	17.5 U	17.5	0	SWLY-E-9wall-3.75	3.75	11/11/2003
HO+DRO	35.8	35.8	1	SWLY-F-12-3.75	3.75	11/14/2003
HO+DRO	17.5 U	17.5	0	SWLY-F-13-3.75	3.75	11/14/2003
HO+DRO	17.5 U	17.5	0	SWLY-F-21wall-3.75	3.75	11/24/2003
HO+DRO	17.5 U	17.5	0	SWLY-G-14-3.75	3.75	11/17/2003
HO+DRO	30	30	1	SWLY-G-15-3.75	3.75	11/20/2003
HO+DRO	24.7	24.7	1	SWLY-G-16-3.75	3.75	11/20/2003
HO+DRO	17.5 U	17.5	0	SWLY-G-17-3.75	3.75	11/20/2003
HO+DRO	17.5 U	17.5	0	SWLY-G-21wall-3.75	3.75	11/24/2003
HO+DRO	17.5 U	17.5	0	SWLY-H-18-3.75	3.75	11/21/2003
HO+DRO	17.5 U	17.5	0	SWLY-H-19-3.75	3.75	11/21/2003
HO+DRO	17.5 U	17.5	0	SWLY-H-21wall-3.75	3.75	11/24/2003
HO+DRO	50.5	50.5	1	SWLY-I-20wall-3.75	3.75	11/24/2003
HO+DRO	1195	1195	1	SWLY-I-21wall-3.75	3.75	11/24/2003
HO+DRO	9970	9970	1	DPE-PSS-N17-4	4	12/3/2018
HO+DRO	4810	4810	1	DPE-PSS-O16-4	4	12/3/2018
HO+DRO	102	102	1	DPE-PSS-P16-1	1	12/4/2018
HO+DRO	117	117	1	DPE-PSS-P16-2	2	12/4/2018
HO+DRO	34.5	34.5	1	DPE-PSS-O17-3	3	12/4/2018
HO+DRO	89	89	1	DPE-PSS-Q15-1	1	12/4/2018
HO+DRO	98.5	98.5	1	DPE-PSS-T14-4	4	12/4/2018
HO+DRO	1010	1010	1	DPE-PSS-W9-4	4	12/5/2018
HO+DRO	2305	2305	1	DPE-PSS-W11-2	2	12/6/2018
HO+DRO	82.8	82.8	1	DPE-PSS-W11-3	3	12/6/2018
HO+DRO	14.5 U	14.5	0	DPE-PSS-V12-4	4	12/6/2018
HO+DRO	49 U	49	0	SP-B1-B6-1	1	10/2/2017
HO+DRO	48	48	1	SP-B1-B4-4	4	10/2/2017
HO+DRO	52 U	52	0	SP-B1-I8-1	1	10/2/2017
HO+DRO	63	63	1	SP-B1-H4-4	4	10/2/2017
HO+DRO	147	147	1	SP-B1-D8-2	2	10/2/2017

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UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/16/2024 7:16:31 AM
From File	0-4 ft Interior ProUCL Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (arsenic)

General Statistics

Total Number of Observations	41	Number of Distinct Observations	39
Number of Detects	40	Number of Non-Detects	1
Number of Distinct Detects	39	Number of Distinct Non-Detects	1
Minimum Detect	1.38	Minimum Non-Detect	5.54
Maximum Detect	30.9	Maximum Non-Detect	5.54
Variance Detects	40.78	Percent Non-Detects	2.439%
Mean Detects	4.764	SD Detects	6.386
Median Detects	2.705	CV Detects	1.341
Skewness Detects	3.639	Kurtosis Detects	13.33
Mean of Logged Detects	1.196	SD of Logged Detects	0.72

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.482	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.919	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.318	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.162	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	4.714	KM Standard Error of Mean	0.987
90KM SD	6.238	95% KM (BCA) UCL	6.512
95% KM (t) UCL	6.376	95% KM (Percentile Bootstrap) UCL	6.503
95% KM (z) UCL	6.337	95% KM Bootstrap t UCL	9.045
90% KM Chebyshev UCL	7.675	95% KM Chebyshev UCL	9.016
97.5% KM Chebyshev UCL	10.88	99% KM Chebyshev UCL	14.53

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.432	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.766	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.213	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.142	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.517	k star (bias corrected MLE)	1.42
Theta hat (MLE)	3.141	Theta star (bias corrected MLE)	3.356
nu hat (MLE)	121.3	nu star (bias corrected)	113.6
Mean (detects)	4.764		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.38	Mean	4.706
Maximum	30.9	Median	2.67
SD	6.316	CV	1.342
k hat (MLE)	1.534	k star (bias corrected MLE)	1.438
Theta hat (MLE)	3.068	Theta star (bias corrected MLE)	3.273
nu hat (MLE)	125.8	nu star (bias corrected)	117.9
Adjusted Level of Significance (β)	0.0441		
Approximate Chi Square Value (117.91, α)	93.84	Adjusted Chi Square Value (117.91, β)	93.06
95% Gamma Approximate UCL	5.914	95% Gamma Adjusted UCL	5.963

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Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.714	SD (KM)	6.238
Variance (KM)	38.91	SE of Mean (KM)	0.987
k hat (KM)	0.571	k star (KM)	0.546
nu hat (KM)	46.82	nu star (KM)	44.73
theta hat (KM)	8.255	theta star (KM)	8.641
80% gamma percentile (KM)	7.764	90% gamma percentile (KM)	12.52
95% gamma percentile (KM)	17.55	99% gamma percentile (KM)	29.83

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (44.73, α)	30.39	Adjusted Chi Square Value (44.73, β)	29.96
95% KM Approximate Gamma UCL	6.938	95% KM Adjusted Gamma UCL	7.039

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.848	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.949	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.15	Lilliefors GOF Test
10% Lilliefors Critical Value	0.128	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.716	Mean in Log Scale	1.193
SD in Original Scale	6.313	SD in Log Scale	0.712
95% t UCL (assumes normality of ROS data)	6.376	95% Percentile Bootstrap UCL	6.452
95% BCA Bootstrap UCL	6.935	95% Bootstrap t UCL	9.37
95% H-UCL (Log ROS)	5.355		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.19	KM Geo Mean	3.287
KM SD (logged)	0.706	95% Critical H Value (KM-Log)	2.06
KM Standard Error of Mean (logged)	0.112	95% H-UCL (KM -Log)	5.308
KM SD (logged)	0.706	95% Critical H Value (KM-Log)	2.06
KM Standard Error of Mean (logged)	0.112		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.715	Mean in Log Scale	1.192
SD in Original Scale	6.313	SD in Log Scale	0.712
95% t UCL (Assumes normality)	6.375	95% H-Stat UCL	5.354

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 6.376

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (benzene1)

General Statistics

Total Number of Observations	187	Number of Distinct Observations	107
Number of Detects	25	Number of Non-Detects	162
Number of Distinct Detects	24	Number of Distinct Non-Detects	84
Minimum Detect	0.0508	Minimum Non-Detect	0.0076
Maximum Detect	4.47	Maximum Non-Detect	0.3
Variance Detects	1.482	Percent Non-Detects	86.63%
Mean Detects	0.661	SD Detects	1.217
Median Detects	0.156	CV Detects	1.841
Skewness Detects	2.671	Kurtosis Detects	6.515
Mean of Logged Detects	-1.438	SD of Logged Detects	1.315

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.535	Shapiro Wilk GOF Test
1% Shapiro Wilk Critical Value	0.886	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.361	Lilliefors GOF Test
1% Lilliefors Critical Value	0.201	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0951	KM Standard Error of Mean	0.0365
90KM SD	0.49	95% KM (BCA) UCL	0.17
95% KM (t) UCL	0.156	95% KM (Percentile Bootstrap) UCL	0.161
95% KM (z) UCL	0.155	95% KM Bootstrap t UCL	0.252
90% KM Chebyshev UCL	0.205	95% KM Chebyshev UCL	0.254
97.5% KM Chebyshev UCL	0.323	99% KM Chebyshev UCL	0.459

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.248	Anderson-Darling GOF Test
5% A-D Critical Value	0.797	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.23	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.183	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.603	k star (bias corrected MLE)	0.557
Theta hat (MLE)	1.097	Theta star (bias corrected MLE)	1.187
nu hat (MLE)	30.14	nu star (bias corrected)	27.86
Mean (detects)	0.661		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0971
Maximum	4.47	Median	0.01
SD	0.491	CV	5.053
k hat (MLE)	0.362	k star (bias corrected MLE)	0.359
Theta hat (MLE)	0.268	Theta star (bias corrected MLE)	0.27
nu hat (MLE)	135.3	nu star (bias corrected)	134.4
Adjusted Level of Significance (β)	0.0487		
Approximate Chi Square Value (134.42, α)	108.6	Adjusted Chi Square Value (134.42, β)	108.5
95% Gamma Approximate UCL	0.12	95% Gamma Adjusted UCL	0.12

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0951	SD (KM)	0.49
Variance (KM)	0.24	SE of Mean (KM)	0.0365
k hat (KM)	0.0377	k star (KM)	0.0407
nu hat (KM)	14.11	nu star (KM)	15.22
theta hat (KM)	2.52	theta star (KM)	2.337
80% gamma percentile (KM)	0.00565	90% gamma percentile (KM)	0.106
95% gamma percentile (KM)	0.461	99% gamma percentile (KM)	2.234

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.22, α)	7.414	Adjusted Chi Square Value (15.22, β)	7.372
95% KM Approximate Gamma UCL	0.195	95% KM Adjusted Gamma UCL	0.196

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Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.884	Shapiro Wilk GOF Test
10% Shapiro Wilk Critical Value	0.931	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.182	Lilliefors GOF Test
10% Lilliefors Critical Value	0.159	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0902	Mean in Log Scale	-6.514
SD in Original Scale	0.492	SD in Log Scale	2.525
95% t UCL (assumes normality of ROS data)	0.15	95% Percentile Bootstrap UCL	0.157
95% BCA Bootstrap UCL	0.173	95% Bootstrap t UCL	0.216
95% H-UCL (Log ROS)	0.0733		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.417	KM Geo Mean	0.0121
KM SD (logged)	1.264	95% Critical H Value (KM-Log)	2.416
KM Standard Error of Mean (logged)	0.0945	95% H-UCL (KM -Log)	0.0336
KM SD (logged)	1.264	95% Critical H Value (KM-Log)	2.416
KM Standard Error of Mean (logged)	0.0945		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.102	Mean in Log Scale	-3.866
SD in Original Scale	0.49	SD in Log Scale	1.139
95% t UCL (Assumes normality)	0.161	95% H-Stat UCL	0.0486

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.156

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (gasoline range organics (gro))

General Statistics

Total Number of Observations	187	Number of Distinct Observations	137
Number of Detects	69	Number of Non-Detects	118
Number of Distinct Detects	67	Number of Distinct Non-Detects	71
Minimum Detect	1.7	Minimum Non-Detect	1.9
Maximum Detect	2440	Maximum Non-Detect	29.2
Variance Detects	162380	Percent Non-Detects	63.1%
Mean Detects	171.4	SD Detects	403
Median Detects	27.7	CV Detects	2.351
Skewness Detects	4.235	Kurtosis Detects	20.03
Mean of Logged Detects	3.687	SD of Logged Detects	1.627

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.457	Normal GOF Test on Detected Observations Only
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.337	Lilliefors GOF Test
1% Lilliefors Critical Value	0.123	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	64.4	KM Standard Error of Mean	18.89
90KM SD	256.4	95% KM (BCA) UCL	99.4
95% KM (t) UCL	95.62	95% KM (Percentile Bootstrap) UCL	98.04
95% KM (z) UCL	95.47	95% KM Bootstrap t UCL	125.2
90% KM Chebyshev UCL	121.1	95% KM Chebyshev UCL	146.7
97.5% KM Chebyshev UCL	182.4	99% KM Chebyshev UCL	252.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	4.602	Anderson-Darling GOF Test
5% A-D Critical Value	0.83	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.213	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.114	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.444	k star (bias corrected MLE)	0.434
Theta hat (MLE)	385.9	Theta star (bias corrected MLE)	394.5
nu hat (MLE)	61.28	nu star (bias corrected)	59.95
Mean (detects)	171.4		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	63.24
Maximum	2440	Median	0.01
SD	257.4	CV	4.069
k hat (MLE)	0.137	k star (bias corrected MLE)	0.138
Theta hat (MLE)	462.3	Theta star (bias corrected MLE)	457.7
nu hat (MLE)	51.17	nu star (bias corrected)	51.68
Adjusted Level of Significance (β)	0.0487		
Approximate Chi Square Value (51.68, α)	36.17	Adjusted Chi Square Value (51.68, β)	36.07
95% Gamma Approximate UCL	90.37	95% Gamma Adjusted UCL	90.62

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	64.4	SD (KM)	256.4
Variance (KM)	65741	SE of Mean (KM)	18.89
k hat (KM)	0.0631	k star (KM)	0.0656
nu hat (KM)	23.6	nu star (KM)	24.55
theta hat (KM)	1021	theta star (KM)	981.1
80% gamma percentile (KM)	19.75	90% gamma percentile (KM)	131.8
95% gamma percentile (KM)	367.1	99% gamma percentile (KM)	1249

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (24.55, α)	14.27	Adjusted Chi Square Value (24.55, β)	14.21
95% KM Approximate Gamma UCL	110.8	95% KM Adjusted Gamma UCL	111.3

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Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.94	Shapiro Wilk GOF Test	
10% Shapiro Wilk P Value	0.00373	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.115	Lilliefors GOF Test	
10% Lilliefors Critical Value	0.0975	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	63.72	Mean in Log Scale	0.904
SD in Original Scale	257.3	SD in Log Scale	2.506
95% t UCL (assumes normality of ROS data)	94.82	95% Percentile Bootstrap UCL	97.11
95% BCA Bootstrap UCL	104.7	95% Bootstrap t UCL	115.8
95% H-UCL (Log ROS)	115.2		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.722	KM Geo Mean	5.597
KM SD (logged)	1.803	95% Critical H Value (KM-Log)	2.987
KM Standard Error of Mean (logged)	0.135	95% H-UCL (KM -Log)	42.18
KM SD (logged)	1.803	95% Critical H Value (KM-Log)	2.987
KM Standard Error of Mean (logged)	0.135		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	64.91	Mean in Log Scale	1.955
SD in Original Scale	257	SD in Log Scale	1.662
95% t UCL (Assumes normality)	95.98	95% H-Stat UCL	39.64

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 95.62

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (ho+dro)

General Statistics

Total Number of Observations	187	Number of Distinct Observations	140
Number of Detects	100	Number of Non-Detects	87
Number of Distinct Detects	97	Number of Distinct Non-Detects	44
Minimum Detect	24.7	Minimum Non-Detect	14.5
Maximum Detect	9970	Maximum Non-Detect	52
Variance Detects	1312942	Percent Non-Detects	46.52%
Mean Detects	417.8	SD Detects	1146
Median Detects	100.5	CV Detects	2.742
Skewness Detects	6.636	Kurtosis Detects	51.21
Mean of Logged Detects	4.957	SD of Logged Detects	1.258

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.357	Normal GOF Test on Detected Observations Only
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.366	Lilliefors GOF Test
1% Lilliefors Critical Value	0.103	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	230.3	KM Standard Error of Mean	63.03
90KM SD	857.6	95% KM (BCA) UCL	346.1
95% KM (t) UCL	334.5	95% KM (Percentile Bootstrap) UCL	342.5
95% KM (z) UCL	333.9	95% KM Bootstrap t UCL	461.8
90% KM Chebyshev UCL	419.4	95% KM Chebyshev UCL	505
97.5% KM Chebyshev UCL	623.9	99% KM Chebyshev UCL	857.4

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	7.689	Anderson-Darling GOF Test
5% A-D Critical Value	0.811	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.216	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.0941	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.576	k star (bias corrected MLE)	0.566
Theta hat (MLE)	724.9	Theta star (bias corrected MLE)	738.5
nu hat (MLE)	115.3	nu star (bias corrected)	113.2
Mean (detects)	417.8		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	223.5
Maximum	9970	Median	30
SD	861.7	CV	3.856
k hat (MLE)	0.156	k star (bias corrected MLE)	0.157
Theta hat (MLE)	1433	Theta star (bias corrected MLE)	1423
nu hat (MLE)	58.32	nu star (bias corrected)	58.72
Adjusted Level of Significance (β)	0.0487		
Approximate Chi Square Value (58.72, α)	42.1	Adjusted Chi Square Value (58.72, β)	41.99
95% Gamma Approximate UCL	311.7	95% Gamma Adjusted UCL	312.5

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	230.3	SD (KM)	857.6
Variance (KM)	735538	SE of Mean (KM)	63.03
k hat (KM)	0.0721	k star (KM)	0.0745
nu hat (KM)	26.96	nu star (KM)	27.86
theta hat (KM)	3194	theta star (KM)	3091
80% gamma percentile (KM)	94.71	90% gamma percentile (KM)	520.5
95% gamma percentile (KM)	1333	99% gamma percentile (KM)	4217

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (27.86, α)	16.82	Adjusted Chi Square Value (27.86, β)	16.75
95% KM Approximate Gamma UCL	381.4	95% KM Adjusted Gamma UCL	382.9

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.92	Shapiro Wilk GOF Test
10% Shapiro Wilk P Value	1.3410E-6	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.133	Lilliefors GOF Test
10% Lilliefors Critical Value	0.0813	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	227	Mean in Log Scale	3.491
SD in Original Scale	860.8	SD in Log Scale	1.894
95% t UCL (assumes normality of ROS data)	331	95% Percentile Bootstrap UCL	339.3
95% BCA Bootstrap UCL	382.3	95% Bootstrap t UCL	435.4
95% H-UCL (Log ROS)	302.8		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.897	KM Geo Mean	49.28
KM SD (logged)	1.459	95% Critical H Value (KM-Log)	2.612
KM Standard Error of Mean (logged)	0.107	95% H-UCL (KM -Log)	189
KM SD (logged)	1.459	95% Critical H Value (KM-Log)	2.612
KM Standard Error of Mean (logged)	0.107		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	228.2	Mean in Log Scale	3.722
SD in Original Scale	860.5	SD in Log Scale	1.619
95% t UCL (Assumes normality)	332.2	95% H-Stat UCL	213.5

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 334.5

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Attachment B-5

Terrestrial Ecological Evaluation Dataset (0 to 15 feet bgs)

Sample Identification (ID)	B1-14-14.5	B12-0.5-1	B12-1-1.5	B12-2.5-3	B12-3.5-4	B1-4.5-5	B14-0.5-1	B14-1.5-2	B14-2.5-3
Sample Depth (feet bgs)	14-14.5	0.5-1	1-1.5	2.5-3	3.5-4	4.5-5	0.5-1	1.5-2	2.5-3
Sample Date	8/22/2011	8/24/2011	8/24/2011	8/24/2011	8/24/2011	8/22/2011	8/25/2011	8/25/2011	8/25/2011
VOCs									
Benzene[1]	0.17	0.033 U W	0.038 U W	0.051 U W	0.0028 U	0.0022 U	0.11 U W	0.023 U W	0.051 U W
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.01167	0.0007224 U	0.07917	0.0006283	0.0005213	0.02947	NA	NA
Benzo[a]pyrene	NA	0.0083	0.00096 U	0.057	0.00083 U	0.00069 U	0.022	NA	NA
Benzo[a]anthracene	NA	0.007	0.00096 U	0.051	0.00083 U	0.00069 U	0.014	NA	NA
Benzo[b]fluoranthene	NA	0.015	0.00096 U	0.084	0.00083 U	0.00069 U	0.031	NA	NA
Benzo(g,h,i)perylene	NA	0.0043	0.00096 U	0.038	0.00083 U	0.00069 U	0.012	NA	NA
Benzo(k)fluoranthene	NA	0.0053	0.00096 U	0.035	0.00083 U	0.00069 U	0.014	NA	NA
Chrysene	NA	0.011	0.00048 U	0.064	0.00058	0.00038	0.019	NA	NA
Dibenz(a,h)anthracene	NA	0.0012	0.00096 U	0.0093	0.00083 U	0.00069 U	0.0028	NA	NA
Indeno(1,2,3-cd)pyrene	NA	0.0041	0.00096 U	0.036	0.00083 U	0.00069 U	0.011	NA	NA
1-Methylnaphthalene	NA	0.00087 U	0.00096 U	0.0054 U	0.00083 U	0.00069 U	0.0095	NA	NA
2-Methylnaphthalene	NA	0.00087	0.00096 U	0.0054	0.00083 U	0.00069 U	0.011	NA	NA
Gasoline Range Organics (GRO)	2.1 U	17 UW	34 W	25 UW	14 U	1.1 U	57 UW	11 UW	25 UW
Diesel Range Organics (DRO)	4.8 U	140	120	160	4.1	3.1 UX	16	NA	5.0 U
Heavy Oil Organics (HO)	16 U	150	100	75	28	14 X	110	NA	17 U
HO+DRO	10.4 U	290	220	235	32.1	15.55	126	NA	11 U
Total Petroleum Hydrocarbons (TPH)[3]	11.45 U	298.5	254	247.5	39.1	16.1	154.5	5.5	23.5 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

ARCADIS

Sample Identification (ID)	B14-3.5-4	B15-11-11.5	B15-4.5-5	B15-6.5-7	B15-8.5-9	B1-9.5-10	B2-12-12.5	B2-14.5-15	B2-4-4.5
Sample Depth (feet bgs)	3.5-4	11-11.5	4.5-5	6.5-7	8.5-9	9.5-10	12-12.5	14.5-15	4-4.5
Sample Date	8/25/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/22/2011	8/22/2011	8/22/2011	8/22/2011
VOCs									
Benzene[1]	0.058 U W	0.029 U W	0.0025 U	0.0026 U V	0.0048 U V	0.23 W	0.0020 U	0.0024 U	0.018 UW
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0009003	NA	0.0005311	NA	0.0008315	0.008175	0.000881	NA	0.05368
Benzo[a]pyrene	0.0012 U	NA	0.0007 U	NA	0.0011 U	0.0085 U	0.00074 U	NA	0.038
Benzo[a]anthracene	0.0012 U	NA	0.0007 U	NA	0.0011 U	0.0085 U	0.00074 U	NA	0.02
Benzo[b]fluoranthene	0.0012 U	NA	0.0007 U	NA	0.0011 U	0.016	0.0034	NA	0.048
Benzo(g,h,i)perylene	0.0012 U	NA	0.0007 U	NA	0.0011 U	0.013	0.00074 U	NA	0.064
Benzo(k)fluoranthene	0.0012 U	NA	0.0007 U	NA	0.0011 U	0.0085 U	0.00074 U	NA	0.018
Chrysene	0.0006 U	NA	0.00061	NA	0.00065	0.013	0.0023	NA	0.048
Dibenz(a,h)anthracene	0.0012 U	NA	0.0007 U	NA	0.0011 U	0.0085 U	0.00074 U	NA	0.013
Indeno(1,2,3-cd)pyrene	0.0012 U	NA	0.0007 U	NA	0.0011 U	0.0092	0.00074 U	NA	0.023
1-Methylnaphthalene	0.0018	NA	0.0018	NA	0.003	0.18	0.0017	NA	0.0071 U
2-Methylnaphthalene	0.0014 U	NA	0.0021 U	NA	0.0026 U	0.043 U	0.0018 U	NA	0.0071
Gasoline Range Organics (GRO)	29 UW	15 UW	1.3 U	1.3 U	2.4 U	25 W	2	1.2 U	9.2 UW
Diesel Range Organics (DRO)	7.4	4 U	4.5	3.6 U	7.8	5.3	130	3.4 U	620
Heavy Oil Organics (HO)	76	13 U	17	18	54	42	530	11 U	720
HO+DRO	83.4	8.5 U	21.5	19.8	61.8	47.3	660	7.2 U	1340
Total Petroleum Hydrocarbons (TPH)[3]	97.9	16 U	22.15	20.45	63	72.3	662	7.8 U	1344.6
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

ARCADIS

Sample Identification (ID)	B2-7-7.5	B2-9.5-10	B3-12-12.5	B3-14-14.5	B3-4.5-5	B3-7-7.5	DB1-A-10-4	DB1-A-10wall-2	DB1-A-11-4
Sample Depth (feet bgs)	7-7.5	9.5-10	12-12.5	14-14.5	4.5-5	7-7.5	4	2	4
Sample Date	8/22/2011	8/22/2011	8/22/2011	8/22/2011	8/22/2011	8/22/2011	10/8/2003	10/8/2003	10/8/2003
VOCs									
Benzene[1]	0.0020 U	0.0019 U	0.0020 U	0.0040	0.0022 U	0.0021 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.000727	0.002005	0.0005765	NA	NA	0.0007175	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.00075 U	0.0012	0.00075 U	NA	NA	0.00073 U	0.01 U	NA	0.01 U
Benzo[a]anthracene	0.00075 U	0.0015	0.00075 U	NA	NA	0.00073 U	0.01 U	NA	0.01 U
Benzo[b]fluoranthene	0.0019	0.0051	0.0023	NA	NA	0.0023	0.01 U	NA	0.01 U
Benzo(g,h,i)perylene	0.00075 U	0.00076 U	0.00075 U	NA	NA	0.00073 U	NA	NA	NA
Benzo(k)fluoranthene	0.00075 U	0.00076 U	0.00075 U	NA	NA	0.00073 U	0.01 U	NA	0.01 U
Chrysene	0.0012	0.0031	0.0014	NA	NA	0.0017	0.01 U	NA	0.01 U
Dibenz(a,h)anthracene	0.00075 U	0.00076 U	0.00075 U	NA	NA	0.00073 U	0.01 U	NA	0.01 U
Indeno(1,2,3-cd)pyrene	0.00075 U	0.00076 U	0.00075 U	NA	NA	0.00073 U	0.01 U	NA	0.01 U
1-Methylnaphthalene	0.0014	0.0037	0.0025	NA	NA	0.0026	NA	NA	NA
2-Methylnaphthalene	0.0021 U	0.0047	0.0025 U	NA	NA	0.0031 U	NA	NA	NA
Gasoline Range Organics (GRO)	1 U	16	6.8	1.3	1.1 U	1.1 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	30	100	43 X	3.3 U	3.2 U	110 X	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	37	100	46 X	11 U	11 U	70 X	25.0 U	25.0 U	25.0 U
HO+DRO	67	200	89	7.15 U	7.1 U	180	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	67.5	216	95.8	8.45	7.65 U	180.55	20 U	20 U	20 U
Arsenic	NA	NA	NA	NA	NA	NA	4	2	2.55 [3.39]

Sample Identification (ID)	DB1-A-11wall-2	DB1-A-12-4	DB1-A-12wall-2	DB1-A-13-4	DB1-A-13wall-2	DB1-A-14-3	DB1-A-1-5	DB1-A-15-3	DB1-A-16-3
Sample Depth (feet bgs)	2	4	2	4	2	3	5	3	3
Sample Date	10/8/2003	10/8/2003	10/8/2003	10/8/2003	10/8/2003	10/9/2003	9/16/2003	10/9/2003	10/9/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	11.7	10.0 U	15.4
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	24.2	17.5 U	27.9
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	26.7	20 U	30.4
Arsenic	4	3	3	4	4	<0.50	2	3	8.13 [7.07]

Sample Identification (ID)	DB1-A-17-5	DB1-A-17Wall-2	DB1-A-18-5	DB1-A-18Wall-2	DB1-A-19-5	DB1-A-19Wall-2.5	DB1-A-20-5	DB1-A-20wall-2	DB1-A-21-5
Sample Depth (feet bgs)	5	2	5	2	5	2.5	5	2	5
Sample Date	10/9/2003	10/9/2003	10/9/2003	10/9/2003	10/9/2003	10/9/2003	10/10/2003	10/10/2003	10/10/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.26	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.01001
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	131	5 U	6.19	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	24.2	10.0 U	11.8	10.0 U	13.9	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	36.7	17.5 U	24.3	17.5 U	26.4	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	167.7	20 U	30.49	20 U	28.9	20 U
Arsenic	2	NA	3	NA	4	5	3	NA	3

Sample Identification (ID)	DB1-A-22-8	DB1-A-23-6	DB1-A-23wall-3	DB1-A-24-6	DB1-A-24wall-3	DB1-A-25-7	DB1-A-25wall-3	DB1-A-2-6	DB1-A-26-11
Sample Depth (feet bgs)	8	6	3	6	3	7	3	6	1
Sample Date	9/8/2003	10/10/2003	10/10/2003	10/10/2003	10/10/2003	10/10/2003	10/10/2003	9/12/2003	9/5/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.05	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.03775 U	0.00755 U	0.00755 U	0.00755 U	0.06873	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.13 D	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.12 D	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.07 D	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.16 D	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.07 D	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5	5 U	5 U	5 U	5 U	5 U	356	5 U	5 U
Diesel Range Organics (DRO)	10	10.0 U	826 D	10.0 U	10.0 U	10.0 U	1410 D	10.0 U	10.0 U
Heavy Oil Organics (HO)	25	25.0 U	475 D	25.0 U	25.0 U	25.0 U	878 D	25.0 U	25.0 U
HO+DRO	35	17.5 U	1301	17.5 U	17.5 U	17.5 U	2288	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	40	20 U	1303.5	20 U	20 U	20 U	2644	20 U	20 U
Arsenic	2	2	2	2	2	2	3	2	1

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Sample Identification (ID)	DB1-A-27-10	DB1-A-27wall1-3	DB1-A-27wall2-7	DB1-A-28-7	DB1-A-28wall-3	DB1-A-29-9	DB1-A-29wall1-2	DB1-A-29wall2-5	DB1-A-2wall-3
Sample Depth (feet bgs)	10	3	7	7	3	9	2	5	3
Sample Date	9/3/2003	9/3/2003	9/3/2003	9/3/2003	9/3/2003	9/2/2003	9/2/2003	9/2/2003	9/12/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.04
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5	5 U	5	5	5 U	5	5 U	5 U	5.47
Diesel Range Organics (DRO)	10	10.0 U	10	10	95.8	10	10.4	10.0 U	46.1
Heavy Oil Organics (HO)	25	25.0 U	25	25	288	25	25.0 U	25.0 U	25.0 U
HO+DRO	35	17.5 U	35	35	383.8	35	22.9	17.5 U	58.6
Total Petroleum Hydrocarbons (TPH)[3]	40	20 U	40	40	386.3	40	25.4	20 U	64.07
Arsenic	2	3	6	3	5	0.59 [0.77]	5	6	2

Sample Identification (ID)	DB1-A-30-7	DB1-A-30wall-3	DB1-A-31-10	DB1-A-31wall1-3	DB1-A-31wall2-7	DB1-A-3-4	DB1-A-3wall2-2.5	DB1-A-4-4	DB1-A-4wall-2.5
Sample Depth (feet bgs)	7	3	0	3	7	4	2.5	4	2.5
Sample Date	9/3/2003	9/3/2003	9/3/2003	9/3/2003	9/3/2003	9/19/2003	9/23/2003	9/19/2003	9/22/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.02413	0.00755 U	0.02186	0.00755 U	0.00755 U	0.05025	0.00755 U	0.05075
Benzo[a]pyrene	0.01 U	0.02	0.01 U	0.01	0.01 U	0.01 U	0.05 U	0.01 U	0.05 U
Benzo[a]anthracene	0.01 U	0.03	0.01 U	0.03	0.01 U	0.01 U	0.15 D	0.01 U	0.15 D
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01	0.01 U	0.01 U	0.05 U	0.01 U	0.05 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01	0.01 U	0.01 U	0.05 U	0.01 U	0.05 U
Chrysene	0.01 U	0.08	0.01 U	0.03	0.01 U	0.01 U	0.05 U	0.01 U	0.08 D
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.05 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.02	0.01 U	0.01 U	0.05 U	0.01 U	0.05 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5	5 U	5 U	5 U	5 U	5 U	23.6	5 U	6.46
Diesel Range Organics (DRO)	10	40.2	10.0 U	343 D	10.0 U	10.0 U	814 DJ	10.0 U	290 DJ
Heavy Oil Organics (HO)	25	80	25.0 U	161	25.0 U	25.0 U	365 D	25.0 U	139 DJ
HO+DRO	35	120.2	17.5 U	504	17.5 U	17.5 U	1179	17.5 U	429
Total Petroleum Hydrocarbons (TPH)[3]	40	122.7	20 U	506.5	20 U	20 U	1202.6	20 U	435.46
Arsenic	4	11	2	10	4	1	3	1	3

Sample Identification (ID)	DB1-A-5-5	DB1-A-5wall-2	DB1-A-6-5	DB1-A-6wall-2.5	DB1-A-7-5	DB1-A-7wall-2.5	DB1-A-8-5	DB1-A-8wall-2.5	DB1-A-9-5
Sample Depth (feet bgs)	5	2	5	2.5	5	2.5	5	2.5	5
Sample Date	9/22/2003	10/6/2003	9/24/2003	9/24/2003	9/24/2003	9/24/2003	10/6/2003	10/6/2003	10/6/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	17.6 J	10.0 U	531 D	23.7 J	60.4	26.8	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	342	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	30.1	17.5 U	873	36.2	72.9	39.3	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	32.6	20 U	875.5	38.7	75.4	41.8	20 U	20 U
Arsenic	1.59 [2.39]	4	2	6	3	7	3	2	2

Sample Identification (ID)	DB1-A-9wall-2.5	DB1-B-10-4	DB1-B-11-4	DB1-B-1-2	DB1-B-12-4	DB1-B-13-4	DB1-B-14-3	DB1-B-15-3	DB1-B-16-3.5
Sample Depth (feet bgs)	2.5	4	4	2	4	4	3	3	3.5
Sample Date	10/6/2003	9/26/2003	9/29/2003	9/12/2003	10/3/2003	10/6/2003	10/6/2003	10/6/2003	10/8/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	60.6	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.9	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	86.5	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	89	20 U	20 U	20 U	20 U	20 U
Arsenic	2	4	3	3	2	3	4	3	5

Sample Identification (ID)	DB1-B-17-4.5	DB1-B-18-3	DB1-B-19-3	DB1-B-20-4	DB1-B-21-4	DB1-B-22-4	DB1-B-2-3	DB1-B-23-0.5	DB1-B-24-1
Sample Depth (feet bgs)	4.5	3	3	4	4	4	3	0.5	1
Sample Date	10/9/2003	9/15/2003	9/15/2003	9/8/2003	9/8/2003	9/8/2003	9/12/2003	8/29/2003	8/29/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.37	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.8	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	56.3	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	47.7	25.0 U
HO+DRO	17.5 U	23.3	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	104	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	25.8	20 U	20 U	20 U	20 U	20 U	106.5	20 U
Arsenic	4	4	2	1.95 [1.86]	3.77 [3.66]	5	3	3	2

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Sample Identification (ID)	DB1-B-25-1.5	DB1-B-26-1	DB1-B-27-1	DB1-B-28-1	DB1-B-29-1.5	DB1-B-30-4	DB1-B-31-6	DB1-B-31wall-3	DB1-B-3-3.5
Sample Depth (feet bgs)	1.5	1	1	1	1.5	4	6	3	3.5
Sample Date	9/5/2003	8/28/2003	8/27/2003	8/27/2003	8/25/2003	8/25/2003	9/4/2003	9/4/2003	9/19/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	28.3	10.0 U	40.1	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	29.8	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	40.8	17.5 U	69.9	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	43.3	20 U	72.4	20 U	20 U	20 U	20 U	20 U	20 U
Arsenic	2	2	2	1	1	3	0.97 [1.11]	2	2

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Sample Identification (ID)	DB1-B-4-4	DB1-B-5-4	DB1-B-6-4	DB1-B-7-4	DB1-B-8-4	DB1-B-9-4	DB1-C-10-4	DB1-C-11-4	DB1-C-1-2
Sample Depth (feet bgs)	4	4	4	4	4	4	4	4	2
Sample Date	9/19/2003	9/22/2003	9/24/2003	9/24/2003	9/25/2003	9/25/2003	9/26/2003	9/29/2003	9/12/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.02743	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.02	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.03	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.02	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.02	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.03	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Arsenic	2	2	2.15 [2.02]	1	3	3	2	2	2

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Sample Identification (ID)	DB1-C-12-3	DB1-C-13-3	DB1-C-14-3	DB1-C-15-3	DB1-C-16-2	DB1-C-17-5	DB1-C-17wall-2	DB1-C-18-2.5	DB1-C-19-1.5
Sample Depth (feet bgs)	3	3	3	3	2	5	2	2.5	1.5
Sample Date	10/3/2003	10/3/2003	10/3/2003	10/3/2003	9/16/2003	9/16/2003	9/16/2003	9/17/2003	9/15/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Arsenic	5	2	3	4	3	4	4	4	2.68 [4.07]

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Sample Identification (ID)	DB1-C-20-4	DB1-C-21-5	DB1-C-22-4	DB1-C-23-1.5	DB1-C-2-4	DB1-C-24-1	DB1-C-25-1	DB1-C-26-1	DB1-C-27-1
Sample Depth (feet bgs)	4	5	4	1.5	4	1	1	1	1
Sample Date	9/8/2003	9/12/2003	9/12/2003	9/5/2003	9/12/2003	8/29/2003	8/28/2003	8/28/2003	8/27/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00766	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	6.66	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	24.16	20 U	20 U
Arsenic	4	1	1	3	4	10	2.19 [2]	2.25 [1.85]	2

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Sample Identification (ID)	DB1-C-28-1	DB1-C-29-4	DB1-C-30-4	DB1-C-31-4	DB1-C-31wall-2	DB1-C-3-4	DB1-C-4-4	DB1-C-5-4	DB1-C-6-4
Sample Depth (feet bgs)	1	4	4	4	2	4	4	4	4
Sample Date	8/27/2003	8/25/2003	8/25/2003	8/25/2003	8/25/2003	9/19/2003	9/19/2003	9/22/2003	9/24/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Arsenic	2	2	1	2	2	3	4	6.07 [4.89]	4

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Sample Identification (ID)	DB1-C-7-4	DB1-C-8-4	DB1-C-9-4	DB1-D-10-4	DB1-D-11-4	DB1-D-12-3	DB1-D-1-3	DB1-D-13-3	DB1-D-14-3
Sample Depth (feet bgs)	4	4	4	4	4	3	3	3	3
Sample Date	9/24/2003	9/25/2003	9/26/2003	9/26/2003	9/29/2003	10/1/2003	9/12/2003	10/1/2003	10/1/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	000694444444444444	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Arsenic	3	10	4	1	3	4.66 [4.46]	3	4	5

Sample Identification (ID)	DB1-D-15-2	DB1-D-16-1.5	DB1-D-17-1	DB1-D-18-1	DB1-D-19-1	DB1-D-20-3	DB1-D-21-3	DB1-D-22-2	DB1-D-23-1
Sample Depth (feet bgs)	2	1.5	1	1	1	3	3	2	1
Sample Date	10/1/2003	9/16/2003	9/16/2003	9/15/2003	9/15/2003	9/8/2003	9/8/2003	9/8/2003	8/29/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.07 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.017375 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	11.6 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	23.1 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	57.8 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	40.45 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	46.25 U	20 U	20 U	20 U	20 U	20 U
Arsenic	4	5	5	7	3	10	6	4.98 [6.28]	2

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Sample Identification (ID)	DB1-D-2-4	DB1-D-24-1	DB1-D-25-1.5	DB1-D-26-1.5	DB1-D-27-1	DB1-D-28-1	DB1-D-29-2	DB1-D-30-3	DB1-D-31-1
Sample Depth (feet bgs)	4	1	1.5	1.5	1	1	2	3	1
Sample Date	9/12/2003	8/29/2003	8/28/2003	8/28/2003	8/27/2003	8/27/2003	8/26/2003	8/25/2003	9/3/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.04	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00868	0.00805	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01	0.01	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	37.3	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	78.2	10.0 U	10.0 U	10.0 U	10.0 U	64.5	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	52.6 U	25.0 U	25.0 U	25.0 U	25.0 U	37.9	25.0 U	25.0 U
HO+DRO	17.5 U	104.5	17.5 U	17.5 U	17.5 U	17.5 U	102.4	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	107	20 U	20 U	20 U	20 U	139.7	20 U	20 U
Arsenic	3	7	8	3	3	3	2	2	3

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Sample Identification (ID)	DB1-D-3-3.5	DB1-D-4-4	DB1-D-5-4	DB1-D-6-4	DB1-D-7-4	DB1-D-8-4	DB1-D-9-4	DB1-D-9-7	DB1-E-10-2.5
Sample Depth (feet bgs)	3.5	4	4	4	4	4	4	7	2.5
Sample Date	9/19/2003	9/19/2003	9/22/2003	9/24/2003	9/24/2003	9/25/2003	10/3/2003	9/25/2003	9/19/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.09 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.0151 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.02117 U
Benzo[a]pyrene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U
Benzo[a]anthracene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U
Chrysene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	10 U	5 U	5 U	5 U	5 U	5 U	14.2 U
Diesel Range Organics (DRO)	10.0 U	14.3	38.3	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	28.3 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	70.8 U
HO+DRO	17.5 U	26.8	50.8	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	49.55 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	29.3	55.8	20 U	20 U	20 U	20 U	20 U	56.65 U
Arsenic	2	4	5	5	3	4	4	2	10

Sample Identification (ID)	DB1-E-11-2	DB1-E-12-2	DB1-E-13-2	DB1-E-1-4	DB1-E-14-1	DB1-E-15-1.5	DB1-E-16-1	DB1-E-17-1	DB1-E-18-1
Sample Depth (feet bgs)	2	2	2	4	1	1.5	1	1	1
Sample Date	9/19/2003	9/19/2003	9/19/2003	9/16/2003	9/16/2003	9/16/2003	9/16/2003	9/16/2003	9/15/2003
VOCs									
Benzene[1]	0.07 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.01659 U	0.01656 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.01529 U	0.00755 U
Benzo[a]pyrene	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Benzo[a]anthracene	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Benzo[b]fluoranthene	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Chrysene	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Dibenz(a,h)anthracene	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	10.9 U	10.7 U	5 U	5 U	5 U	5 U	5 U	10.2 U	5 U
Diesel Range Organics (DRO)	21.8 U	21.5 U	10.0 U	13.3 U	16.9 U	10.0 U	10.0 U	20.4 U	10.0 U
Heavy Oil Organics (HO)	54.4 U	53.7 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	50.9 U	25.0 U
HO+DRO	38.1 U	37.6 U	17.5 U	19.15 U	20.95 U	17.5 U	17.5 U	35.65 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	43.55 U	42.95 U	20 U	21.65 U	23.45 U	20 U	20 U	40.75 U	20 U
Arsenic	4	9	2	1	6	6	10	11.2 [13.5]	6

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Sample Identification (ID)	DB1-E-19-1	DB1-E-20-3	DB1-E-21-2	DB1-E-22-1	DB1-E-2-3	DB1-E-23-2.5	DB1-E-24-1.5	DB1-E-25-1.5	DB1-E-26-1.5
Sample Depth (feet bgs)	1	3	2	1	3	2.5	1.5	1.5	1.5
Sample Date	9/15/2003	9/8/2003	9/8/2003	9/8/2003	9/12/2003	8/29/2003	8/29/2003	8/28/2003	8/28/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00766	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Arsenic	3	7	6	4	2	4	7	5	3

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Sample Identification (ID)	DB1-E-27-1	DB1-E-28-1	DB1-E-29-4	DB1-E-30-3	DB1-E-3-3.5	DB1-E-4-3	DB1-E-5-3	DB1-E-6-3	DB1-E-7-2.5
Sample Depth (feet bgs)	1	1	4	3	3.5	3	3	3	2.5
Sample Date	8/27/2003	8/27/2003	8/26/2003	8/26/2003	9/19/2003	9/19/2003	9/19/2003	9/19/2003	9/19/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.07 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00778	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.01658 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Chrysene	0.01 U	0.03	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	10.8 U	5 U	5 U
Diesel Range Organics (DRO)	14.4 U	22.6 U	10.0 U	10.0 U	10.0 U	10.0 U	21.7 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	54.2 U	25.0 U	25.0 U
HO+DRO	19.7 U	23.8 U	17.5 U	17.5 U	17.5 U	17.5 U	37.95 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	22.2 U	26.3 U	20 U	20 U	20 U	20 U	43.35 U	20 U	20 U
Arsenic	3	3	3	3	3	9	5	3	3

Sample Identification (ID)	DB1-E-8-2.5	DB1-E-9-2.5	DB1-F-10-2	DB1-F-11-2	DB1-F-12-2	DB1-F-13-2	DB1-F-14-1.5	DB1-F-1-5	DB1-F-15-1.5
Sample Depth (feet bgs)	2.5	2.5	2	2	2	2	1.5	5	1.5
Sample Date	9/19/2003	9/19/2003	9/17/2003	9/17/2003	9/17/2003	9/17/2003	9/16/2003	9/16/2003	9/18/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.07 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.01664 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	11.2 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	22.3 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	55.8 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	39.05 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	44.65 U	20 U	20 U	20 U	20 U	20 U
Arsenic	6	7	3	14	3	3.99 [4.75]	8.29 [4.65]	2	5

Sample Identification (ID)	DB1-F-16-1.5	DB1-F-17-1	DB1-F-18-1.5	DB1-F-19-1	DB1-F-1wall-2.5	DB1-F-20-1	DB1-F-21-1.5	DB1-F-22-1	DB1-F-2-3
Sample Depth (feet bgs)	1.5	1	1.5	1	2.5	1	1.5	1	3
Sample Date	9/18/2003	9/16/2003	9/15/2003	9/15/2003	9/16/2003	9/8/2003	9/15/2003	9/8/2003	9/16/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	12.5 U	10.0 U	11.6	10.0 U	14.1	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	18.75 U	17.5 U	24.1	17.5 U	26.6	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	21.25 U	20 U	26.6	20 U	29.1	20 U
Arsenic	4	9	4	4.36 [4.16]	1	11	3	8	2

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Sample Identification (ID)	DB1-F-23-1	DB1-F-24-1	DB1-F-25-1.5	DB1-F-26-1.5	DB1-F-27-1.5	DB1-F-28-1	DB1-F-29-0.5	DB1-F-30-1	DB1-F-3-2.5
Sample Depth (feet bgs)	1	1	1.5	1.5	1.5	1	0.5	1	2.5
Sample Date	8/29/2003	8/29/2003	8/28/2003	9/5/2003	9/5/2003	8/27/2003	8/26/2003	8/26/2003	9/18/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00767	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.02	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	13.2	5 U	5 U	5 U	5 U	6.92	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	101	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	60	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	161	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	174.2	20 U	20 U	20 U	20 U	24.42	20 U
Arsenic	4	6	4	0	3	4	12	4	2

Sample Identification (ID)	DB1-F-4-2	DB1-F-5-2	DB1-F-6-1.5	DB1-F-7-2	DB1-F-8-2	DB1-F-9-2	DB1-G-10-2	DB1-G-11-2	DB1-G-12-2
Sample Depth (feet bgs)	2	2	1.5	2	2	2	2	2	2
Sample Date	9/18/2003	9/18/2003	9/18/2003	9/18/2003	9/18/2003	9/18/2003	9/17/2003	9/17/2003	9/17/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.08 U	0.07 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.018875 U	0.01807 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	12.5 U	11.8 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	25.0 U	23.5 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	62.6 U	58.8 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	43.8 U	41.15 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	50.05 U	47.05 U	20 U
Arsenic	1	2	2	4	3	5	7	7	3

Sample Identification (ID)	DB1-G-13-2	DB1-G-14-1	DB1-G-1-5	DB1-G-15-1	DB1-G-16-1	DB1-G-17-1	DB1-G-18-1	DB1-G-19-1.5	DB1-G-1wall-2.5
Sample Depth (feet bgs)	2	1	5	1	1	1	1	1.5	2.5
Sample Date	9/17/2003	9/16/2003	9/12/2003	9/16/2003	9/16/2003	9/16/2003	9/15/2003	9/17/2003	9/12/2003
VOCs									
Benzene[1]	0.09 U	0.09 U	0.03 U	0.06 U	0.07 U	0.06 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.02266 U	0.02269 U	0.00755 U	0.01513 U	0.017395 U	0.01465 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.03 U	0.03 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.03 U	0.03 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.03 U	0.03 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.03 U	0.03 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U
Chrysene	0.03 U	0.03 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.03 U	0.03 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.03 U	0.03 U	0.01 U	0.02 U	0.02 U	0.02 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	15.1 U	15.2 U	5 U	10.1 U	11.7 U	10.2 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	34.6	30.4 U	10.0 U	20.3 U	29.5	20.5 U	10.0 U	126	10.0 U
Heavy Oil Organics (HO)	75.3 U	75.9 U	25.0 U	50.7 U	58.3 U	51.2 U	25.0 U	74.9	25.0 U
HO+DRO	72.25	53.15 U	17.5 U	35.5 U	58.65	35.85 U	17.5 U	200.9	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	79.8	60.75 U	20 U	40.55 U	64.5	40.95 U	20 U	203.4	20 U
Arsenic	11	11	2	7	9	9.16 [5.66]	3	5	2

Sample Identification (ID)	DB1-G-20-1	DB1-G-21-0.5	DB1-G-22-1	DB1-G-2-3	DB1-G-23-0.5	DB1-G-24-1	DB1-G-25-1.5	DB1-G-26-1.5	DB1-G-27-1
Sample Depth (feet bgs)	1	0.5	1	3	0.5	1	1.5	1.5	1
Sample Date	9/8/2003	9/8/2003	9/15/2003	9/12/2003	8/29/2003	8/29/2003	8/28/2003	8/28/2003	8/27/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00775	0.03828	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00768	0.015815 U	0.00767
Benzo[a]pyrene	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Benzo[a]anthracene	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Chrysene	0.03	0.08 D	0.01 U	0.01 U	0.01 U	0.01 U	0.02	0.02 U	0.02
Dibenz(a,h)anthracene	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.05 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	9.18	10.3 U	10.4
Diesel Range Organics (DRO)	34.4	30.6	10.0 U	10.0 U	10.0 U	10.0 U	14.4	20.6 U	54.4
Heavy Oil Organics (HO)	25.3	25.2	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	51.4 U	31.4
HO+DRO	59.7	55.8	17.5 U	17.5 U	17.5 U	17.5 U	26.9	36 U	85.8
Total Petroleum Hydrocarbons (TPH)[3]	62.2	58.3	20 U	20 U	20 U	20 U	36.08	41.15 U	96.2
Arsenic	6.61 [7.52]	3	6	1	3	4	5	6	5

ARCADIS

Sample Identification (ID)	DB1-G-28-1	DB1-G-29-2.5	DB1-G-30-0.5	DB1-G-3-2	DB1-G-4-2.5	DB1-G-5-3	DB1-G-6-3	DB1-G-7-3	DB1-G-8-3
Sample Depth (feet bgs)	1	2.5	0.5	2	2.5	3	3	3	3
Sample Date	8/27/2003	8/26/2003	8/26/2003	9/12/2003	9/17/2003	9/17/2003	9/17/2003	9/17/2003	9/17/2003
VOCs									
Benzene[1]	0.09 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.07 U	0.07 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.02116 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.01815 U	0.017375 U
Benzo[a]pyrene	0.03 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U
Benzo[a]anthracene	0.03 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U
Benzo[b]fluoranthene	0.03 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.03 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U
Chrysene	0.03 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U
Dibenz(a,h)anthracene	0.03 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U
Indeno(1,2,3-cd)pyrene	0.03 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.02 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	14.1 U	5 U	5 U	5 U	5 U	5 U	5 U	12.2 U	11.5 U
Diesel Range Organics (DRO)	28.2 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	24.3 U	23.1 U
Heavy Oil Organics (HO)	70.5 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	60.8 U	57.7 U
HO+DRO	49.35 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	42.55 U	40.4 U
Total Petroleum Hydrocarbons (TPH)[3]	56.4 U	20 U	20 U	20 U	20 U	20 U	20 U	48.65 U	46.15 U
Arsenic	10	2.46 [3.09]	6.03 [4.81]	3	1	3	5	4	4

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Sample Identification (ID)	DB1-G-9-2	DB1-H-10-4	DB1-H-11-4.5	DB1-H-12-4	DB1-H-13-4	DB1-H-14-3	DB1-H-15-2	DB1-H-16-2	DB1-H-17-4
Sample Depth (feet bgs)	2	4	4.5	4	4	3	2	2	4
Sample Date	9/17/2003	9/8/2003	9/12/2003	9/8/2003	9/8/2003	9/5/2003	9/5/2003	9/5/2003	9/5/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	13.9	10.0 U	10.0 U	27.7	10.8	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	26.4	17.5 U	17.5 U	40.2	23.3	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	28.9	20 U	20 U	42.7	25.8	20 U
Arsenic	4	5	3	4	4	4.2 [4.62]	5	5	3

Sample Identification (ID)	DB1-H-18-5	DB1-H-19-2	DB1-H-20-1.5	DB1-H-20wall-3	DB1-H-21-2	DB1-H-22-5	DB1-H-23-4	DB1-H-24-4	DB1-H-25-3
Sample Depth (feet bgs)	5	2	1.5	3	2	5	4	4	3
Sample Date	9/5/2003	9/4/2003	9/10/2003	9/4/2003	9/2/2003	9/2/2003	8/29/2003	8/29/2003	8/29/2003
VOCs									
Benzene[1]	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.015865 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	10.6 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	21.1 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	11.8	16.7	10.0 U
Heavy Oil Organics (HO)	52.9 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	37 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	24.3	29.2	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	42.3 U	20 U	20 U	20 U	20 U	20 U	26.8	31.7	20 U
Arsenic	4	3	7	5	4	3	2	1	3

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Sample Identification (ID)	DB1-H-26-3	DB1-H-2-7	DB1-H-27-1.5	DB1-H-28-1	DB1-H-29-5	DB1-H-30-5	DB1-H-30wall-1	DB1-H-3-5	DB1-H-4-4
Sample Depth (feet bgs)	3	7	1.5	1	5	5	1	5	4
Sample Date	8/29/2003	9/11/2003	9/5/2003	8/27/2003	8/25/2003	8/25/2003	9/3/2003	9/11/2003	9/11/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	26.5	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.00	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	22.5	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	49	20 U	20 U
Arsenic	5	5	5	2	3	2	7	2	17

Sample Identification (ID)	DB1-H-5-3	DB1-H-6-3	DB1-H-7-4	DB1-H-8-4	DB1-H-9-4	DB1-I-10-5	DB1-I-10wall-2	DB1-I-11-5	DB1-I-12-3
Sample Depth (feet bgs)	3	3	4	4	4	5	2	5	3
Sample Date	9/11/2003	9/11/2003	9/11/2003	9/11/2003	9/8/2003	9/8/2003	9/8/2003	9/8/2003	9/8/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.07 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.017395 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	11.6 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	23.3 U	10.0 U	11.4
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	58.2 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	40.75 U	17.5 U	23.9
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	46.55 U	20 U	26.4
Arsenic	1.5 [1.77]	2	3	4	3	4	14	6	4

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Sample Identification (ID)	DB1-I-13-5	DB1-I-13wall-2	DB1-I-14-3	DB1-I-15-5	DB1-I-15wall-2	DB1-I-16-5	DB1-I-16wall-3	DB1-I-17-4	DB1-I-18-5
Sample Depth (feet bgs)	5	2	3	5	2	5	3	4	5
Sample Date	9/8/2003	9/12/2003	9/5/2003	9/5/2003	9/10/2003	9/5/2003	9/10/2003	9/5/2003	9/4/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.0151 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.02 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Arsenic	3	3	5	2	4	3	5	3	2

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Sample Identification (ID)	DB1-I-18wall-3	DB1-I-19-5	DB1-I-19wall-2	DB1-I-20-5	DB1-I-20wall-2	DB1-I-21-3	DB1-I-22-3	DB1-I-23-2	DB1-I-24-3
Sample Depth (feet bgs)	3	5	2	5	2	3	3	2	3
Sample Date	9/10/2003	9/4/2003	9/4/2003	9/4/2003	9/4/2003	9/2/2003	9/2/2003	8/29/2003	8/29/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.4	10.0 U	10.0 U	10.0 U	30.1	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	22.9	17.5 U	17.5 U	17.5 U	42.6	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	25.4	20 U	20 U	20 U	45.1	20 U	20 U	20 U	20 U
Arsenic	3	2	5	1.83 [1.52]	4	2	8	NA	4

Sample Identification (ID)	DB1-I-25-3	DB1-I-26-1	DB1-I-2-7	DB1-I-27-1	DB1-I-28-1	DB1-I-29-5	DB1-I-2wall-3	DB1-I-30-5	DB1-I-30wall-1
Sample Depth (feet bgs)	3	1	7	1	1	5	3	5	1
Sample Date	8/29/2003	8/29/2003	9/11/2003	8/27/2003	8/27/2003	8/25/2003	9/11/2003	8/25/2003	9/3/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Arsenic	3	3	1	3	3	2	2	2	NA

Sample Identification (ID)	DB1-I-3-5	DB1-I-3wall-2	DB1-I-4-5	DB1-I-4wall-2	DB1-I-5-4	DB1-I-6-5	DB1-I-6wall-2	DB1-I-7-5	DB1-I-7wall-2.5
Sample Depth (feet bgs)	5	2	5	2	4	5	2	5	2.5
Sample Date	9/11/2003	9/11/2003	9/11/2003	9/11/2003	9/11/2003	9/11/2003	9/11/2003	9/16/2003	9/16/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	39.4	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	23.5
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	51.9	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	17.5 U	36
Total Petroleum Hydrocarbons (TPH)[3]	20 U	54.4	20 U	20 U	20 U	20 U	20 U	20 U	38.5
Arsenic	2	2	1	2	2	1	3	3	3

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Sample Identification (ID)	DB1-I-8-1	DB1-I-8wall-3	DB1-I-9-0.5	EX-A1-C-16-7	EX-A1-C-16-NSW-3	EX-A1-C-17-3	EX-A1-D-16-12	EX-A1-D-17-12	EX-A1-D-17-ESW-10
Sample Depth (feet bgs)	1	3	0.5	7	3	3	12	12	10
Sample Date	9/11/2003	9/11/2003	9/8/2003	11/15/2007	11/15/2007	11/15/2007	11/19/2007	11/15/2007	11/15/2007
VOCs									
Benzene[1]	0.03 U	0.03 U	0.09 U	0.0303 U	0.0301 U	0.06	0.0299 U	0.0294 U	0.0272 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.02268 U	NA	0.00892	0.0154	NA	NA	NA
Benzo[a]pyrene	0.01 U	0.01 U	0.03 U	NA	0.0117	0.0122	NA	NA	NA
Benzo[a]anthracene	0.01 U	0.01 U	0.03 U	NA	0.0117	0.0122	NA	NA	NA
Benzo[b]fluoranthene	0.01 U	0.01 U	0.03 U	NA	0.0117	0.0122	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.03 U	NA	0.0117	0.0122	NA	NA	NA
Chrysene	0.01 U	0.01 U	0.03 U	NA	0.0148	0.013	NA	NA	NA
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.03 U	NA	0.0117	0.0122	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.03 U	NA	0.0117	0.0122	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	15.1 U	5.04 U	5.02 U	19.5	4.98 U	4.9 U	4.53 U
Diesel Range Organics (DRO)	35.8	10.0 U	60.1	11.9 U	93.9 Q4	70.6 Q4	12.1 U	12.6 U	11.7 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	75.7 U	29.6 U	165 Q4	123 Q4	30.2 U	31.5 U	29.4 U
HO+DRO	48.3	17.5 U	97.95	20.75 U	258.9	193.6	21.15 U	22.05 U	20.55 U
Total Petroleum Hydrocarbons (TPH)[3]	50.8	20 U	105.5	23.27 U	261.41	213.1	23.64 U	24.5 U	22.815 U
Arsenic	10	4	19	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-A1-D-17-ESW-5	EX-A1-E-15-15	EX-A1-E-16-15	EX-A1-E-17-12	EX-A1-E-17-ESW-4	EX-A1-F-15-15	EX-A1-F-16-15	EX-A1-F-17-12	EX-A1-F-17-3
Sample Depth (feet bgs)	5	15	15	12	4	15	15	12	3
Sample Date	11/15/2007	11/8/2007	11/8/2007	11/14/2007	11/15/2007	11/8/2007	11/8/2007	11/14/2007	10/29/2007
VOCs									
Benzene[1]	0.0316 U	0.0299 U	0.0279 U [0.0311 U]	0.0291 U	0.06	0.0270 U	0.14	0.0301 U	0.0267 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA [NA]	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.26 U	4.98 U	4.65 U [5.18 U]	4.85 U	5.14 U	4.51 U	4.54 U	5.01 U	4.44 U
Diesel Range Organics (DRO)	11.7 U	12.3 U	11.6 U [12.6 U]	12.2 U	12.2 U	12.2 U	12.0 U	12.3 U	11.2 U
Heavy Oil Organics (HO)	29.1 U	30.7 U	29.0 U [31.5 U]	30.4 U	30.6 U	30.4 U	30.1 U	30.8 U	28 U
HO+DRO	20.4 U	21.5 U	20.3 U	21.3 U	21.4 U	21.3 U	21.05 U	21.55 U	19.6 U
Total Petroleum Hydrocarbons (TPH)[3]	23.03 U	23.99 U	22.625 U	23.725 U	23.97 U	23.555 U	23.32 U	24.055 U	21.82 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-A1-F-18-4	EX-A1-F-18-5	EX-A1-G-15-15	EX-A1-G-16-15	EX-A1-G-17-15	EX-A1-H-15-15	EX-A1-H-16-15	EX-A1-H-17-15	EX-A1-I-16-15
Sample Depth (feet bgs)	4	5	15	15	15	15	15	15	15
Sample Date	10/29/2007	11/5/2007	11/8/2007	10/31/2007	10/29/2007	11/8/2007	10/31/2007	10/29/2007	10/31/2007
VOCs									
Benzene[1]	0.0979 [0.0591]	0.0273 U [0.0291 U]	0.0289 U	0.04	0.0291 U	0.0291 U	0.0303 U	0.0298 U [0.0282 U]	0.0285 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0432 [0.0441]	NA [NA]	NA	NA	NA	NA	NA	NA [NA]	NA
Benzo[a]pyrene	0.057	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	0.057	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	0.057	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.057	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	0.0985	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.057	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.057	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	201 JZ [139 JZ]	4.55 U[4.85 U]	4.82 U	4.94 U	4.85 U	4.86 U	5.05 U	4.97 U [4.70 U]	4.74 U
Diesel Range Organics (DRO)	405 Q11 [1,020 Q11]	11.3 U [11.3 U]	11.7 U	11.7 U	12.0 U	12.8 U	11.7 U	12.8 U [12.7 U]	12.5 U
Heavy Oil Organics (HO)	158 [339]	28.2 U [28.3 U]	29.3 U	29.3 U	30.1 U	31.9 U	29.4 U	31.9 U [31.7 U]	31.1 U
HO+DRO	1359	19.75 U	20.5 U	20.5 U	21.05 U	22.35 U	20.55 U	22.2 U	21.8 U
Total Petroleum Hydrocarbons (TPH)[3]	1560	22.025 U	22.91 U	22.97 U	23.475 U	24.78 U	23.075 U	24.55 U	24.17 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-A1-I-17-15	EX-A1-J-16-15	EX-A1-J-17-15	EX-A1-J-19-8	EX-A1-K-17-15	EX-A1-K-18-12	EX-A1-K-18-SSW-3	EX-A1-K-18-SSW-8	EX-A1-K-19-3
Sample Depth (feet bgs)	15	15	15	8	15	12	3	8	3
Sample Date	10/29/2007	10/31/2007	10/29/2007	10/23/2007	10/30/2007	10/23/2007	10/30/2007	10/30/2007	10/30/2007
VOCs									
Benzene[1]	0.0317 U	0.0306 U	**0.0316 U**	0.0312 U	0.0308 U	0.0278 U	0.0282 U	0.0291 U	0.0322 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	**NA**	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.28 U	5.11 U	**5.27 U**	5.19 U	5.13 U	4.63 U	4.7 U	4.86 U	5.36 U
Diesel Range Organics (DRO)	12.7 U	12.7 U	**13.6 U**	12.6 U	12.7 U	11.7 U	10.5 U	11.4 U	11.6 U
Heavy Oil Organics (HO)	31.8 U	31.7 U	**34.0 U**	31.5 U	31.8 U	29.3 U	26.1 U	28.4 U	29 U
HO+DRO	22.25 U	22.2 U	23.8 U	22.05 U	22.25 U	20.5 U	18.3 U	19.9 U	20.3 U
Total Petroleum Hydrocarbons (TPH)[3]	24.89 U	24.755 U	26.435 U	24.645 U	24.815 U	22.815 U	20.65 U	22.33 U	22.98 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-A1-L-17-12	EX-A2-O-10-10	EX-A2-O-11-10	EX-A2-O-12-10	EX-A2-O-13-10	EX-A2-O-9-10	EX-A2-P-10-11	EX-A2-P-11-11	EX-A2-P-12-10
Sample Depth (feet bgs)	12	10	10	10	10	10	11	11	10
Sample Date	11/8/2007	1/28/2008	1/28/2008	1/28/2008	1/28/2008	1/28/2008	1/30/2008	1/30/2008	1/30/2008
VOCs									
Benzene[1]	0.12	0.0299 U	0.0270 U	0.0305 U	0.0351 U	0.369 U [0.344 U]	0.0350 U	0.0301 U	0.0275 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.0239	NA	NA	NA	0.0515 [0.0484]	NA	NA	0.00921
Benzo[a]pyrene	NA	0.0173	NA	NA	NA	0.0676	NA	NA	0.0122
Benzo[a]anthracene	NA	0.015	NA	NA	NA	0.0676	NA	NA	0.0122
Benzo[b]fluoranthene	NA	0.0173	NA	NA	NA	0.0676	NA	NA	0.0122
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0197	NA	NA	NA	0.0676	NA	NA	0.0122
Chrysene	NA	0.0244	NA	NA	NA	0.0767	NA	NA	0.0122
Dibenz(a,h)anthracene	NA	0.0118	NA	NA	NA	0.0676	NA	NA	0.0122
Indeno(1,2,3-cd)pyrene	NA	0.0118	NA	NA	NA	0.0676	NA	NA	0.0122
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.65 U	73.9 JZ	4.5 U	5.08 U	5.85 U	466 JZ [389 JZ]	5.83 U	5.01 U	4.58 U
Diesel Range Organics (DRO)	11.7 U	30.6	11.8 U	13.0 U	12.9 U	149 [371]	12.7 U	11.3 U	17.2 JY
Heavy Oil Organics (HO)	29.4 U	29.3 U	29.6 U	32.5 U	32.3 U	78.5 [91.5]	31.8 U	28.2 U	43.2
HO+DRO	20.55 U	45.25	20.7 U	22.75 U	22.6 U	462.5	22.25 U	19.75 U	60.4
Total Petroleum Hydrocarbons (TPH)[3]	22.875 U	119.15	22.95 U	25.29 U	25.525 U	928.5	25.165 U	22.255 U	62.69
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-A2-P-13-10	EX-A2-P-9-15	EX-A2-Q-10-12	EX-A2-Q-11-12	EX-A2-Q-12-13	EX-A2-Q-9-12	EX-A2-R-10-12	EX-A2-R-11-12	EX-A2-R-12-12
Sample Depth (feet bgs)	10	15	12	12	13	12	12	12	12
Sample Date	1/30/2008	1/30/2008	2/1/2008	2/1/2008	2/1/2008	2/1/2008	2/15/2008	2/15/2008	2/15/2008
VOCs									
Benzene[1]	0.0318 U	0.0289 U	0.0364 U	0.0366 U	0.0324 U	0.0333 U	0.0422 U [0.0375 U]	0.0484 U	0.0380 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA [NA]	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.31 U	4.82 U	6.06 U	6.1 U	5.39 U	5.55 U	7.04 U [6.26 U]	8.06 U	6.34 U
Diesel Range Organics (DRO)	12.9 U	12.0 U	11.9 U	12.2 U	12.2 U	11.8 U	12.8 U [12.1 U]	13.8 U	12.2 U
Heavy Oil Organics (HO)	32.4 U	30.1 U	29.8 U	30.5 U	30.6 U	29.5 U	31.9 U [30.3 U]	34.6 U	30.5 U
HO+DRO	22.65 U	21.05 U	20.85 U	21.35 U	21.4 U	20.65 U	21.2 U	24.2 U	21.35 U
Total Petroleum Hydrocarbons (TPH)[3]	25.305 U	23.46 U	23.88 U	24.4 U	24.095 U	23.425 U	24.33 U	28.23 U	24.52 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-A2-R-13-12	EX-A2-S-12-12	EX-A2-S-13-6	EX-A3-AA-5-10	EX-A3-AA-6-10	EX-A3-AA-7-10	EX-A3-AA-7-ESW-4	EX-A3-BB-6-10	EX-A3-BB-7-10
Sample Depth (feet bgs)	12	12	6	10	10	10	4	10	10
Sample Date	2/22/2008	2/22/2008	2/15/2008	9/26/2007	9/21/2007	9/21/2007	9/20/2007	9/21/2007	9/21/2007
VOCs									
Benzene[1]	0.0433 U	0.0406 U	0.0356 U	0.0290 U	0.0309 U	0.0333 U	0.0307 U	0.0296 U [0.0299 U]	0.07
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	0.00861	NA	NA	NA	NA	NA [NA]	NA
Benzo[a]pyrene	NA	NA	0.0114	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	0.0114	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	0.0114	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	0.0114	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	0.0114	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	0.0114	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	0.0114	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	7.21 U	6.76 U	194 JZ	4.84 U	5.15 U	5.56 U	5.11 U	4.93 U [4.98 U]	5.27 U
Diesel Range Organics (DRO)	13.2 U	12.8 U	683	12.3 U	10.9 U	12.5 U	12.7 U	12.7 U [13.0 U]	11.9 U
Heavy Oil Organics (HO)	33.0 U	32.0 U	54.8 Q7	30.7 U	27.1 U	31.3 U	31.8 U	31.7 U [32.6 U]	29.7 U
HO+DRO	23.1 U	22.4 U	737.8	21.5 U	19 U	21.9 U	22.25 U	22.2 U	20.8 U
Total Petroleum Hydrocarbons (TPH)[3]	26.705 U	25.78 U	931.8	23.92 U	21.575 U	24.68 U	24.805 U	24.665 U	23.435 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-A3-BB-7-ESW-4	EX-A3-CC-6-10	EX-A3-CC-7-10	EX-A3-CC-7-ESW-4	EX-A3-DD-6-10	EX-A3-Y-4-8	EX-A3-Y-4-NSW-4	EX-A3-Y-4-WSW-4	EX-A3-Y-5-8
Sample Depth (feet bgs)	4	10	10	4	10	8	4	4	8
Sample Date	9/21/2007	10/1/2007	10/1/2007	10/2/2007	10/2/2007	9/21/2007	9/20/2007	9/20/2007	9/21/2007
VOCs									
Benzene[1]	0.16	2.76	1.21 [1.73]	0.11	0.09	0.0214 U	0.0267 U	0.0114 U	0.0275 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00997	NA	NA [NA]	0.00876	NA	NA	0.00868	NA	NA
Benzo[a]pyrene	0.0132	NA	NA	0.0116	NA	NA	0.0115	NA	NA
Benzo[a]anthracene	0.0132	NA	NA	0.0116	NA	NA	0.0115	NA	NA
Benzo[b]fluoranthene	0.0132	NA	NA	0.0116	NA	NA	0.0115	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0132	NA	NA	0.0116	NA	NA	0.0115	NA	NA
Chrysene	0.0132	NA	NA	0.0116	NA	NA	0.0115	NA	NA
Dibenz(a,h)anthracene	0.0132	NA	NA	0.0116	NA	NA	0.0115	NA	NA
Indeno(1,2,3-cd)pyrene	0.0132	NA	NA	0.0116	NA	NA	0.0115	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	88	7.09 J	6.71 U [5.90]	25.8	5.34 U	3.57 U	8.24 JZ	1.9 U	4.58 U
Diesel Range Organics (DRO)	18.9	12.3 U	12.1 U [12.1 U]	85.6 Q4	11.9 U	10.4 U	169	10.4 U	10.3 U
Heavy Oil Organics (HO)	32.6 U	30.9 U	30.3 U [30.3 U]	44.7 Q4	29.6 U	25.9 U	140	25.9 U	25.9 U
HO+DRO	35.2	21.6 U	21.2 U	130.3	20.75 U	18.15 U	309	18.15 U	18.1 U
Total Petroleum Hydrocarbons (TPH)[3]	123.2	28.69	27.1 U	156.1	23.42 U	19.935 U	317.24	19.1 U	20.39 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-A3-Y-5-NSW-4	EX-A3-Y-6-10	EX-A3-Y-6-NSW-4	EX-A3-Z-4-10	EX-A3-Z-5-10	EX-A3-Z-6-10	EX-A3-Z-7-10	EX-A3-Z-7-ESW-4	EX-A4-F-9-9
Sample Depth (feet bgs)	4	10	4	10	10	10	10	4	9
Sample Date	9/20/2007	9/25/2007	9/20/2007	9/21/2007	9/21/2007	9/21/2007	9/21/2007	9/20/2007	10/17/2007
VOCs									
Benzene[1]	0.0498 U	0.387	0.0232 U	0.03	0.0275 U	0.19	0.05	0.0207 U	0.06
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00880	NA	0.00793	NA	NA	0.00944	NA	NA	NA
Benzo[a]pyrene	0.0115	NA	0.0105	NA	NA	0.0125	NA	NA	NA
Benzo[a]anthracene	0.0115	NA	0.0105	NA	NA	0.0125	NA	NA	NA
Benzo[b]fluoranthene	0.0115	NA	0.0105	NA	NA	0.0125	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0115	NA	0.0105	NA	NA	0.0125	NA	NA	NA
Chrysene	0.0173	NA	0.0105	NA	NA	0.0125	NA	NA	NA
Dibenz(a,h)anthracene	0.0115	NA	0.0105	NA	NA	0.0125	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.0115	NA	0.0105	NA	NA	0.0125	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	19.4 JZ	5.25	27.7 JZ	5.83	4.59 U	5.2 U	4.4 U	3.45 U	20.1
Diesel Range Organics (DRO)	111	12.2 U	37.4	11.4 U	11.6 U	18.8	11.1 U	10.6 U	11.9 U
Heavy Oil Organics (HO)	122	30.5 U	41.0	28.4 U	29.1 U	32.0 U	27.8 U	26.4 U	29.7 U
HO+DRO	233	21.35 U	78.4	19.9 U	20.35 U	34.8	19.45 U	18.5 U	20.8 U
Total Petroleum Hydrocarbons (TPH)[3]	252.4	26.6	106.1	25.73	22.645 U	37.4	21.65 U	20.225 U	40.9
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-A4-F-9-ESW-4	EX-A4-G-6-9	EX-A4-G-7-9	EX-A4-G-8-9	EX-A4-G-9-9	EX-A4-G-9-ESW-4	EX-A4-H-6-9	EX-A4-H-7-9	EX-A4-H-8-4
Sample Depth (feet bgs)	4	9	9	9	9	4	9	9	4
Sample Date	10/17/2007	10/1/2007	9/27/2007	9/27/2007	10/17/2007	10/17/2007	9/27/2007	9/27/2007	9/12/2007
VOCs									
Benzene[1]	0.0349 U	0.0307 U	0.0295 U	0.0311 U	0.0295 U	0.0290 U [0.0283 U]	0.0269 U [0.0295 U]	0.0318 U	0.0286 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0100	NA	NA	NA	NA	0.00853 [0.00868]	NA [NA]	NA	0.0858
Benzo[a]pyrene	0.0133	NA	NA	NA	NA	0.0113	NA	NA	0.111
Benzo[a]anthracene	0.0133	NA	NA	NA	NA	0.0113	NA	NA	0.111
Benzo[b]fluoranthene	0.0133	NA	NA	NA	NA	0.0113	NA	NA	0.111
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0133	NA	NA	NA	NA	0.0113	NA	NA	0.111
Chrysene	0.0133	NA	NA	NA	NA	0.0113	NA	NA	0.251
Dibenz(a,h)anthracene	0.0133	NA	NA	NA	NA	0.0113	NA	NA	0.111
Indeno(1,2,3-cd)pyrene	0.0133	NA	NA	NA	NA	0.0113	NA	NA	0.111
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.81 U	5.12 U	4.92 U	5.19 U	4.92 U	9.59 JZ [4.72 U]	4.48 U [4.91 U]	5.3 U	19.6 JZ
Diesel Range Organics (DRO)	17.3 Q12	12.7 U	12.7 U	11.7 U	12.5 U	41.4 [33.5]	12.6 U [12.4 U]	12.9 U	1,250 JQ4
Heavy Oil Organics (HO)	33.3 U	31.8 U	31.7 U	29.2 U	31.1 U	36.0 [32.7]	31.5 U [31.1 U]	32.3 U	788 JQ4
HO+DRO	33.95	22.25 U	22.2 U	20.45 U	21.8 U	77.4	21.75 U	22.6 U	2038
Total Petroleum Hydrocarbons (TPH)[3]	36.855	24.81 U	24.66 U	23.045 U	24.26 U	86.99	23.99 U	25.25 U	2057.6
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-A4-H-8-9	EX-A4-H-9-9	EX-A4-H-9-ESW-4	EX-A4-I-6-9	EX-A4-I-7-9	EX-A4-I-8-9	EX-A4-J-6-9	EX-A4-J-6-SSW-9	EX-A4-J-7-9
Sample Depth (feet bgs)	9	9	4	9	9	9	9	9	9
Sample Date	9/27/2007	10/17/2007	10/17/2007	9/21/2007	10/16/2007	10/16/2007	9/21/2007	9/21/2007	9/21/2007
VOCs									
Benzene[1]	0.09	0.32	0.0273 U	0.0565 U	0.0372 U	0.0396 U	0.0288 U	0.0304 U	0.0299 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	0.00861	NA	NA	NA	NA	0.0383	NA
Benzo[a]pyrene	NA	NA	0.0114	NA	NA	NA	NA	0.0507	NA
Benzo[a]anthracene	NA	NA	0.0114	NA	NA	NA	NA	0.0507	NA
Benzo[b]fluoranthene	NA	NA	0.0114	NA	NA	NA	NA	0.0507	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	0.0114	NA	NA	NA	NA	0.0507	NA
Chrysene	NA	NA	0.0114	NA	NA	NA	NA	0.0507	NA
Dibenz(a,h)anthracene	NA	NA	0.0114	NA	NA	NA	NA	0.0507	NA
Indeno(1,2,3-cd)pyrene	NA	NA	0.0114	NA	NA	NA	NA	0.0507	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.99 U	7.36 U	4.55 U	9.42 U	6.2 U	6.6 U	4.79 U	22.1	4.98 U
Diesel Range Organics (DRO)	12.3 U	16.8 U	203	19.9 U	12.1 U	12.1 U	12.1 U	111 Q4	12.2 U
Heavy Oil Organics (HO)	30.8 U	42.0 U	50.3	49.7 U	30.2 U	30.2 U	30.4 U	105 Q4	30.4 U
HO+DRO	21.55 U	29.4 U	253.3	34.8 U	21.15 U	21.15 U	21.25 U	216	21.3 U
Total Petroleum Hydrocarbons (TPH)[3]	24.045 U	33.08 U	255.575	39.51 U	24.25 U	24.45 U	23.645 U	238.1	23.79 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-A4-J-7-SSW-4	EX-A4-J-8-9	EX-A4-K-8-9	EX-AW-E-23-5(2)	EX-AW-E-24-10	EX-AW-E-24-NSW-5	EX-AW-E-25-10	EX-AW-E-25-ESW-5	EX-AW-E-25-NSW-5
Sample Depth (feet bgs)	4	9	9	5	10	5	10	5	5
Sample Date	9/21/2007	10/16/2007	10/16/2007	9/17/2008	9/11/2008	9/11/2008	9/11/2008	9/11/2008	9/11/2008
VOCs									
Benzene[1]	0.0342 U	0.0340 U	0.0367 U	0.0363 U	0.0354 U	0.0363 U	0.0405 U	0.0327 U [0.0339 U]	0.0373 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0388	NA	NA	NA	0.00891	0.00892	0.00982	0.00846 [0.00838]	0.00898
Benzo[a]pyrene	0.0514	NA	NA	NA	0.0118	0.0116	0.013	0.0112	0.0119
Benzo[a]anthracene	0.0514	NA	NA	NA	0.0118	0.0116	0.013	0.0112	0.0119
Benzo[b]fluoranthene	0.0514	NA	NA	NA	0.0118	0.0116	0.013	0.0112	0.0119
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0514	NA	NA	NA	0.0118	0.0116	0.013	0.0112	0.0119
Chrysene	0.0514	NA	NA	NA	0.0118	0.022	0.013	0.0112	0.0119
Dibenz(a,h)anthracene	0.0514	NA	NA	NA	0.0118	0.0116	0.013	0.0112	0.0119
Indeno(1,2,3-cd)pyrene	0.0514	NA	NA	NA	0.0118	0.0116	0.013	0.0112	0.0119
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.69 U	5.66 U	6.12 U	6.05 U	5.9 U	30 JZ	6.75 U	75.2 JZ [171 JZ]	6.21 U
Diesel Range Organics (DRO)	119 Q4	11.9 U	12.3 U	11.9 U	28.1	357	102	18.4 [24.6]	16.1
Heavy Oil Organics (HO)	119 Q4	29.8 U	30.8 U	29.7 U	29.0 U	134	32.8 U	28.2 U [27.5 U]	29.7 U
HO+DRO	238	20.85 U	21.55 U	20.8 U	42.6	491	118.4	38.35	30.95
Total Petroleum Hydrocarbons (TPH)[3]	240.845	23.68 U	24.61 U	23.825 U	45.55	521	121.775	209.35	34.055
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-AW-F-23-5(2)	EX-AW-F-24-5	EX-AW-F-25-5	EX-AW-F-25-ESW-5	EX-B10-N-6-10	EX-B10-O-6-10	EX-B10-O-7-12	EX-B10-O-8-12	EX-B10-P-6-10
Sample Depth (feet bgs)	5	5	5	5	10	10	12	12	10
Sample Date	9/12/2008	9/11/2008	9/11/2008	9/11/2008	2/8/2008	2/8/2008	1/16/2008	1/16/2008	2/8/2008
VOCs									
Benzene[1]	0.0339 U	0.0345 U	0.0277 U	0.0372 U	0.0361 U	0.0352 U	0.0302 U [0.0330 U]	0.0316 U	0.0400 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	0.0181	0.00846	NA	NA	NA [NA]	NA	NA
Benzo[a]pyrene	NA	NA	0.0154	0.0112	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	0.0105	0.0112	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	0.0105	0.0112	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	0.0105	0.0112	NA	NA	NA	NA	NA
Chrysene	NA	NA	0.0105	0.0112	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	0.0105	0.0112	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	0.0105	0.0112	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.65 U	12	6.68 JZ	6.2 U	6.01 U	5.86 U	5.03 U [5.50 U]	5.27 U	8.23
Diesel Range Organics (DRO)	11.6 U	10.9 U	58.1	62.6	12.4 U	12.3 U	12.2 U [13.3 U]	12.7 U	12.6 U
Heavy Oil Organics (HO)	29.1 U	27.3 U	71.8	27.9 U	31.1 U	30.8 U	30.5 U [33.3 U]	31.8 U	31.6 U
HO+DRO	20.35 U	19.1 U	129.9	76.55	21.75 U	21.55 U	21.35 U	22.25 U	22.1 U
Total Petroleum Hydrocarbons (TPH)[3]	23.175 U	31.1	136.58	79.65	24.755 U	24.48 U	23.865 U	24.885 U	30.33
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B10-P-7-15	EX-B10-P-8-15	EX-B10-Q-6-11	EX-B10-Q-7-15	EX-B11-Q-8-14	EX-B11-R-6-5	EX-B11-R-7-12	EX-B11-R-8-12	EX-B11-R-9-12
Sample Depth (feet bgs)	15	15	11	15	14	5	12	12	12
Sample Date	1/30/2008	1/30/2008	2/8/2008	1/30/2008	1/30/2008	2/8/2008	1/22/2008	1/30/2008	2/12/2008
VOCs									
Benzene[1]	0.0328 U	0.0322 U	0.0343 U	0.0309 U	0.0306 U [0.0317]	0.0346 U [0.0340 U]	0.03	0.03	0.06
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	0.00891 [NA]	0.0224 [0.0258]	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	0.0118	0.0164	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	0.0118	0.0112	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	0.0118	0.019	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	0.0118	0.019	NA	NA	NA
Chrysene	NA	NA	NA	NA	0.0118	0.0566	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.0118	0.0112	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.0118	0.0112	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	9.68	5.36 U	5.73	5.16 U	5.8 [4.96 U]	56.8 JZ [168 JZ]	5.09 U	13.9	5.55 U
Diesel Range Organics (DRO)	13.2 U	12.2 U	12.8 U	12.5 U	20.1 JY [11.8 U]	1,510 [1,310]	12.0 U	11.8 U	11.7 U
Heavy Oil Organics (HO)	32.9 U	30.5 U	32.1 U	31.3 U	29.7 U [29.5 U]	296 [265]	30.0 U	29.6 U	29.3 U
HO+DRO	23.05 U	21.35 U	22.45 U	21.9 U	34.85	1806	21 U	20.7 U	20.5 U
Total Petroleum Hydrocarbons (TPH)[3]	32.73	24.03 U	28.18	24.48 U	40.65	1974	23.545 U	34.6	23.275 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B11-S-10-2	EX-B11-S-11-12	EX-B11-S-7-12	EX-B11-S-7-WSW-5	EX-B11-S-8-12	EX-B11-S-9-12	EX-B11-T-10-10	EX-B11-T-11-12	EX-B11-T-11-ESW-6
Sample Depth (feet bgs)	2	12	12	5	12	12	10	12	6
Sample Date	2/15/2008	2/14/2008	1/22/2008	1/18/2008	1/30/2008	2/12/2008	2/14/2008	2/14/2008	2/15/2008
VOCs									
Benzene[1]	0.0408 U	0.0398 U	0.04	0.0290 U	0.0287 U	0.04	0.0342 U	0.0306 U	0.0382 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	0.00929	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	6.8 U	6.63 U	6.08	4.83 U	8.58	38.7 JZ	5.7 U	5.1 U	6.37 U
Diesel Range Organics (DRO)	12.7 U	12.3 U	12.1 U	10.9 U	12.1 U	67.6	12.3 U	11.7 U	12.5 U
Heavy Oil Organics (HO)	31.8 U	30.7 U	30.2 U	27.2 U	30.2 U	31.1 U	30.6 U	29.2 U	31.4 U
HO+DRO	22.25 U	21.5 U	21.15 U	19.05 U	21.15 U	83.15	21.45 U	20.45 U	21.95 U
Total Petroleum Hydrocarbons (TPH)[3]	25.65 U	24.815 U	27.23	21.465 U	29.73	121.85	24.3 U	23 U	25.135 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-B11-T-7-12	EX-B11-T-7-WSW-5	EX-B11-T-8-12	EX-B11-T-9-12	EX-B11-U-11-5	EX-B11-U-7-5	EX-B13-AA-2-10	EX-B13-AA-2-NSW-4	EX-B13-AA-2-WSW-4
Sample Depth (feet bgs)	12	5	12	12	5	5	10	4	4
Sample Date	1/22/2008	1/18/2008	1/30/2008	2/12/2008	2/12/2008	1/18/2008	9/26/2007	9/19/2007	9/19/2007
VOCs									
Benzene[1]	0.03	0.0290 U	0.23	0.19	0.0429 U	0.0290 U	0.03	0.0306 U	0.0303 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00891	NA	NA	NA	0.0260	NA	NA	0.0126	NA
Benzo[a]pyrene	0.0118	NA	NA	NA	0.0222	NA	NA	0.0106	NA
Benzo[a]anthracene	0.0118	NA	NA	NA	0.0128	NA	NA	0.0106	NA
Benzo[b]fluoranthene	0.0118	NA	NA	NA	0.0128	NA	NA	0.0106	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0118	NA	NA	NA	0.0128	NA	NA	0.0166	NA
Chrysene	0.0118	NA	NA	NA	0.0631	NA	NA	0.0116	NA
Dibenz(a,h)anthracene	0.0118	NA	NA	NA	0.0128	NA	NA	0.0113	NA
Indeno(1,2,3-cd)pyrene	0.0118	NA	NA	NA	0.0128	NA	NA	0.0279	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	48.4 JZ	9.95 JZ	6.5	6.36 U	8.8 JZ	4.84 U	12.8	5.11 U	5.05 U
Diesel Range Organics (DRO)	52.3	10.9 U	11.9 U	12.5 U	423 Q4	11.0 U	12.5 U	35.2	11.0 U
Heavy Oil Organics (HO)	29.6 U	27.2 U	29.9 U	31.4 U	131 Q4	27.5 U	31.1 U	101	27.5 U
HO+DRO	67.1	19.05 U	20.9 U	21.95 U	554	19.25 U	21.8 U	136.2	19.25 U
Total Petroleum Hydrocarbons (TPH)[3]	115.5	29	27.4	25.13 U	562.8	21.67 U	34.6	138.755	21.775 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B13-AA-3-10	EX-B13-AA-3-NSW-4	EX-B13-AA-4-10	EX-B13-BB-2-10	EX-B13-BB-2-WSW-4	EX-B13-BB-3-10	EX-B13-BB-4-10	EX-B13-BB-5-10	EX-B13-CC-1-4
Sample Depth (feet bgs)	10	4	10	10	4	10	10	10	4
Sample Date	9/26/2007	9/19/2007	9/26/2007	9/25/2007	9/19/2007	9/25/2007	9/25/2007	9/27/2007	10/10/2007
VOCs									
Benzene[1]	0.0322 U	0.0265 U	0.0313 U	0.0336 U	0.48	0.0281 U [0.0319 U]	0.0283 U	0.0295 U	0.0432 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	0.0335	NA [NA]	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	0.044	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	0.044	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	0.044	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	0.044	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	0.0464	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.044	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.044	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.37 U	4.41 U	5.22 U	5.6 U	774 JZ	4.98 U [5.32 U]	4.72 U	4.91 U	20.2
Diesel Range Organics (DRO)	12.9 U	10.5 U	11.7 U	11.8 U	1030 J	10.7 U [11.5 U]	12.7 U	11.4 U	18.4 U
Heavy Oil Organics (HO)	32.2 U	26.2 U	29.2 U	29.5 U	105 J	26.7 U [28.8 U]	31.8 U	28.5 U	45.9 U
HO+DRO	22.55 U	18.35 U	20.45 U	20.65 U	1135	18.7 U	22.25 U	19.95 U	32.15 U
Total Petroleum Hydrocarbons (TPH)[3]	25.235 U	20.555 U	23.06 U	23.45 U	1909	21.19 U	24.61 U	22.405 U	52.35
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B13-CC-2-10	EX-B13-CC-3-10	EX-B13-CC-4-10	EX-B13-CC-5-10	EX-B13-DD-1-4	EX-B13-DD-2-10	EX-B13-DD-3-10	EX-B13-DD-4-10	EX-B13-DD-5-10
Sample Depth (feet bgs)	10	10	10	10	4	10	10	10	10
Sample Date	10/8/2007	9/27/2007	9/27/2007	9/27/2007	10/8/2007	10/8/2007	10/2/2007	10/2/2007	10/2/2007
VOCs									
Benzene[1]	0.0278 U	0.0285 U	0.0279 U	0.0299 U	0.0408 U	0.0291 U	0.0279 U	0.17	0.06
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.63 U	4.75 U	4.65 U	4.98 U	6.79 U	4.84 U	4.65 U	4.61	4.51 U
Diesel Range Organics (DRO)	11.3 U	12.1 U	12.0 U	12.5 U	14.7 U	11.8 U	11.1 U	11.7 U	11.6 U
Heavy Oil Organics (HO)	28.1 U	30.2 U	30.1 U	31.2 U	36.7 U	29.5 U	27.8 U	29.1 U	28.9 U
HO+DRO	19.7 U	21.15 U	21.05 U	21.85 U	25.7 U	20.65 U	19.45 U	20.4 U	20.25 U
Total Petroleum Hydrocarbons (TPH)[3]	22.015 U	23.525 U	23.375 U	24.34 U	29.095 U	23.07 U	21.775 U	25.01	22.505 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B13-EE-1-4	EX-B13-EE-2-10	EX-B13-EE-3-10	EX-B13-EE-3-SSW-4	EX-B13-EE-4-10	EX-B13-EE-4-SSW-4	EX-B13-FF-2-4	EX-B13-FF-3-10	EX-B13-FF-3-ESW-4
Sample Depth (feet bgs)	4	10	10	4	10	4	4	10	4
Sample Date	10/8/2007	10/8/2007	10/5/2007	10/5/2007	10/5/2007	10/5/2007	10/9/2007	10/9/2007	10/9/2007
VOCs									
Benzene[1]	0.0283 U	0.0272 U	0.0298 U	0.05	0.0296 U [0.0292 U]	0.0314 U	0.0302 U	0.04	0.0289 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA [NA]	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.72 U	4.53 U	4.96 U	6.85	4.94 U [4.87 U]	5.23 U	5.04 U	8.17	4.81 U
Diesel Range Organics (DRO)	12.2 U	11.6 U	11.5 U	12.2 U	11.7 U [11.1 U]	12.6 U	12.8 U	11.7 U	12.7 U
Heavy Oil Organics (HO)	30.4 U	28.9 U	28.8 U	30.6 U	29.3 U [27.8 U]	31.5 U	32.0 U	29.4 U	31.8 U
HO+DRO	21.3 U	20.25 U	20.15 U	21.4 U	19.45 U	22.05 U	22.4 U	20.55 U	22.25 U
Total Petroleum Hydrocarbons (TPH)[3]	23.66 U	22.515 U	22.63 U	28.25	21.885 U	24.665 U	24.92 U	28.72	24.655 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-B13-GG-3-4	EX-B14-DD-7-2.5	EX-B14-DD-8-6	EX-B14-DD-NSW-2.5	EX-B14-EE-5-4	EX-B14-EE-6-8	EX-B14-EE-7-8	EX-B14-EE-8-4	EX-B14-FF-6-4
Sample Depth (feet bgs)	4	2.5	6	2.5	4	8	8	4	4
Sample Date	10/9/2007	8/23/2007	9/4/2007	8/23/2007	9/10/2007	9/10/2007	8/23/2007	8/23/2007	9/7/2007
VOCs									
Benzene[1]	0.14	1.85	0.0999 [0.0912]	0.0885 J [1.32 J]	0.40	0.24	0.0581 U	0.26	0.21
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.0121	0.00945 [0.00929]	0.0112 [0.0244]	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	0.0132	0.0123	0.0121	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	0.0132	0.0123	0.0121	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	0.0132	0.0123	0.0121	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0132	0.0123	0.0121	NA	NA	NA	NA	NA
Chrysene	NA	0.0132	0.022	0.0121	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	0.0193	0.0123	0.018	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	0.0157	0.0123	0.015	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.62 U	70.6	13.9 [11.9]	25 [72.9 JZ]	445 JZ	5.41 U	9.68 U	4.9 U	5.57
Diesel Range Organics (DRO)	12.9 U	151	70.8 JQ4 [28.3 JQ4]	157 Q4 [188]	12.1 U	11.7 U	17.9 U	12.7 U	12.6 U
Heavy Oil Organics (HO)	32.2 U	82.0	75.1 JQ4 [30.9 UQ4]	83.6 Q4 [88.7]	30.3 U	29.2 U	44.7 U	31.7 U	31.4 U
HO+DRO	22.55 U	233	145.9	276.7	21.2 U	20.45 U	31.3 U	22.2 U	22 U
Total Petroleum Hydrocarbons (TPH)[3]	24.86 U	303.6	159.8	349.6	466.2	23.155 U	36.14 U	24.65 U	27.57
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B14-FF-7-8	EX-B14-FF-8-4SW	EX-B14-FF-WSW-4	EX-B14-GG-7-8	EX-B14-GG-WSW-4	EX-B14-HH-6-4	EX-B14-HH-6F	EX-B14-HH-7-4SW	EX-B15-HH-2-4
Sample Depth (feet bgs)	8	4	4	8	4	4	6	4	4
Sample Date	8/23/2007	8/22/2007	8/23/2007	8/23/2007	8/23/2007	8/23/2007	8/23/2007	8/23/2007	8/28/2007
VOCs									
Benzene[1]	0.0763 U	0.0505 U	0.10	0.0266 U	0.0275 U	0.0302 U [0.0285 U]	0.0260 U	0.0277 U	0.09
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.0119	0.0107	NA	0.0218	0.0107 [0.0107]	0.0110	0.0117	NA
Benzo[a]pyrene	NA	0.0157	0.0115	NA	0.0228	0.0115	0.0121	0.0118	NA
Benzo[a]anthracene	NA	0.0157	0.0115	NA	0.0228	0.0115	0.0121	0.0118	NA
Benzo[b]fluoranthene	NA	0.0157	0.0115	NA	0.0228	0.0115	0.0121	0.0118	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0157	0.0115	NA	0.0228	0.0115	0.0121	0.0118	NA
Chrysene	NA	0.0157	0.0115	NA	0.0653	0.0115	0.0121	0.0118	NA
Dibenz(a,h)anthracene	NA	0.0157	0.0173	NA	0.0353	0.0171	0.0167	0.0214	NA
Indeno(1,2,3-cd)pyrene	NA	0.0157	0.0145	NA	0.0281	0.0141	0.0141	0.018	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	12.7 U	8.41 U	16.3	4.44 U	8.72	5.04 U [4.75 U]	4.33 U	9.66 JZ	5.63 U
Diesel Range Organics (DRO)	20.1 U	523	64.2	12.1 U	428 Q4	40.1 Q4 [44.6 Q4]	38.3 Q12	29.1 JY	13.2 U
Heavy Oil Organics (HO)	50.3 U	144	34.6	30.4 U	138 Q4	80.6 Q4 [90.5 Q4]	29.4 U	29.5 U	33.0 U
HO+DRO	35.2 U	667	98.8	21.25 U	566	135.1	53	43.85	23.1 U
Total Petroleum Hydrocarbons (TPH)[3]	41.55 U	671.205	115.1	23.47 U	574.72	137.475	55.165	53.51	25.915 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B15-HH-3-ESW-4	EX-B15-HH-3-NSW-4	EX-B15-II-2-8	EX-B15-II-2-WSW-4	EX-B15-II-3-8	EX-B15-II-4-ESW-4	EX-B16-MM-1-6SW	EX-B17-RR-1-6SW	EX-B17-SS-1-6SW
Sample Depth (feet bgs)	4	4	8	4	8	4	6	6	6
Sample Date	8/28/2007	8/28/2007	8/28/2007	8/28/2007	8/28/2007	8/28/2007	8/20/2007	8/20/2007	8/20/2007
VOCs									
Benzene[1]	0.0319 U	0.36	0.06	1.10	0.0264 U	0.0316 U	0.305 U	0.0488 U	0.0270 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	0.0115	0.00911	0.0113	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.0125	0.0117	0.015	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	0.0203	0.0117	0.015	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	0.0125	0.0117	0.015	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	0.0125	0.0117	0.015	NA
Chrysene	NA	NA	NA	NA	NA	0.0329	0.014	0.015	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	0.02	0.0155	0.015	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	0.0152	0.0131	0.015	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.32 U	5.39 U	12.6	29.2 U	4.4 U	209 JZ	293 JZ	8.14 U	4.5 U
Diesel Range Organics (DRO)	11.9 U	13.0 U	15.4 U	12.9 U	11.6 U	676	656	51.2 JY	12.0 U
Heavy Oil Organics (HO)	29.8 U	32.4 U	38.4 U	32.4 U	29.1 U	153	78.3 Q7	72.5 J	30.1 U
HO+DRO	20.85 U	22.7 U	26.9 U	22.65 U	20.35 U	829	734.3	123.7	21.05 U
Total Petroleum Hydrocarbons (TPH)[3]	23.51 U	25.395 U	39.5	37.25 U	22.55 U	1038	1027.3	127.77	23.3 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-B18-UU-1-6SW	EX-B18-VV-1-6SW	EX-B1-C-46-4(2)	EX-B1-C-47-4	EX-B1-D-43-4	EX-B1-D-44-12	EX-B1-D-44-NSW-4(2	EX-B1-D-45-12	EX-B1-D-45-NSW-4
Sample Depth (feet bgs)	6	6	4	4	4	12	4	12	4
Sample Date	8/17/2007	8/17/2007	9/2/2008	8/8/2008	8/19/2008	8/18/2008	9/2/2008	8/14/2008	9/2/2008
VOCs									
Benzene[1]	0.290 U [0.288 U]	1.56 U	0.0302 U	0.0309 U	4.39	0.121 U	0.05	0.224 [0.0598 U]	0.0316 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0435 [0.0103]	0.0457	NA	0.0414 U	NA	0.0369 U	0.0188	NA [NA]	0.0152
Benzo[a]pyrene	0.0576	0.0605	0.0113	0.0549	NA	0.0489	0.0149	NA	0.0122
Benzo[a]anthracene	0.0576	0.0605	0.0112	0.0549	NA	0.0489	0.0157	NA	0.0116
Benzo[b]fluoranthene	0.0576	0.0605	0.0112	0.0549	NA	0.0489	0.0113	NA	0.0116
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0576	0.0605	0.0112	0.0549	NA	0.0489	0.0113	NA	0.0116
Chrysene	0.0576	0.0605	0.0112	0.0549	NA	0.0489	0.0113	NA	0.0116
Dibenz(a,h)anthracene	0.0576	0.0605	0.0112	0.0549	NA	0.0489	0.0113	NA	0.0116
Indeno(1,2,3-cd)pyrene	0.0576	0.0605	0.0112	0.0549	NA	0.0489	0.0113	NA	0.0116
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	693 JZ [611 JZ]	2150 JZ	5.03 U	51.8 JZ	2000 J	20.2 U	32.6	76.1 JZ [9.96 UJ]	28.8 JY
Diesel Range Organics (DRO)	1140 J [376 J]	2670 J	46.8 JY	236	11.6 U	25.6	101	14.6 U [15.4 U]	5.26 U
Heavy Oil Organics (HO)	146 U [58.5 U]	312 U	92.7	123	29 U	60.3 U	153	36.4 U [38.5 U]	69.0
HO+DRO	1169.25	2826	139.5	359	20.3 U	55.75	254	25.5 U	71.63
Total Petroleum Hydrocarbons (TPH)[3]	1862.25	4976	142.015	410.8	2020.3	65.85	286.6	101.6	100.43
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-B1-D-46-12	EX-B1-D-47-4	EX-B1-E-41-8	EX-B1-E-41-NSW-4	EX-B1-E-42-8	EX-B1-E-42-NSW-4	EX-B1-E-43-12	EX-B1-E-44-12	EX-B1-E-45-12
Sample Depth (feet bgs)	12	4	8	4	8	4	12	12	12
Sample Date	8/11/2008	8/8/2008	8/27/2008	8/27/2008	8/27/2008	8/27/2008	8/21/2008	8/19/2008	8/14/2008
VOCs									
Benzene[1]	0.113 U	0.0349 U	0.0325 U	0.0314 U	0.0327 U	0.16	0.259 U	0.143 U	0.106 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0431	0.123	0.0205	NA	0.0172	0.0714	NA	NA	NA
Benzo[a]pyrene	0.0349	0.0985	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	0.022	0.073	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	0.0357	0.0843	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.022	0.0562	NA	NA	NA	NA	NA	NA	NA
Chrysene	0.0262	0.0704	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.022	0.0562	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.022	0.0562	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	18.9 U	36.6 JZ	9.58	7.74	13	223	43.1 U	23.9 U	17.7 U
Diesel Range Organics (DRO)	69.6 JY	135	173	10.6 U	130	76.8	40.8 U	28.0 U	19.8 U
Heavy Oil Organics (HO)	158	105	153	26.6 U	122	83.1	102 U	69.9 U	49.6 U
HO+DRO	227.6	240	326	18.6 U	252	159.9	71.4 U	48.95 U	34.7 U
Total Petroleum Hydrocarbons (TPH)[3]	237.05	276.6	335.58	26.34	265	382.9	92.95 U	60.9 U	43.55 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B1-E-46-12	EX-B1-E-47-4	EX-B1-E-47-SSW-4(2)	EX-B1-F-42-8	EX-B1-F-42-SSW-4	EX-B1-F-43-4	EX-B1-F-45-10	EX-B1-F-45-SSW-4	EX-B1-F-47-4(2)
Sample Depth (feet bgs)	12	4	4	8	4	4	10	4	4
Sample Date	8/13/2008	8/8/2008	9/2/2008	8/27/2008	8/27/2008	8/21/2008	8/15/2008	8/18/2008	9/2/2008
VOCs									
Benzene[1]	0.133 U	0.0336 U	0.0280 U	0.0332 U	0.0327 U [0.0306 U]	0.0288 U	0.0671 U	0.0296 U	0.0291 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.0172	NA	0.0165	NA [NA]	0.0184	NA	0.0719	NA
Benzo[a]pyrene	NA	0.0136	NA	NA	NA	0.0223	NA	0.0575	NA
Benzo[a]anthracene	NA	0.0108	NA	NA	NA	0.0223	NA	0.0564	NA
Benzo[b]fluoranthene	NA	0.0141	NA	NA	NA	0.0264	NA	0.0564	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0108	NA	NA	NA	0.0223	NA	0.0564	NA
Chrysene	NA	0.0108	NA	NA	NA	0.0223	NA	0.0564	NA
Dibenz(a,h)anthracene	NA	0.0108	NA	NA	NA	0.0223	NA	0.0564	NA
Indeno(1,2,3-cd)pyrene	NA	0.0108	NA	NA	NA	0.0223	NA	0.0564	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	22.1 U	5.61 U	4.66 U	12.4	5.46 U [5.11 U]	35.6 JZ	11.2 U	21.4 JZ	4.86 U
Diesel Range Organics (DRO)	23.0 U	21.1	10.8 U	144	10.7 U [10.6 U]	231	16.8 U	95.5	10.9 U
Heavy Oil Organics (HO)	57.6 U	26.9 U	27.0 U	114	26.8 U [26.6 U]	275	41.9 U	115	27.2 U
HO+DRO	40.3 U	34.55	18.9 U	258	18.6 U	506	29.35 U	210.5	19.05 U
Total Petroleum Hydrocarbons (TPH)[3]	51.35 U	37.355	21.23 U	270.4	21.155 U	541.6	34.95 U	231.9	21.48 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B20-F-19-6	EX-B20-F-19-NSW-3	EX-B20-F-20-10	EX-B20-F-20-NSW-4	EX-B20-F-21-4	EX-B20-G-13-12	EX-B20-G-14-12	EX-B20-G-14-WSW-4	EX-B20-G-18-15
Sample Depth (feet bgs)	6	3	10	4	4	12	12	4	15
Sample Date	10/18/2007	10/26/2007	10/30/2007	10/30/2007	10/17/2007	11/26/2007	11/20/2007	11/20/2007	10/18/2007
VOCs									
Benzene[1]	0.05	0.0271 U	0.0290 U	0.0286 U [0.0292 U]	0.0316 U	0.0268 U	0.0292 U	0.0299 U	0.0276 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	0.0230	NA [NA]	NA	0.00823	NA	0.00815	NA
Benzo[a]pyrene	NA	NA	0.0172	NA	NA	0.0109	NA	0.0108	NA
Benzo[a]anthracene	NA	NA	0.0124	NA	NA	0.0109	NA	0.0108	NA
Benzo[b]fluoranthene	NA	NA	0.0124	NA	NA	0.0109	NA	0.0108	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	0.0133	NA	NA	0.0109	NA	0.0108	NA
Chrysene	NA	NA	0.0124	NA	NA	0.0109	NA	0.0108	NA
Dibenz(a,h)anthracene	NA	NA	0.0193	NA	NA	0.0109	NA	0.0108	NA
Indeno(1,2,3-cd)pyrene	NA	NA	0.0127	NA	NA	0.0109	NA	0.0108	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	23	4.51 U	4.84 U	4.76 U [4.86 U]	5.26 U	4.47 U	4.86 U	4.98 U	5.04 U
Diesel Range Organics (DRO)	12.4 U	11.1 U	53.4	11.1 U [11.3 U]	12.0 U	100 J	12.1 U	48.5 Q11	12.1 U
Heavy Oil Organics (HO)	31.1 U	27.8 U	31.1 U	27.8 U [28.3 U]	30.0 U	27.3 U	30.3 U	32.9	30.3 U
HO+DRO	21.75 U	19.45 U	68.95	19.45 U	21 U	113.65	21.2 U	81.4	21.2 U
Total Petroleum Hydrocarbons (TPH)[3]	44.75	21.705 U	71.37	21.83 U	23.63 U	115.885	23.63 U	83.89	23.72 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B20-G-19-15	EX-B20-G-20-15	EX-B20-G-21-10	EX-B20-G-21-ESW-5	EX-B20-H-10-4	EX-B20-H-11-4	EX-B20-H-12-6	EX-B20-H-12-NSW-2	EX-B20-H-13-12
Sample Depth (feet bgs)	15	15	10	5	4	4	6	2	12
Sample Date	10/18/2007	10/18/2007	10/17/2007	10/26/2007	11/30/2007	11/29/2007	11/29/2007	11/29/2007	11/26/2007
VOCs									
Benzene[1]	0.0377 U	0.04	0.271 U	0.0273 U	0.0291 U	0.0298 U	0.0284 U [0.0291 U]	0.0262 U	0.0330 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	0.00944	0.00891	0.00858	NA	0.00823 [0.00831]	NA	NA
Benzo[a]pyrene	NA	NA	0.0125	0.0118	0.0113	NA	0.0109	NA	NA
Benzo[a]anthracene	NA	NA	0.0125	0.0118	0.0113	NA	0.0109	NA	NA
Benzo[b]fluoranthene	NA	NA	0.0125	0.0118	0.0113	NA	0.0109	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	0.0125	0.0118	0.0113	NA	0.0109	NA	NA
Chrysene	NA	NA	0.0125	0.0118	0.0208	NA	0.0109	NA	NA
Dibenz(a,h)anthracene	NA	NA	0.0125	0.0118	0.0113	NA	0.0109	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	0.0125	0.0118	0.0113	NA	0.0109	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	6.28 U	4.88 U	123 JZ	4.55 U	4.84 U	4.97 U	4.73 U [4.85 U]	4.37 U	5.5 U
Diesel Range Organics (DRO)	12.0 U	11.8 U	1020	36.0 C8	148 Q4	11.0 U	28.9 Q11 [35.8 Q11]	11.3 U	12.3 U
Heavy Oil Organics (HO)	30.1 U	29.4 U	59.0	29.3 U	195 Q4	27.5 U	27.4 U [27.6 U]	28.3 U	30.7 U
HO+DRO	21.05 U	20.6 U	1079	50.65	343	19.25 U	49.5	19.8 U	21.5 U
Total Petroleum Hydrocarbons (TPH)[3]	24.19 U	23.04 U	1202	52.925	345.42	21.735 U	51.865	21.985 U	24.25 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B20-H-14-12	EX-B20-H-14-WSW-4	EX-B20-H-18-15	EX-B20-H-19-15	EX-B20-H-20-15	EX-B20-H-21-10	EX-B20-H-21-ESW-5	EX-B20-I-10-10	EX-B20-I-11-10
Sample Depth (feet bgs)	12	4	15	15	15	10	5	10	10
Sample Date	11/20/2007	11/20/2007	10/18/2007	10/18/2007	10/18/2007	10/18/2007	10/26/2007	11/29/2007	11/29/2007
VOCs									
Benzene[1]	0.0319 U	0.0277 U [0.0306 U]	0.0299 U [0.0301 U]	0.0276 U	0.11	0.0683 U	0.0271 U	0.0308 U	0.0329 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00959	0.00876 [0.00846]	NA [NA]	NA	NA	0.0153	0.00891	NA	NA
Benzo[a]pyrene	0.0127	0.0116	NA	NA	NA	0.0201	0.0118	NA	NA
Benzo[a]anthracene	0.0127	0.0116	NA	NA	NA	0.0201	0.0118	NA	NA
Benzo[b]fluoranthene	0.0127	0.0116	NA	NA	NA	0.0201	0.0118	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0127	0.0116	NA	NA	NA	0.0201	0.0118	NA	NA
Chrysene	0.0127	0.0116	NA	NA	NA	0.0228	0.0118	NA	NA
Dibenz(a,h)anthracene	0.0127	0.0116	NA	NA	NA	0.0201	0.0118	NA	NA
Indeno(1,2,3-cd)pyrene	0.0127	0.0116	NA	NA	NA	0.0201	0.0118	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.31 U	4.61 U [5.10 U]	4.98 U [5.02 U]	4.6 U	10.5	11.4 U	7.14 JZ	5.14 U	7.89
Diesel Range Organics (DRO)	70.9 Q11	27.1 Q11 [20.4 Q11]	12.0 U [12.2 U]	12.1 U	13.8 U	506	58.7 J	12.7 U	12.2 U
Heavy Oil Organics (HO)	31.6 U	28.5 U [27.6 U]	30.0 U [30.5 U]	30.2 U	34.5 U	72.1	29.1 U	31.8 U	30.6 U
HO+DRO	86.7	40.9	21 U	21.15 U	24.15 U	578.1	73.25	22.25 U	21.4 U
Total Petroleum Hydrocarbons (TPH)[3]	89.355	43.205	23.49 U	23.45 U	34.65	583.8	80.39	24.82 U	29.29
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B20-I-11-NSW-6	EX-B20-I-12-10	EX-B20-I-13-12	EX-B20-I-14-12	EX-B20-I-15-15	EX-B20-I-18-15	EX-B20-I-19-15	EX-B20-I-20-8	EX-B20-I-21-4
Sample Depth (feet bgs)	6	10	12	12	15	15	15	8	4
Sample Date	11/29/2007	11/29/2007	11/26/2007	11/20/2007	11/5/2007	10/19/2007	10/18/2007	10/18/2007	10/30/2007
VOCs									
Benzene[1]	0.0299 U	0.0296 U	0.0291 U	0.0314 U	0.0315 U	0.04	0.0361 U [0.0326 U]	0.0303 U	0.0254 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00815	NA	NA	NA	NA	NA	NA [NA]	NA	0.0231
Benzo[a]pyrene	0.0108	NA	NA	NA	NA	NA	NA	NA	0.0175
Benzo[a]anthracene	0.0108	NA	NA	NA	NA	NA	NA	NA	0.0118
Benzo[b]fluoranthene	0.0108	NA	NA	NA	NA	NA	NA	NA	0.0118
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0108	NA	NA	NA	NA	NA	NA	NA	0.0128
Chrysene	0.0108	NA	NA	NA	NA	NA	NA	NA	0.0133
Dibenz(a,h)anthracene	0.0108	NA	NA	NA	NA	NA	NA	NA	0.0179
Indeno(1,2,3-cd)pyrene	0.0108	NA	NA	NA	NA	NA	NA	NA	0.0122
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.84 JZ	5.87	4.85 U	5.24 U	5.25 U	4.98 U	6.01 U [5.43 U]	5.05 U	4.83 JZ
Diesel Range Organics (DRO)	63.6 Q11	12.4 U	11.8 U	13.0 U	13.6 U	12.6 U	13.3 U [13.1 U]	12.7 U	37.8
Heavy Oil Organics (HO)	26.9 U	31.0 U	29.4 U	32.5 U	34.0 U	31.6 U	33.2 U [32.9 U]	31.7 U	49.7
HO+DRO	77.05	21.7 U	20.6 U	22.75 U	23.8 U	22.1 U	23 U	22.2 U	87.5
Total Petroleum Hydrocarbons (TPH)[3]	82.89	27.57	23.025 U	25.37 U	26.425 U	24.59 U	25.715 U	24.725 U	92.33
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-B20-I-9-9	EX-B20-J-10-10	EX-B20-J-11-11	EX-B20-J-12-10	EX-B20-J-13-12	EX-B20-J-14-12	EX-B20-J-15-15	EX-B20-J-18-15	EX-B20-J-20-4
Sample Depth (feet bgs)	9	10	11	10	12	12	15	15	4
Sample Date	10/17/2007	11/29/2007	12/13/2007	11/28/2007	11/26/2007	11/20/2007	11/5/2007	10/19/2007	10/30/2007
VOCs									
Benzene[1]	0.0440 U	0.0340 U	0.0301 U	0.03	0.0304 U	0.0302 U	0.0346 U	0.0293 U	0.0355 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	0.00891	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.0118	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	0.0118	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	0.0118	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	0.0118	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	0.0118	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	0.0118	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	0.0118	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	7.33 U	18.1	5.02 U	5.39 U	5.07 U	5.03 U	5.77 U	4.89 U	5.92 U
Diesel Range Organics (DRO)	15.6 U	12.7 U	12.6 U	12.3 U	12.2 U	29.6 Q11	13.2 U	12.2 U	13.9 UC
Heavy Oil Organics (HO)	39.1 U	31.8 U	31.6 U	30.8 U	30.4 U	29.3 U	32.9 U	30.5 U	34.8 U
HO+DRO	27.35 U	22.25 U	22.1 U	21.55 U	21.3 U	44.25	23.05 U	21.35 U	24.35 U
Total Petroleum Hydrocarbons (TPH)[3]	31.015 U	40.35	24.61 U	24.245 U	23.835 U	46.765	25.935 U	23.795 U	27.31 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B20-J-9-9	EX-B20-K-10-10	EX-B20-K-11-10	EX-B20-K-12-12	EX-B20-K-13-12	EX-B20-K-14-12	EX-B20-K-15-15	EX-B20-K-16-15	EX-B20-K-7-5
Sample Depth (feet bgs)	9	10	10	12	12	12	15	15	5
Sample Date	10/17/2007	11/30/2007	11/29/2007	11/29/2007	11/26/2007	11/20/2007	11/5/2007	10/31/2007	1/10/2008
VOCs									
Benzene[1]	0.0310 U	0.0315 U	0.0290 U	0.0310 U	0.0305 U	0.0283 U	0.0282 U	0.0279 U	0.0349 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00906	NA	NA	NA	NA	NA	NA	NA	0.00936
Benzo[a]pyrene	0.012	NA	NA	NA	NA	NA	NA	NA	0.0124
Benzo[a]anthracene	0.012	NA	NA	NA	NA	NA	NA	NA	0.0124
Benzo[b]fluoranthene	0.012	NA	NA	NA	NA	NA	NA	NA	0.0124
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.012	NA	NA	NA	NA	NA	NA	NA	0.0124
Chrysene	0.012	NA	NA	NA	NA	NA	NA	NA	0.0124
Dibenz(a,h)anthracene	0.012	NA	NA	NA	NA	NA	NA	NA	0.0124
Indeno(1,2,3-cd)pyrene	0.012	NA	NA	NA	NA	NA	NA	NA	0.0124
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	37 JZ	5.25 U	4.83 U	5.17 U	5.08 U	4.71 U	4.7 U	4.66 U	65.1 JZ
Diesel Range Organics (DRO)	12.9	12.9 U	12.4 U	12.8 U	13.1 U	12.3 U	12.2 U	12.4 U	16.1 JY
Heavy Oil Organics (HO)	29.8 U	32.3 U	31.0 U	32.1 U	32.8 U	30.8 U	30.5 U	31.0 U	41.1
HO+DRO	27.8	22.6 U	21.7 U	22.45 U	22.95 U	21.55 U	21.35 U	21.7 U	57.2
Total Petroleum Hydrocarbons (TPH)[3]	64.8	25.225 U	24.115 U	25.035 U	25.49 U	23.905 U	23.7 U	24.03 U	122.3
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B20-K-9-9	EX-B20-L-10-10	EX-B20-L-11-10	EX-B20-L-12-12	EX-B20-L-13-12	EX-B20-L-14-12	EX-B20-L-15-15	EX-B20-L-16-15	EX-B20-L-7-5
Sample Depth (feet bgs)	9	10	10	12	12	12	15	15	5
Sample Date	10/16/2007	11/30/2007	12/7/2007	11/29/2007	11/26/2007	11/20/2007	11/5/2007	10/31/2007	2/8/2008
VOCs									
Benzene[1]	0.0385 U	0.0310 U	0.0322 U	0.0321 U	0.0295 U	0.0292 U	0.0282 U	0.0297 U	0.0256 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA	NA	0.00956
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	0.0109
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	0.016
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.0109
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	0.0109
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	0.0327
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	0.0109
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	0.0109
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	8.19	5.16 U	5.37 U	5.36 U	4.92 U	4.86 U	4.71 U	4.96 U	41.3 JZ
Diesel Range Organics (DRO)	12.3 U	12.6 U	13.1 U	12.1 U	12.8 U	12.2 U	12.3 U	12.7 U	84.8
Heavy Oil Organics (HO)	30.9 U	31.4 U	32.7 U	30.3 U	32.0 U	30.5 U	30.8 U	31.7 U	64.8
HO+DRO	21.6 U	22 U	22.9 U	21.2 U	22.4 U	21.35 U	21.55 U	22.2 U	149.6
Total Petroleum Hydrocarbons (TPH)[3]	29.79	24.58 U	25.585 U	23.88 U	24.86 U	23.78 U	23.905 U	24.68 U	190.9
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B20-L-8-10	EX-B20-L-8-WSW5	EX-B20-L-9-10	EX-B20-M-10-12	EX-B20-M-11-12	EX-B20-M-12-12	EX-B20-M-13-14	EX-B20-M-14-11	EX-B20-M-15-11
Sample Depth (feet bgs)	10	5	10	12	12	12	14	11	11
Sample Date	12/11/2007	1/7/2008	12/11/2007	12/7/2007	12/7/2007	12/7/2007	12/7/2007	12/7/2007	12/7/2007
VOCs									
Benzene[1]	0.0337 U	0.0410 [0.0430]	0.0320 U	0.04	0.0314 U	0.0299 U [0.0310 U]	0.0332 U	0.0306 U	0.0316 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.0104 [0.00973]	NA	NA	NA	NA [NA]	NA	NA	NA
Benzo[a]pyrene	NA	0.0138	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	0.0138	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	0.0138	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0138	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	0.0143	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	0.0138	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	0.0138	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	6.07	26.8 JZ [36.4 JZ]	5.34 U	8.72	5.23 U	4.98 U [5.17 U]	5.54 U	5.1 U	5.27 U
Diesel Range Organics (DRO)	13.7 U	107 Q4 [154 Q4]	12.8 U	12.5 U	12.7 U	11.5 U [11.0 U]	13.8 U	11.9 U	11.5 U
Heavy Oil Organics (HO)	34.1 U	81.4 JQ4 [202 JQ4]	31.9 U	31.2 U	31.7 U	28.9 U [27.4 U]	34.5 U	29.7 U	28.8 U
HO+DRO	23.9 U	356	22.35 U	21.85 U	22.2 U	19.2 U	24.15 U	20.8 U	20.15 U
Total Petroleum Hydrocarbons (TPH)[3]	29.97	392.4	25.02 U	30.57	24.815 U	21.69 U	26.92 U	23.35 U	22.785 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B20-M-7-10	EX-B20-M-8-12	EX-B20-M-9-12	EX-B20-N-10-12	EX-B20-N-11-12	EX-B20-N-12-12	EX-B20-N-13-12	EX-B20-N-14-12	EX-B20-N-7-8
Sample Depth (feet bgs)	10	12	12	12	12	12	12	12	8
Sample Date	2/8/2008	1/16/2008	1/16/2008	1/8/2008	1/8/2008	1/8/2008	1/8/2008	12/11/2007	1/16/2008
VOCs									
Benzene[1]	0.0376 U	0.0297 U	0.0319 U	0.0292 U	0.0292 U	0.0282 U	0.0310 U	0.0308 U	0.0324 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	6.27 U	9.22	9.88	4.87 U	5.56	4.7 U	5.17 U	5.13 U	8.29
Diesel Range Organics (DRO)	12.0 U	11.9 U	12.3 U	11.7 U	12.1 U	11.9 U	12.4 U	12.3 U	11.9 U
Heavy Oil Organics (HO)	29.9 U	29.8 U	30.8 U	29.2 U	30.2 U	29.9 U	31.0 U	30.7 U	29.7 U
HO+DRO	20.95 U	20.85 U	21.55 U	20.45 U	21.15 U	20.9 U	21.7 U	21.5 U	20.8 U
Total Petroleum Hydrocarbons (TPH)[3]	24.085 U	30.07	31.43	22.885 U	26.71	23.25 U	24.285 U	24.065 U	29.09
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B20-N-7-WSW-4	EX-B20-N-8-12	EX-B20-N-9-12	EX-B21-ESW-2	EX-B21-FLOOR-4	EX-B21-NSW-2	EX-B2-E-33(2)-6	EX-B2-E-33-6	EX-B2-E-34-6
Sample Depth (feet bgs)	4	12	12	2	4	2	6	6	6
Sample Date	1/16/2008	1/16/2008	1/16/2008	10/11/2007	10/11/2007	10/11/2007	2/27/2008	2/25/2008	2/25/2008
VOCs									
Benzene[1]	0.0293 U	0.0318 U	0.0313 U	0.0354 U	0.0303 U	0.0300 U	0.0345 U	0.0326 U	0.0331 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0152	NA	NA	NA	NA	0.00883	0.00872	0.00883	0.00923
Benzo[a]pyrene	0.0123	NA	NA	NA	NA	0.0117	NA	0.0117	0.012
Benzo[a]anthracene	0.0109	NA	NA	NA	NA	0.0117	NA	0.0117	0.012
Benzo[b]fluoranthene	0.0109	NA	NA	NA	NA	0.0117	NA	0.0117	0.012
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0109	NA	NA	NA	NA	0.0117	NA	0.0117	0.012
Chrysene	0.0203	NA	NA	NA	NA	0.0117	NA	0.0117	0.0231
Dibenz(a,h)anthracene	0.0109	NA	NA	NA	NA	0.0117	NA	0.0117	0.012
Indeno(1,2,3-cd)pyrene	0.0109	NA	NA	NA	NA	0.0117	NA	0.0117	0.012
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	33.5 JZ	5.3 U	5.21 U	5.91 U	5.06 U	5 U	25.1 JZ	8.75 JZ	32.2 JZ
Diesel Range Organics (DRO)	148 Q4	12.8 U	12.6 U	11.0 U	11.8 U	12.4 JY	203 Q9	129 Q10	101 Q9
Heavy Oil Organics (HO)	125 Q4	31.9 U	31.6 U	27.5 U	29.5 U	44.6	126	86.6 Q10	54.2
HO+DRO	273	22.35 U	22.1 U	19.25 U	20.65 U	57	329	215.6	155.2
Total Petroleum Hydrocarbons (TPH)[3]	306.5	25 U	24.705 U	22.205 U	23.18 U	59.5	354.1	224.35	187.4
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B2-E-35(3)-6	EX-B2-E-35-6	EX-B2-E-36-6	EX-B2-E-40-4	EX-B2-E-41(2)-5	EX-B2-E-41-4	EX-B2-F-32-12	EX-B2-F-33-12	EX-B2-F-34-11
Sample Depth (feet bgs)	6	6	6	4	5	4	12	12	11
Sample Date	3/5/2008	2/22/2008	2/27/2008	1/23/2008	2/4/2008	1/23/2008	3/3/2008	2/28/2008	2/28/2008
VOCs									
Benzene[1]	0.0370 U	0.0336 U	0.0420 U	0.0313 U	0.0289 U	0.0262 U [0.0264 U]	0.108 U	0.0656 U [0.0670 U]	0.0603 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0993	0.117	0.0243	0.00922	0.0879	0.0528 [0.120]	NA	NA [NA]	NA
Benzo[a]pyrene	0.077	0.092	0.0194	0.0121	0.115	0.0393	NA	NA	NA
Benzo[a]anthracene	0.0898	0.105	0.0187	0.0121	0.115	0.0326	NA	NA	NA
Benzo[b]fluoranthene	0.0477	0.0575	0.0122	0.0121	0.115	0.043	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0327	0.0575	0.0122	0.0121	0.115	0.0229	NA	NA	NA
Chrysene	0.306	0.297	0.0572	0.0142	0.162	0.0846	NA	NA	NA
Dibenz(a,h)anthracene	0.0225	0.0575	0.0122	0.0121	0.115	0.0123	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.0225	0.0575	0.0122	0.0121	0.115	0.0155	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	79.7 JZ	66.7 JZ	20 JZ	5.22 U	7.34 JZ	13.5 JZ [13.3 JZ]	18 U	10.9 U [11.2 U]	10.1 U
Diesel Range Organics (DRO)	992 Q4	1,270 Q9	402 Q9	48.9 J	647 Q4	196 Q4 [208 Q4]	20.6 U	16.0 U [15.6 U]	15.7 U
Heavy Oil Organics (HO)	518 Q4	687	155	48.5 Q4	363 Q4	152 Q4 [182 Q4]	51.4 U	40.1 U [39.1 U]	39.2 U
HO+DRO	1510	1957	557	97.4	1010	390	36 U	27.35 U	27.45 U
Total Petroleum Hydrocarbons (TPH)[3]	1589.7	2023.7	577	100.01	1017.34	403.5	45 U	32.8 U	32.5 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-B2-F-35-12	EX-B2-F-36-13	EX-B2-F-36-NSW-6	EX-B2-F-37-13	EX-B2-F-37-NSW-6	EX-B2-F-38(2)-14	EX-B2-F-38-8	EX-B2-F-38-NSW(2)-5	EX-B2-F-38-NSW(2)-6
Sample Depth (feet bgs)	12	13	6	13	6	14	8	5	6
Sample Date	2/25/2008	2/22/2008	2/22/2008	2/22/2008	2/22/2008	2/6/2008	1/31/2008	2/6/2008	3/5/2008
VOCs									
Benzene[1]	0.105 U	0.0790 U	0.0409 U	0.0705 U	0.0378 U	0.0570 U	0.0357 U	0.0350 J	0.0307 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.0205	0.0305	NA	0.00929	NA	0.111	0.0317	0.0339
Benzo[a]pyrene	NA	0.0164	0.0233	NA	0.0123	NA	0.116	0.0232	0.0267
Benzo[a]anthracene	NA	0.0155	0.0291	NA	0.0123	NA	0.256	0.0532	0.0291
Benzo[b]fluoranthene	NA	0.0155	0.0157	NA	0.0123	NA	0.116	0.0112	0.0174
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0155	0.0122	NA	0.0123	NA	0.116	0.0112	0.0114
Chrysene	NA	0.0245	0.0862	NA	0.0123	NA	0.427	0.0915	0.0842
Dibenz(a,h)anthracene	NA	0.0155	0.0122	NA	0.0123	NA	0.116	0.0112	0.0114
Indeno(1,2,3-cd)pyrene	NA	0.0155	0.0122	NA	0.0123	NA	0.116	0.0112	0.0114
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	17.5 U	13.2 U	69.9 JZ	11.8 U	8.43	9.49 U	18.9 JZ	214 JZ	44.9 JZ
Diesel Range Organics (DRO)	16.6 U	331 Q9	215 Q9	16.9 U	25.3 Q4	15.3 U	1450	329	374 Q4
Heavy Oil Organics (HO)	41.4 U	105	70.9	42.2 U	30.7 UQ4	38.2 U	458	137	187 Q4
HO+DRO	29 U	436	285.9	29.55 U	40.65	26.75 U	1908	466	561
Total Petroleum Hydrocarbons (TPH)[3]	37.75 U	442.6	355.8	35.45 U	49.08	31.495 U	1926.9	680	605.9
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B2-F-38-NSW-4	EX-B2-F-38-WSW-5	EX-B2-F-39(2)-12	EX-B2-F-39-8	EX-B2-F-39-NSW-4	EX-B2-F-40-8	EX-B2-F-41-8	EX-B2-F-41-ESW(2)-5	EX-B2-G-32-6
Sample Depth (feet bgs)	4	5	12	8	4	8	8	5	6
Sample Date	1/31/2008	1/31/2008	2/5/2008	1/28/2008	1/28/2008	1/25/2008	1/23/2008	2/4/2008	2/26/2008
VOCs									
Benzene[1]	0.0295 U [0.0212 U]	0.0291 U	0.0580 U	0.0290 U [0.0287 U]	0.0308 U	0.17	0.0288 U	3.30	0.139 J
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00831 [0.0287]	0.00909	NA	0.0894 [0.00886]	0.00853	0.00914	0.00847	0.0753	0.00959
Benzo[a]pyrene	0.011	0.011	NA	0.117	0.0113	0.0121	0.0111	0.0597	0.0127
Benzo[a]anthracene	0.011	0.0118	NA	0.117	0.0113	0.0121	0.0111	0.056	0.0127
Benzo[b]fluoranthene	0.011	0.011	NA	0.117	0.0113	0.0121	0.0111	0.056	0.0127
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.011	0.011	NA	0.117	0.0113	0.0121	0.0111	0.056	0.0127
Chrysene	0.011	0.0213	NA	0.164	0.0113	0.0121	0.0146	0.157	0.0127
Dibenz(a,h)anthracene	0.011	0.011	NA	0.117	0.0113	0.0121	0.0111	0.056	0.0127
Indeno(1,2,3-cd)pyrene	0.011	0.011	NA	0.117	0.0113	0.0121	0.0111	0.056	0.0127
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.97 JZ [13.4 JZ]	19.2 JZ	9.66 U	5.35 JZ [5.58 JZ]	5.14 U	6.9	19 JZ	127	1090
Diesel Range Organics (DRO)	25.0 [33.6 J]	105	15.2 U	1010 J [51.5 J]	39.6	67.8 Q11	111 Q4	513 Q4	1230 J
Heavy Oil Organics (HO)	28.0 U [28.0 U]	48.8	38.0 U	250 J [28.8 UJ]	28.2 U	42.5	64.3 Q4	478 Q4	161 U
HO+DRO	47.6	153.8	26.6 U	1260	53.7	110.3	175.3	991	1310.5
Total Petroleum Hydrocarbons (TPH)[3]	61	173	31.43 U	1265.58	56.27	117.2	194.3	1118	2400.5
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-B2-G-33(2)-6	EX-B2-G-34-10	EX-B2-G-34-SSW-6	EX-B2-G-35-10	EX-B2-G-35-SSW-6	EX-B2-G-36-12	EX-B2-G-37-13	EX-B2-G-38(2)-13	EX-B2-G-38-8
Sample Depth (feet bgs)	6	10	6	10	6	12	13	13	8
Sample Date	2/28/2008	2/25/2008	2/25/2008	2/22/2008	2/22/2008	2/22/2008	2/22/2008	2/6/2008	1/31/2008
VOCs									
Benzene[1]	0.0340 U	0.0308 U	0.0429 U	0.119 U	0.0361 U [0.0404 U]	0.0423 U	0.0414 U	0.0332 U	0.0279 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00891	NA	0.0323	NA	0.0167 [0.0474]	0.0240	NA	NA	0.0702
Benzo[a]pyrene	0.0119	NA	0.0266	NA	0.0135	0.0207	NA	NA	0.0501
Benzo[a]anthracene	0.0116	NA	0.0268	NA	0.0124	0.013	NA	NA	0.0814
Benzo[b]fluoranthene	0.0116	NA	0.0127	NA	0.0124	0.013	NA	NA	0.0456
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0116	NA	0.0127	NA	0.0124	0.013	NA	NA	0.0448
Chrysene	0.0116	NA	0.0527	NA	0.0124	0.013	NA	NA	0.182
Dibenz(a,h)anthracene	0.0116	NA	0.0127	NA	0.0124	0.013	NA	NA	0.0112
Indeno(1,2,3-cd)pyrene	0.0116	NA	0.0127	NA	0.0124	0.013	NA	NA	0.0112
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	13.1 JZ	5.13 U	31.1 JZ	19.8 U	6.91 JZ [102 JZ]	7.05 U	6.9 U	5.54 U	87 JZ
Diesel Range Organics (DRO)	32.7 Q9	11.0 U	28.9	22.4 U	19.3 Q9 [42.6 Q9]	38.1 Q4	12.8 U	11.8 U	1020
Heavy Oil Organics (HO)	28.9 U	27.6 U	31.9	56.1 U	30.6 U [35.8]	32.5 U	32.0 U	29.6 U	335
HO+DRO	47.15	19.3 U	60.8	39.25 U	78.4	54.35	22.4 U	20.7 U	1355
Total Petroleum Hydrocarbons (TPH)[3]	60.25	21.865 U	91.9	49.15 U	180.4	57.875	25.85 U	23.47 U	1442
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B2-G-38-WSW-5	EX-B2-G-39(2)-11	EX-B2-G-39-SSW-4	EX-B2-G-40-8	EX-B2-G-40-SSW-4	EX-B2-G-41-8	EX-B2-G-41-ESW-4	EX-B2-G-41-SSW-4	EX-B2-H-35-6
Sample Depth (feet bgs)	5	11	4	8	4	8	4	4	6
Sample Date	1/31/2008	2/5/2008	1/28/2008	1/25/2008	1/25/2008	1/24/2008	1/24/2008	1/24/2008	2/27/2008
VOCs									
Benzene[1]	0.0305 U	0.0662 U	0.0271 U	0.0317 U	0.0287 U	0.0354 U	0.0356 U	0.0341 U	0.0833 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0516	NA	0.00861	0.00883	0.00906	0.00891	0.0415	0.00853	0.0123
Benzo[a]pyrene	0.0605	NA	0.0114	0.0117	0.012	0.0118	0.0583	0.0113	0.0163
Benzo[a]anthracene	0.0767	NA	0.0114	0.0117	0.012	0.0118	0.0117	0.0113	0.0163
Benzo[b]fluoranthene	0.0605	NA	0.0114	0.0117	0.012	0.0118	0.0583	0.0113	0.0163
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0605	NA	0.0114	0.0117	0.012	0.0118	0.0583	0.0113	0.0163
Chrysene	0.161	NA	0.0114	0.0117	0.012	0.0118	0.0117	0.0113	0.0163
Dibenz(a,h)anthracene	0.0605	NA	0.0114	0.0117	0.012	0.0118	0.0583	0.0113	0.0163
Indeno(1,2,3-cd)pyrene	0.0605	NA	0.0114	0.0117	0.012	0.0118	0.0583	0.0113	0.0163
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	100 JZ	13.5	4.52 U	5.29 U	4.79 U	61.1 JZ	5.93 U	5.68 U	18.5
Diesel Range Organics (DRO)	651	16.3 U	24.5	59.9 Q11	22.3 Q11	125 J	438 Q4	20.1 Q4	41.4 Q4
Heavy Oil Organics (HO)	317 Q4	40.7 U	30.6	43.0	32.6	110 Q4	361 Q4	57.1 Q4	40.7 UQ4
HO+DRO	968	28.5 U	55.1	102.9	54.9	235	799	77.2	61.75
Total Petroleum Hydrocarbons (TPH)[3]	1068	42	57.36	105.545	57.295	296.1	801.965	80.04	80.25
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B2-H-36-6	EX-B2-H-37(2)-6	EX-B2-H-38(2)-10	EX-B2-H-38-WSW(2)-5	EX-B3-E-32-6	EX-B3-F-31-12	EX-B3-F-31-NSW-6	EX-B3-G-29-5	EX-B3-G-29-NSW-4
Sample Depth (feet bgs)	6	6	10	5	6	12	6	5	4
Sample Date	2/22/2008	3/5/2008	2/6/2008	2/6/2008	2/26/2008	3/10/2008	3/10/2008	3/11/2008	3/11/2008
VOCs									
Benzene[1]	0.0426 U	0.0349 U	0.0293 U	0.0329 U	0.0474 U	0.0604 U	0.0306 U	0.0356 U	0.0313 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0225	0.00868	NA	0.0160	NA	NA	0.00891	NA	0.0300
Benzo[a]pyrene	0.0185	0.0115	NA	0.0117	NA	NA	0.0118	NA	0.024
Benzo[a]anthracene	0.0126	0.0115	NA	0.0168	NA	NA	0.0118	NA	0.0135
Benzo[b]fluoranthene	0.0117	0.0115	NA	0.011	NA	NA	0.0118	NA	0.0165
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0117	0.0115	NA	0.011	NA	NA	0.0118	NA	0.0165
Chrysene	0.036	0.0115	NA	0.0402	NA	NA	0.0118	NA	0.0277
Dibenz(a,h)anthracene	0.0117	0.0115	NA	0.011	NA	NA	0.0118	NA	0.0112
Indeno(1,2,3-cd)pyrene	0.0117	0.0115	NA	0.011	NA	NA	0.0118	NA	0.0112
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	70.4 JZ	75 JZ	4.88 U	6.75 JZ	7.9 U	10.1 U	5.1 U	5.94 U	5.22 U
Diesel Range Organics (DRO)	453 Q4	312 Q4	11.2 U	128 Q4	13.2 U	15.1 U	13.8 Q4	11.5 U	27.1 JY
Heavy Oil Organics (HO)	248 Q4	513 Q4	28.1 U	96.1 Q4	33.1 U	37.8 U	29.7 U	28.8 U	161
HO+DRO	701	825	19.65 U	224.1	23.15 U	26.45 U	28.65	20.15 U	188.1
Total Petroleum Hydrocarbons (TPH)[3]	771.4	900	22.09 U	230.85	27.1 U	31.5 U	31.2	23.12 U	190.71
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B3-G-29-SSW-5	EX-B3-G-30-12	EX-B3-G-30-NSW-6	EX-B3-G-30-SSW-6	EX-B3-G-31-12	EX-B3-G-31-SSW-6	EX-B4-B-23-6	EX-B4-B-24-6	EX-B5-B-20(2)-4
Sample Depth (feet bgs)	5	12	6	6	12	6	6	6	4
Sample Date	3/11/2008	3/11/2008	3/11/2008	3/10/2008	3/10/2008	3/10/2008	2/25/2008	2/25/2008	2/28/2008
VOCs									
Benzene[1]	0.0377 U [0.0345 U]	0.0352 U	0.11	0.0322 U	0.0368 U	0.0427 U	0.0297 U [0.0321 U]	0.0366 U	0.0354 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA [NA]	NA	0.0184	NA	NA	NA	0.0145 [NA]	NA	NA
Benzo[a]pyrene	NA	NA	0.0148	NA	NA	NA	0.0116	NA	NA
Benzo[a]anthracene	NA	NA	0.0131	NA	NA	NA	0.0112	NA	NA
Benzo[b]fluoranthene	NA	NA	0.0131	NA	NA	NA	0.0112	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	0.0131	NA	NA	NA	0.0112	NA	NA
Chrysene	NA	NA	0.0296	NA	NA	NA	0.0112	NA	NA
Dibenz(a,h)anthracene	NA	NA	0.0131	NA	NA	NA	0.0112	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	0.0131	NA	NA	NA	0.0112	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	6.29 U [5.75 U]	5.86 U	12.8 JZ	5.36 U	6.13 U	27.4	4.94 U [5.35 U]	6.1 U	5.9 U
Diesel Range Organics (DRO)	12.4 U [11.3 U]	11.9 U	169 Q4	11.5 U	12.5 U	12.3 U	15.5 JY [11.2 U]	12.1 U	12.1 U
Heavy Oil Organics (HO)	30.9 U [28.4 U]	29.9 U	120 Q4	28.7 U	31.3 U	30.8 U	27.8 U [28.0 U]	30.3 U	30.3 U
HO+DRO	19.85 U	20.9 U	289	20.1 U	21.9 U	21.55 U	29.4	21.2 U	21.2 U
Total Petroleum Hydrocarbons (TPH)[3]	22.725 U	23.83 U	301.8	22.78 U	24.965 U	48.95	31.87	24.25 U	24.15 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B5-B-20-4	EX-B6-C-15-3	EX-B6-D-13-3	EX-B6-D-14-10	EX-B6-D-14-NSW-3	EX-B6-D-15-12	EX-B6-E-13-4	EX-B6-E-14-10	EX-B6-F-14-10
Sample Depth (feet bgs)	4	3	3	10	3	12	4	10	10
Sample Date	2/22/2008	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007	11/19/2007
VOCs									
Benzene[1]	0.0363 U	0.0335 U	0.0269 U	0.0321 U	0.0369 U	0.0332 U [0.0323 U]	0.0261 U [0.0270 U]	0.0312 U	0.0302 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.111	NA	0.00846	NA	NA	NA [NA]	0.00853 [0.00853]	NA	NA
Benzo[a]pyrene	NA	NA	0.0112	NA	NA	NA	0.0113	NA	NA
Benzo[a]anthracene	NA	NA	0.0112	NA	NA	NA	0.0113	NA	NA
Benzo[b]fluoranthene	NA	NA	0.0112	NA	NA	NA	0.0113	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	0.0112	NA	NA	NA	0.0113	NA	NA
Chrysene	NA	NA	0.0112	NA	NA	NA	0.0113	NA	NA
Dibenz(a,h)anthracene	NA	NA	0.0112	NA	NA	NA	0.0113	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	0.0112	NA	NA	NA	0.0113	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	6.05 U	5.59 U	12.1	6.31	6.16 U	5.54 U [5.79]	4.35 U [4.49 U]	5.2 U	5.04 U
Diesel Range Organics (DRO)	592 Q4	12.6 U	61.6	12.2 U	15.0 U	13.2 U [12.6 U]	146 J [33.6 J]	12.1 U	12.6 U
Heavy Oil Organics (HO)	473 Q4	31.5 U	27.7 U	30.5 U	37.4 U	33.0 U [31.6 U]	113 [28.4 U]	30.2 U	31.5 U
HO+DRO	1065	22.05 U	75.45	21.35 U	26.2 U	22.1 U	259	21.15 U	22.05 U
Total Petroleum Hydrocarbons (TPH)[3]	1068.025	24.845 U	87.55	27.66	29.28 U	27.89	261.175	23.75 U	24.57 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B6-F-14-WSW-3	EX-B8-G-4-9	EX-B8-G-4-WSW-4	EX-B8-G-5-9	EX-B8-H-3-10	EX-B8-H-3-NSW-5	EX-B8-H-3-WSW-5	EX-B8-H-4-9	EX-B8-H-5-9
Sample Depth (feet bgs)	3	9	4	9	10	5	5	9	9
Sample Date	11/19/2007	10/1/2007	10/1/2007	10/1/2007	9/10/2008	9/10/2008	9/10/2008	10/1/2007	10/1/2007
VOCs									
Benzene[1]	0.0275 U	0.0308 U	0.0271 U	0.0319 U	0.0385 U	0.0322 U	0.0427 U	0.0324 U	0.0353 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00846	0.00921	0.0808	NA	NA	0.0266	0.0439	NA	NA
Benzo[a]pyrene	0.0112	0.0122	0.107	NA	NA	0.0232	0.0377	NA	NA
Benzo[a]anthracene	0.0112	0.0122	0.107	NA	NA	0.0109	0.0238	NA	NA
Benzo[b]fluoranthene	0.0112	0.0122	0.107	NA	NA	0.0109	0.0238	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0112	0.0122	0.107	NA	NA	0.0109	0.0238	NA	NA
Chrysene	0.0112	0.0122	0.107	NA	NA	0.0134	0.0244	NA	NA
Dibenz(a,h)anthracene	0.0112	0.0122	0.107	NA	NA	0.0109	0.0238	NA	NA
Indeno(1,2,3-cd)pyrene	0.0112	0.0122	0.107	NA	NA	0.0109	0.0238	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.59 U	5.14 U	5.76 JZ	5.32 U	6.42 U	5.37 U	7.12 U	5.4 U	5.88 U
Diesel Range Organics (DRO)	42.4 Q11	18.2	133 J	13.3 U	12.2 U	10.9 U	58.0 JY	11.9 U	12.2 U
Heavy Oil Organics (HO)	28.0 U	30.5 U	245 J	33.2 U	30.5 U	31.2	342	29.8 U	30.4 U
HO+DRO	56.4	33.45	378	23.25 U	21.35 U	36.65	400	20.85 U	21.3 U
Total Petroleum Hydrocarbons (TPH)[3]	58.695	36.02	383.76	25.91 U	24.56 U	39.335	403.56	23.55 U	24.24 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B8-I-3-10	EX-B8-I-3-WSW-5(2)	EX-B8-I-4-9	EX-B8-I-5-9	EX-B8-J-3-10	EX-B8-J-3-SSW-5	EX-B8-J-3-WSW-5	EX-B8-J-4-5	EX-B8-J-4-SSW-2.5
Sample Depth (feet bgs)	10	5	9	9	10	5	5	5	2.5
Sample Date	9/10/2008	9/11/2008	10/1/2007	10/1/2007	9/10/2008	9/10/2008	9/10/2008	10/23/2007	10/23/2007
VOCs									
Benzene[1]	0.0412 U	0.0525 U	0.08	0.0292 U	0.0369 U	0.0302 U [0.0338 U]	0.0302 U	0.0251 U	0.0331 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.0589	NA	NA	NA	0.00793 U [0.00793 U]	0.00800 U	0.0170	NA
Benzo[a]pyrene	NA	0.0461	NA	NA	NA	0.0105	0.0106	0.0225	NA
Benzo[a]anthracene	NA	0.0259	NA	NA	NA	0.0105	0.0106	0.0225	NA
Benzo[b]fluoranthene	NA	0.0546	NA	NA	NA	0.0105	0.0106	0.0225	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0271	NA	NA	NA	0.0105	0.0106	0.0225	NA
Chrysene	NA	0.0727	NA	NA	NA	0.0105	0.0106	0.0225	NA
Dibenz(a,h)anthracene	NA	0.0259	NA	NA	NA	0.0105	0.0106	0.0225	NA
Indeno(1,2,3-cd)pyrene	NA	0.0259	NA	NA	NA	0.0105	0.0106	0.0225	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	6.86 U	8.75 U	4.98 U	4.86 U	6.16 U	9.14 [5.64 U]	5.03 U	4.19 U	5.52 U
Diesel Range Organics (DRO)	12.4 U	352	12.2 U	12.1 U	11.8 U	51.5 [335 JY]	270 JY	146 Q4	10.9 U
Heavy Oil Organics (HO)	31.0 U	354	30.4 U	30.2 U	29.5 U	41.1 [315]	278	167 Q4	27.3 U
HO+DRO	21.7 U	706	21.3 U	21.15 U	20.65 U	650	548	313	19.1 U
Total Petroleum Hydrocarbons (TPH)[3]	25.13 U	710.375	23.79 U	23.58 U	23.73 U	659.14	550.515	315.095	21.86 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-B8-J-5-4	EX-B8-J-5-9	EX-B9-M-4-11	EX-B9-M-4-NSW-6	EX-B9-M-4-WSW-6	EX-B9-M-5-11	EX-B9-M-5-NSW-6	EX-B9-M-6-11	EX-B9-M-6-NSW-6
Sample Depth (feet bgs)	4	9	11	6	6	11	6	11	6
Sample Date	10/1/2007	10/1/2007	2/20/2008	2/19/2008	2/19/2008	2/19/2008	2/19/2008	2/19/2008	2/19/2008
VOCs									
Benzene[1]	0.0272 U	0.0366 U	0.0315 U	0.329 U	0.336 U	0.0411 U	0.0285 U	0.0364 U [0.0453 U]	0.0383 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00831	NA	NA	0.00907	0.0173	NA	0.00823	NA [NA]	NA
Benzo[a]pyrene	0.011	NA	NA	NA	0.0142	NA	0.0109	NA	NA
Benzo[a]anthracene	0.011	NA	NA	NA	0.0112	NA	0.0109	NA	NA
Benzo[b]fluoranthene	0.011	NA	NA	NA	0.0112	NA	0.0109	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.011	NA	NA	NA	0.0112	NA	0.0109	NA	NA
Chrysene	0.011	NA	NA	NA	0.026	NA	0.0109	NA	NA
Dibenz(a,h)anthracene	0.011	NA	NA	NA	0.0112	NA	0.0109	NA	NA
Indeno(1,2,3-cd)pyrene	0.011	NA	NA	NA	0.0112	NA	0.0109	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.53 U	6.1 U	5.24 U	755 JZ	816 JZ	6.85 U	98.5 JZ	6.06 U [7.55 U]	16.2
Diesel Range Organics (DRO)	35.9 JY	11.3 U	11.6 U	439 Q4	537 JX	13.0 U	40.9 Q4	12.5 U [13.4 U]	13.0 U
Heavy Oil Organics (HO)	43.8	28.4 U	29.1 U	211 Q4	141 U	32.5 U	27.1 UQ4	31.4 U [33.4 U]	32.6 U
HO+DRO	79.7	19.85 U	20.35 U	650	607.5	22.75 U	54.45	21.95 U	22.8 U
Total Petroleum Hydrocarbons (TPH)[3]	81.965	22.9 U	22.97 U	1405	1423.5	26.175 U	152.95	24.98 U	39
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B9-N-3-5	EX-B9-N-4-11	EX-B9-N-4-WSW-6	EX-B9-N-5-12	EX-B9-O-3-10	EX-B9-O-3-WSW-5	EX-B9-O-4-12	EX-B9-O-4-WSW-6	EX-B9-O-5-12
Sample Depth (feet bgs)	5	11	6	12	10	5	12	6	12
Sample Date	9/9/2008	2/20/2008	2/20/2008	2/13/2008	9/9/2008	9/9/2008	2/20/2008	2/20/2008	2/13/2008
VOCs									
Benzene[1]	0.0331 U	0.0349 U	0.0338 U	0.0343 U	0.0353 U	0.0322 U	0.0373 U [0.0373 U]	0.0322 U	0.0365 U [0.0354 U]
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	0.00891	NA	NA	NA	NA [NA]	0.00800	NA [NA]
Benzo[a]pyrene	NA	NA	0.0117	NA	NA	NA	NA	0.0106	NA
Benzo[a]anthracene	NA	NA	0.0117	NA	NA	NA	NA	0.0106	NA
Benzo[b]fluoranthene	NA	NA	0.0117	NA	NA	NA	NA	0.0106	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	0.0117	NA	NA	NA	NA	0.0106	NA
Chrysene	NA	NA	0.0136	NA	NA	NA	NA	0.0106	NA
Dibenz(a,h)anthracene	NA	NA	0.0117	NA	NA	NA	NA	0.0106	NA
Indeno(1,2,3-cd)pyrene	NA	NA	0.0117	NA	NA	NA	NA	0.0106	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.51 U	5.82 U	276 JZ	5.72 U	9.57	5.37 U	20.2 [15.9]	50.7 JZ	6.09 U [5.91 U]
Diesel Range Organics (DRO)	10.8 U	12.1 U	139 Q4	11.8 U	11.7 U	10.5 U	12.3 U [12.5 U]	24.4	11.8 U [11.9 U]
Heavy Oil Organics (HO)	26.9 U	30.3 U	128 Q4	29.6 U	29.3 U	26.2 U	30.7 U [31.2 U]	26.5 U	29.6 U [29.7 U]
HO+DRO	18.85 U	21.2 U	267	20.7 U	20.5 U	18.35 U	21.5 U	37.65	20.7 U
Total Petroleum Hydrocarbons (TPH)[3]	21.605 U	24.11 U	543	23.56 U	30.07	21.035 U	41.7	88.35	23.655 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-B9-P-3-10	EX-B9-P-3-SSW-5	EX-B9-P-3-WSW-5	EX-B9-P-4-12	EX-B9-P-4-SSW(2)-6	EX-B9-P-4-SSW-6	EX-B9-P-4-WSW-6	EX-B9-P-5-12	EX-B9-Q-5-6
Sample Depth (feet bgs)	10	5	5	12	6	6	6	12	6
Sample Date	9/9/2008	9/9/2008	9/9/2008	2/20/2008	2/25/2008	2/20/2008	2/20/2008	2/13/2008	2/13/2008
VOCs									
Benzene[1]	0.0360 U	0.0320 U	0.0327 U	0.0396 U	0.332 U	0.295 U	0.0333 U	0.0315 U	0.0175 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	0.0194	0.0316	NA	NA	0.0145
Benzo[a]pyrene	NA	NA	NA	NA	0.0154	0.0248	NA	NA	0.0111
Benzo[a]anthracene	NA	NA	NA	NA	0.0128	0.0269	NA	NA	0.0104
Benzo[b]fluoranthene	NA	NA	NA	NA	0.0111	0.0144	NA	NA	0.0104
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	0.0111	0.0112	NA	NA	0.0111
Chrysene	NA	NA	NA	NA	0.0499	0.0946	NA	NA	0.0194
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.0111	0.0112	NA	NA	0.0104
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.0111	0.0112	NA	NA	0.0104
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	11.4	5.33 U	5.45 U	8.18	967 JZ	898 JZ	5.56 U	5.25 U	2.91 U
Diesel Range Organics (DRO)	12.0 U	10.6 U	10.3 U	12.6 U	470 JX	1430 Q4	11.8 U	11.6 U	56.5 Q4
Heavy Oil Organics (HO)	29.9 U	26.4 U	25.9 U	31.5 U	138 U	248 Q4	29.5 U	29.0 U	35.4 Q4
HO+DRO	20.95 U	18.5 U	18.1 U	22.05 U	539	1678	20.65 U	20.3 U	91.9
Total Petroleum Hydrocarbons (TPH)[3]	32.35	21.165 U	20.825 U	30.23	1506	2576	23.43 U	22.925 U	93.355
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-RRT-ZZ-2-4	EX-RRT-ZZ-2-ESW-3	EX-SDTI-5-NSW-4	EX-SDTI-5-SSW-4	EX-SDTI-ESW-4	EX-SDTI-FF-S-8	EX-SDTI-GG-ESW-4	EX-SDTI-GG-S-8	EX-SDTI-GG-WSW-4
Sample Depth (feet bgs)	4	3	4	4	4	8	4	8	4
Sample Date	8/1/2008	8/1/2008	8/22/2007	8/22/2007	8/22/2007	8/22/2007	8/22/2007	8/22/2007	8/22/2007
VOCs									
Benzene[1]	0.0552 U	0.0800 U	0.0320 U	0.0344 U	0.0400 U	0.0333 U	0.0304 U	0.0286 U	0.0322 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	0.0107	0.00951	NA	0.00936	0.00929
Benzo[a]pyrene	NA	NA	NA	NA	0.0142	0.0126	NA	0.0124	0.0123
Benzo[a]anthracene	NA	NA	NA	NA	0.0142	0.0126	NA	0.0124	0.0123
Benzo[b]fluoranthene	NA	NA	NA	NA	0.0142	0.0126	NA	0.0124	0.0123
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	0.0142	0.0126	NA	0.0124	0.0123
Chrysene	NA	NA	NA	NA	0.0142	0.0126	NA	0.0124	0.0123
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.0142	0.0126	NA	0.0124	0.0123
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.0142	0.0126	NA	0.0124	0.0123
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	20.3	46.4 J	5.33 U	5.74 U	6.67 U	5.56 U	5.07 U	4.77 U	5.37 U
Diesel Range Organics (DRO)	15.2 U	18.2 U	12.8 U	13.0 U	30.1 Q11	32.3 Q11	12.3 U	12.1 U	36.8 Q11
Heavy Oil Organics (HO)	38.0 U	45.4 U	31.9 U	32.4 U	36.6 U	64.7	30.6 U	42.4	31.5 U
HO+DRO	26.6 U	31.8 U	22.35 U	22.7 U	48.4	97	21.45 U	48.45	52.55
Total Petroleum Hydrocarbons (TPH)[3]	46.9	78.2	25.015 U	25.57 U	51.735	99.78	23.985 U	50.835	55.235
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-SDTI-WSW-4	EX-WW-G-27-2SW	EX-WW-G-27-4	EX-WW-H-27-2.5	EX-WW-H-28-2	EX-WW-H-29-1	EX-WW-I-26-1	ISP-E-17-2	ISP-E-18-2
Sample Depth (feet bgs)	4	2	4	2.5	2	1	1	2	2
Sample Date	8/22/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	8/7/2007	9/17/2008	9/17/2008
VOCs									
Benzene[1]	0.08	0.0287 U	0.0299 U	0.0384 U	0.0294 U	0.0335 U	0.0254 U	0.0310 U	0.0312 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.00924	NA	0.0321	0.00891	0.00808	0.00934	NA	0.0248
Benzo[a]pyrene	NA	0.0106	NA	0.0222	0.0118	0.0107	0.0109	NA	0.0195
Benzo[a]anthracene	NA	0.0106	NA	0.0192	0.0118	0.0107	0.0109	NA	0.0133
Benzo[b]fluoranthene	NA	0.0169	NA	0.0281	0.0118	0.0107	0.0109	NA	0.0213
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0106	NA	0.0304	0.0118	0.0107	0.0159	NA	0.0112
Chrysene	NA	0.0127	NA	0.0233	0.0118	0.0107	0.0116	NA	0.0138
Dibenz(a,h)anthracene	NA	0.0106	NA	0.0121	0.0118	0.0107	0.0109	NA	0.0112
Indeno(1,2,3-cd)pyrene	NA	0.0106	NA	0.0131	0.0118	0.0107	0.0109	NA	0.0112
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	9.4	4.79 U	4.89 U	6.39 U	6.07	4.59 U	4.24 U	5.16 U	5.19 U
Diesel Range Organics (DRO)	12.2 U	14.9 JY	10.9 U	16.4 JY	21.4 JY	20.0 JY	12.3 JY	10.4 U	15.2
Heavy Oil Organics (HO)	30.6 U	49.7	27.3 U	60.0	68.1	78.9	44.3	26.1 U	27.9 U
HO+DRO	21.4 U	64.6	19.1 U	76.4	89.5	98.9	56.6	18.25 U	29.15
Total Petroleum Hydrocarbons (TPH)[3]	30.8	66.995	21.545 U	79.595	95.57	101.195	58.72	20.83 U	31.745
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	ISP-E-19-2	ISP-E-20-2	ISP-E-21-2	ISP-F-17-2	ISP-F-18-2	ISP-F-19-2	ISP-F-20-2	ISP-F-21-2	ISP-G-17-2
Sample Depth (feet bgs)	2	2	2	2	2	2	2	2	2
Sample Date	9/22/2008	9/22/2008	9/22/2008	9/17/2008	9/17/2008	9/22/2008	9/22/2008	9/22/2008	9/17/2008
VOCs									
Benzene[1]	0.0337 U	0.0333 U	0.0318 U	0.0319 U	0.0267 U	0.0329 U	0.0351 U	0.0344 U	0.0314 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00868 U	0.0212	0.00850	NA	0.0170	0.0523	0.0498	NA	NA
Benzo[a]pyrene	0.0115	0.0159	0.0111	NA	0.021	0.0403	0.0412	NA	NA
Benzo[a]anthracene	0.0115	0.0245	0.0111	NA	0.021	0.0252	0.0152	NA	NA
Benzo[b]fluoranthene	0.0115	0.0113	0.0111	NA	0.0222	0.0274	0.0215	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0115	0.0113	0.0111	NA	0.021	0.0281	0.0193	NA	NA
Chrysene	0.0115	0.057	0.0173	NA	0.021	0.0398	0.0309	NA	NA
Dibenz(a,h)anthracene	0.0115	0.0113	0.0111	NA	0.021	0.0111	0.0108	NA	NA
Indeno(1,2,3-cd)pyrene	0.0115	0.0113	0.0111	NA	0.021	0.0293	0.022	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.62 U	7.17 JZ	25 JZ	5.32 U	4.45 U	5.49 U	5.85 U	5.74 U	5.24 U
Diesel Range Organics (DRO)	51.3 J	105	16.7	10.4 U	29.0	14.3	11.6	11.0 U	10.4 U
Heavy Oil Organics (HO)	42.8	67.4	27.7 U	26.0 U	32.9	27.5 U	27.1 U	27.4 U	26.1 U
HO+DRO	94.1	172.4	30.55	18.2 U	61.9	28.05	25.15	19.2 U	18.25 U
Total Petroleum Hydrocarbons (TPH)[3]	96.91	179.57	55.55	20.86 U	64.125	30.795	28.075	22.07 U	20.87 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	ISP-G-18-2	ISP-G-19-2(2)	ISP-G-20-2	ISP-G-21-2	MW-129R-4.5	MW-129R-7.0	MW-502-6.0	MW-511-8.5	MW-527-12
Sample Depth (feet bgs)	2	2	2	2	4.5	7	6	8.5	12
Sample Date	9/17/2008	9/25/2008	9/22/2008	9/22/2008	10/14/2008	10/14/2008	10/14/2008	10/14/2008	6/22/2012
VOCs									
Benzene[1]	0.0314 U	0.0344 U	0.0328 U	0.0322 U	0.0303 U	0.0446 U	0.0337 U	0.0378 U [0.0361 U]	0.11 U W
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.0161	0.00823 U	0.0335	0.0439	0.0479 U	NA	NA [NA]	NA
Benzo[a]pyrene	NA	0.0212	0.0109	0.0258	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	0.0212	0.0109	0.0178	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	0.0212	0.0109	0.021	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0212	0.0109	0.0144	NA	NA	NA	NA	NA
Chrysene	NA	0.0216	0.0109	0.0452	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	0.0212	0.0109	0.0109	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	0.0212	0.0109	0.0138	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.23 U	5.73 U	5.46 U	9.03 JZ	24.4 JZ	7.43 U	5.62 U	5.62 U	96
Diesel Range Organics (DRO)	10.6 U	75.5	11.4	74.1	823	2690	11.6 U	11.6 U	220
Heavy Oil Organics (HO)	26.4 U	57.1	27.1 U	35.0	178	313	29.0 U	29.0 U	400
HO+DRO	18.5 U	132.6	24.95	109.1	1001	3003	20.3 U	20.3 U	620
Total Petroleum Hydrocarbons (TPH)[3]	21.115 U	135.465	27.68	118.13	1025.4	3006.715	23.11 U	23.11 U	716
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	MW-527-13.5	MW-527-8	MW-527-9	MW-528-15	MW-528-8	RRT-YY-2-6	RRT-YY-2-WSW-3	RRT-ZZ-2-NSW-3	RRT-ZZ-3-NSW-3
Sample Depth (feet bgs)	13.5	8	9	15	8	6	3	3	3
Sample Date	6/22/2012	6/14/2012	6/22/2012	6/22/2012	6/14/2012	8/4/2008	8/4/2008	8/4/2008	8/4/2008
VOCs									
Benzene[1]	0.11 U W	0.02	0.053 U W	0.025 U W	0.02	0.105 U	0.0397 U [0.0357 U]	0.0349 U	0.0382 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	0.00808 U [0.00808 U]	0.00853 U	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	0.0107	0.0113	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	0.0107	0.0113	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	0.0107	0.0113	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	0.0107	0.0113	NA
Chrysene	NA	NA	NA	NA	NA	NA	0.0107	0.0113	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	0.0107	0.0113	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	0.0107	0.0113	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	21 UW	2.4	11 UW	70	1.1 U	39.9 J	6.61 U [5.95 U]	5.81 U	6.37 U
Diesel Range Organics (DRO)	990	170	240	190	4.0	20.8 U	27.1 JY [26.8 JY]	30.2 J	11.8 U
Heavy Oil Organics (HO)	620	180	390	180	22	52.0 U	32.9 [31.6]	60.4	29.4 U [28.9 U]
HO+DRO	1610	350	630	370	26	36.4 U	60	90.6	20.35 U
Total Petroleum Hydrocarbons (TPH)[3]	1620.5	352.4	635.5	440	26.55	76.3	62.975	93.505	23.535 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	SB-10-11.0	SB-1-11.5	SB-11-11.0	SB-12-11.5	SB-13-11	SB-14-11	SB-15-10.5	SB-16-9.5	SB-17-11.5
Sample Depth (feet bgs)	11	11.5	11	11.5	11	11	10.5	9.5	11.5
Sample Date	4/4/2008	4/3/2008	4/4/2008	4/4/2008	4/11/2008	4/11/2008	4/14/2008	4/14/2008	4/14/2008
VOCs									
Benzene[1]	0.0341 U [0.0350 U]	0.0304 U	0.0556 U	0.0348 U	0.0465 U	0.0385 U	0.0354 U [0.0366 U]	0.0312 U	0.0321 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA [NA]	NA	NA	NA	NA	NA	NA [NA]	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.69 U [5.84 U]	5.07 U	9.27 U	5.8 U	7.76 U	6.42 U	5.9 U [6.11 U]	5.19 U	5.35 U
Diesel Range Organics (DRO)	11.8 U [11.6 U]	11.4 U	14.2 U	12.1 U	13.1 U	12.4 U	11.9 U [11.9 U]	11.1 U	11.8 U
Heavy Oil Organics (HO)	29.6	28.6 U	35.5 U	30.2 U	32.8 U	31.1 U	29.7 U [29.7 U]	27.6 U	29.4 U
HO+DRO	35.4	20 U	24.85 U	21.15 U	22.95 U	21.75 U	20.8 U	19.35 U	20.6 U
Total Petroleum Hydrocarbons (TPH)[3]	38.245	22.535 U	29.485 U	24.05 U	26.83 U	24.96 U	23.75 U	21.945 U	23.275 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SB-18-11	SB-19-12	SB-20-9.5	SB-2-11	SB-21-10.5	SB-22-10	SB-23-11	SB-24-10	SB-25-11
Sample Depth (feet bgs)	11	12	9.5	11	10.5	10	11	10	11
Sample Date	4/11/2008	4/11/2008	4/14/2008	4/3/2008	4/14/2008	4/11/2008	4/11/2008	4/11/2008	4/11/2008
VOCs									
Benzene[1]	0.71	0.0292 U	0.0323 U	0.0609 U	0.0348 U	0.0371 U [0.0371 U]	0.0357 U	0.0398 U	0.0359 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00842	NA	NA	NA	NA	NA [NA]	NA	NA	NA
Benzo[a]pyrene	0.011	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	0.011	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	0.011	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.011	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	0.0169	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.011	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.011	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	1070 JZ	4.86 U	5.38 U	10.2 U	5.81 U	6.18 U [6.19 U]	5.95 U	6.63 U	5.98 U
Diesel Range Organics (DRO)	299	11.5 U	11.8 U	15.6 U	12.3 U	12.8 U [12.3 U]	12.2 U	12.9 U	12.0 U
Heavy Oil Organics (HO)	45.0	28.6 U	29.5 U	38.9 U	30.6 U	32.1 U [30.6 U]	30.5 U	32.3 U	30.0 U
HO+DRO	344	20.05 U	20.65 U	27.25 U	21.45 U	21.45 U	21.35 U	22.6 U	21 U
Total Petroleum Hydrocarbons (TPH)[3]	1414	22.48 U	23.34 U	32.35 U	24.355 U	24.54 U	24.325 U	25.915 U	23.99 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SB-26-10.5	SB-27-10	SB-28-9	SB-29-9	SB-30-9.5	SB-3-10.5	SB-3-12	SB-31-9.5	SB-32-9.5
Sample Depth (feet bgs)	10.5	10	9	9	9.5	10.5	12	9.5	9.5
Sample Date	4/14/2008	4/14/2008	4/11/2008	4/8/2008	4/10/2008	4/3/2008	4/3/2008	4/10/2008	4/10/2008
VOCs									
Benzene[1]	0.0339 U	0.20	0.0313 U	0.07	0.0343 U	0.0335 U	0.0372 U	0.0420 U	0.0541 U [0.0538 U]
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.00896	0.00838 U	NA	NA	NA	NA	NA	NA [NA]
Benzo[a]pyrene	NA	0.0117	0.0111	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	0.0117	0.0111	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	0.0117	0.0111	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.0117	0.0111	NA	NA	NA	NA	NA	NA
Chrysene	NA	0.0188	0.0111	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	0.0117	0.0111	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	0.0117	0.0111	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.65 U	13.8 JZ	6.59	10.7	5.72 U	5.59 U	6.2 U	6.99 U	9.02 U [8.97 U]
Diesel Range Organics (DRO)	11.6 U	279	11.9	11.4 U	11.6 U	12.0 U	11.9 U	12.9 U	14.4 U [14.4 U]
Heavy Oil Organics (HO)	29.1 U	29.2 U	28.7 U	28.4 U	29.1 U	30.0 U	29.7 U	32.4 U	36.0 U [36.0 U]
HO+DRO	20.35 U	293.6	26.25	19.9 U	20.35 U	21 U	20.8 U	22.65 U	25.2 U
Total Petroleum Hydrocarbons (TPH)[3]	23.175 U	307.4	32.84	30.6	23.21 U	23.795 U	23.9 U	26.145 U	29.685 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SB-33-11	SB-34-11	SB-35-9	SB-36-12	SB-37-9	SB-38-10	SB-38-8.5	SB-39-14	SB-40-11
Sample Depth (feet bgs)	11	11	9	12	9	10	8.5	14	11
Sample Date	4/10/2008	4/10/2008	4/10/2008	4/10/2008	4/8/2008	4/8/2008	4/8/2008	4/10/2008	4/10/2008
VOCs									
Benzene[1]	0.0471 U	0.0344 U	0.0442 U	0.0252 U	0.224 [0.225]	0.11	0.07	0.0285 U	0.0365 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA [NA]	0.00929 U	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	0.0123	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	7.86 U	5.74 U	7.36 U	4.2 U	5.66 U [6.47 U]	5.85 U	6.34 U	4.75 U	6.09 U
Diesel Range Organics (DRO)	13.2 U	11.8 U	12.7 U	10.9 U	12.0 U [12.8 U]	12.3 U	12.0 U	11.3 U	12.1 U
Heavy Oil Organics (HO)	32.9 U	29.5 U	31.7 U	27.2 U	29.9 U [31.9 U]	30.8 U	29.9 U	28.4 U	30.1 U
HO+DRO	23.05 U	20.65 U	22.2 U	19.05 U	20.95 U	21.55 U	20.95 U	19.85 U	21.1 U
Total Petroleum Hydrocarbons (TPH)[3]	26.98 U	23.52 U	25.88 U	21.15 U	23.78 U	24.475 U	24.12 U	22.225 U	24.145 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SB-4-10.5	SB-41-10	SB-42-10	SB-43-11.5	SB-44-11	SB-45-10	SB-46-10.5	SB-46-6	SB-47-10
Sample Depth (feet bgs)	10.5	10	10	11.5	11	10	10.5	6	10
Sample Date	4/4/2008	4/10/2008	4/9/2008	4/9/2008	4/9/2008	4/8/2008	4/8/2008	4/8/2008	4/9/2008
VOCs									
Benzene[1]	0.0307 U	0.0346 U	0.0464 U [0.0821]	0.0420 U	0.21	0.21	0.0311 U	0.0323 U	0.0437 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA [NA]	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.11 U	5.76 U	7.74 U [8.22 U]	6.99 U	5.48 U	5.91 U	5.18 U	5.38 U	7.29 U
Diesel Range Organics (DRO)	11.3 U	11.8 U	14.1 U [14.8 U]	13.3 U	11.8 U	11.4 U	11.4 U	11.5 U	12.9 U
Heavy Oil Organics (HO)	28.1 U	29.6 U	35.2 U [37.1 U]	33.3 U	29.4 U	28.4 U	28.5 U	28.8 U	32.2 U
HO+DRO	19.7 U	20.7 U	24.65 U	23.3 U	20.6 U	19.9 U	19.95 U	20.15 U	22.55 U
Total Petroleum Hydrocarbons (TPH)[3]	22.255 U	23.58 U	28.52 U	26.795 U	23.34 U	22.855 U	22.54 U	22.84 U	26.195 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SB-48-11.5	SB-49-10.5	SB-50-10.5	SB-5-11.5	SB-51-9.5	SB-52-9.5	SB-53-10.5	SB-54-10.5	SB-55-11.5
Sample Depth (feet bgs)	11.5	10.5	10.5	11.5	9.5	9.5	10.5	10.5	11.5
Sample Date	4/9/2008	4/9/2008	4/9/2008	4/4/2008	4/8/2008	4/8/2008	4/9/2008	4/9/2008	4/7/2008
VOCs									
Benzene[1]	0.0459 U	0.0333 U	0.0350 U	0.04	0.0350 U	0.0317 U	0.0309 U	0.0373 U	0.0606 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	7.65 U	5.55 U	5.83 U	5.13 U	5.83 U	5.28 U	14.8	6.22 U	10.1 U
Diesel Range Organics (DRO)	13.6 U	11.8 U	12.1 U	10.9 U	12.1 U	11.4 U	10.8 U	12.1 U	15.7 U
Heavy Oil Organics (HO)	34.1 U	29.4 U	30.2 U	27.4 U	30.3 U	28.5 U	27.1 U	30.3 U	39.2 U
HO+DRO	23.85 U	20.6 U	21.15 U	19.15 U	21.2 U	19.95 U	18.95 U	21.2 U	27.45 U
Total Petroleum Hydrocarbons (TPH)[3]	27.675 U	23.375 U	24.065 U	21.715 U	24.115 U	22.59 U	33.75	24.31 U	32.5 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SB-56-14.5	SB-57-10.5	SB-58-11.0	SB-59-5.5	SB-60-10.5	SB-6-11.0	SB-61-10.5	SB-62-10.5	SB-63-6.0
Sample Depth (feet bgs)	14.5	10.5	11	5.5	10.5	11	10.5	10.5	6
Sample Date	4/8/2008	4/7/2008	4/7/2008	4/8/2008	4/7/2008	4/4/2008	4/7/2008	4/7/2008	4/7/2008
VOCs									
Benzene[1]	0.0337 U	0.0307 U	0.0359 U	0.0311 U	0.0825 [0.0864]	0.0356 U	0.0511 U	0.0607 U	0.157 J
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA [NA]	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.61 U	5.11 U	5.98 U	5.18 U	7.41 U [6.37 U]	5.94 U	8.52 U	10.1 U	978 JZ
Diesel Range Organics (DRO)	11.7 U	11.3 U	11.6 U	11.4 U	12.3 U [21.7 U]	11.8 U	15.1 U	15.8 U	20.2 U
Heavy Oil Organics (HO)	29.3 U	28.2 U	29.1 U	28.5 U	30.8 U [29.0 U]	29.5 U	37.8 U	39.5 U	50.4 U
HO+DRO	20.5 U	19.75 U	20.35 U	19.95 U	20.65 U	20.65 U	26.45 U	27.65 U	35.3 U
Total Petroleum Hydrocarbons (TPH)[3]	23.305 U	22.305 U	23.34 U	22.54 U	23.835 U	23.62 U	30.71 U	32.7 U	1013.3
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SB-64-5.5	SB-64-7.0	SB-67-5.5	SB-70-12.5	SB-70-6.0	SB-70-7.0	SB-7-11.5	SB-71-8.0	SB-72-6.5
Sample Depth (feet bgs)	5.5	7	5.5	12.5	6	7	11.5	8	6.5
Sample Date	4/7/2008	4/7/2008	6/24/2008	6/25/2008	6/24/2008	6/25/2008	4/4/2008	6/25/2008	6/25/2008
VOCs									
Benzene[1]	0.139 J	0.33	0.0398 U	0.0366 U	0.0371 U	0.0369 U	0.0334 U	0.0368 U	0.0371 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0452 U	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	534 JZ	63.1	6.63 U	6.11 U	6.18 U	6.16 U	5.56 U	6.14 U	6.19 U
Diesel Range Organics (DRO)	444	19.9 U	11.9 U	11.6 U	10.9 U	11.5 U	11.5 U	11.7 U	11.7 U
Heavy Oil Organics (HO)	32.2	49.7 U	29.7 U	29.1 U	27.2 U	28.8 U	28.8 U	29.3 U	29.3 U
HO+DRO	476.2	34.8 U	20.8 U	20.35 U	19.05 U	20.15 U	20.15 U	20.5 U	20.5 U
Total Petroleum Hydrocarbons (TPH)[3]	1010.2	97.9	24.115 U	23.405 U	22.14 U	23.23 U	22.93 U	23.57 U	23.595 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SB-73-15.0	SB-73-6.0	SB-74-15	SB-74-6.0	SB-75-15.0	SB-75-6.0	SB-76-10.5	SB-76-14	SB-76-4.5
Sample Depth (feet bgs)	15	6	15	6	15	6	10.5	14	4.5
Sample Date	6/26/2008	6/26/2008	6/26/2008	6/26/2008	6/26/2008	6/26/2008	6/30/2008	6/30/2008	6/30/2008
VOCs									
Benzene[1]	0.0369 U	0.0445 U	0.0380 U	0.0375 U	0.0398 U	0.0406 U	0.0501 U	0.0288 U [0.0355 U]	0.0389 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	0.190	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	6.15 U	7.41 U	6.34 U	6.25 U	6.63 U	6.77 U	40.1 JZ	4.8 U [5.91 U]	9.14
Diesel Range Organics (DRO)	12.0 U	13.0 U	12.2 U	12.2 U	12.3 U	12.2 U	2090 J	12.0 U [11.9 U]	11.4 U
Heavy Oil Organics (HO)	30.1 U	32.6 U	30.4 U	30.4 U	30.8 U	30.5 U	409 J	30.0 U [29.8 U]	28.5 U
HO+DRO	21.05 U	22.8 U	21.3 U	21.3 U	21.55 U	21.35 U	2499	20.85 U	19.95 U
Total Petroleum Hydrocarbons (TPH)[3]	24.125 U	26.505 U	24.47 U	24.425 U	24.865 U	24.735 U	2539.1	23.25 U	29.09
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	SB-77-14	SB-77-6	SB-78-10	SB-78-12.5	SB-78-5.5	SB-78-8.5	SB-79-11.5	SB-79-5	SB-8-11.0
Sample Depth (feet bgs)	14	6	10	12.5	5.5	8.5	11.5	5	11
Sample Date	6/30/2008	6/30/2008	6/30/2008	6/30/2008	6/30/2008	6/30/2008	6/30/2008	6/30/2008	4/4/2008
VOCs									
Benzene[1]	0.0336 U	0.0392 U	0.0325 U	0.0353 U	6.57 J	0.0351 U	0.0550 U	0.0344 U	0.05
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	0.0183	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.61 U	6.53 U	15.1 JZ	5.89 U	693	5.85 U	9.16 U	5.73 U	5.05 U
Diesel Range Organics (DRO)	11.8 U	12.0 U	11.4 U	12.2 U	257	11.4 U	13.1 U	11.0 U	11.4 U
Heavy Oil Organics (HO)	28.5 U	29.9 U	28.6 U	30.6 U	356	28.4 U	32.7 U	27.5 U	28.5 U
HO+DRO	20.15 U	20.95 U	20 U	21.4 U	613	19.9 U	22.9 U	19.25 U	19.95 U
Total Petroleum Hydrocarbons (TPH)[3]	22.955 U	24.215 U	35.1	24.345 U	1306	22.825 U	27.48 U	22.115 U	22.475 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SB-81-5	SB-81-9.5	SB-82-7	SB-82-9	SB-83-7	SB-83-8.5	SB-84-6	SB-84-8	SB-85-5.5
Sample Depth (feet bgs)	5	9.5	7	9	7	8.5	6	8	5.5
Sample Date	6/30/2008	6/30/2008	7/1/2008	7/1/2008	7/1/2008	7/1/2008	7/1/2008	7/1/2008	7/2/2008
VOCs									
Benzene[1]	0.0301 U	0.0414 U	**0.0349 U**	0.0455 U	0.0333 U	0.0502 U	0.0610 U	0.0745 U	0.0357 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0896	NA	**NA**	NA	0.00891	0.0108	0.0119	NA	0.0225
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	21.1 JZ	6.91 U	**5.81 U**	7.58 U	5.55 U	8.37 U	10.2 U	12.4 U	5.96 U
Diesel Range Organics (DRO)	34.4	12.6 U	**11.9 U**	13.6 U	16.8	18.7	20.7	17.6 U	75.4
Heavy Oil Organics (HO)	49.4	31.4 U	**29.7 U**	33.9 U	29.6 U	35.6 U	43.3	44.0 U	28.2 U
HO+DRO	83.8	22 U	20.8 U	23.75 U	31.6	36.5	64	30.8 U	89.5
Total Petroleum Hydrocarbons (TPH)[3]	104.9	25.455 U	23.705 U	27.54 U	34.375	40.685	69.1	37 U	92.48
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	SB-85-7.5	SB-86-4.5	SB-86-6.5	SB-87-14.0	SB-87-6.0	SB-88-8.0	SB-9-11.0	STRM-1floor-8	STRM-1wall-4
Sample Depth (feet bgs)	7.5	4.5	6.5	14	6	8	11	8	4
Sample Date	7/2/2008	7/2/2008	7/2/2008	7/25/2008	7/25/2008	7/25/2008	4/4/2008	10/24/2003	10/24/2003
VOCs									
Benzene[1]	0.114 U	0.0324 U	0.0513 U	0.05	0.06	0.0145 U	0.04	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.0182	NA	NA	0.0535	0.0167	NA	0.00755 U	0.00755 U
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U
Chrysene	NA	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	177 J	5.4 U	8.56 U	6.86 U	74.2 JZ	2.59	5.43 U	5 U	5 U
Diesel Range Organics (DRO)	21.2 U	31.1 JY	14.2 U	12.2 U	79.8	35.9	11.5 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	52.9 U	77.9	35.4 U	30.4 U	88.6	98.5	28.7 U	25.0 U	25.0 U
HO+DRO	37.05 U	109	24.8 U	21.3 U	168.4	134.4	20.1 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	214.05	111.7	29.08 U	24.73 U	242.6	136.99	22.815 U	20 U	20 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	STRM-2Floor-6	STRM-2wallW-3	STRM-3WallW-3	STRM-4wallW-3	SWLY-A-10wall-3.75	SWLY-A-11WALL-3.7	SWLY-A-12WALL-3.7	SWLY-A-13WALL-3.7	SWLY-A-15wall-3.75
Sample Depth (feet bgs)	6	3	3	3	3.75	3.75	3.75	3.75	3.75
Sample Date	10/28/2003	10/28/2003	10/27/2003	10/24/2003	11/11/2003	11/25/2003	11/25/2003	11/25/2003	12/1/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.06 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.02155	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.0906	0.00755 U	0.03775 U
Benzo[a]pyrene	0.01 U	0.01	0.01 U	0.01 U	0.01 U	0.01 U	0.07 D	0.01 U	0.05 U
Benzo[a]anthracene	0.01 U	0.05	0.01 U	0.01 U	0.01 U	0.01 U	0.13 D	0.01 U	0.05 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.05 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.05 U
Chrysene	0.01 U	0.04	0.01 U	0.01 U	0.01 U	0.01 U	0.16 D	0.01 U	0.05 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.05 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.05 U	0.01 U	0.05 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	200 D	5 U	5 U	5 U	9.24	114 D	17	5 U
Diesel Range Organics (DRO)	10.0 U	1330 D	10.0 U	10.0 U	10.0 U	14.1	1090 D	10.0 U	57.3
Heavy Oil Organics (HO)	25.0 U	25 U	25.0 U	25.0 U	25.0 U	25.0 U	81.6	25.0 U	51.8
HO+DRO	17.5 U	1342.5	17.5 U	17.5 U	17.5 U	26.6	1171.6	17.5 U	109.1
Total Petroleum Hydrocarbons (TPH)[3]	20 U	1542.5	20 U	20 U	20 U	35.84	1285.6	34.5	111.6
Arsenic	NA	NA	NA	NA	3	NA	NA	NA	NA

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Sample Identification (ID)	SWLY-A-17wall-3.75	SWLY-A-18wall-3.75	SWLY-A-19wall-3.75	SWLY-A-1Wall-3.75	SWLY-A-20WALL-3.75	SWLY-A-21WALL-3.75	SWLY-A-2Wall-3.75	SWLY-A-3Wall-3.75	SWLY-A-4Wall-3.75
Sample Depth (feet bgs)	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
Sample Date	12/1/2003	12/2/2003	12/2/2003	10/14/2003	12/4/2003	12/4/2003	10/14/2003	10/14/2003	10/16/2003
VOCs									
Benzene[1]	0.12 U	0.03 U	0.11	0.03 U	0.03 U	0.13	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0461	0.00755 U	0.00755 U	0.03755	0.02855	0.00755 U	0.00755 U	0.03797	0.02108
Benzo[a]pyrene	0.05 U	0.01 U	0.01 U	NA	0.03	0.01 U	0.01 U	0.03	0.01
Benzo[a]anthracene	0.1 D	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.02	0.02
Benzo[b]fluoranthene	0.05 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.05 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.02
Chrysene	0.15 D	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.04	0.03
Dibenz(a,h)anthracene	0.05 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.05 U	0.01 U	0.01 U	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	428 DJ	5 U	114 J	5 U	16.4	41.5	5 U	29.1	5 U
Diesel Range Organics (DRO)	1160 D	10.0 U	10.0 U	10.0 U	14.6	10.0 U	10.0 U	164	432 D
Heavy Oil Organics (HO)	191	25.0 U	25.0 U	25.0 U	25.0	25.0 U	25.0 U	29.3	121 D
HO+DRO	1351	17.5 U	17.5 U	17.5 U	39.6	17.5 U	17.5 U	193.3	553
Total Petroleum Hydrocarbons (TPH)[3]	1779	20 U	131.5	20 U	56	59	20 U	222.4	555.5
Arsenic	NA	2	3	4	NA	NA	2	3	9

Sample Identification (ID)	SWLY-A-7WALL-3.75	SWLY-A-8WALL-3.75	SWLY-C-1Wall-3.75	SWLY-D-1Wall-3.75	SWLY-D-21wall-3.75	SWLY-D-2Wall-3.75	SWLY-D-3Wall-3.75	SWLY-D-4Wall-3.75	SWLY-D-5WALL-3.75
Sample Depth (feet bgs)	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
Sample Date	11/6/2003	11/6/2003	10/16/2003	10/16/2003	12/5/2003	10/16/2003	10/17/2003	10/21/2003	11/6/2003
VOCs									
Benzene[1]	0.30 U	0.06 U	0.03 U	0.03 U	0.03 U	0.03 U	4.47 D	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00763	0.00755 U	0.00755 U	0.00755 U	0.00834	0.00755 U	0.02865	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.03	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01	0.01 U	0.01 U	0.01 U	0.02	0.01 U	0.02	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	549 DJ	527 DJ	5 U	5 U	17.4	17.8	2440 D	5 U	5 U
Diesel Range Organics (DRO)	604	172	10.0 U	10.0 U	91.7	64	442 D	10.0 U	94.4 J
Heavy Oil Organics (HO)	50.0 U	50.0	25.0 U	25.0 U	54.5	38.6	41.2	25.0 U	25.0 U
HO+DRO	629	222	17.5 U	17.5 U	146.2	102.6	483.2	17.5 U	106.9
Total Petroleum Hydrocarbons (TPH)[3]	1178	749	20 U	20 U	163.6	120.4	2923.2	20 U	109.4
Arsenic	3	2	2	2	NA	1	2	2	3

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Sample Identification (ID)	SWLY-D-6WALL-3.75	SWLY-D-7Wall-3.75	SWLY-D-7-Wall-3.75	SWLY-E-10-3.75	SWLY-E-11-3.75	SWLY-E-21wall-3.75	SWLY-E-8wall-3.75	SWLY-E-9wall-3.75	SWLY-F-12-3.75
Sample Depth (feet bgs)	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
Sample Date	11/6/2003	11/10/2003	11/7/2003	11/12/2003	11/13/2003	12/5/2003	11/11/2003	11/11/2003	11/14/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00773	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.02	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	57.5	10.0 U	77.9	10.0 U	10.0 U	10.8
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	33.1	25.0 U	82.1	25.0 U	25.0 U	25.0
HO+DRO	17.5 U	17.5 U	17.5 U	90.6	17.5 U	160	17.5 U	17.5 U	35.8
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	93.1	20 U	162.5	20 U	20 U	38.3
Arsenic	3	6	2	2	1	NA	2	2	2

Sample Identification (ID)	SWLY-F-13-3.75	SWLY-F-21wall-3.75	SWLY-G-14-3.75	SWLY-G-15-3.75	SWLY-G-16-3.75	SWLY-G-17-3.75	SWLY-G-21wall-3.75	SWLY-H-18-3.75	SWLY-H-19-3.75
Sample Depth (feet bgs)	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
Sample Date	11/14/2003	11/24/2003	11/17/2003	11/20/2003	11/20/2003	11/20/2003	11/24/2003	11/21/2003	11/21/2003
VOCs									
Benzene[1]	0.03 U	0.03 U	0.30	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U	0.00755 U	0.00782	0.00755 U	0.00755 U	0.00755 U	0.00755 U	0.00755 U
Benzo[a]pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[a]anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo[b]fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	0.01 U	0.01 U	0.01 U	0.03	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5 U	5 U	5 U	5 U	12.2	5 U	5 U	5 U	5 U
Diesel Range Organics (DRO)	10.0 U	10.0 U	10.0 U	10.0 U	12.2	10.0 U	10.0 U	10.0 U	10.0 U
Heavy Oil Organics (HO)	25.0 U	25.0 U	25.0 U	25.0	25.0 U	25.0 U	25.0 U	25.0 U	25.0 U
HO+DRO	17.5 U	17.5 U	17.5 U	30	24.7	17.5 U	17.5 U	17.5 U	17.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	20 U	20 U	32.5	36.9	20 U	20 U	20 U	20 U
Arsenic	2	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SWLY-H-21wall-3.75	SWLY-I-20wall-3.75	SWLY-I-21wall-3.75	DPE-PSS-N17-4	DPE-PSS-N17-6	DPE-PSS-O16-4	DPE-PSS-O16-6	DPE-PSS-P15-6	DPE-PSS-P15-11
Sample Depth (feet bgs)	3.75	3.75	3.75	4	6	4	6	6	11
Sample Date	11/24/2003	11/24/2003	11/24/2003	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018	12/3/2018
VOCs									
Benzene[1]	0.03 U	0.03 U [0.03 U]	0.03 U	0.0089 U	0.0089 U	0.0084 U	0.008 U	0.016 U	0.0087 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.00755 U	0.00755 U [0.00755 U]	0.03775 U	0.001416	NA	0.0004 UU	0.000834	0.0036335	NA
Benzo[a]pyrene	0.01 U	0.01 U	0.05 U	0.0047 U	NA	0.0054 U	0.0054 U	0.0057 U	NA
Benzo[a]anthracene	0.01 U	0.01 U	0.05 U	0.011	NA	0.0054 U	0.0047 J	0.028	NA
Benzo[b]fluoranthene	0.01 U	0.01 U	0.05 U	0.0047 U	NA	0.0054 U	0.00064 U*	0.0057 U	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.01 U	0.01 U	0.05 U	0.0047 U	NA	0.0054 U	0.0054 U	0.0057 U	NA
Chrysene	0.01 U	0.01 U	0.05 U	0.0047 U	NA	0.0054 U	0.0054 U	0.046	NA
Dibenz(a,h)anthracene	0.01 U	0.01 U	0.05 U	0.0047 U	NA	0.0054 U	0.0054 U	0.0057 U	NA
Indeno(1,2,3-cd)pyrene	0.01 U	0.01 U	0.05 U	0.0047 U	NA	0.0054 U	0.0054 U	0.0057 U	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	0.021	NA	0.05	NA	0.097	NA
Gasoline Range Organics (GRO)	5 U	5 U [17.8]	60.9	620	3.4 J	570	8.5	1400	2.6 J
Diesel Range Organics (DRO)	10.0 U	10.0 U [38]	1070 D	9700	14 U	4700	410	4100	14 U
Heavy Oil Organics (HO)	25.0 U	25.0 U [25.0 U]	125	270	21 U	110	24 J	520	19 U
HO+DRO	17.5 U	50.5	1195	9970	17.5 U	4810	434	4620	16.5 U
Total Petroleum Hydrocarbons (TPH)[3]	20 U	68.3	1255.9	10590	20.9	5380	442.5	6020	19.1
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	DPE-PSS-Q14-6	DPE-PSS-Q14-14.5	DPE-PSS-P16-1	DPE-PSS-P16-2	DPE-PSS-P16-6	DPE-PSS-O17-3	DPE-PSS-O17-6	DPE-PSS-Q15-1	DPE-PSS-Q15-6
Sample Depth (feet bgs)	6	14.5	1	2	6	3	6	1	6
Sample Date	12/3/2018	12/3/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/4/2018
VOCs									
Benzene[1]	0.0085 U	0.0086 U	0.0076 U	0.0093 U	0.0087 U	0.0076 U	0.0088 U	0.0077 U	0.009 U [0.01 U]
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.003412	NA	0.00928	0.000652	0.000532	0.00709	NA	0.004935	NA
Benzo[a]pyrene	0.0053 U	NA	0.0049 U	0.0053 U	0.0055 U	0.053 U	NA	0.043 U	NA
Benzo[a]anthracene	0.026	NA	0.034	0.002 J	0.0012 J	0.026 J	NA	0.015 J	NA
Benzo[b]fluoranthene	0.0053 U	NA	0.049 U	0.0053 U	0.0055 U*	0.053 U	NA	0.043 U	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0053 U	NA	0.049 U	0.0053 U	0.0055 U	0.053 U	NA	0.043 U	NA
Chrysene	0.047	NA	0.27	0.011	0.0054 J	0.1	NA	0.06	NA
Dibenz(a,h)anthracene	0.0053 U	NA	0.049 U	0.0053 U	0.0055 U	0.053 U	NA	0.043 U	NA
Indeno(1,2,3-cd)pyrene	0.0053 U	NA	0.049 U	0.0053 U	0.0055 U	0.053 U	NA	0.043 U	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	1.9	NA	0.63	NA	NA	0.021	NA	0.35	NA
Gasoline Range Organics (GRO)	870	2.6	720	100	28	120	14	210	18 [10]
Diesel Range Organics (DRO)	7200	14 U	20 J	42 J	14 U	13 U	14 U	25 J	13 U [13 U]
Heavy Oil Organics (HO)	990	20 U	82	75	34 J	28 J	19 U	64	19 U [19 U]
HO+DRO	8190	17 U	102	117	41	34.5	16.5 U	89	16 U
Total Petroleum Hydrocarbons (TPH)[3]	9060	19.6	822	217	69	154.5	30.5	299	34
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	DPE-PSS-T14-4	DPE-PSS-T14-6	DPE-PSS-U13-8.5	DPE-PSS-U13-14.5	DPE-PSS-W9-4	DPE-PSS-W9-6	DPE-PSS-V10-5	DPE-PSS-V10-10	DPE-PSS-V10-13
Sample Depth (feet bgs)	4	6	8.5	14.5	4	6	5	10	13
Sample Date	12/4/2018	12/4/2018	12/4/2018	12/4/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018
VOCs									
Benzene[1]	0.0085 U	0.0083 U	0.0083 U	0.009 U	0.072	0.13	0.67 [8.4]	3.4	0.0088 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0005995	0.000396	0.0124005	NA	0.0005335	0.02533	0.034995 [0.13415]	0.05893	0.0004165 UU
Benzo[a]pyrene	0.0052 U	0.0051 U	0.0081	NA	0.0049 U	0.018 J	0.03	0.045	0.0056 U
Benzo[a]anthracene	0.0025 J	0.0051 U	0.027	NA	0.0049 U	0.026 J	0.03	0.056	0.0056 U
Benzo[b]fluoranthene	0.0052 U*	0.0051 U	0.0073	NA	0.0049 U	0.029 *	0.028 U	0.057	0.0056 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0052 U	0.0051 U	0.0029 J	NA	0.0049 U	0.0057 J	0.028 U	0.028 U	0.0056 U
Chrysene	0.0052 U	0.0024 J	0.032	NA	0.018	0.09	0.13	0.21	0.0056 U
Dibenz(a,h)anthracene	0.0052 U	0.0051 U	0.0051 U	NA	0.0049 U	0.027 U	0.028 U	0.028 U	0.0056 U
Indeno(1,2,3-cd)pyrene	0.0052 U	0.0051 U	0.0022 J	NA	0.0049 U	0.027 U	0.028 U	0.028 U	0.0056 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	0.00074	0.066	NA	0.064	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.6	3.1 J	370	31	78	960	240 [1000]	1100	2.7 U
Diesel Range Organics (DRO)	13 U	13 U	1200	14 U	290	1400	5800 [6700]	6100	14 U
Heavy Oil Organics (HO)	92	44 J	45 J	21 U	720	710	7900 [6400]	8300	22 J
HO+DRO	98.5	50.5	1245	17.5 U	1010	2110	14600	14400	29
Total Petroleum Hydrocarbons (TPH)[3]	104.1	53.6	1615	48.5	1088	3070	15600	15500	30.35
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	DPE-PSS-V11-5	DPE-PSS-V11-9.5	DPE-PSS-W10-7	DPE-PSS-W10-10	DPE-PSS-W10-14.5	DPE-PSS-W11-2	DPE-PSS-W11-3	DPE-PSS-W11-6	DPE-PSS-V12-4
Sample Depth (feet bgs)	5	9.5	7	10	14.5	2	3	6	4
Sample Date	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/5/2018	12/6/2018	12/6/2018	12/6/2018	12/6/2018
VOCs									
Benzene[1]	0.016 J	0.0087 U	0.0086 U	0.0082 U	0.0096 U	0.0094 U F2 F1	0.0084 U	0.0081 U	0.0091 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0047	NA	0.002325	0.0058	NA	0.0857	0.0019545 UU	NA	0.0003735 UU
Benzo[a]pyrene	0.0037 J	NA	0.025 U	0.053 U	NA	0.071 J F1	0.026 U	NA	0.005 U
Benzo[a]anthracene	0.0069	NA	0.0045 J	0.015 J	NA	0.04 J	0.026 U	NA	0.005 U
Benzo[b]fluoranthene	0.0052 U	NA	0.025 U	0.053 U*	NA	0.047 J F2 F1	0.026 U F2	NA	0.005 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0052 U	NA	0.025 U	0.053 U	NA	0.13 U	0.026 U	NA	0.005 U
Chrysene	0.018	NA	0.025	0.088	NA	0.19	0.026 U	NA	0.005 U
Dibenz(a,h)anthracene	0.0052 U	NA	0.025 U	0.053 U	NA	0.026 J	0.026 U	NA	0.005 U
Indeno(1,2,3-cd)pyrene	0.0052 U	NA	0.025 U	0.053 U	NA	0.13 U	0.026 U	NA	0.005 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	0.089	NA	0.036	NA	NA	0.096	NA	NA	0.009
Gasoline Range Organics (GRO)	39	2.6 U	17	46	2.9 U	110	5 J	2.4 U	6.4
Diesel Range Organics (DRO)	25 J	15 U	25 U	240 U	16 U	610 U	9.6 U	10 U	12 U
Heavy Oil Organics (HO)	88	21 U	450	1200	23 U	2000 J F1	78	15 U	17 U
HO+DRO	113	18 U	462.5	1320	19.5 U	2305	82.8	12.5 U	14.5 U
Total Petroleum Hydrocarbons (TPH)[3]	152	19.3 U	479.5	1366	20.95 U	2415	87.8	13.7 U	20.9
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	DPE-PSS-V12-6	DPE-PSS-Y9-7.5	DPE-PSS-Y9-9	DPE-PSS-Y9-14.5	DPE-PSS-W8-6.5	DPE-PSS-W8-8.5	DPE-PSS-X9-7	DPE-PSS-X9-14.5	DPE-PSS-X8-7
Sample Depth (feet bgs)	6	7.5	9	14.5	6.5	8.5	7	14.5	7
Sample Date	12/6/2018	12/6/2018	12/6/2018	12/6/2018	12/6/2018	12/6/2018	12/7/2018	12/7/2018	12/7/2018
VOCs									
Benzene[1]	0.0094 U	0.011 U	0.011 U [0.01 U]	0.013 U	0.18	33	0.22 F2 F1	0.012 U	3.6
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	0.00919	0.189955 [0.34905]	NA	0.063745	0.08299	0.0023915	0.00048 UU	0.01944
Benzo[a]pyrene	NA	0.067 U	0.17 J	NA	0.048 J	0.051 J	0.0017 J	0.0064 U	0.012
Benzo[a]anthracene	NA	0.037 J	0.27 U	NA	0.049 J	0.086	0.0033 J	0.0064 U	0.027
Benzo[b]fluoranthene	NA	0.067 U	0.27 U	NA	0.044 J	0.2	0.002 J	0.0064 U	0.022
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	0.067 U	0.27 U	NA	0.058 U	0.057 U	0.0051 U	0.0064 U	0.0055
Chrysene	NA	0.11	0.27 U	NA	0.17	0.23	0.0064	0.0064 U	0.048
Dibenz(a,h)anthracene	NA	0.067 U	0.088 J	NA	0.02 J	0.057 U	0.0051 U	0.0064 U	0.0041
Indeno(1,2,3-cd)pyrene	NA	0.067 U	0.055 J	NA	0.024 J	0.057 U	0.0051 U	0.0064 U	0.011
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	11	NA	24	NA	0.79	NA	NA
Gasoline Range Organics (GRO)	3.9 J	5.6 J	980 [1000]	3.8 U	2800	3100	150	7 J	1000
Diesel Range Organics (DRO)	14 U	61 J	6300 [510]	17 U	2400	120	480	570	14 U
Heavy Oil Organics (HO)	20 U	130	3600 [330]	24 U	1200	70	100	200	27 J
HO+DRO	17 U	191	9900	20.5 U	3600	190	580	770	34
Total Petroleum Hydrocarbons (TPH)[3]	20.9	196.6	10900	22.4 U	6400	3290	730	777	1034
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	DPE-PSS-X8-12.5	EX-DB2-A3-10	EX-DB2-A4-10	EX-DB2-A5-10	EX-DB2-A6-10	EX-DB2-A7-10	EX-DB2-A8-10	EX-DB2-A3-5-SW	EX-DB2-A4-5-SW
Sample Depth (feet bgs)	12.5	10	10	10	10	10	10	5	5
Sample Date	12/7/2018	9/6/2017	9/7/2017	9/7/2017	9/7/2017	9/7/2017	9/7/2017	9/8/2017	9/8/2017
VOCs									
Benzene[1]	8.4	0.025 U	0.024 U	0.027 U	0.029 U	0.059 U	0.035 U	0.023 U	0.02 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.02491	NA	NA	NA	NA	NA	NA	0.001425 JB	0.001786 JB
Benzo[a]pyrene	0.016 J	NA	NA	NA	NA	NA	NA	0.00084	0.00082
Benzo[a]anthracene	0.053	NA	NA	NA	NA	NA	NA	0.0015	0.0011
Benzo[b]fluoranthene	0.019 J	NA	NA	NA	NA	NA	NA	0.0012	0.0034
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0053 J	NA	NA	NA	NA	NA	NA	0.0011	0.00081
Chrysene	0.081	NA	NA	NA	NA	NA	NA	0.0058 U	0.003
Dibenz(a,h)anthracene	0.028 U	NA	NA	NA	NA	NA	NA	0.00084	0.0053 U
Indeno(1,2,3-cd)pyrene	0.028 U	NA	NA	NA	NA	NA	NA	0.00092	0.0014
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	1200 H	14 B	4.7 U	5.5 U	0.68 U	12 U	6.9 U	4.6 U	4 U
Diesel Range Organics (DRO)	2000	53 U	53 U	54 U	64 U	59 U	47 U	47 U	13 J
Heavy Oil Organics (HO)	270	16 J	16 J	15 J	15 J	13 J	15 J	18 J	47 J
HO+DRO	2270	42.5	42.5	42	47	42.5	38.5	41.5	60
Total Petroleum Hydrocarbons (TPH)[3]	3470	56.5	44.85	44.75	47.34	48.5	41.95	43.8	62
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-DB2-A5-5-SW	EX-DB2-A6-5-SW	EX-DB2-A7-5-SW	EX-DB2-A8-5-SW	EX-DB2-B3-10	EX-DB2-B4-10	EX-DB2-B5-10	EX-DB2-B6-10	EX-DB2-B7-10
Sample Depth (feet bgs)	5	5	5	5	10	10	10	10	10
Sample Date	9/8/2017	9/7/2017	9/7/2017	9/7/2017	9/12/2017	9/12/2017	9/12/2017	9/12/2017	9/12/2017
VOCs									
Benzene[1]	0.019 U [0.022 U]	0.021 U	0.018 U	0.021 U	0.024 U	0.023 U	0.027 U	0.027 U	0.024 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	03595 JB [0.0016865	0.001867 JB	0.0016 JB	0.0038915 JB	NA	NA	NA	NA	NA
Benzo[a]pyrene	0.00061	0.00076	0.00077	0.0055 U	NA	NA	NA	NA	NA
Benzo[a]anthracene	0.0057 U	0.005 U	0.0046 U	0.0055 U	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	0.00093	0.0022	0.0028	0.00099	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.0057 U	0.005 U	0.00059	0.0055 U	NA	NA	NA	NA	NA
Chrysene	0.0057 U	0.0037	0.0031	0.0055 U	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	0.0057 U	0.005 U	0.0046 U	0.0019	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.0057 U	0.005 U	0.0011	0.0055 U	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.3 U [3.9 U]	0.49 U	3.6 U	4.2 U	4.8 U	4.5 U	5.3 U	5.4 U	4.9 U
Diesel Range Organics (DRO)	34 J [94 B]	41 J	20 J	30 J	49 U	51 U	56 U	57 U	50 U
Heavy Oil Organics (HO)	120 [17 JB]	80 0	64 0	99 0	19 J	19 J	28 J	32 J	15 J
HO+DRO	214	121	84	129	43.5	44.5	56	60.5	40
Total Petroleum Hydrocarbons (TPH)[3]	215.95	121.245	85.8	131.1	45.9	46.75	58.65	63.2	42.45
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-DB2-B8-10	EX-DB2-A2-10	EX-DB2-B2-10	EX-DB2-C2-10	EX-DB2-A1-8-SW	EX-DB2-B1-8-SW	EX-DB2-C1-8-SW	EX-DB2-D1-8-SW	EX-DB2-D2-10
Sample Depth (feet bgs)	10	10	10	10	8	8	8	8	10
Sample Date	9/12/2017	9/13/2017	9/14/2017	9/14/2017	9/15/2017	9/15/2017	9/18/2017	9/18/2017	9/18/2017
VOCs									
Benzene[1]	0.023 U	0.024 U	0.023 U	0.024 U	0.027 U	0.025 U	0.026 U	0.027 U	0.028 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.7 U	4.9 U	4.6 U	4.8 U	5.3 U	5 U	5.2 U	5.4 U	5.6 U
Diesel Range Organics (DRO)	49 U	62 U	14 JF1	57 U	64 U	62 U	60 U	65 U	62 U
Heavy Oil Organics (HO)	22 J	12 J	22 JB	13 JB	27 J	18 J	60 U	65 U	62 U
HO+DRO	46.5	43	36	41.5	59	49	60 U	65 U	62 U
Total Petroleum Hydrocarbons (TPH)[3]	48.85	45.45	38.3	43.9	61.65	51.5	62.6 U	67.7 U	64.8 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-DB2-E0-1	EX-DB2-E1-8-SW	EX-DB2-E1-10	EX-DB2-F0-1	EX-DB2-F1-10	EX-DB2-F2-12	EX-DB2-C3-10	EX-DB2-C4-10	EX-DB2-C5-10
Sample Depth (feet bgs)	1	8	10	1	10	12	10	10	10
Sample Date	9/18/2017	9/19/2017	9/19/2017	9/20/2017	9/20/2017	9/21/2017	9/22/2017	9/22/2017	9/22/2017
VOCs									
Benzene[1]	0.029 U	0.023 U	0.027 U [0.029 U]	0.13 U	0.024 U	0.018 U	0.023 U	0.037 U	0.027 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	0.0706	NA	NA	0.07576	NA	0.002163	NA	NA	NA
Benzo[a]pyrene	0.05	NA	NA	0.049	NA	0.0011	NA	NA	NA
Benzo[a]anthracene	0.072	NA	NA	0.051	NA	0.0053 U	NA	NA	NA
Benzo[b]fluoranthene	0.061	NA	NA	0.11	NA	0.0016	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	0.022	NA	NA	0.03	NA	0.0053 U	NA	NA	NA
Chrysene	0.13	NA	NA	0.1	NA	0.0021	NA	NA	NA
Dibenz(a,h)anthracene	0.01	NA	NA	0.016 U	NA	0.0053 U	NA	NA	NA
Indeno(1,2,3-cd)pyrene	0.028	NA	NA	0.06	NA	0.00087	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	22 0	4.7 U	5.7 U [5.4 U]	26 U	4.9 U	2.1 J	4.5 U	7.4 U	5.5 U
Diesel Range Organics (DRO)	640 0	56 U	20 J [62 U]	180 0	62 U	16 J	60 U	69 U	61 U
Heavy Oil Organics (HO)	800 0	56 U	29 J [27 J]	470 0	62 U	150 0	60 U	20 J	61 U
HO+DRO	1440	56 U	49	650	62 U	166	60 U	54.5	61 U
Total Petroleum Hydrocarbons (TPH)[3]	1462	58.35 U	51.7	663	64.45 U	168.1	62.25 U	58.2	63.75 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	EX-DB2-C6-10	EX-DB2-C7-11	EX-DB2-C8-10	EX-DB2-D3-10	EX-DB2-A2-6-SW	EX-DB2-E2-10	EX-DB2-D4-10	EX-DB2-D5-10	EX-DB2-D6-10
Sample Depth (feet bgs)	10	11	10	10	6	10	10	10	10
Sample Date	9/22/2017	9/22/2017	9/22/2017	9/22/2017	9/25/2017	9/26/2017	9/27/2017	9/27/2017	9/27/2017
VOCs									
Benzene[1]	0.021 U	0.025 U	0.025 U	0.025 U	0.036 U	0.027 U	0.029 U	0.025 U	0.026 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	4.3 U	4.9 U	5 U	5 U	7.2 U	5.4 U	5.8 U	5 U	5.2 U
Diesel Range Organics (DRO)	60 U	61 U	60 U	61 U	67 U	63 U	60 U	20 J	44 U
Heavy Oil Organics (HO)	11 J	12 J	60 U	61 U	22 J	63 U	60 U	15 J	44 U
HO+DRO	41	42.5	60 U	61 U	55.5	63 U	60 U	35	44 U
Total Petroleum Hydrocarbons (TPH)[3]	43.15	44.95	62.5 U	63.5 U	59.1	65.7 U	62.9 U	37.5	46.6 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

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Sample Identification (ID)	EX-DB2-D7-11	EX-DB2-D8-10	EX-DB2-E3-11	EX-DB2-E4-10	EX-DB2-E5-10	EX-DB2-E6-11	SP-B1-B6-1	SP-B1-B4-4	SP-B1-I8-1
Sample Depth (feet bgs)	11	10	11	10	10	11	1	4	1
Sample Date	9/27/2017	9/27/2017	9/29/2017	9/29/2017	9/29/2017	9/29/2017	10/2/2017	10/2/2017	10/2/2017
VOCs									
Benzene[1]	0.026 U	0.025 U	0.024 U	0.024 U	0.026 U	0.024 U [0.028 U]	0.02 U	0.02 U	0.02 U
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	5.2 U	5 U	4.9 U	4.9 U	5.2 U	5.6 U [4.8 U]	4 U	4 U	3.9 U
Diesel Range Organics (DRO)	58 U	58 U	56 U	59 U	64 U	63 U [61 U]	49 U	23 J	52 U
Heavy Oil Organics (HO)	58 U	58 U	56 U	59 U	64 U	63 U [61 U]	49 U	25 J	52 U
HO+DRO	58 U	58 U	56 U	59 U	64 U	61 U	49 U	48	52 U
Total Petroleum Hydrocarbons (TPH)[3]	60.6 U	60.5 U	58.45 U	61.45 U	66.6 U	63.4 U	51 U	50	53.95 U
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sample Identification (ID)	SP-B1-C6-13	SP-B1-H4-4	SP-B1-B5-7	SP-B1-D8-2	EX-DB2-E7-10	DB1-H-2wall-3	DB1-I-11wall-2	EX-B19-YY-3-1	EX-B19-YY-2-1
Sample Depth (feet bgs)	13	4	7	2	10	3	2	1	1
Sample Date	10/2/2017	10/2/2017	10/2/2017	10/2/2017	10/2/2017	9/11/2003	9/8/2003	3/5/2008	3/5/2008
VOCs									
Benzene[1]	0.019 U	0.013 U	0.019 U	0.018 U	0.027 U	0.03 U	0.03 U	NA	NA
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	0.001301	NA	0.00755 U	0.00755 U	NA	NA
Benzo[a]pyrene	NA	NA	NA	0.00054	NA	NA	NA	NA	NA
Benzo[a]anthracene	NA	NA	NA	0.00079	NA	NA	NA	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	0.00096	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	0.0049 U	NA	NA	NA	NA	NA
Chrysene	NA	NA	NA	0.0033	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	0.0049 U	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.00063	NA	NA	NA	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	3.9 U	1.7 J	3.8 U	43 0	4.6 J	NA	NA	NA	NA
Diesel Range Organics (DRO)	19 J	33 J	50 U	130 0	62 U	NA	NA	NA	NA
Heavy Oil Organics (HO)	18 J	30 J	14 J	17 J	62 U	NA	NA	NA	NA
HO+DRO	37	63	39	147	62 U	NA	NA	NA	NA
Total Petroleum Hydrocarbons (TPH)[3]	38.95	64.7	40.9	190	66.6	20 U	20 U	NA	NA
Arsenic	NA	NA	NA	NA	NA	NA	NA	5	10

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Sample Identification (ID)	EX-B19-YY-1-1	EX-B19-ZZ-1-1	EX-B19-ZZ-2-1	EX-B19-ZZ-3-1	EX-B19-ZZ-1-2	EX-B19-ZZ-1-2.5	DB1-A-1wall-2.5	DB1-A-17wall-2.5	DB1-A-18wall-2.5
Sample Depth (feet bgs)	1	1	1	1	2	2.5	2.5	2	2
Sample Date	3/5/2008	3/5/2008	3/5/2008	3/5/2008	3/7/2008	3/12/2008	9/16/2003	10/9/2003	10/9/2003
VOCs									
Benzene[1]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA
Benzo[a]anthracene	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA
Benzo[b]fluoranthene	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA
Chrysene	NA	NA	NA	NA	NA	NA	0.21 D	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	0.2 U	NA	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics (DRO)	NA	NA	NA	NA	NA	NA	NA	NA	NA
Heavy Oil Organics (HO)	NA	NA	NA	NA	NA	NA	NA	NA	NA
HO+DRO	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (TPH)[3]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	5	25.0 [30.9]	9	6	31	<5.54	6	4	4

ARCADIS

Sample Identification (ID)	DB1-A-20wall-2.5	DB1-A-21wall-2.5	DB1-A-26wall1-4	DB1-A-26wall2-8	DB1-I-23-3	SWLY-A-5wall-3.75	SWLY-A-6wall-3.75	SWLY-A-9wall-3.75
Sample Depth (feet bgs)	2	2	4	8	2	3.75	3.75	3.75
Sample Date	10/10/2003	10/10/2003	9/5/2003	9/5/2003	8/29/2003	10/16/2003	10/22/2003	11/10/2003
VOCs								
Benzene[1]	NA	NA	NA	NA	NA	NA	NA	NA
Total Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) TEQ[2]	NA	NA	NA	NA	NA	NA	NA	NA
Benzo[a]pyrene	NA	NA	0.5 D	0.01 U	NA	0.01	0.1 U	0.01 U
Benzo[a]anthracene	NA	NA	0.08	0.01 U	NA	0.03	0.1 U	0.01 U
Benzo[b]fluoranthene	NA	NA	0.09 D	0.01 U	NA	0.01 U	0.1 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	0.05 U	0.01 U	NA	0.02	0.1 U	0.01 U
Chrysene	NA	NA	0.14 D	0.01 U	NA	0.09	0.11 D	0.01 U
Dibenz(a,h)anthracene	NA	NA	0.05 U	0.01 U	NA	0.01 U	0.1 U	0.01 U
Indeno(1,2,3-cd)pyrene	NA	NA	0.05 U	0.01 U	NA	0.01 U	0.1 U	0.01 U
1-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA
Gasoline Range Organics (GRO)	NA	NA	NA	NA	NA	NA	NA	NA
Diesel Range Organics (DRO)	NA	NA	NA	NA	NA	NA	NA	NA
Heavy Oil Organics (HO)	NA	NA	NA	NA	NA	NA	NA	NA
HO+DRO	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (TPH)[3]	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1	4	4	8	2	3	3	4

Notes:
NA = Not sampled
[ ] = bracketed data indicate duplicate sample.
All reported concentrations in milligram per kilogram (mg/kg).
Benzene analyzed by Environmental Protection Agency (EPA) Method 8021B.
Arsenic analyzed by EPA Method 6020.
cPAHs analyzed by EPA Method 8270 SIM.
Gasoline analyzed by method NWTPH-G.
Diesel and Heavy Oil (Lube) analyzed by method NWTPH-D Extended.
[1]If benzene was reported as non-detect, the value shown is the reporting limit. Half of the reporting limit value shown in this table was used in the statistical analysis.
[2]cPAHs adjusted for toxicity (TEQ) according to WAC 173-340-708(8). If one or more adjusted cPAH constituents were reported as Non-Detect, half of the reporting limit was used in calculations.
[3]Total petroleum hydrocarbons (TPH) calculated by summing the concentrations of gasoline, diesel and heavy oil. If one or more TPH constituents were reported as Non-Detect, half of the reporting limit value was added to the total.
[4]Lab report for this sample unavailable; detect/non-detect result status assumed based on concentration.

Lab Qualifiers:
U = Not Detected
D = Sample Diluted
J = Indicates an estimated value
W = Reporting limits were raised due to sample foaming

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Appendix C

Pro UCL Statistical Analysis

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 8/16/2024 8:54:10 AM
From File	FS - Edmonds_r5.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Result (1-methylnaphthalene)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
Number of Detects	10	Number of Non-Detects	6
Number of Distinct Detects	9	Number of Distinct Non-Detects	6
Minimum Detect	0.0014	Minimum Non-Detect	6.9000E-4
Maximum Detect	0.18	Maximum Non-Detect	0.0071
Variance Detects	0.00313	Percent Non-Detects	37.5%
Mean Detects	0.0208	SD Detects	0.056
Median Detects	0.00255	CV Detects	2.692
Skewness Detects	3.152	Kurtosis Detects	9.951
Mean of Logged Detects	-5.531	SD of Logged Detects	1.447

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.395	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.781	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.48	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.304	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0134	KM Standard Error of Mean	0.0113
90KM SD	0.0431	95% KM (BCA) UCL	0.0357
95% KM (t) UCL	0.0333	95% KM (Percentile Bootstrap) UCL	0.0356
95% KM (z) UCL	0.0321	95% KM Bootstrap t UCL	0.538
90% KM Chebyshev UCL	0.0474	95% KM Chebyshev UCL	0.0629
97.5% KM Chebyshev UCL	0.0843	99% KM Chebyshev UCL	0.126

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.231	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.796	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.414	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.284	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.397	k star (bias corrected MLE)	0.345
Theta hat (MLE)	0.0524	Theta star (bias corrected MLE)	0.0603
nu hat (MLE)	7.945	nu star (bias corrected)	6.895
Mean (detects)	0.0208		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0014	Mean	0.0168
Maximum	0.18	Median	0.0066
SD	0.0437	CV	2.609
k hat (MLE)	0.569	k star (bias corrected MLE)	0.504
Theta hat (MLE)	0.0294	Theta star (bias corrected MLE)	0.0332
nu hat (MLE)	18.21	nu star (bias corrected)	16.13
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (16.13, α)	8.051	Adjusted Chi Square Value (16.13, β)	7.409
95% Gamma Approximate UCL	0.0335	95% Gamma Adjusted UCL	0.0365

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0134	SD (KM)	0.0431
Variance (KM)	0.00185	SE of Mean (KM)	0.0113
k hat (KM)	0.0967	k star (KM)	0.12
nu hat (KM)	3.095	nu star (KM)	3.848
theta hat (KM)	0.138	theta star (KM)	0.111
80% gamma percentile (KM)	0.0118	90% gamma percentile (KM)	0.038

95% gamma percentile (KM)	0.0764	99% gamma percentile (KM)	0.194

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (3.85, α)	0.663	Adjusted Chi Square Value (3.85, β)	0.532
95% KM Approximate Gamma UCL	0.0778	95% KM Adjusted Gamma UCL	0.0968

95% KM Adjusted Gamma UCL (use when k<=1 and 15 < n < 50)

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.677	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.869	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.319	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.241	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0132	Mean in Log Scale	-6.398
SD in Original Scale	0.0445	SD in Log Scale	1.684
95% t UCL (assumes normality of ROS data)	0.0327	95% Percentile Bootstrap UCL	0.0351
95% BCA Bootstrap UCL	0.0474	95% Bootstrap t UCL	0.513
95% H-UCL (Log ROS)	0.0371		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.09	KM Geo Mean	0.00227
KM SD (logged)	1.339	95% Critical H Value (KM-Log)	3.261
KM Standard Error of Mean (logged)	0.358	95% H-UCL (KM -Log)	0.0171
KM SD (logged)	1.339	95% Critical H Value (KM-Log)	3.261
KM Standard Error of Mean (logged)	0.358		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0135	Mean in Log Scale	-6.126
SD in Original Scale	0.0445	SD in Log Scale	1.5
95% t UCL (Assumes normality)	0.033	95% H-Stat UCL	0.0265

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.0333

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (2-methylnaphthalene)

General Statistics

Total Number of Observations	33	Number of Distinct Observations	31
Number of Detects	22	Number of Non-Detects	11
Number of Distinct Detects	21	Number of Distinct Non-Detects	10
Minimum Detect	7.4000E-4	Minimum Non-Detect	6.9000E-4
Maximum Detect	24	Maximum Non-Detect	0.043
Variance Detects	30.08	Percent Non-Detects	33.33%
Mean Detects	1.784	SD Detects	5.485
Median Detects	0.057	CV Detects	3.074
Skewness Detects	3.7	Kurtosis Detects	14.1
Mean of Logged Detects	-2.779	SD of Logged Detects	2.707

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.372	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.878	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.436	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.214	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.19	KM Standard Error of Mean	0.794
90KM SD	4.455	95% KM (BCA) UCL	2.631

95% KM (t) UCL	2.534	95% KM (Percentile Bootstrap) UCL	2.603
95% KM (z) UCL	2.496	95% KM Bootstrap t UCL	15.34
90% KM Chebyshev UCL	3.571	95% KM Chebyshev UCL	4.65
97.5% KM Chebyshev UCL	6.147	99% KM Chebyshev UCL	9.088
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.156	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.889	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.31	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.205	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.216	k star (bias corrected MLE)	0.217
Theta hat (MLE)	8.243	Theta star (bias corrected MLE)	8.213
nu hat (MLE)	9.523	nu star (bias corrected)	9.558
Mean (detects)	1.784		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	7.4000E-4	Mean	1.193
Maximum	24	Median	0.01
SD	4.524	CV	3.793
k hat (MLE)	0.206	k star (bias corrected MLE)	0.207
Theta hat (MLE)	5.801	Theta star (bias corrected MLE)	5.759
nu hat (MLE)	13.57	nu star (bias corrected)	13.67
Adjusted Level of Significance (β)	0.0419		
Approximate Chi Square Value (13.67, α)	6.345	Adjusted Chi Square Value (13.67, β)	6.089
95% Gamma Approximate UCL	2.569	95% Gamma Adjusted UCL	2.678
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	1.19	SD (KM)	4.455
Variance (KM)	19.85	SE of Mean (KM)	0.794
k hat (KM)	0.0713	k star (KM)	0.085
nu hat (KM)	4.706	nu star (KM)	5.612
theta hat (KM)	16.68	theta star (KM)	13.99
80% gamma percentile (KM)	0.635	90% gamma percentile (KM)	2.926
95% gamma percentile (KM)	6.931	99% gamma percentile (KM)	20.47
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (5.61, α)	1.445	Adjusted Chi Square Value (5.61, β)	1.34
95% KM Approximate Gamma UCL	4.621	95% KM Adjusted Gamma UCL	4.983
95% KM Adjusted Gamma UCL (use when k<=1 and 15 < n < 50)			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.926	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.169	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.189	Mean in Log Scale	-4.617
SD in Original Scale	4.525	SD in Log Scale	3.477
95% t UCL (assumes normality of ROS data)	2.524	95% Percentile Bootstrap UCL	2.582
95% BCA Bootstrap UCL	3.348	95% Bootstrap t UCL	15.25
95% H-UCL (Log ROS)	192.2		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-4.222	KM Geo Mean	0.0147
KM SD (logged)	2.987	95% Critical H Value (KM-Log)	5.429
KM Standard Error of Mean (logged)	0.534	95% H-UCL (KM -Log)	22.34
KM SD (logged)	2.987	95% Critical H Value (KM-Log)	5.429
KM Standard Error of Mean (logged)	0.534		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.19	Mean in Log Scale	-4.127
SD in Original Scale	4.524	SD in Log Scale	2.989
95% t UCL (Assumes normality)	2.524	95% H-Stat UCL	24.84

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 10% Significance Level

Suggested UCL to Use

KM H-UCL	22.34

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (arsenic)

General Statistics

Total Number of Observations	360	Number of Distinct Observations	272
Number of Detects	358	Number of Non-Detects	2
Number of Distinct Detects	271	Number of Distinct Non-Detects	2
Minimum Detect	0.03	Minimum Non-Detect	0.5
Maximum Detect	30.9	Maximum Non-Detect	5.54
Variance Detects	10.75	Percent Non-Detects	0.556%
Mean Detects	4.102	SD Detects	3.279
Median Detects	3.285	CV Detects	0.799
Skewness Detects	4.02	Kurtosis Detects	25.56
Mean of Logged Detects	1.212	SD of Logged Detects	0.63

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.685	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0546	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	4.087	KM Standard Error of Mean	0.173
90KM SD	3.273	95% KM (BCA) UCL	4.395
95% KM (t) UCL	4.372	95% KM (Percentile Bootstrap) UCL	4.377
95% KM (z) UCL	4.372	95% KM Bootstrap t UCL	4.442
90% KM Chebyshev UCL	4.606	95% KM Chebyshev UCL	4.841
97.5% KM Chebyshev UCL	5.167	99% KM Chebyshev UCL	5.807

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	5.842	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.762	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.096	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0485	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.656	k star (bias corrected MLE)	2.635
Theta hat (MLE)	1.544	Theta star (bias corrected MLE)	1.556
nu hat (MLE)	1902	nu star (bias corrected)	1887
Mean (detects)	4.102		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.087
Maximum	30.9	Median	3.275
SD	3.278	CV	0.802
k hat (MLE)	2.503	k star (bias corrected MLE)	2.484
Theta hat (MLE)	1.633	Theta star (bias corrected MLE)	1.646
nu hat (MLE)	1802	nu star (bias corrected)	1788
Adjusted Level of Significance (β)	0.0493		
Approximate Chi Square Value (N/A, α)	1691	Adjusted Chi Square Value (N/A, β)	1691
95% Gamma Approximate UCL	4.322	95% Gamma Adjusted UCL	4.323

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	4.087	SD (KM)	3.273
Variance (KM)	10.71	SE of Mean (KM)	0.173
k hat (KM)	1.559	k star (KM)	1.548
nu hat (KM)	1123	nu star (KM)	1115
theta hat (KM)	2.621	theta star (KM)	2.64
80% gamma percentile (KM)	6.302	90% gamma percentile (KM)	8.452
95% gamma percentile (KM)	10.54	99% gamma percentile (KM)	15.23

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	1038	Adjusted Chi Square Value (N/A, β)	1038
95% KM Approximate Gamma UCL	4.389	95% KM Adjusted Gamma UCL	4.39

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.954	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	1.443E-11	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0614	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.0432	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.089	Mean in Log Scale	1.206
SD in Original Scale	3.276	SD in Log Scale	0.635
95% t UCL (assumes normality of ROS data)	4.374	95% Percentile Bootstrap UCL	4.388
95% BCA Bootstrap UCL	4.406	95% Bootstrap t UCL	4.399
95% H-UCL (Log ROS)	4.351		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	1.198	KM Geo Mean	3.313
KM SD (logged)	0.675	95% Critical H Value (KM-Log)	1.893
KM Standard Error of Mean (logged)	0.0357	95% H-UCL (KM -Log)	4.452
KM SD (logged)	0.675	95% Critical H Value (KM-Log)	1.893
KM Standard Error of Mean (logged)	0.0357		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.087	Mean in Log Scale	1.204
SD in Original Scale	3.277	SD in Log Scale	0.643
95% t UCL (Assumes normality)	4.372	95% H-Stat UCL	4.367

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	4.372		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (benzene1)

General Statistics

Total Number of Observations	1079	Number of Distinct Observations	337
Number of Detects	109	Number of Non-Detects	970
Number of Distinct Detects	101	Number of Distinct Non-Detects	258
Minimum Detect	0.004	Minimum Non-Detect	0.0019
Maximum Detect	33	Maximum Non-Detect	1.56
Variance Detects	11.87	Percent Non-Detects	89.9%
Mean Detects	0.885	SD Detects	3.446
Median Detects	0.108	CV Detects	3.894
Skewness Detects	7.897	Kurtosis Detects	71.31
Mean of Logged Detects	-1.937	SD of Logged Detects	1.546

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.277	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.41	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0985	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0923	KM Standard Error of Mean	0.0343
90KM SD	1.122	95% KM (BCA) UCL	0.169
95% KM (t) UCL	0.149	95% KM (Percentile Bootstrap) UCL	0.159
95% KM (z) UCL	0.149	95% KM Bootstrap t UCL	0.232
90% KM Chebyshev UCL	0.195	95% KM Chebyshev UCL	0.242
97.5% KM Chebyshev UCL	0.307	99% KM Chebyshev UCL	0.434
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	14.09	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.851	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.307	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.0938	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.368	k star (bias corrected MLE)	0.364
Theta hat (MLE)	2.408	Theta star (bias corrected MLE)	2.434
nu hat (MLE)	80.12	nu star (bias corrected)	79.25
Mean (detects)	0.885		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.004	Mean	0.0984
Maximum	33	Median	0.01
SD	1.122	CV	11.41
k hat (MLE)	0.336	k star (bias corrected MLE)	0.335
Theta hat (MLE)	0.293	Theta star (bias corrected MLE)	0.293
nu hat (MLE)	724.4	nu star (bias corrected)	723.8
Adjusted Level of Significance (β)	0.0498		
Approximate Chi Square Value (723.75, α)	662.3	Adjusted Chi Square Value (723.75, β)	662.3
95% Gamma Approximate UCL	0.108	95% Gamma Adjusted UCL	0.108
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0923	SD (KM)	1.122
Variance (KM)	1.259	SE of Mean (KM)	0.0343
k hat (KM)	0.00677	k star (KM)	0.00737
nu hat (KM)	14.61	nu star (KM)	15.9
theta hat (KM)	13.64	theta star (KM)	12.53
80% gamma percentile (KM)	4.993E-13	90% gamma percentile (KM)	4.3670E-6
95% gamma percentile (KM)	0.00671	99% gamma percentile (KM)	2.127
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (15.90, α)	7.893	Adjusted Chi Square Value (15.90, β)	7.885
95% KM Approximate Gamma UCL	0.186	95% KM Adjusted Gamma UCL	0.186
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.9	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	7.959E-10	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.0779	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0903	Mean in Log Scale	-8.165
SD in Original Scale	1.123	SD in Log Scale	3.085
95% t UCL (assumes normality of ROS data)	0.147	95% Percentile Bootstrap UCL	0.149
95% BCA Bootstrap UCL	0.183	95% Bootstrap t UCL	0.227
95% H-UCL (Log ROS)	N/A		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-5.648	KM Geo Mean	0.00352
KM SD (logged)	1.447	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0883	95% H-UCL (KM -Log)	N/A
KM SD (logged)	1.447	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0883		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.106	Mean in Log Scale	-3.934
SD in Original Scale	1.122	SD in Log Scale	0.971

95% t UCL (Assumes normality)	0.163	95% H-Stat UCL	N/A

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.149		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (benzo(g,h,i)perylene)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	5	Number of Distinct Non-Detects	10
Minimum Detect	0.0043	Minimum Non-Detect	6.9000E-4
Maximum Detect	0.064	Maximum Non-Detect	0.0012
Variance Detects	6.0589E-4	Percent Non-Detects	68.75%
Mean Detects	0.0263	SD Detects	0.0246
Median Detects	0.013	CV Detects	0.937
Skewness Detects	1.105	Kurtosis Detects	0.0103
Mean of Logged Detects	-4.047	SD of Logged Detects	1.059

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.305	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00868	KM Standard Error of Mean	0.00478
90KM SD	0.0171	95% KM (BCA) UCL	0.0171
95% KM (t) UCL	0.0171	95% KM (Percentile Bootstrap) UCL	0.0168
95% KM (z) UCL	0.0165	95% KM Bootstrap t UCL	0.0247
90% KM Chebyshev UCL	0.023	95% KM Chebyshev UCL	0.0295
97.5% KM Chebyshev UCL	0.0385	99% KM Chebyshev UCL	0.0562

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.292	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.688	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.269	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.362	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	1.371	k star (bias corrected MLE)	0.682
Theta hat (MLE)	0.0192	Theta star (bias corrected MLE)	0.0385
nu hat (MLE)	13.71	nu star (bias corrected)	6.818
Mean (detects)	0.0263		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0043	Mean	0.0151
Maximum	0.064	Median	0.01
SD	0.0149	CV	0.988
k hat (MLE)	2.268	k star (bias corrected MLE)	1.884
Theta hat (MLE)	0.00665	Theta star (bias corrected MLE)	0.008
nu hat (MLE)	72.58	nu star (bias corrected)	60.3

Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (60.30, α)	43.44	Adjusted Chi Square Value (60.30, β)	41.82
95% Gamma Approximate UCL	0.0209	95% Gamma Adjusted UCL	0.0217
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00868	SD (KM)	0.0171
Variance (KM)	2.9194E-4	SE of Mean (KM)	0.00478
k hat (KM)	0.258	k star (KM)	0.251
nu hat (KM)	8.26	nu star (KM)	8.044
theta hat (KM)	0.0336	theta star (KM)	0.0345
80% gamma percentile (KM)	0.0126	90% gamma percentile (KM)	0.026
95% gamma percentile (KM)	0.0419	99% gamma percentile (KM)	0.0843
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (8.04, α)	2.761	Adjusted Chi Square Value (8.04, β)	2.42
95% KM Approximate Gamma UCL	0.0253	95% KM Adjusted Gamma UCL	0.0289
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.21	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level	
Detected Data appear Lognormal at 10% Significance Level			
Note GOF tests may be unreliable for small sample sizes			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00846	Mean in Log Scale	-6.736
SD in Original Scale	0.0178	SD in Log Scale	1.975
95% t UCL (assumes normality of ROS data)	0.0162	95% Percentile Bootstrap UCL	0.0157
95% BCA Bootstrap UCL	0.019	95% Bootstrap t UCL	0.0354
95% H-UCL (Log ROS)	0.0796		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.269	KM Geo Mean	0.00189
KM SD (logged)	1.589	95% Critical H Value (KM-Log)	3.704
KM Standard Error of Mean (logged)	0.444	95% H-UCL (KM -Log)	0.0306
KM SD (logged)	1.589	95% Critical H Value (KM-Log)	3.704
KM Standard Error of Mean (logged)	0.444		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00849	Mean in Log Scale	-6.624
SD in Original Scale	0.0177	SD in Log Scale	1.882
95% t UCL (Assumes normality)	0.0163	95% H-Stat UCL	0.0615
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 1% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	0.0171		
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (benzo(k)fluoranthene)			
General Statistics			
Total Number of Observations	596	Number of Distinct Observations	119
Number of Detects	181	Number of Non-Detects	415
Number of Distinct Detects	88	Number of Distinct Non-Detects	39
Minimum Detect	5.9000E-4	Minimum Non-Detect	6.9000E-4
Maximum Detect	0.117	Maximum Non-Detect	0.27
Variance Detects	4.3222E-4	Percent Non-Detects	69.63%
Mean Detects	0.02	SD Detects	0.0208
Median Detects	0.012	CV Detects	1.041
Skewness Detects	3.031	Kurtosis Detects	9.78
Mean of Logged Detects	-4.21	SD of Logged Detects	0.729
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.553	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.318	**Lilliefors GOF Test**	

1% Lilliefors Critical Value	0.0766	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.00726	KM Standard Error of Mean	6.2833E-4
90KM SD	0.0144	95% KM (BCA) UCL	0.0084
95% KM (t) UCL	0.0083	95% KM (Percentile Bootstrap) UCL	0.00834
95% KM (z) UCL	0.0083	95% KM Bootstrap t UCL	0.00843
90% KM Chebyshev UCL	0.00915	95% KM Chebyshev UCL	0.01
97.5% KM Chebyshev UCL	0.0112	99% KM Chebyshev UCL	0.0135
Note: KM UCLs may be biased low with this dataset. Other substitution method recommended			
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	22.25	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.768	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.293	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.0696	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.834	k star (bias corrected MLE)	1.808
Theta hat (MLE)	0.0109	Theta star (bias corrected MLE)	0.0111
nu hat (MLE)	664	nu star (bias corrected)	654.3
Mean (detects)	0.02		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	5.9000E-4	Mean	0.0131
Maximum	0.117	Median	0.01
SD	0.0123	CV	0.943
k hat (MLE)	3.612	k star (bias corrected MLE)	3.595
Theta hat (MLE)	0.00362	Theta star (bias corrected MLE)	0.00364
nu hat (MLE)	4305	nu star (bias corrected)	4285
Adjusted Level of Significance (β)	0.0496		
Approximate Chi Square Value (N/A, α)	4134	Adjusted Chi Square Value (N/A, β)	4133
95% Gamma Approximate UCL	0.0135	95% Gamma Adjusted UCL	0.0135
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00726	SD (KM)	0.0144
Variance (KM)	2.0745E-4	SE of Mean (KM)	6.2833E-4
k hat (KM)	0.254	k star (KM)	0.254
nu hat (KM)	303	nu star (KM)	302.8
theta hat (KM)	0.0286	theta star (KM)	0.0286
80% gamma percentile (KM)	0.0106	90% gamma percentile (KM)	0.0218
95% gamma percentile (KM)	0.035	99% gamma percentile (KM)	0.0701
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (302.82, α)	263.5	Adjusted Chi Square Value (302.82, β)	263.4
95% KM Approximate Gamma UCL	0.00835	95% KM Adjusted Gamma UCL	0.00835
Note: KM UCLs may be biased low with this dataset. Other substitution method recommended			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.775	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.0606	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.00813	Mean in Log Scale	-5.525
SD in Original Scale	0.014	SD in Log Scale	1.172
95% t UCL (assumes normality of ROS data)	0.00907	95% Percentile Bootstrap UCL	0.00913
95% BCA Bootstrap UCL	0.00919	95% Bootstrap t UCL	0.00919
95% H-UCL (Log ROS)	0.00883		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-6.114	KM Geo Mean	0.00221
KM SD (logged)	1.51	95% Critical H Value (KM-Log)	2.579
KM Standard Error of Mean (logged)	0.119	95% H-UCL (KM -Log)	0.00811
KM SD (logged)	1.51	95% Critical H Value (KM-Log)	2.579

KM Standard Error of Mean (logged)	0.119		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0108	Mean in Log Scale	-4.936
SD in Original Scale	0.0153	SD in Log Scale	0.822
95% t UCL (Assumes normality)	0.0118	95% H-Stat UCL	0.0108

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.0083		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (benzo[a]anthracene)

General Statistics

Total Number of Observations	596	Number of Distinct Observations	131
Number of Detects	214	Number of Non-Detects	382
Number of Distinct Detects	111	Number of Distinct Non-Detects	28
Minimum Detect	7.9000E-4	Minimum Non-Detect	6.9000E-4
Maximum Detect	0.256	Maximum Non-Detect	0.27
Variance Detects	0.00101	Percent Non-Detects	64.09%
Mean Detects	0.0259	SD Detects	0.0318
Median Detects	0.0124	CV Detects	1.227
Skewness Detects	3.386	Kurtosis Detects	15.48
Mean of Logged Detects	-4.077	SD of Logged Detects	0.875

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.601	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0705	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0106	KM Standard Error of Mean	9.4252E-4
90KM SD	0.0223	95% KM (BCA) UCL	0.0122
95% KM (t) UCL	0.0122	95% KM (Percentile Bootstrap) UCL	0.0122
95% KM (z) UCL	0.0122	95% KM Bootstrap t UCL	0.0123
90% KM Chebyshev UCL	0.0135	95% KM Chebyshev UCL	0.0147
97.5% KM Chebyshev UCL	0.0165	99% KM Chebyshev UCL	0.02

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	18.09	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.776	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.238	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0634	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.324	k star (bias corrected MLE)	1.309
Theta hat (MLE)	0.0195	Theta star (bias corrected MLE)	0.0198
nu hat (MLE)	566.9	nu star (bias corrected)	560.3
Mean (detects)	0.0259		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.9000E-4	Mean	0.0157
Maximum	0.256	Median	0.01
SD	0.0205	CV	1.301
k hat (MLE)	2.065	k star (bias corrected MLE)	2.056
Theta hat (MLE)	0.00762	Theta star (bias corrected MLE)	0.00765
nu hat (MLE)	2461	nu star (bias corrected)	2450
Adjusted Level of Significance (β)	0.0496		
Approximate Chi Square Value (N/A, α)	2336	Adjusted Chi Square Value (N/A, β)	2336
95% Gamma Approximate UCL	0.0165	95% Gamma Adjusted UCL	0.0165

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0106	SD (KM)	0.0223
Variance (KM)	4.9644E-4	SE of Mean (KM)	9.4252E-4
k hat (KM)	0.227	k star (KM)	0.227
nu hat (KM)	271	nu star (KM)	271
theta hat (KM)	0.0467	theta star (KM)	0.0467
80% gamma percentile (KM)	0.0149	90% gamma percentile (KM)	0.0321
95% gamma percentile (KM)	0.0529	99% gamma percentile (KM)	0.109

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (271.01, α)	233.9	Adjusted Chi Square Value (271.01, β)	233.8
95% KM Approximate Gamma UCL	0.0123	95% KM Adjusted Gamma UCL	0.0123

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.866	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.217	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.0558	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.011	Mean in Log Scale	-5.503
SD in Original Scale	0.0221	SD in Log Scale	1.411
95% t UCL (assumes normality of ROS data)	0.0125	95% Percentile Bootstrap UCL	0.0126
95% BCA Bootstrap UCL	0.0127	95% Bootstrap t UCL	0.0127
95% H-UCL (Log ROS)	0.0127		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.702	KM Geo Mean	0.00334
KM SD (logged)	1.481	95% Critical H Value (KM-Log)	2.551
KM Standard Error of Mean (logged)	0.116	95% H-UCL (KM -Log)	0.0117
KM SD (logged)	1.481	95% Critical H Value (KM-Log)	2.551
KM Standard Error of Mean (logged)	0.116		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0132	Mean in Log Scale	-4.857
SD in Original Scale	0.0224	SD in Log Scale	0.902
95% t UCL (Assumes normality)	0.0147	95% H-Stat UCL	0.0126

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.0122		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (benzo[a]pyrene)

General Statistics

Total Number of Observations	596	Number of Distinct Observations	140
Number of Detects	200	Number of Non-Detects	396
Number of Distinct Detects	114	Number of Distinct Non-Detects	32

Minimum Detect	5.4000E-4	Minimum Non-Detect	6.9000E-4
Maximum Detect	0.5	Maximum Non-Detect	0.2
Variance Detects	0.00175	Percent Non-Detects	66.44%
Mean Detects	0.0258	SD Detects	0.0418
Median Detects	0.0123	CV Detects	1.623
Skewness Detects	7.913	Kurtosis Detects	83.94
Mean of Logged Detects	-4.128	SD of Logged Detects	0.953
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.432	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.293	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.0729	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.00973	KM Standard Error of Mean	0.00112
90KM SD	0.0268	95% KM (BCA) UCL	0.012
95% KM (t) UCL	0.0116	95% KM (Percentile Bootstrap) UCL	0.0118
95% KM (z) UCL	0.0116	95% KM Bootstrap t UCL	0.0125
90% KM Chebyshev UCL	0.0131	95% KM Chebyshev UCL	0.0146
97.5% KM Chebyshev UCL	0.0167	99% KM Chebyshev UCL	0.0209
Note: KM UCLs may be biased low with this dataset. Other substitution method recommended			
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	15.67	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.779	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.223	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.0652	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	1.205	k star (bias corrected MLE)	1.19
Theta hat (MLE)	0.0214	Theta star (bias corrected MLE)	0.0217
nu hat (MLE)	481.9	nu star (bias corrected)	476
Mean (detects)	0.0258		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	5.4000E-4	Mean	0.0153
Maximum	0.5	Median	0.01
SD	0.0253	CV	1.651
k hat (MLE)	2.042	k star (bias corrected MLE)	2.033
Theta hat (MLE)	0.00751	Theta star (bias corrected MLE)	0.00754
nu hat (MLE)	2434	nu star (bias corrected)	2423
Adjusted Level of Significance (β)	0.0496		
Approximate Chi Square Value (N/A, α)	2310	Adjusted Chi Square Value (N/A, β)	2310
95% Gamma Approximate UCL	0.0161	95% Gamma Adjusted UCL	0.0161
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.00973	SD (KM)	0.0268
Variance (KM)	7.2032E-4	SE of Mean (KM)	0.00112
k hat (KM)	0.131	k star (KM)	0.132
nu hat (KM)	156.7	nu star (KM)	157.3
theta hat (KM)	0.074	theta star (KM)	0.0738
80% gamma percentile (KM)	0.00943	90% gamma percentile (KM)	0.0282
95% gamma percentile (KM)	0.0548	99% gamma percentile (KM)	0.134
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (157.26, α)	129.3	Adjusted Chi Square Value (157.26, β)	129.2
95% KM Approximate Gamma UCL	0.0118	95% KM Adjusted Gamma UCL	0.0118
Note: KM UCLs may be biased low with this dataset. Other substitution method recommended			
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.841	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.248	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.0577	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0103	Mean in Log Scale	-5.658
SD in Original Scale	0.0266	SD in Log Scale	1.466
95% t UCL (assumes normality of ROS data)	0.012	95% Percentile Bootstrap UCL	0.0122
95% BCA Bootstrap UCL	0.0127	95% Bootstrap t UCL	0.0129
95% H-UCL (Log ROS)	0.0119		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.017	KM Geo Mean	0.00244
KM SD (logged)	1.596	95% Critical H Value (KM-Log)	2.665
KM Standard Error of Mean (logged)	0.11	95% H-UCL (KM -Log)	0.0104
KM SD (logged)	1.596	95% Critical H Value (KM-Log)	2.665
KM Standard Error of Mean (logged)	0.11		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0127	Mean in Log Scale	-4.888
SD in Original Scale	0.0264	SD in Log Scale	0.904
95% t UCL (Assumes normality)	0.0145	95% H-Stat UCL	0.0122

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.0116

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (benzo[b]fluoranthene)

General Statistics

Total Number of Observations	596	Number of Distinct Observations	130
Number of Detects	198	Number of Non-Detects	398
Number of Distinct Detects	105	Number of Distinct Non-Detects	32
Minimum Detect	9.3000E-4	Minimum Non-Detect	6.4000E-4
Maximum Detect	0.2	Maximum Non-Detect	0.27
Variance Detects	7.3942E-4	Percent Non-Detects	66.78%
Mean Detects	0.023	SD Detects	0.0272
Median Detects	0.0121	CV Detects	1.182
Skewness Detects	3.059	Kurtosis Detects	11.69
Mean of Logged Detects	-4.19	SD of Logged Detects	0.89

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.604	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.309	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0733	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0091	KM Standard Error of Mean	7.9041E-4
90KM SD	0.0186	95% KM (BCA) UCL	0.0105
95% KM (t) UCL	0.0104	95% KM (Percentile Bootstrap) UCL	0.0104
95% KM (z) UCL	0.0104	95% KM Bootstrap t UCL	0.0106
90% KM Chebyshev UCL	0.0115	95% KM Chebyshev UCL	0.0125
97.5% KM Chebyshev UCL	0.014	99% KM Chebyshev UCL	0.017

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	18.46	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.775	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.261	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0656	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.338	k star (bias corrected MLE)	1.321
Theta hat (MLE)	0.0172	Theta star (bias corrected MLE)	0.0174
nu hat (MLE)	530	nu star (bias corrected)	523.3
Mean (detects)	0.023		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.3000E-4	Mean	0.0144
Maximum	0.2	Median	0.01
SD	0.0168	CV	1.17
k hat (MLE)	2.415	k star (bias corrected MLE)	2.404
Theta hat (MLE)	0.00595	Theta star (bias corrected MLE)	0.00598
nu hat (MLE)	2879	nu star (bias corrected)	2865
Adjusted Level of Significance (β)	0.0496		
Approximate Chi Square Value (N/A, α)	2742	Adjusted Chi Square Value (N/A, β)	2742
95% Gamma Approximate UCL	0.015	95% Gamma Adjusted UCL	0.015

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0091	SD (KM)	0.0186
Variance (KM)	3.4643E-4	SE of Mean (KM)	7.9041E-4
k hat (KM)	0.239	k star (KM)	0.239
nu hat (KM)	284.8	nu star (KM)	284.7
theta hat (KM)	0.0381	theta star (KM)	0.0381
80% gamma percentile (KM)	0.013	90% gamma percentile (KM)	0.0274
95% gamma percentile (KM)	0.0446	99% gamma percentile (KM)	0.0908

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (284.67, α)	246.6	Adjusted Chi Square Value (284.67, β)	246.5
95% KM Approximate Gamma UCL	0.0105	95% KM Adjusted Gamma UCL	0.0105

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.845	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.251	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.058	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0094	Mean in Log Scale	-5.599
SD in Original Scale	0.0184	SD in Log Scale	1.358
95% t UCL (assumes normality of ROS data)	0.0106	95% Percentile Bootstrap UCL	0.0108
95% BCA Bootstrap UCL	0.0109	95% Bootstrap t UCL	0.0108
95% H-UCL (Log ROS)	0.0106		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.733	KM Geo Mean	0.00324
KM SD (logged)	1.362	95% Critical H Value (KM-Log)	2.435
KM Standard Error of Mean (logged)	0.11	95% H-UCL (KM -Log)	0.00938
KM SD (logged)	1.362	95% Critical H Value (KM-Log)	2.435
KM Standard Error of Mean (logged)	0.11		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0121	Mean in Log Scale	-4.888
SD in Original Scale	0.019	SD in Log Scale	0.844
95% t UCL (Assumes normality)	0.0133	95% H-Stat UCL	0.0115

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.0104		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods, then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (chrysene)

General Statistics

Total Number of Observations	596	Number of Distinct Observations	153
Number of Detects	235	Number of Non-Detects	361
Number of Distinct Detects	143	Number of Distinct Non-Detects	17
Minimum Detect	3.8000E-4	Minimum Non-Detect	4.8000E-4
Maximum Detect	0.427	Maximum Non-Detect	0.27
Variance Detects	0.00358	Percent Non-Detects	60.57%
Mean Detects	0.0421	SD Detects	0.0599
Median Detects	0.0157	CV Detects	1.421
Skewness Detects	2.995	Kurtosis Detects	11.09
Mean of Logged Detects	-3.835	SD of Logged Detects	1.164

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.626	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0673	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.018	KM Standard Error of Mean	0.00175
90KM SD	0.0423	95% KM (BCA) UCL	0.0211
95% KM (t) UCL	0.0209	95% KM (Percentile Bootstrap) UCL	0.021
95% KM (z) UCL	0.0209	95% KM Bootstrap t UCL	0.0215
90% KM Chebyshev UCL	0.0233	95% KM Chebyshev UCL	0.0257
97.5% KM Chebyshev UCL	0.029	99% KM Chebyshev UCL	0.0354

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	12.42	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.79	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.178	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0617	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.878	k star (bias corrected MLE)	0.87
Theta hat (MLE)	0.0479	Theta star (bias corrected MLE)	0.0484
nu hat (MLE)	412.9	nu star (bias corrected)	409
Mean (detects)	0.0421		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	3.8000E-4	Mean	0.0227
Maximum	0.427	Median	0.01
SD	0.0407	CV	1.794
k hat (MLE)	1.11	k star (bias corrected MLE)	1.106
Theta hat (MLE)	0.0204	Theta star (bias corrected MLE)	0.0205
nu hat (MLE)	1323	nu star (bias corrected)	1318
Adjusted Level of Significance (β)	0.0496		
Approximate Chi Square Value (N/A, α)	1234	Adjusted Chi Square Value (N/A, β)	1234
95% Gamma Approximate UCL	0.0242	95% Gamma Adjusted UCL	0.0242

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.018	SD (KM)	0.0423
Variance (KM)	0.00179	SE of Mean (KM)	0.00175
k hat (KM)	0.182	k star (KM)	0.182
nu hat (KM)	216.5	nu star (KM)	216.8
theta hat (KM)	0.0993	theta star (KM)	0.0992
80% gamma percentile (KM)	0.0225	90% gamma percentile (KM)	0.0544
95% gamma percentile (KM)	0.0952	99% gamma percentile (KM)	0.209

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (216.76, α)	183.7	Adjusted Chi Square Value (216.76, β)	183.6
95% KM Approximate Gamma UCL	0.0213	95% KM Adjusted Gamma UCL	0.0213
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.921	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.191	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.0533	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	0.0182	Mean in Log Scale	-5.401
SD in Original Scale	0.0423	SD in Log Scale	1.704
95% t UCL (assumes normality of ROS data)	0.0211	95% Percentile Bootstrap UCL	0.0213
95% BCA Bootstrap UCL	0.0216	95% Bootstrap t UCL	0.0216
95% H-UCL (Log ROS)	0.0234		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	-5.423	KM Geo Mean	0.00441
KM SD (logged)	1.639	95% Critical H Value (KM-Log)	2.709
KM Standard Error of Mean (logged)	0.137	95% H-UCL (KM -Log)	0.0203
KM SD (logged)	1.639	95% Critical H Value (KM-Log)	2.709
KM Standard Error of Mean (logged)	0.137		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0202	Mean in Log Scale	-4.693
SD in Original Scale	0.0419	SD in Log Scale	1.053
95% t UCL (Assumes normality)	0.023	95% H-Stat UCL	0.0175
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Suggested UCL to Use			
95% KM (t) UCL	0.0209		
The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.			
Please verify the data were collected from random locations.			
If the data were collected using judgmental or other non-random methods,			
then contact a statistician to correctly calculate UCLs.			
Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
Result (dibenz(a,h)anthracene)			
General Statistics			
Total Number of Observations	596	Number of Distinct Observations	115
Number of Detects	175	Number of Non-Detects	421
Number of Distinct Detects	81	Number of Distinct Non-Detects	39
Minimum Detect	8.4000E-4	Minimum Non-Detect	6.9000E-4
Maximum Detect	0.117	Maximum Non-Detect	0.2
Variance Detects	4.6601E-4	Percent Non-Detects	70.64%
Mean Detects	0.0201	SD Detects	0.0216
Median Detects	0.0118	CV Detects	1.075
Skewness Detects	2.961	Kurtosis Detects	8.891
Mean of Logged Detects	-4.21	SD of Logged Detects	0.707
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.53	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.338	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.0779	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.00709	KM Standard Error of Mean	6.3624E-4
90KM SD	0.0145	95% KM (BCA) UCL	0.00817
95% KM (t) UCL	0.00814	95% KM (Percentile Bootstrap) UCL	0.00817
95% KM (z) UCL	0.00814	95% KM Bootstrap t UCL	0.00825
90% KM Chebyshev UCL	0.009	95% KM Chebyshev UCL	0.00986
97.5% KM Chebyshev UCL	0.0111	99% KM Chebyshev UCL	0.0134

	A–E	F	G–K	L
1185	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**			
1186				
1187	**Gamma GOF Tests on Detected Observations Only**			
1188	A-D Test Statistic	25.38	**Anderson-Darling GOF Test**	
1189	5% A-D Critical Value	0.768	Detected Data Not Gamma Distributed at 5% Significance Level	
1190	K-S Test Statistic	0.317	**Kolmogorov-Smirnov GOF**	
1191	5% K-S Critical Value	0.0712	Detected Data Not Gamma Distributed at 5% Significance Level	
1192	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1193				
1194	**Gamma Statistics on Detected Data Only**			
1195	k hat (MLE)	1.806	k star (bias corrected MLE)	1.779
1196	Theta hat (MLE)	0.0111	Theta star (bias corrected MLE)	0.0113
1197	nu hat (MLE)	632.1	nu star (bias corrected)	622.6
1198	Mean (detects)	0.0201		
1199				
1200	**Gamma ROS Statistics using Imputed Non-Detects**			
1201	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1202	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1203	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1204	This is especially true when the sample size is small.			
1205	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1206	Minimum	8.4000E-4	Mean	0.013
1207	Maximum	0.117	Median	0.01
1208	SD	0.0126	CV	0.965
1209	k hat (MLE)	3.646	k star (bias corrected MLE)	3.629
1210	Theta hat (MLE)	0.00357	Theta star (bias corrected MLE)	0.00358
1211	nu hat (MLE)	4346	nu star (bias corrected)	4325
1212	Adjusted Level of Significance (β)	0.0496		
1213	Approximate Chi Square Value (N/A, α)	4173	Adjusted Chi Square Value (N/A, β)	4173
1214	95% Gamma Approximate UCL	0.0135	95% Gamma Adjusted UCL	0.0135
1215				
1216	**Estimates of Gamma Parameters using KM Estimates**			
1217	Mean (KM)	0.00709	SD (KM)	0.0145
1218	Variance (KM)	2.1150E-4	SE of Mean (KM)	6.3624E-4
1219	k hat (KM)	0.238	k star (KM)	0.238
1220	nu hat (KM)	283.3	nu star (KM)	283.2
1221	theta hat (KM)	0.0298	theta star (KM)	0.0298
1222	80% gamma percentile (KM)	0.0101	90% gamma percentile (KM)	0.0213
1223	95% gamma percentile (KM)	0.0348	99% gamma percentile (KM)	0.071
1224				
1225	**Gamma Kaplan-Meier (KM) Statistics**			
1226	Approximate Chi Square Value (283.22, α)	245.2	Adjusted Chi Square Value (283.22, β)	245.2
1227	95% KM Approximate Gamma UCL	0.00819	95% KM Adjusted Gamma UCL	0.00819
1228	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**			
1229				
1230	**Lognormal GOF Test on Detected Observations Only**			
1231	Shapiro Wilk Approximate Test Statistic	0.745	**Shapiro Wilk GOF Test**	
1232	10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
1233	Lilliefors Test Statistic	0.276	**Lilliefors GOF Test**	
1234	10% Lilliefors Critical Value	0.0617	Detected Data Not Lognormal at 10% Significance Level	
1235	**Detected Data Not Lognormal at 10% Significance Level**			
1236				
1237	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1238	Mean in Original Scale	0.008	Mean in Log Scale	-5.541
1239	SD in Original Scale	0.0142	SD in Log Scale	1.158
1240	95% t UCL (assumes normality of ROS data)	0.00895	95% Percentile Bootstrap UCL	0.00896
1241	95% BCA Bootstrap UCL	0.00902	95% Bootstrap t UCL	0.00907
1242	95% H-UCL (Log ROS)	0.00854		
1243				
1244	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1245	KM Mean (logged)	-6.07	KM Geo Mean	0.00231
1246	KM SD (logged)	1.416	95% Critical H Value (KM-Log)	2.487
1247	KM Standard Error of Mean (logged)	0.117	95% H-UCL (KM -Log)	0.00728
1248	KM SD (logged)	1.416	95% Critical H Value (KM-Log)	2.487
1249	KM Standard Error of Mean (logged)	0.117		
1250	**Note: KM UCLs may be biased low with this dataset. Other substitution method recommended**			
1251				
1252	**DL/2 Statistics**			
1253	**DL/2 Normal**		**DL/2 Log-Transformed**	
1254	Mean in Original Scale	0.0103	Mean in Log Scale	-4.958
1255	SD in Original Scale	0.0144	SD in Log Scale	0.798
1256	95% t UCL (Assumes normality)	0.0113	95% H-Stat UCL	0.0103
1257	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1258				

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.00814

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (diesel range organics (dro))

General Statistics

Total Number of Observations	1076	Number of Distinct Observations	347
Number of Detects	314	Number of Non-Detects	762
Number of Distinct Detects	264	Number of Distinct Non-Detects	120
Minimum Detect	4	Minimum Non-Detect	3.1
Maximum Detect	9700	Maximum Non-Detect	610
Variance Detects	1068825	Percent Non-Detects	70.82%
Mean Detects	374.2	SD Detects	1034
Median Detects	61.3	CV Detects	2.763
Skewness Detects	5.699	Kurtosis Detects	37.71
Mean of Logged Detects	4.437	SD of Logged Detects	1.604

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.38	Normal GOF Test on Detected Observations Only
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.36	Lilliefors GOF Test
1% Lilliefors Critical Value	0.0583	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	112.5	KM Standard Error of Mean	17.78
90KM SD	582.4	95% KM (BCA) UCL	146.2
95% KM (t) UCL	141.8	95% KM (Percentile Bootstrap) UCL	144.8
95% KM (z) UCL	141.8	95% KM Bootstrap t UCL	151.5
90% KM Chebyshev UCL	165.9	95% KM Chebyshev UCL	190
97.5% KM Chebyshev UCL	223.6	99% KM Chebyshev UCL	289.5

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	19.63	Anderson-Darling GOF Test
5% A-D Critical Value	0.837	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.186	Kolmogorov-Smirnov GOF
5% K-S Critical Value	0.0545	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.436	k star (bias corrected MLE)	0.434
Theta hat (MLE)	858	Theta star (bias corrected MLE)	862.1
nu hat (MLE)	273.9	nu star (bias corrected)	272.6
Mean (detects)	374.2		

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	109.2
Maximum	9700	Median	0.01
SD	583.2	CV	5.341
k hat (MLE)	0.119	k star (bias corrected MLE)	0.119
Theta hat (MLE)	916.3	Theta star (bias corrected MLE)	914.1
nu hat (MLE)	256.5	nu star (bias corrected)	257.1
Adjusted Level of Significance (β)	0.0498		
Approximate Chi Square Value (257.11, α)	221	Adjusted Chi Square Value (257.11, β)	220.9
95% Gamma Approximate UCL	127.1	95% Gamma Adjusted UCL	127.1

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	112.5	SD (KM)	582.4
Variance (KM)	339152	SE of Mean (KM)	17.78
k hat (KM)	0.0373	k star (KM)	0.0378
nu hat (KM)	80.31	nu star (KM)	81.42
theta hat (KM)	3015	theta star (KM)	2974
80% gamma percentile (KM)	4.732	90% gamma percentile (KM)	110.1
95% gamma percentile (KM)	521.9	99% gamma percentile (KM)	2709
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (81.42, α)	61.63	Adjusted Chi Square Value (81.42, β)	61.6
95% KM Approximate Gamma UCL	148.6	95% KM Adjusted Gamma UCL	148.7
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.941	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	2.220E-16	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0931	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.0461	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			
Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	110.6	Mean in Log Scale	1.02
SD in Original Scale	583	SD in Log Scale	2.809
95% t UCL (assumes normality of ROS data)	139.9	95% Percentile Bootstrap UCL	139.8
95% BCA Bootstrap UCL	145.1	95% Bootstrap t UCL	150.2
95% H-UCL (Log ROS)	N/A		
Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution			
KM Mean (logged)	2.302	KM Geo Mean	9.991
KM SD (logged)	1.657	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0756	95% H-UCL (KM -Log)	N/A
KM SD (logged)	1.657	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0756		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	114.7	Mean in Log Scale	2.606
SD in Original Scale	582.3	SD in Log Scale	1.512
95% t UCL (Assumes normality)	143.9	95% H-Stat UCL	N/A
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution			
Suggested UCL to Use			
95% KM (t) UCL	141.8		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (gasoline range organics (gro))

General Statistics			
Total Number of Observations	1077	Number of Distinct Observations	460
Number of Detects	252	Number of Non-Detects	825
Number of Distinct Detects	228	Number of Distinct Non-Detects	272
Minimum Detect	1.3	Minimum Non-Detect	0.49
Maximum Detect	3100	Maximum Non-Detect	57
Variance Detects	181357	Percent Non-Detects	76.6%
Mean Detects	172.1	SD Detects	425.9
Median Detects	19.45	CV Detects	2.475
Skewness Detects	4.094	Kurtosis Detects	19.75
Mean of Logged Detects	3.421	SD of Logged Detects	1.722
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.452	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.352	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.065	Detected Data Not Normal at 1% Significance Level	

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	41.44	KM Standard Error of Mean	6.655
90KM SD	217.9	95% KM (BCA) UCL	52.83
95% KM (t) UCL	52.4	95% KM (Percentile Bootstrap) UCL	52.67
95% KM (z) UCL	52.39	95% KM Bootstrap t UCL	54.9
90% KM Chebyshev UCL	61.41	95% KM Chebyshev UCL	70.45
97.5% KM Chebyshev UCL	83	99% KM Chebyshev UCL	107.7

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	22.17	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.85	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.226	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.0619	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.384	k star (bias corrected MLE)	0.382
Theta hat (MLE)	448.5	Theta star (bias corrected MLE)	450.8
nu hat (MLE)	193.3	nu star (bias corrected)	192.4
Mean (detects)	172.1		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	40.27
Maximum	3100	Median	0.01
SD	218.2	CV	5.419
k hat (MLE)	0.123	k star (bias corrected MLE)	0.123
Theta hat (MLE)	327.2	Theta star (bias corrected MLE)	326.5
nu hat (MLE)	265.1	nu star (bias corrected)	265.6
Adjusted Level of Significance (β)	0.0498		
Approximate Chi Square Value (265.65, α)	228.9	Adjusted Chi Square Value (265.65, β)	228.9
95% Gamma Approximate UCL	46.73	95% Gamma Adjusted UCL	46.74

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	41.44	SD (KM)	217.9
Variance (KM)	47479	SE of Mean (KM)	6.655
k hat (KM)	0.0362	k star (KM)	0.0367
nu hat (KM)	77.92	nu star (KM)	79.04
theta hat (KM)	1146	theta star (KM)	1129
80% gamma percentile (KM)	1.495	90% gamma percentile (KM)	38.2
95% gamma percentile (KM)	188.4	99% gamma percentile (KM)	1008

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (79.04, α)	59.55	Adjusted Chi Square Value (79.04, β)	59.53
95% KM Approximate Gamma UCL	55	95% KM Adjusted Gamma UCL	55.02

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.906	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.122	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.0515	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	40.63	Mean in Log Scale	-0.608
SD in Original Scale	218.1	SD in Log Scale	2.843
95% t UCL (assumes normality of ROS data)	51.58	95% Percentile Bootstrap UCL	51.58
95% BCA Bootstrap UCL	52.9	95% Bootstrap t UCL	54.23
95% H-UCL (Log ROS)	N/A		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.849	KM Geo Mean	2.338
KM SD (logged)	1.808	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.133	95% H-UCL (KM -Log)	N/A
KM SD (logged)	1.808	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.133		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	42.53	Mean in Log Scale	1.571
SD in Original Scale	217.8	SD in Log Scale	1.357
95% t UCL (Assumes normality)	53.46	95% H-Stat UCL	N/A

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	52.4

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (heavy oil organics (ho))

General Statistics

Total Number of Observations	1076	Number of Distinct Observations	317
Number of Detects	257	Number of Non-Detects	819
Number of Distinct Detects	195	Number of Distinct Non-Detects	164
Minimum Detect	11	Minimum Non-Detect	11
Maximum Detect	8300	Maximum Non-Detect	312
Variance Detects	584778	Percent Non-Detects	76.12%
Mean Detects	228.2	SD Detects	764.7
Median Detects	76	CV Detects	3.352
Skewness Detects	9.015	Kurtosis Detects	88.78
Mean of Logged Detects	4.444	SD of Logged Detects	1.173

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.252	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.388	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0644	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	66.78	KM Standard Error of Mean	11.73
90KM SD	383.8	95% KM (BCA) UCL	90.79
95% KM (t) UCL	86.1	95% KM (Percentile Bootstrap) UCL	88.68
95% KM (z) UCL	86.08	95% KM Bootstrap t UCL	112.8
90% KM Chebyshev UCL	102	95% KM Chebyshev UCL	117.9
97.5% KM Chebyshev UCL	140.1	99% KM Chebyshev UCL	183.5

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	15.98	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.809	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.189	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0599	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.623	k star (bias corrected MLE)	0.618
Theta hat (MLE)	366.2	Theta star (bias corrected MLE)	368.9
nu hat (MLE)	320.3	nu star (bias corrected)	317.9
Mean (detects)	228.2		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	54.5
Maximum	8300	Median	0.01
SD	385.7	CV	7.076
k hat (MLE)	0.123	k star (bias corrected MLE)	0.123
Theta hat (MLE)	444.1	Theta star (bias corrected MLE)	443.1

1555	nu hat (MLE)	264.1	nu star (bias corrected)	264.7
1556	Adjusted Level of Significance (β)	0.0498		
1557	Approximate Chi Square Value (264.70, α)	228	Adjusted Chi Square Value (264.70, β)	228
1558	95% Gamma Approximate UCL	63.27	95% Gamma Adjusted UCL	63.28
1559				
1560	**Estimates of Gamma Parameters using KM Estimates**			
1561	Mean (KM)	66.78	SD (KM)	383.8
1562	Variance (KM)	147319	SE of Mean (KM)	11.73
1563	k hat (KM)	0.0303	k star (KM)	0.0308
1564	nu hat (KM)	65.15	nu star (KM)	66.3
1565	theta hat (KM)	2206	theta star (KM)	2168
1566	80% gamma percentile (KM)	0.893	90% gamma percentile (KM)	41.59
1567	95% gamma percentile (KM)	264.9	99% gamma percentile (KM)	1712
1568				
1569	**Gamma Kaplan-Meier (KM) Statistics**			
1570	Approximate Chi Square Value (66.30, α)	48.56	Adjusted Chi Square Value (66.30, β)	48.54
1571	95% KM Approximate Gamma UCL	91.18	95% KM Adjusted Gamma UCL	91.21
1572				
1573	**Lognormal GOF Test on Detected Observations Only**			
1574	Shapiro Wilk Approximate Test Statistic	0.949	**Shapiro Wilk GOF Test**	
1575	10% Shapiro Wilk P Value	2.7675E-9	Detected Data Not Lognormal at 10% Significance Level	
1576	Lilliefors Test Statistic	0.0582	**Lilliefors GOF Test**	
1577	10% Lilliefors Critical Value	0.051	Detected Data Not Lognormal at 10% Significance Level	
1578	**Detected Data Not Lognormal at 10% Significance Level**			
1579				
1580	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1581	Mean in Original Scale	62.39	Mean in Log Scale	2.529
1582	SD in Original Scale	384.6	SD in Log Scale	1.503
1583	95% t UCL (assumes normality of ROS data)	81.69	95% Percentile Bootstrap UCL	82.71
1584	95% BCA Bootstrap UCL	88.29	95% Bootstrap t UCL	108.2
1585	95% H-UCL (Log ROS)	N/A		
1586				
1587	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1588	KM Mean (logged)	3.151	KM Geo Mean	23.37
1589	KM SD (logged)	0.95	95% Critical H Value (KM-Log)	N/A
1590	KM Standard Error of Mean (logged)	0.0403	95% H-UCL (KM -Log)	N/A
1591	KM SD (logged)	0.95	95% Critical H Value (KM-Log)	N/A
1592	KM Standard Error of Mean (logged)	0.0403		
1593				
1594	**DL/2 Statistics**			
1595	**DL/2 Normal**		**DL/2 Log-Transformed**	
1596	Mean in Original Scale	66.28	Mean in Log Scale	3.11
1597	SD in Original Scale	384.1	SD in Log Scale	0.971
1598	95% t UCL (Assumes normality)	85.56	95% H-Stat UCL	N/A
1599	**DL/2 is not a recommended method, provided for comparisons and historical reasons**			
1600				
1601	**Nonparametric Distribution Free UCL Statistics**			
1602	**Data do not follow a Discernible Distribution**			
1603				
1604	**Suggested UCL to Use**			
1605	95% KM (t) UCL	86.1		
1606				
1607	**The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.**			
1608	**Please verify the data were collected from random locations.**			
1609	**If the data were collected using judgmental or other non-random methods,**			
1610	**then contact a statistician to correctly calculate UCLs.**			
1611				
1612	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.			
1613	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.			
1614	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.			
1615				
1616	Result (ho+dro)			
1617				
1618	**General Statistics**			
1619	Total Number of Observations	1075	Number of Distinct Observations	475
1620	Number of Detects	352	Number of Non-Detects	723
1621	Number of Distinct Detects	320	Number of Distinct Non-Detects	175
1622	Minimum Detect	15.55	Minimum Non-Detect	7.1
1623	Maximum Detect	14600	Maximum Non-Detect	71.4
1624	Variance Detects	2197168	Percent Non-Detects	67.26%
1625	Mean Detects	507.1	SD Detects	1482
1626	Median Detects	98.23	CV Detects	2.923
1627	Skewness Detects	6.906	Kurtosis Detects	55.13
1628	Mean of Logged Detects	4.956	SD of Logged Detects	1.409

	A–E	F	G–K	L
1629				
1630	Normal GOF Test on Detects Only			
1631	Shapiro Wilk Test Statistic	0.334	**Normal GOF Test on Detected Observations Only**	
1632	1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
1633	Lilliefors Test Statistic	0.37	**Lilliefors GOF Test**	
1634	1% Lilliefors Critical Value	0.0551	Detected Data Not Normal at 1% Significance Level	
1635	**Detected Data Not Normal at 1% Significance Level**			
1636				
1637	**Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs**			
1638	KM Mean	171.6	KM Standard Error of Mean	26.85
1639	90KM SD	878.7	95% KM (BCA) UCL	219.6
1640	95% KM (t) UCL	215.8	95% KM (Percentile Bootstrap) UCL	218
1641	95% KM (z) UCL	215.8	95% KM Bootstrap t UCL	231.2
1642	90% KM Chebyshev UCL	252.2	95% KM Chebyshev UCL	288.6
1643	97.5% KM Chebyshev UCL	339.3	99% KM Chebyshev UCL	438.7
1644				
1645	**Gamma GOF Tests on Detected Observations Only**			
1646	A-D Test Statistic	24.69	**Anderson-Darling GOF Test**	
1647	5% A-D Critical Value	0.823	Detected Data Not Gamma Distributed at 5% Significance Level	
1648	K-S Test Statistic	0.186	**Kolmogorov-Smirnov GOF**	
1649	5% K-S Critical Value	0.0513	Detected Data Not Gamma Distributed at 5% Significance Level	
1650	**Detected Data Not Gamma Distributed at 5% Significance Level**			
1651				
1652	**Gamma Statistics on Detected Data Only**			
1653	k hat (MLE)	0.499	k star (bias corrected MLE)	0.497
1654	Theta hat (MLE)	1016	Theta star (bias corrected MLE)	1021
1655	nu hat (MLE)	351.3	nu star (bias corrected)	349.7
1656	Mean (detects)	507.1		
1657				
1658	**Gamma ROS Statistics using Imputed Non-Detects**			
1659	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
1660	GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
1661	For such situations, GROS method may yield incorrect values of UCLs and BTVs			
1662	This is especially true when the sample size is small.			
1663	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
1664	Minimum	0.01	Mean	166
1665	Maximum	14600	Median	0.01
1666	SD	880.2	CV	5.301
1667	k hat (MLE)	0.12	k star (bias corrected MLE)	0.121
1668	Theta hat (MLE)	1380	Theta star (bias corrected MLE)	1376
1669	nu hat (MLE)	258.7	nu star (bias corrected)	259.4
1670	Adjusted Level of Significance (β)	0.0498		
1671	Approximate Chi Square Value (259.36, α)	223.1	Adjusted Chi Square Value (259.36, β)	223
1672	95% Gamma Approximate UCL	193.1	95% Gamma Adjusted UCL	193.1
1673				
1674	**Estimates of Gamma Parameters using KM Estimates**			
1675	Mean (KM)	171.6	SD (KM)	878.7
1676	Variance (KM)	772194	SE of Mean (KM)	26.85
1677	k hat (KM)	0.0381	k star (KM)	0.0387
1678	nu hat (KM)	82	nu star (KM)	83.11
1679	theta hat (KM)	4499	theta star (KM)	4440
1680	80% gamma percentile (KM)	8.016	90% gamma percentile (KM)	174.9
1681	95% gamma percentile (KM)	806.8	99% gamma percentile (KM)	4103
1682				
1683	**Gamma Kaplan-Meier (KM) Statistics**			
1684	Approximate Chi Square Value (83.11, α)	63.1	Adjusted Chi Square Value (83.11, β)	63.08
1685	95% KM Approximate Gamma UCL	226	95% KM Adjusted Gamma UCL	226.1
1686				
1687	**Lognormal GOF Test on Detected Observations Only**			
1688	Shapiro Wilk Approximate Test Statistic	0.912	**Shapiro Wilk GOF Test**	
1689	10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
1690	Lilliefors Test Statistic	0.112	**Lilliefors GOF Test**	
1691	10% Lilliefors Critical Value	0.0436	Detected Data Not Lognormal at 10% Significance Level	
1692	**Detected Data Not Lognormal at 10% Significance Level**			
1693				
1694	**Lognormal ROS Statistics Using Imputed Non-Detects**			
1695	Mean in Original Scale	168.8	Mean in Log Scale	2.09
1696	SD in Original Scale	879.7	SD in Log Scale	2.458
1697	95% t UCL (assumes normality of ROS data)	213	95% Percentile Bootstrap UCL	215
1698	95% BCA Bootstrap UCL	222.7	95% Bootstrap t UCL	233.1
1699	95% H-UCL (Log ROS)	N/A		
1700				
1701	**Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution**			
1702	KM Mean (logged)	3.009	KM Geo Mean	20.28

KM SD (logged)	1.596	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0731	95% H-UCL (KM -Log)	N/A
KM SD (logged)	1.596	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0731		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	173.3	Mean in Log Scale	3.196
SD in Original Scale	878.8	SD in Log Scale	1.486
95% t UCL (Assumes normality)	217.5	95% H-Stat UCL	N/A

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	215.8		

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (indeno(1,2,3-cd)pyrene)

General Statistics

Total Number of Observations	596	Number of Distinct Observations	118
Number of Detects	181	Number of Non-Detects	415
Number of Distinct Detects	85	Number of Distinct Non-Detects	38
Minimum Detect	6.3000E-4	Minimum Non-Detect	6.9000E-4
Maximum Detect	0.117	Maximum Non-Detect	0.2
Variance Detects	4.3279E-4	Percent Non-Detects	69.63%
Mean Detects	0.0197	SD Detects	0.0208
Median Detects	0.0118	CV Detects	1.054
Skewness Detects	3.031	Kurtosis Detects	9.81
Mean of Logged Detects	-4.238	SD of Logged Detects	0.769

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.548	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.345	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0766	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0071	KM Standard Error of Mean	6.2390E-4
90KM SD	0.0144	95% KM (BCA) UCL	0.00821
95% KM (t) UCL	0.00813	95% KM (Percentile Bootstrap) UCL	0.00817
95% KM (z) UCL	0.00812	95% KM Bootstrap t UCL	0.00826
90% KM Chebyshev UCL	0.00897	95% KM Chebyshev UCL	0.00982
97.5% KM Chebyshev UCL	0.011	99% KM Chebyshev UCL	0.0133

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	23.03	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.769	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.286	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0696	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.743	k star (bias corrected MLE)	1.718
Theta hat (MLE)	0.0113	Theta star (bias corrected MLE)	0.0115
nu hat (MLE)	631	nu star (bias corrected)	621.8
Mean (detects)	0.0197		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	6.3000E-4	Mean	0.013
Maximum	0.117	Median	0.01
SD	0.0123	CV	0.946
k hat (MLE)	3.535	k star (bias corrected MLE)	3.519
Theta hat (MLE)	0.00368	Theta star (bias corrected MLE)	0.00369
nu hat (MLE)	4214	nu star (bias corrected)	4194
Adjusted Level of Significance (β)	0.0496		
Approximate Chi Square Value (N/A, α)	4045	Adjusted Chi Square Value (N/A, β)	4044
95% Gamma Approximate UCL	0.0135	95% Gamma Adjusted UCL	0.0135

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0071	SD (KM)	0.0144
Variance (KM)	2.0631E-4	SE of Mean (KM)	6.2390E-4
k hat (KM)	0.244	k star (KM)	0.244
nu hat (KM)	291.2	nu star (KM)	291
theta hat (KM)	0.0291	theta star (KM)	0.0291
80% gamma percentile (KM)	0.0102	90% gamma percentile (KM)	0.0213
95% gamma percentile (KM)	0.0346	99% gamma percentile (KM)	0.07

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (291.02, α)	252.5	Adjusted Chi Square Value (291.02, β)	252.4
95% KM Approximate Gamma UCL	0.00818	95% KM Adjusted Gamma UCL	0.00818

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.754	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.285	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.0606	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00794	Mean in Log Scale	-5.588
SD in Original Scale	0.014	SD in Log Scale	1.209
95% t UCL (assumes normality of ROS data)	0.00889	95% Percentile Bootstrap UCL	0.00892
95% BCA Bootstrap UCL	0.00903	95% Bootstrap t UCL	0.00903
95% H-UCL (Log ROS)	0.00872		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.126	KM Geo Mean	0.00219
KM SD (logged)	1.465	95% Critical H Value (KM-Log)	2.534
KM Standard Error of Mean (logged)	0.106	95% H-UCL (KM -Log)	0.00744
KM SD (logged)	1.465	95% Critical H Value (KM-Log)	2.534
KM Standard Error of Mean (logged)	0.106		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0105	Mean in Log Scale	-4.949
SD in Original Scale	0.0143	SD in Log Scale	0.825
95% t UCL (Assumes normality)	0.0115	95% H-Stat UCL	0.0107

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.00813

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (total carcinogenic polycyclic aromatic hydrocarbons (cpahs) teq2)

General Statistics

Total Number of Observations	613	Number of Distinct Observations	234

Number of Detects	251	Number of Non-Detects	362
Number of Distinct Detects	201	Number of Distinct Non-Detects	40
Minimum Detect	3.9600E-4	Minimum Non-Detect	3.7350E-4
Maximum Detect	0.349	Maximum Non-Detect	0.0479
Variance Detects	0.00121	Percent Non-Detects	59.05%
Mean Detects	0.0248	SD Detects	0.0347
Median Detects	0.01	CV Detects	1.402
Skewness Detects	4.485	Kurtosis Detects	32.26
Mean of Logged Detects	-4.34	SD of Logged Detects	1.212
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.616	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.241	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.0652	Detected Data Not Normal at 1% Significance Level	
Detected Data Not Normal at 1% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
KM Mean	0.0113	KM Standard Error of Mean	0.00102
90KM SD	0.0249	95% KM (BCA) UCL	0.0131
95% KM (t) UCL	0.013	95% KM (Percentile Bootstrap) UCL	0.0131
95% KM (z) UCL	0.013	95% KM Bootstrap t UCL	0.0134
90% KM Chebyshev UCL	0.0144	95% KM Chebyshev UCL	0.0157
97.5% KM Chebyshev UCL	0.0177	99% KM Chebyshev UCL	0.0215
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	7.771	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.788	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.154	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.0597	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	0.911	k star (bias corrected MLE)	0.902
Theta hat (MLE)	0.0272	Theta star (bias corrected MLE)	0.0274
nu hat (MLE)	457.2	nu star (bias corrected)	453
Mean (detects)	0.0248		
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)			
For such situations, GROS method may yield incorrect values of UCLs and BTVs			
This is especially true when the sample size is small.			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	3.9600E-4	Mean	0.016
Maximum	0.349	Median	0.01
SD	0.0234	CV	1.456
k hat (MLE)	1.519	k star (bias corrected MLE)	1.513
Theta hat (MLE)	0.0106	Theta star (bias corrected MLE)	0.0106
nu hat (MLE)	1862	nu star (bias corrected)	1854
Adjusted Level of Significance (β)	0.0496		
Approximate Chi Square Value (N/A, α)	1755	Adjusted Chi Square Value (N/A, β)	1755
95% Gamma Approximate UCL	0.0169	95% Gamma Adjusted UCL	0.017
Estimates of Gamma Parameters using KM Estimates			
Mean (KM)	0.0113	SD (KM)	0.0249
Variance (KM)	6.2080E-4	SE of Mean (KM)	0.00102
k hat (KM)	0.205	k star (KM)	0.205
nu hat (KM)	251.6	nu star (KM)	251.7
theta hat (KM)	0.055	theta star (KM)	0.055
80% gamma percentile (KM)	0.0151	90% gamma percentile (KM)	0.0341
95% gamma percentile (KM)	0.0578	99% gamma percentile (KM)	0.123
Gamma Kaplan-Meier (KM) Statistics			
Approximate Chi Square Value (251.66, α)	215.9	Adjusted Chi Square Value (251.66, β)	215.9
95% KM Approximate Gamma UCL	0.0132	95% KM Adjusted Gamma UCL	0.0132
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Approximate Test Statistic	0.925	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.198	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.0516	Detected Data Not Lognormal at 10% Significance Level	
Detected Data Not Lognormal at 10% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0113	Mean in Log Scale	-5.723
SD in Original Scale	0.0249	SD in Log Scale	1.612
95% t UCL (assumes normality of ROS data)	0.0129	95% Percentile Bootstrap UCL	0.0131
95% BCA Bootstrap UCL	0.0133	95% Bootstrap t UCL	0.0132
95% H-UCL (Log ROS)	0.0142		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.74	KM Geo Mean	0.00321
KM SD (logged)	1.57	95% Critical H Value (KM-Log)	2.582
KM Standard Error of Mean (logged)	0.106	95% H-UCL (KM -Log)	0.013
KM SD (logged)	1.57	95% Critical H Value (KM-Log)	2.582
KM Standard Error of Mean (logged)	0.106		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0127	Mean in Log Scale	-5.044
SD in Original Scale	0.0244	SD in Log Scale	1.035
95% t UCL (Assumes normality)	0.0143	95% H-Stat UCL	0.012

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.013

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Result (total petroleum hydrocarbons (tph)3)

General Statistics

Total Number of Observations	1078	Number of Distinct Observations	737
Number of Detects	424	Number of Non-Detects	654
Number of Distinct Detects	403	Number of Distinct Non-Detects	340
Minimum Detect	5.5	Minimum Non-Detect	7.65
Maximum Detect	15600	Maximum Non-Detect	92.95
Variance Detects	2353332	Percent Non-Detects	60.67%
Mean Detects	528.3	SD Detects	1534
Median Detects	90.63	CV Detects	2.904
Skewness Detects	6.742	Kurtosis Detects	54.3
Mean of Logged Detects	4.89	SD of Logged Detects	1.472

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.347	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.367	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.0502	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	213.9	KM Standard Error of Mean	30.32
90KM SD	993.7	95% KM (BCA) UCL	266.2
95% KM (t) UCL	263.8	95% KM (Percentile Bootstrap) UCL	266.4
95% KM (z) UCL	263.7	95% KM Bootstrap t UCL	282.8
90% KM Chebyshev UCL	304.8	95% KM Chebyshev UCL	346
97.5% KM Chebyshev UCL	403.2	99% KM Chebyshev UCL	515.5

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	33.21	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.831	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.206	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.0468	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.466	k star (bias corrected MLE)	0.464

Theta hat (MLE)	1134	Theta star (bias corrected MLE)	1138
nu hat (MLE)	394.9	nu star (bias corrected)	393.5
Mean (detects)	528.3		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	207.8
Maximum	15600	Median	0.01
SD	995.5	CV	4.791
k hat (MLE)	0.127	k star (bias corrected MLE)	0.127
Theta hat (MLE)	1639	Theta star (bias corrected MLE)	1635
nu hat (MLE)	273.4	nu star (bias corrected)	274
Adjusted Level of Significance (β)	0.0498		
Approximate Chi Square Value (273.97, α)	236.6	Adjusted Chi Square Value (273.97, β)	236.6
95% Gamma Approximate UCL	240.6	95% Gamma Adjusted UCL	240.6

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	213.9	SD (KM)	993.7
Variance (KM)	987534	SE of Mean (KM)	30.32
k hat (KM)	0.0463	k star (KM)	0.0468
nu hat (KM)	99.86	nu star (KM)	100.9
theta hat (KM)	4617	theta star (KM)	4569
80% gamma percentile (KM)	22.76	90% gamma percentile (KM)	298.3
95% gamma percentile (KM)	1109	99% gamma percentile (KM)	4773

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (100.92, α)	78.74	Adjusted Chi Square Value (100.92, β)	78.71
95% KM Approximate Gamma UCL	274.1	95% KM Adjusted Gamma UCL	274.2

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.907	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	0	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.12	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.0397	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	210.2	Mean in Log Scale	2.501
SD in Original Scale	995	SD in Log Scale	2.307
95% t UCL (assumes normality of ROS data)	260.1	95% Percentile Bootstrap UCL	261.5
95% BCA Bootstrap UCL	270.7	95% Bootstrap t UCL	279.2
95% H-UCL (Log ROS)	N/A		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	3.224	KM Geo Mean	25.12
KM SD (logged)	1.683	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.109	95% H-UCL (KM -Log)	N/A
KM SD (logged)	1.683	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.109		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	215.2	Mean in Log Scale	3.418
SD in Original Scale	993.9	SD in Log Scale	1.517
95% t UCL (Assumes normality)	265.1	95% H-Stat UCL	N/A

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	263.8

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

	A	B	C	D	E	F	G	H	I	J	K	L
2073	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
2074												

Appendix D

Sustainability Evaluation

Chevron Environmental Management Company

Appendix D – Sustainability Evaluation

Former Unocal Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

August 19, 2024

Appendix D – Sustainability Evaluation

Former Unocal Edmonds Bulk Fuel Terminal
11720 Unoco Road
Edmonds, Washington

August 19, 2024

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Contents

Acronyms and Abbreviations ii

1 Introduction 1-1

2 Proposed Remedial Alternatives 2-2

2.1 Alternative 4 – Excavation 2-2

2.2 Alternative 6 – Dual-Phase Extraction Treatment System Operation, Engineered Cover System, Contingency Plan, and Environmental Covenant 2-3

3 Evaluation and Summary 3-5

4 References 4-5

Tables

Table C-1 Site Wise Evaluation Numbers

Figures

Figure C-1 Total GHG and Energy Footprints

Acronyms and Abbreviations

GSR	Green and Sustainable Remediation
GHG	greenhouse gas
NAVFAC	Naval Facilities Engineering Systems Command
MTCO2e	metric ton carbon dioxide equivalents
GREET	Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation
MMBTU	metric million British Thermal Units
SOx	sulfur oxides
NOx	nitrogen oxides
PM10	particulate matter with diameters of 10 microns or less
Arcadis	Arcadis U.S., Inc.
DPE	dual-phase extraction
Ecology	Washington State Department of Ecology
FS Addendum	Public Review Draft Final Feasibility Study Report Addendum
Site	former Unocal Edmonds Bulk Fuel Terminal, located at 11720 Unoco Road, Edmonds, Washington
Unocal	Union Oil Company of California
USEPA	United States Environmental Protection Agency
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

1 Introduction

A sustainability evaluation to compare two active remedial alternatives associated with the Edmonds Bulk Fuel Terminal Feasibility Study Addendum was conducted in accordance with current Green and Sustainable Remediation (GSR) guidelines and requirements set by the Washington State Department of Ecology (Ecology; Ecology 2023). The quantitative analysis was completed using the GSR SiteWise™ tool developed by the Battelle Memorial Institute and the U.S. Department of Defense on Alternative 4: Excavation and Alternative 6: Dual-Phase Extraction Treatment System Operation, Engineered Cover System, Contingency Plan, and Environmental Covenant.

SiteWise™ was developed using industry-standard guidance and assumptions; the remedial scenarios were scoped using fundamental engineering practices and design assumptions with support from product and manufacturer documentation, when available. This quantitative sustainability analysis included analysis of the following metrics.

Greenhouse Gas (GHG) emission footprint. SiteWise™ documents emissions of GHGs, including carbon dioxide (CO_2), methane, and nitrogen oxides in the form of metric ton carbon dioxide equivalents (MTCO2e). The tool uses industry standards to quantify this metric, including the GHG Inventory Guidance developed by the USEPA Climate Leaders Program (NAVFAC 2018, USEPA 2009). Specific emission factors were developed by Argonne National Laboratory's Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model; USEPA's MOBILE6 model; USEPA's NONROAD model; and the life cycle inventory provided by National Renewable Energy Laboratory (NAVFAC 2018).

Energy usage. This metric considers both fuel and electricity power requirements in the form of metric million British Thermal Units (MMBTU) through the remedial life cycle. SiteWise™ uses energy content for fuels as determined by the GREET model.

Air emissions. This metric inventories emissions including sulfur oxides (SO_x), nitrogen oxides (NO_x), and particulate matter with diameters of 10 microns or less (PM10). SiteWise™ assumptions were developed using the USEPA's Office of Transportation and Air Quality MOBILE6 and NONROAD programs.

Water impacts. Water usage and impacts to water bodies (surface water, aquifers) were evaluated for each alternative based on expected activities for each scenario.

Resource consumption and waste production. The volume and composition of materials and wastes associated with each technology were identified based on expected activities and prior case studies. The life cycle footprint to manufacture, transport, utilize, and dispose of materials were considered in the overall sustainability analysis; for example, transportation associated with waste disposal was quantified in the GHG, energy, and air emissions analyses.

Injury and fatality risk. SiteWise™ utilizes various industry-sourced statistics to quantify the probability of worker injuries and fatalities. This metric is based on activities performed by workers under each scenario, such as heavy equipment operations or work duration.

In addition to the SiteWise™ assessment, the social cost of carbon was estimated for the year 2025 in general accordance with the Washington Utilities and Transportation Commission and Clean Energy Transformation Act (Revised Code of Washington [RCW] 2019). The adjusted GHG cost is presented in 2022 dollars. Although not required for remediation projects, this value is presented to provide broader context of the impact GHGs have on society.

Finally, climate vulnerability and resilience were assessed in accordance with Ecology's Sustainable Remediation: Climate Change Resiliency and Green Remediation guidance document (Ecology 2023). Ecology's best practices and recommendations were incorporated as feasible. By addressing residual impacts at this coastal site, both remedies do not effect overall site resiliency to severe weather events and climate change, including coastal flooding, tidal intrusion, erosion, and sea level rise.

2 Proposed Remedial Alternatives

Based on the site characteristics and available technology, the following remedial alternatives are considered to address the impacted soil and groundwater onsite:

- Alternative 4 – Excavation
- Alternative 6 – Dual-Phase Extraction Treatment System Operation, Engineered Cover System, Contingency Plan, and Environmental Covenant.

The following sections provide a summary of the sustainability of each remedial alternative, as well as a final ranking of overall sustainability.

2.1 Alternative 4 – Excavation

This alternative consists of excavating approximately 24,000 tons of impacted soil and transporting it to a landfill with dump trucks (via a transfer station) and rail cars. Groundwater encountered during the excavation would likely be treated with granular activated carbon (GAC) and discharged.

- **GHG Emissions:** The GHG emissions for Alternative 4 would be the higher of the two alternatives by approximately 93% (1,370 MTCO2e). The GHG footprint was primarily driven by the transportation of backfill and impacted soil to and from the site. The social cost of the carbon for Alternative 4 as defined by the Clean Energy Transformation Act would be approximately $129,000 (RCW 2019).
- **Energy Requirements:** The total energy requirements would be the higher of the two alternatives by approximately an order of magnitude. The energy footprint of Alternative 4 would primarily consist of fuel usage to transport consumables and wastes. However, Alternative 4 has negligible electricity usage compared to Alternative 6.
- **Air Emissions:** The emissions of air pollution and particulates associated with Alternative 4 would be higher than Alternative 6. This includes both onsite emissions from operation of heavy equipment, as well as global air emissions driven by the production and transportation of consumables and waste.
- **Water Requirements and Impact on Water Resources:** The impact on water resources would be the lower of the two alternatives. While approximately 2,000,000 gallons of groundwater would be expected to be extracted from the site during excavation as a result of intrusion and dewatering, the water would be treated and discharged onsite. Therefore, the net loss of water resources would be low.
- **Material Consumption and Waste Generation**: Material consumption for Alternative 4 would be the higher of the two alternatives due to the volume of backfill needed. The waste generation would also be higher due to the amount of impacted soil needing to be transported offsite.

- **Injury and Fatality Risk**: Alternative 4 would have a higher risk of injuries and fatalities due to the time spent operating heavy equipment and driving consumables and wastes to and from the site.
- **Climate Resilience and Biodiversity**: By removing source material, Alternative 4 would improve the resiliency of the site against severe weather events and climate change from the current site conditions. Specifically, removal of contaminated soil would limit the potential migration of impacts during flood events, erosion, or increased tidal interactions resulting from sea level rise. Additionally, this alternative does not include infrastructure that would be vulnerable to extreme weather. The excavation may disturb the ecosystem and associated biodiversity in the short term, though removal of contamination would provide long-term protectiveness.

Alternative 4 would produce higher emissions of carbon and other air pollutants. Additionally, this alternative produces more waste and has higher safety concerns. However, the overall water use associated with this alternative is lower than Alternative 6. Finally, Alternative 4 would likely make the site more resilient to climate impacts as compared to its current state. Additional information regarding the footprint of this alternative is shown in Table 1 and Figure 1.

2.2 Alternative 6 – Dual-Phase Extraction Treatment System Operation, Engineered Cover System, Contingency Plan, and Environmental Covenant.

This alternative consists of operating the existing DPE system for an additional year, followed by the installation of a geotextile and rock cover.

- **GHG Emissions:** The GHG emissions for Alternative 6 would be significantly lower than Alternative 4 (94 MTCO2e, approximately 7% of the Alternative 4 emissions). The GHG footprint for Alternative 6 would be driven by the electricity usage to operate the system. The social cost of this carbon as defined by the Clean Energy Transformation Act would be approximately $8,800 (RCW 2019).
- **Energy Requirements:** Continued operation of the DPE system and installation of the cover would have a lower total energy usage than Alternative 4. Specifically, this alternative is associated with lower fuel usage but higher electricity usage, with a lower overall footprint. The electricity is associated with the operation of the DPE system.
- **Air Emissions:** The emissions of air pollution and particulates associated with Alternative 6 would be lower than Alternative 4. Onsite emissions associated with this alternative would be negligible. Some global emissions would be associated with production of consumables and production of electricity, though these emissions would be approximately one to two orders of magnitude lower of those associated with Alternative 4.
- **Water Requirements and Impact on Water Resources:** The impact on water resources would be higher than Alternative 4. Although no water would be directly lost as part of the remedy, approximately 40,800 gallons of water would be utilized in the production of electricity needed to run the system. This estimate is based on Washington-specific data regarding the production of electricity.
- **Material Consumption and Waste Generation**: Both material consumption and waste generation for Alternative 6 would be lower than Alternative 4. The drivers for Alternative 6 include the production and supply chain of rock and geotextile for the engineered cover, as well as the production and disposal of GAC.

- **Injury and Fatality Risk**: The risk of injuries and fatalities for Alternative 6 would be lower than Alternative 4 (approximately 9% and 7% of the Alternative 4 footprint, respectively). The reduction in safety risks would primarily be due to decreased driving associated with consumables or waste transport.
- **Climate Resilience and Biodiversity**: By removing contaminated groundwater and constructing a cover, Alternative 6 would also improve the resiliency of the site against climate change and severe weather events. Specifically, short-term direct groundwater treatment would reduce long-term migration of impacts via groundwater and tidal interactions. Additionally, the installation of a cover system would protect against migration of impacts associated with erosion coast flooding or sea level rise. Finally, this alternative produces short- and long-term protectiveness of the ecosystem and biodiversity by minimizing land disturbance and preventing contact with contaminated soils. The DPE system would be vulnerable to damage in extreme weather events in the short term (<1 year), but temporary system shut down would not increase the risk of contaminant migration. Long-term infrastructure vulnerabilities would be much lower after system decommissioning and be limited to maintenance of the cover.

Alternative 6 would have a significantly lower carbon footprint, non-carbon air emissions, and material consumption than Alternative 4. Additionally, it is the safer remedy to implement for site workers. However, this alternative has higher off-site water use than Alternative 4. Finally, both alternatives would make the site more resilient to climate impacts and be protective of biodiversity than current site conditions. Additional information regarding the footprint of this alternative is shown in Table 1 and Figure 1.

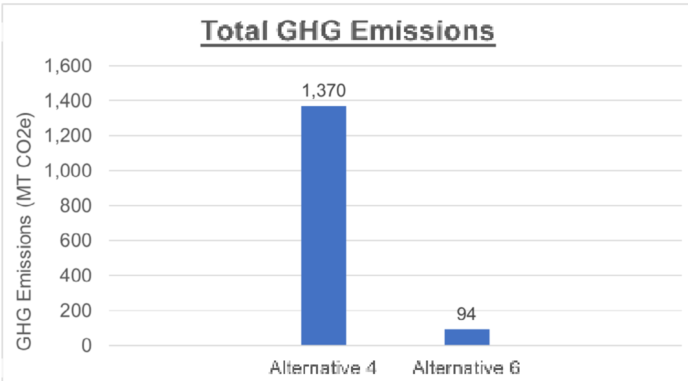
Table C-1. SiteWise[TM] Evaluation Summary

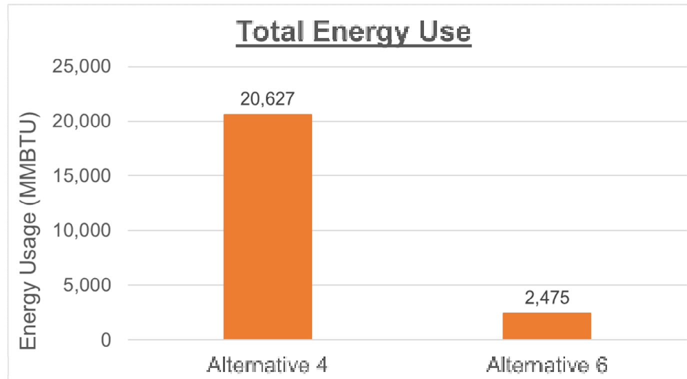
Sustainability Metric	Alternative 4: Excavation	Alternative 6: DPE and Cover System
GHG Emissions (MT CO2e)	1370	94
Total Energy (MMBTU)	20627	2475
Total Water (gal)	0.00	40800
Onsite NO_x Emissions (MT)	0.31	0.0030
Onsite SO_x Emissions (MT)	0.072	0.00056
Onsite PM_{10} Emissions (MT)	0.023	0.00037
Total NOx Emissions (MT)	8.9	0.18
Total SOx Emissions (MT)	4.2	0.26
Total PM10 Emissions (MT)	6.1	0.07
Injury Risk (%)	0.17	0.016
Fatality Risk (%)	0.0016	0.00012

Acronyms and Abbreviations

BTU = British thermal unit
CO2e = carbon dioxide equivalent
gal = gallons
MM = metric million
MT = metric ton
NOx = nitrogen oxides
PM10 = particulate matter <0.01 mm diameter
SOx = sulfur oxides
% = percent

Figure C-1. Total GHG and Energy Footprints





3 Evaluation and Summary

Both Alternative 4 and Alternative 6 would be protective of site biodiversity, limit migration of impacts, and increase climate resiliency. However, Alternative 6 (Dual-Phase Extraction Treatment System Operation, Engineered Cover System, Contingency Plan, and Environmental Covenant) would have a significantly lower impact with respect to GHG and other air emissions, energy use, and safety. Therefore, Alternative 4 is considered to be the more sustainable alternative.

4 References

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