Draft Remedial Investigation/Feasibility Study

Cap Sante Marine Site
Anacortes, Washington
Ecology Agreed Order No. DE-07TCPHQ-4197

for
Washington State Department of Ecology on Behalf of Port of Anacortes

March 20, 2013

GeoEngineers
Earth Science + Technology

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LIST OF ABBREVIATIONS AND ACRONYMS

ASTM	American Society for Testing and Materials
BETX	Benzene, ethylbenzene, toluene and xylenes
BGS	Below ground surface
Clearcreek	Clearcreek Contractors, Inc.
CAOs	Cleanup action objectives
cm	Centimeter
cm/s	Centimeter per second
cPAHs	Carcinogenic polycyclic aromatic hydrocarbons
CSM	Conceptual Site Model
DCA	Disproportionate cost analysis
DCAP	Draft Cleanup Action Plan
DMMP	Dredged Material Management Program
Ecology	Washington State Department of Ecology
EPH	Extractable petroleum hydrocarbons
FS	Feasibility Study
GeoEngineers	GeoEngineers Inc.
MTCA	Model Toxics Control Act
mg/kg	Milligram per kilogram
mg/L	Milligrams per liter
MLLW	Mean lower low water
PAHs	Polycyclic aromatic hydrocarbons
PCBs	Polychlorinated biphenyls
Port	Port of Anacortes
TEE	Terrestrial Ecological Evaluation
TEQ	Toxicity equivalent
TPH	Total petroleum hydrocarbons
RI	Remedial Investigation
UST	Underground Storage Tank
VPH	Volatile petroleum hydrocarbons
VOCs	Volatile organic compounds
WAC	Washington Administrative Code

1.0 INTRODUCTION

This document presents the Remedial Investigation/Feasibility Study (RI/FS) for the Cap Sante Marine Site (Site) located in Anacortes, Washington. The Site is formally referenced in the Washington State Department of Ecology (Ecology) databases as the Cap Sante Marine Site (Ecology Facility Site Identification No. 67532227) and is generally located along the western edge of the Cap Sante Boat Haven in Anacortes, Washington (Figure 1). The Site is subject to cleanup actions by the Port of Anacortes (Port) in accordance with the requirements of Ecology Agreed Order No. DE-07TCPHQ-4197 (Agreed Order). Completion of the RI/FS is a requirement of the Agreed Order scope of work. Ecology is managing the Site as part of the Fidalgo and Padilla Bay component to the Puget Sound Initiative.

Preliminary investigation and remediation activities (product recovery) were completed at the Site in the early 1980s when fuel was observed seeping into the marine waters south and east of the underground storage tanks (USTs) at the Site. Subsequent remedial investigations (RIs) were performed at the Site from 2004 through 2007 to evaluate soil, groundwater and sediment conditions (Floyd Snider McCarthy, 2004; Floyd|Snider, 2005; Landau, 2007a; and GeoEngineers, 2007). Based on the information generated by these RIs, an Interim Action was performed in 2007 in accordance with the Work Plan Supplement (GeoEngineers, 2007) to remove petroleum- and metals-contaminated soil in the vicinity of the USTs. RI activities performed at/adjacent to the Site between 2011 and 2012 (GeoEngineers, 2013a) provided additional environmental data to define the nature and extent of residual contamination at the Site not addressed by the Interim Action.

The purpose of this RI/FS is to present the results of RI and interim action activities completed at the Site and provide an evaluation of cleanup alternatives for addressing residual contamination following completion of the Interim Action.

1.1. Statement of Objectives

The objectives of this document is to: (1) summarize the results of historical data and remedial investigation (RI) activities completed to evaluate environmental conditions at the Site; (2) present a summary of interim action activities completed at the Site; and (3) present an evaluation of cleanup alternatives to address contamination remaining at the Site.

1.2. Report Organization

This report is organized as follows:

- Section 1.0 introduces the document with a brief description of the Site, and presents the objective and organization of the RI/FS report.
- Section 2.0 describes the Site history, previous environmental studies performed, and soil, groundwater and sediment conditions at the Site. In addition, this section summarizes current and future land use, exposure pathways and receptors for Site contamination, and the regulatory framework for Site investigation and cleanup.

- Section 3.0 describes the development of cleanup standards and the results of the RI completed at and adjacent to the Site.
- Section 4.0 summarizes the Cap Sante Marine Interim Action completed at the Site.
- Section 5.0 presents the Site Feasibility Study (FS).
- Section 6.0 presents the limitations for use of this report.
- Section 7.0 presents the references used in preparing this report.

2.0 SITE DESCRIPTION AND BACKGROUND

2.1. Site Description

For the purposes of the RI/FS, the Site is generally divided into two separate areas that are based on the historical use of the Site and include the historical Cap Sante Marine Lease Area, and Fisherman's Work and Parking Area (Figure 2).

The former Cap Sante Lease Area was located generally between 11th and 13th Streets east of Q Avenue. Recent redevelopment of this portion of the Site includes construction of a restaurant, pedestrian esplanade and parking. The Site grade is relatively flat with asphalt parking, concrete sidewalks and landscaped areas surrounding the recently constructed restaurant. The Fisherman's Work and Parking Area is located south of the historical Cap Sante Marine Lease Area. This portion of the Site is generally flat, paved with asphalt, and has been used as a work/parking area since the late 1980's.

Adjacent properties include a Safeway grocery store and gravel boat trailer parking area (located at the Shell Oil Tank Farm Site) west of the Site, across Q Avenue. Office spaces and parking for the Cap Sante Boat Haven Harbor Master, United States Customs and boat/yacht sales are located north of the Site, across 11th Street. Two marine storage warehouses (web lockers) are located south of the Site. The Site and surrounding features are shown on Figure 2.

2.2. Historical Operations and Site Uses

The Site and surrounding area was originally a portion of the Fidalgo Bay tide flats, which were filled to the current grade between the 1940s and early 1950s using dredged material from the adjacent federal waterway. The property was acquired by the Port in 1956 and was leased to a series of tenants who operated a boatyard and marina support area providing small boat storage, boat launch, boat maintenance and offshore fueling facilities. From the late 1970s to 2007, Cap Sante Marine, Ltd. occupied the northern portion of the Site and provided small vessel storage, launch, and minor maintenance services. Vessel fueling was historically provided from a float located offshore from the Site. Fuel (gasoline, diesel and two-stroke oil pre-mix) was supplied to the float via a series of underground pipelines from former USTs located within the former Cap Sante Marine Lease Area.

During the early 1980s, petroleum fuel was observed seeping into the marine waters at several locations east and southeast of the Site which were the result of leaking USTs and/or associated product lines. Although the USTs and supply lines were repaired in 1982, petroleum seepage continued to be observed at the Site. In 1984, the Port installed and operated a petroleum

recovery system under order from the U.S. Coast Guard to control the observed fuel seepage. The petroleum recovery system consisted of an interceptor trench system coupled with a recovery well. The interceptor trench extended to a depth of about 8 to 10 feet below ground surface (bgs) at the approximate location shown in Figure 2. After six months of operation, petroleum seepage into the harbor was no longer observed and product recovery operations ceased. During operation of the recovery system approximately 1,250 gallons of fuel were recovered from the trench. In 1985 the Port discontinued product recovery operations and replaced the old USTs with two new 12,000-gallon fuel tanks. Fueling service at the Site was discontinued and the fuel float facility demolished in 2006 as part of Site redevelopment activities. In 2007, USTs and supply lines at the Site were removed by the Port during an interim action completed to address petroleum contamination at the Site. Currently, a tenant to the Port leases a portion of the property to operate the current restaurant. Other areas of the property are used for pedestrian access (esplanade), boat launching and general parking.

Additional information regarding Site use history is presented in the Cap Sante Work Plan (Landau, 2007b). The approximate locations of the historical USTs, product supply lines and petroleum recovery trench are shown relative to the Site on Figure 2. Visual observations of contamination in the vicinity of the Site are also shown on Figure 2.

2.3. Previous Environmental Studies

Previous environmental investigations completed at and/or adjacent to the Site include:

- Petroleum Seepage Study in 1983 (Hart Crowser, 1983);
- Dredge Material Characterization in 2000 (Hart Crowser, 2000);
- Limited Environmental Due Diligence Investigation in 2004 (Floyd Snider McCarthy, 2004);
- Limited Environmental Due Diligence Investigation in 2005 (Floyd|Snider, 2005);
- Cap Sante Marine Area Remedial Investigation in 2007 (Landau, 2007a);
- Shallow Soil Characterization in 2007 (Attachment 1); and
- Soil and groundwater investigation related to the former Shell Oil Tank Farm Site in 2011 and 2012 (GeoEngineers, 2013a).

Detailed information regarding investigations completed prior to May 2007 are presented in the Shell Work Plan (GeoEngineers, 2009a) and Cap Sante Work Plan (Landau, 2007b). Information regarding the former Shell Tank Farm soil and groundwater investigation is detailed in the Former Shell Tank Farm RI/FS (GeoEngineers, 2013b). Samples obtained and analytical tests performed with respect to these investigations are summarized in Table 1. Tabulated chemical analytical results for these samples are presented in Appendix A and/or Attachment 1.

The environmental setting for the Site with respect to soil, groundwater and sediment conditions based on the results of these studies is summarized in the following sections.

2.3.1. Soil Conditions

Based on subsurface information obtained during previous studies, subsurface geology consists of dredged fill material overlying native marine sediment (silts and sands) and glacial deposits. The dredged fill material at the Site generally consist of fine to medium sand with varying amounts of silt and gravel and extend from the ground surface to depths of approximately 5 feet to 12 feet bgs. The fill material is typically about 8 feet thick in most areas of the Site. The native soil underlying the dredged fill material consists of sandy silt that was associated with the historical tide flat at the Site.

2.3.2. Groundwater Conditions

Based on subsurface information obtained during previous studies, three hydrogeologic units have been identified at the Site, including: (1) a shallow, unconfined aquifer occurring in the dredged fill; (2) a native silt confining unit; and (3) a deeper, confined aquifer. Measured depth to groundwater at the Site ranges from approximately 4 to 6 feet bgs (approximately elevation 7 to 8.5 feet mean lower low water [MLLW]). Observed groundwater flow direction is predominantly to the east-southeast toward Fidalgo Bay. Based on the results of tidal studies completed at the Site, tidal influence on groundwater levels and flow direction appears to be limited with a 0.8-foot fluctuation in groundwater levels in near shore wells during a high-low tide cycle. Measured fluctuation in groundwater levels away from the shore (approximately 100 to 200 feet) is approximately 0.1 feet.

In accordance with WAC 173-340-720(2)(d), groundwater is classified as a potential future source of drinking water because it is present in sufficient quantity, contains less than 10,000 milligrams per liter (mg/L) total dissolved solids and is not too deep to recover. However, because (1) of the proximity to marine surface water; (2) groundwater does not serve as a current source of drinking water; (3) the surface water is not classified as a suitable domestic water supply source; (4) there are known points of entry of the groundwater into surface water; and (5) potentially contaminated groundwater will not migrate to groundwater that is a current or potential future source of drinking water, Site groundwater qualifies as a non-potable water source.

2.3.3. Sediment Conditions

Sediments adjacent to the Site were evaluated between February 1999 and January 2000 in conjunction with maintenance dredging of the marina. Dredge materials were subject to the chemical quality evaluations required by the Dredged Material Management Program (DMMP) and were found to be suitable for open water disposal. Maintenance dredging within the marina east of the Site was completed between 2004 and 2007 to remove near surface sediments. The exposed sediment surface consisted of marine silts with occasional sand and gravel.

Additional sediment characterization was completed as part of the Site remedial investigation in 2007. The results of sampling and analysis confirmed that there is no evidence of petroleum contamination in the sediment areas located downgradient of the Site.

2.4. Current and Likely Future Land Use

The current Site use includes an active marina with facilities for boat launching and moorage, a public access walkway (esplanade) along the shoreline and restaurant. There currently are no plans to change the uses of the Site in the foreseeable future.

2.5. Exposure Pathways and Receptors

Fuel released from the former USTs and/or associated product lines, and releases from other historic operations at the Site have resulted in direct impacts to soil and secondary impacts to groundwater. Surface water and sediments have the potential for impacts through the migration of contaminants in groundwater to the marine environment, or as a result of shoreline erosion. Potential exposure pathways related to these media are discussed below.

2.5.1. Soil

The following potential exposure pathways and receptors existed for contaminants in Site soil:

- Contact (dermal, incidental ingestion or inhalation) by visitors, workers (including workers excavating soil) and potential future residents or users with hazardous substances in soil;
- Contact (dermal, incidental ingestion or inhalation) by terrestrial wildlife with hazardous substances in soil; and
- Leaching to groundwater.

2.5.2. Groundwater

The following potential exposure pathways and receptors for contaminants in Site groundwater:

- Groundwater to surface water, exposure of aquatic receptors to impacted groundwater that may discharge to Fidalgo Bay, resulting in acute or chronic effects; and
- Ingestion of aquatic organisms affected by the discharge of impacted groundwater to Fidalgo Bay by Site visitors.

As described in Section 2.3.2, human ingestion of hazardous substances released from the Site in groundwater was not a potential exposure pathway because groundwater at the Site, or potentially affected by Site soil, is not a current or reasonable future source of drinking water.

2.6. Regulatory Framework

In 2007, the Port entered into Agreed Order No. DE-07TCPHQ-4197 with Ecology. Work to be performed under the Agreed Order included completing the scope of remedial investigation activities outlined in the Ecology-approved Cap Sante Work Plan and the interim action activities outlined in the Ecology-approved Work Plan Supplement. In addition, the requirements of the Agreed Order include preparation of RI/FS and Draft Cleanup Action Plan (DCAP) documents for the Site. This RI/FS and a separate DCAP, when approved by Ecology, will complete the work requirements described in the Agreed Order.

3.0 REMEDIAL INVESTIGATION

3.1. Cleanup Standards

Cleanup standards consist of: (1) cleanup levels that are protective of human health and the environment, (2) the point of compliance at which the cleanup levels must be met. Preliminary cleanup levels were developed in the Cap Sante Marine Work Plan as part of the RI planning activities. This process identified potential exposure pathways for human and environmental impacts based on the planned land use. Proposed cleanup standards for remedial alternative evaluation are presented below. Final cleanup standards will be established during preparation of the DCAP.

3.1.1. Proposed Cleanup Levels

3.1.1.1. SOIL

Preliminary soil cleanup levels for the Site were developed as part of the Ecology-approved Cap Sante Work Plan (Landau, 2007b) and are based on MTCA Method A values for unrestricted land use, MTCA Method B standard formula values for the protection of human health and MTCA Method B soil concentrations protective of groundwater calculated using Ecology's fixed-parameter, three-phase partitioning model (MTCASGL Workbook; WAC 173-340-747(4)(b)). Preliminary soil cleanup levels developed for the Cap Sante Work Plan considered:

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

Because Site conditions do not meet any of the criteria in WAC 173-340-741(2), a terrestrial evaluation is not required. A copy of the completed Terrestrial Ecological Evaluation (TEE) Process – Primary Exclusions Documentation Form is presented in Appendix B.

In addition to these criteria, natural background soil metals concentrations in Washington state (Ecology, 1994) were considered in accordance with WAC 173-340-705(6) and WAC 173-340-709 where the lowest applicable regulatory criteria, adjusted for natural background metals concentrations, were selected as the preliminary soil cleanup levels. Details regarding the sources/derivation of each of the regulatory criteria are provided in the Cap Sante Work Plan.

For this RI/FS report, the preliminary soil cleanup levels developed during for the Cap Sante Work Plan have been adopted as the proposed cleanup levels for the Site with the exception of carcinogenic polycyclic aromatic hydrocarbons (cPAHs). As discussed in the Investigation Data Report (Data Report; Landau, 2007a), cPAH concentrations in saturated zone soil at several locations exceeded the preliminary cleanup levels. However, in accordance with WAC 173-340-747(9), it has been empirically demonstrated with groundwater analytical results that these cPAH concentrations in saturated soil are protective of groundwater and adjacent marine surface water (cPAHs were not detected above the preliminary groundwater cleanup levels). Based on this empirical demonstration and consultation with Ecology, the proposed soil cleanup level for cPAHs within the saturated zone is 0.137 milligrams per kilogram (mg/kg) total cPAH

toxicity equivalent (TEQ). The proposed final soil cleanup levels for the Site are presented in Table 2.

3.1.1.2. GROUNDWATER

Preliminary groundwater cleanup levels for the Site were developed as part of the Ecology-approved Cap Sante Work Plan. As indicated above, groundwater at, or potentially affected by the Site contamination is not currently used for drinking water and is not a reasonable future source of drinking water because of its proximity to marine surface water. Therefore, the following potential exposure pathways for Site groundwater were considered for developing preliminary cleanup levels:

- Human ingestion of marine organisms contaminated by releases of affected Site groundwater to adjacent marine surface water; and
- Acute or chronic effects to aquatic organisms contaminated by releases from exposure to constituents in groundwater discharging to adjacent marine surface water.

Groundwater cleanup criteria were developed to be adequately protective of aquatic organisms and of humans that ingest these marine organisms. Except for petroleum hydrocarbons (gasoline, diesel and heavy oil), MTCA Method B marine surface water preliminary cleanup levels were developed in accordance with WAC 173-340-730(3). According to the Cap Sante Work Plan, gasoline-, diesel- and heavy oil-range petroleum hydrocarbon cleanup levels based on sediment toxicity testing were not developed because the detected concentrations in sediment were not high enough to warrant toxicity testing (Landau, 2007b). Subsequently, because cleanup levels protective of marine surface water have not been established for petroleum hydrocarbons, gasoline-, diesel- and heavy oil-range hydrocarbon cleanup levels for groundwater were referenced from MTCA Table 720-1 (MTCA Method A), in accordance with WAC 173-340-730(3)(b)(iii)(C).

For this RI/FS report, the preliminary groundwater cleanup levels developed for the Cap Sante Work Plan have been adopted as the proposed final groundwater cleanup levels for the Site and are presented in Table 3.

3.1.2. Point of Compliance

Under MTCA, the point of compliance is the point or location on a site where the cleanup levels must be attained. This section describes the proposed points of compliance for soil and groundwater.

3.1.2.1. SOIL

The standard point of compliance for the proposed human health based-direct contact soil cleanup levels shown in Table 2 is throughout the soil column from the ground surface to 15 feet bgs, in accordance with WAC 173-340-740(6)(d). The points of compliance for soil cleanup levels based on protection of groundwater as marine surface water are 0-5 feet bgs for the unsaturated zone and 5 feet bgs and greater for the saturated zone.

3.1.2.2. GROUNDWATER

Because the proposed final groundwater cleanup levels shown in Table 3 are based on protection of marine surface water and not protection of groundwater as drinking water, the proposed

conditional point of compliance for the preliminary groundwater cleanup levels is where groundwater discharges to Fidalgo Bay.

3.2. Soil Investigations and Results

This section presents a summary of the soil investigation activities conducted at the Site.

3.2.1. Soil Investigation Activities

In 1983, Hart Crowser conducted a petroleum seepage study on behalf of the Port to evaluate observed petroleum seepage into Cap Sante Boat Haven, hydrogeologic conditions and identify the petroleum source (Hart Crowser, 1983). Soil conditions were evaluated at eight boring locations (B-1 through B-8) and three test pit locations (TP-1 through TP-3). No soil samples were submitted for chemical analysis as part of this field investigation.

In 2004 and 2005, Floyd|Snider conducted several phases of environmental due diligence investigation on behalf of the Port to evaluate the extent of soil and groundwater contamination at the Site (Floyd Snider McCarthy, 2004 and Floyd|Snider, 2005). In 2004, soil samples were obtained from six locations (GP-1 through GP-4, GP-5B and GP-6) near the former fuel recovery trench. A total of 13 soil sample were analyzed for petroleum hydrocarbon identification and/or gasoline-, diesel-, and/or heavy oil-range petroleum hydrocarbons, and/or benzene, ethylbenzene, toluene and xylenes (BETX). In 2005, soil samples were obtained from 14 locations (CSM01 through CSM14) within the former Cap Sante Marine Lease Area and Fisherman's Work and Parking Area. A total of 22 soil samples were analyzed for petroleum hydrocarbon identification, gasoline-, diesel-, and/or heavy oil-range petroleum hydrocarbons, and/or BETX.

In May 2007, Landau completed an RI field study on behalf of the Port to delineate the extent of petroleum-impacted soil at the Site associated with releases from the USTs (Landau, 2007a). Soil samples were obtained from 15 boring locations (SB-01 through SB-14 and MW-3D) upgradient, cross gradient and downgradient of the former USTs, where petroleum sheens were observed during construction of the oil recovery trench and near the shoreline. A total of 45 soil samples were analyzed for diesel-, and heavy oil-range petroleum hydrocarbons, volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and/or lead.

In September 2007, GeoEngineers completed a supplemental shallow soil investigation on behalf of the Port as part of an interim action design study to evaluate the vertical extent of non-contaminated soil (soil in which contaminants either were not detected or were less than preliminary Site cleanup levels) overlying petroleum hydrocarbon contaminated soil associated with USTs releases at the Site (Attachment 1). Soil samples were obtained from 11 boring locations (GEI-1 through GEI-11) completed in the vicinity of the planned interim action excavation area. A total of 11 samples were submitted for chemical analysis of gasoline-, diesel- and oil-range petroleum hydrocarbons, BETX, PAHs and/or lead.

In 2011, GeoEngineers completed an RI field study on behalf of the Port to further evaluate the extent of petroleum- and PAH-impacted soil identified during previous environmental investigations (GeoEngineers, 2013a). Soil samples were obtained from 16 boring locations (GEI-16 through GEI-29, GEI-35 and GEI-MW-1). A total of 89 soil samples (including duplicate samples) were

analyzed for gasoline-, diesel-, and heavy oil-range petroleum hydrocarbons, VOCs, PAHs, polychlorinated biphenyls (PCBs) and/or metals (cadmium and/or lead).

RI field study locations completed between 1983 and 2011 are shown relative to the Site on Figure 3. Soil chemical analytical results are summarized below.

3.2.2. Soil Investigation Results

Results of the 1983 seepage study (Hart Crowser, 1983) indicated the presence of free product measuring up to 0.89 feet in thickness in borings B-2, B-3, B-5, B-7 and B-8 completed downgradient of the historic gasoline and diesel USTs. No product was observed in borings B-1 and B-4 and test pits TP-1 through TP-3. Soil samples were not submitted for chemical analysis.

Results of the 2004 and 2005 soil investigations (Floyd Snider McCarthy, 2004 and Floyd|Snider, 2005) confirmed the presence of petroleum hydrocarbons and BETX compounds at concentrations above preliminary (MTCA Method A and/or B) cleanup levels in the vicinity of the USTs within the Former Cap Sante Marine Lease Area. These studies identified soil contaminated with gasoline- and diesel-range petroleum hydrocarbons, benzene and xylenes in a roughly fan-shaped area around the USTs that extended to Fidalgo Bay. Additionally, gasoline- and diesel-range petroleum hydrocarbons were detected at concentrations exceeding preliminary soil cleanup levels 200 feet southwest of the former USTs. The petroleum hydrocarbon exceedances at this location appear to be unrelated to the historical UST releases.

Results of the May 2007 soil investigation (Landau, 2007a) indicated that the preliminary soil cleanup level exceedances occurred within the capillary fringe and saturated zone in the vicinity of the USTs at depths ranging from 3 to 16 feet bgs. Additionally, an isolated area containing gasoline-range impacted soil was identified approximately 170 feet north of the former USTs. A second isolated area in which gasoline-range and PAH impacted soil was also identified approximately 170 feet southwest of the former USTs. These impacted areas appear to be unrelated to the historical UST releases. Other constituents detected in soil at concentrations exceeding the preliminary cleanup levels in the vicinity of the former USTs include lead, copper and cPAHs. Each of these exceedances was a single occurrence.

Results of the September 2007 supplemental shallow soil investigation (Attachment 1) provided additional delineation of the lateral and vertical extent of the petroleum contaminated soil associated with releases from the former USTs. Selected soil samples analyzed for gasoline-, diesel- and oil-range petroleum hydrocarbons, BETX, PAHs and lead were used to characterize the overburden and surrounding soil for reuse. Chemical constituents either were not detected or were detected at concentrations less than MTCA Method A and/or B cleanup levels with one exception. Gasoline-range petroleum hydrocarbons were detected at a concentration greater than the MTCA Method A cleanup level in soil from 2 to 3 feet bgs in boring GEI-7, located approximately 50 feet south of the former USTs (Figure 3).

Results of the 2011 soil investigation (GeoEngineers, 2013a) provided additional delineation of the lateral and vertical extent of the petroleum and PAH contaminated soil associated with soil sample locations CSM13, SB-13 and SB-14 in which contaminants were detected at concentrations greater than preliminary soil cleanup levels. Based on the sample results, gasoline-range

petroleum hydrocarbons and PAHs in the vicinity of SB-13 and SB-14 (southwest of the former USTs) were found to be limited in extent and occur between 3 and 10 feet bgs. Gasoline- and diesel-range petroleum hydrocarbons in the vicinity of CSM-13 also appear to be limited in extent and occur between 8 and 14 feet bgs. Results of this soil investigation also indicated the presence of PAHs in soil at concentrations exceeding preliminary soil cleanup levels in the vicinity of CSM13.

Results of the September 2007 shallow soil investigation are presented in Attachment 1. Tables summarizing chemical analytical results from other RI investigations are presented in Appendix A. Soil sample locations are shown relative to the Site on Figure 3.

3.3. Groundwater Investigations and Results

This section presents a summary of the RI groundwater investigation activities conducted at the Site.

3.3.1. Groundwater Investigation Activities

Hydrogeologic characterization activities were completed by Hart Crowser and Landau in 1983 and 2007, respectively. Hydraulic conductivity of shallow fill soil and groundwater flow direction was evaluated by Hart Crowser in 1983 to develop alternatives for mitigating the observed petroleum seepage to the Cap Sante Boat Haven. Hydrogeologic conditions were further evaluated by Landau in 2007 through water level measurements, slug tests and a tidal study. Slug tests were performed to estimate the range of hydraulic conductivities in the vicinity of four on-site monitoring wells (MW-01 through MW-04). These tests were performed at a low tidal stage using a slug rod, downhole pressure transducer, and an electric water level indicator in general accordance with American Society for Testing and Materials (ASTM) D 4044-96 (1999) methods. The tidal study involved measuring water levels in monitoring wells MW-01 through MW-04 and measuring surface water levels within the marina. A combination of pressure transducers/dataloggers and an electric water level indicator were used to measure water elevations over a 72-hour period.

In 2004 and 2005, Floyd|Snider conducted several phases of environmental due diligence investigation on behalf of the Port to evaluate the extent of groundwater and soil contamination at the Site (Floyd Snider McCarthy, 2004 and Floyd|Snider, 2005). In 2004, groundwater samples were collected for chemical analyses from six soil boring locations (GP-1 through GP-4, GP-5B and GP-6) near the former fuel recovery trench to determine type and concentration of petroleum hydrocarbons in groundwater. In 2005, groundwater samples were collected for chemical analyses from ten soil boring locations (CSM01 through CSM04 and CSM07 through CSM13) located adjacent to the former USTs, in the southern portions of the Cap Sante Marine Lease Area and within Fisherman's Work and Parking Area. Groundwater samples obtained during these Floyd|Snider studies were analyzed for gasoline-, diesel-, and/or heavy oil-range petroleum hydrocarbons, and BETX.

In 2007, Landau installed four groundwater monitoring wells (MW-01 through MW-04) upgradient, cross gradient and downgradient of the former USTs and collected groundwater samples from these wells and soil boring SB-01 to investigate groundwater conditions in the vicinity of the USTs and historical releases. These samples were analyzed for gasoline-range petroleum hydrocarbons, VOCs including BETX, PAHs, and metals (total and dissolved lead and hexavalent chromium).

Conventional chemistry parameters including conductivity, total dissolved solids, salinity and chloride were also analyzed.

Post-interim action groundwater compliance monitoring activities were completed by GeoEngineers in 2008 and 2009 following the completion of interim remedial action in the Cap Sante Marine Lease Area. These activities are summarized in Section 4.3.

In 2012 GeoEngineers installed groundwater monitoring wells GEI-MW-6 and GEI-MW-7 to investigate groundwater conditions associated with the gasoline-, diesel- and/or heavy oil-range petroleum hydrocarbons and/or PAHs contaminated soil located south and southwest of the former Cap Sante Marine Lease Area. Groundwater samples obtained from these monitoring wells were analyzed for gasoline-, diesel- and heavy oil-range petroleum hydrocarbons, BETX, PAHs, and metals (lead).

Groundwater sample locations are shown relative to the Site on Figure 4. Hydrogeologic and chemical analytical results from these studies are summarized below.

3.3.2. Groundwater Investigation Results

3.3.2.1. HYDROGEOLOGIC CHARACTERIZATION

Based on an evaluation of the soil type observed by Hart Crowser during their 1983 field investigation, a hydraulic conductivity of $1.4x10^{-4}$ centimeter per second (cm/s) was estimated. Results of Landau's 2007 field investigation estimated hydraulic conductivity of the saturated soil by completing slug tests in monitoring wells MW-1 through MW-4 installed at the Site as part of this study. Hydraulic conductivity estimates for wells MW-2, MW-3 and MW-4 were similar, with mean values of $6.1x10^{-2}$ cm/s, $6.3x10^{-2}$ cm/s and $7.3x10^{-2}$ cm/s, respectively. These conductivity values are about 4 to 6 times greater than the $1.4x10^{-2}$ cm/s value estimated for MW-1.

In 2007, Landau conducted a tidal study which included measuring groundwater and surface water elevations continuously over a 72-hour period. During this study, surface water elevations in the marina fluctuated by approximately 11.8 feet. During this same time, groundwater levels in monitoring wells MW-1 through MW-4 ranged between 4 and 6 feet bgs. The observed fluctuation in monitoring well MW-2 (near the shore) was approximately 0.8 feet. The groundwater level in MW-1 located away from the shore (approximately 140 feet), fluctuated by less than 0.1 foot. Based on measured groundwater elevations, groundwater flow at the Site is generally to the southeast and does not appear to be significantly altered by tidal fluctuations. Groundwater level fluctuations and tidal efficiency values calculated are detailed in the Data Report (Landau, 2007a).

3.3.2.2. CHEMICAL ANALYTICAL RESULTS

Results of the 2004 and 2005 groundwater investigation indicated gasoline- and diesel-range petroleum hydrocarbons and/or benzene concentrations exceeding preliminary groundwater cleanup levels in groundwater samples obtained from soil boring GP2, GP3 and CSM07 through CSM11 located in the vicinity of the former USTs. In addition, diesel and heavy oil-range petroleum hydrocarbons were detected at a concentration exceeding the preliminary groundwater cleanup level in groundwater sample obtained from soil boring CSM12 located at the southwest corner of the Former Cap Sante Marine Lease Area.

During the 2007 sampling event, concentrations of gasoline-range petroleum hydrocarbons, VOCs, PAHs and/or lead were detected at concentrations significantly below the preliminary cleanup levels in monitoring wells MW-01 through MW-04 located down gradient, up gradient and cross gradient of the former USTs with one exception. Gasoline-range petroleum hydrocarbons and benzene were detected at concentrations exceeding the preliminary cleanup levels at MW-03.

Results of post-interim action groundwater compliance monitoring activities completed by GeoEngineers in 2008 and 2009 are summarized in Section 4.3. During the 2012 sampling event, contaminants of concern (petroleum hydrocarbons, BETX, PAHs and lead) were not detected in groundwater at monitoring wells GEI-MW-6 and GEI-MW-7 located within or down gradient of two petroleum hydrocarbon and/or PAH soil exceedances areas remaining at the Site.

Tables summarizing chemical analytical results from previous RI field investigations are included in Appendix A. Groundwater monitoring well locations are shown relative to the Site on Figure 4.

3.4. Sediment Investigation and Results

This section presents a summary of the sediment investigation activities conducted adjacent to the Site.

3.4.1. Sediment Investigation Activities

Marine sediments adjacent to the Site were initially tested by Hart Crowser in February 1999 and January 2000 in conjunction with maintenance dredging of Cap Sante Boat Haven. Dredged materials were subject to the chemical quality evaluations required by the DMMP and were found to meet criteria for unconfined open-water disposal.

Sediments east of the Site were also sampled and analyzed as part of the 2007 RI field study. The Ecology-approved sediment investigation consisted of obtaining sediment samples along the bank area adjacent to the Site and within the maintenance dredging area offshore of the Site. The purpose of the sediment sampling was to determine if sediments had been impacted by the Site contamination, to evaluate the range of TPH concentrations offshore of the Site and to provide data for determination of soil and groundwater cleanup criteria based on sediment toxicity. Surface (0 to 10 cm) sediment samples were collected at 12 locations (SED-01 through SED-12; Figure 5), including three intertidal locations near the shoreline where historical fuel seepage was observed. The samples were submitted for petroleum hydrocarbon fractions including volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons (EPH), and diesel- and oil-range petroleum hydrocarbons, and determination of grain size. Sediment samples SED-1 through SED-3 (bank area samples) were also analyzed for gasoline-range petroleum hydrocarbons.

A detailed description of the 2007 sediment investigation is presented in the Cap Sante Work Plan (Landau, 2007b). The report summarizing the February 1999 and January 2000 sediment investigation is included as an appendix to the Cap Sante Work Plan (Landau, 2007b). Soil chemical analytical results from these studies are summarized below.

3.4.2. Sediment Investigation Results

Results of February 1999 and January 2000 sediment investigation were determined to be suitable for unconfined open-water disposal.

Concentrations of diesel- and motor oil-range petroleum hydrocarbons were found to be low in all of the samples that were analyzed as part of the 2007 sediment investigation. Gasoline-range petroleum hydrocarbons were not detected in any of the samples submitted for chemical analysis. Diesel-range petroleum hydrocarbons ranged from below detection limits to 110 milligrams per kilogram (mg/kg) and motor oil-range petroleum hydrocarbons ranged from below detection limits to 370 mg/kg. EPH concentrations ranged from 3.2 to 100 mg/kg, and VPH was not detected. At the direction of Ecology, no bioassay testing was required because TPH concentrations were low in the sediment samples analyzed. Subsequently, follow-on sediment toxicity testing for the purposes of determining soil and groundwater cleanup criteria was not required (Benson 2007 as cited in Landau, 2007a).

Tables summarizing chemical analytical results from the February 1999/January 2000 and 2007 sediment investigation are included in Appendix A. Sediment sample locations for the 2007 sediment investigation are shown relative to the Site on Figure 5.

3.5. Terrestrial Ecological Evaluation

As indicated in Section 3.1.1, a terrestrial ecological evaluation was not required for the Site because the Site does not meet any of the criteria in WAC 173-340-7491(1). Copies of the forms documenting this determination for the Site are presented in Appendix B.

Based on this evaluation, human contact and soil leaching to groundwater remain as the only applicable, potential exposure pathways for soil contamination at the Site.

3.6. Remedial Investigation – Summary of Findings

Several environmental investigations have been completed (as described above) to evaluate contamination in soil, groundwater and sediment related to historic Site use and petroleum releases from former USTs. The results of the RI indicate the presence of petroleum constituents at concentrations exceeding preliminary soil and groundwater cleanup levels associated with releases from the former USTs. Additionally, PAHs and metals (lead and copper) were also identified in soil at the Site. No evidence of sediment quality impacts in the marine areas related to historical fuel releases at the Site were identified by the RIs.

Recent investigations indicate that limited areas of petroleum hydrocarbon and/or PAH contamination observed in the vicinity of the Historic Fuel Supply Line Area (former Shell Tank Farm Site) are not likely to be related the historical use of the fuel lines or the migration of contaminants in groundwater from the Tank Farm Area and are likely to be related to the historical operations at the former Cap Sante Marine Lease Area. As agreed to with Ecology, the contamination identified in the vicinity of CSM13, SB-13 and SB-14 located east of Q Avenue will be addressed as part of this RI/FS since they are located within the Cap Sante Marine study area and there is no specific evidence that the contamination is associated with the historic fuel lines from the former Shell Tank Farm Site.

To address petroleum contamination in soil and groundwater in the vicinity of the historical UST and associated product lines adjacent to Fidalgo Bay, the Port completed interim remedial activities to decommission two 12,000-gallon USTs, associated product lines and remove approximately 9,900 cubic yards of petroleum and metals contaminated soil from the site. Interim remedial action activities are detailed in the Interim Action Report (GeoEngineers, 2008) and summarized below in Section 4.0.

Based on the results of the soil, groundwater, sediment sampling and subsequent interim action, potential exposure pathways for human contact with contaminated soil, soil leaching to groundwater, and groundwater discharging to surface water are present in limited areas of the Site.

Current Site conditions and the approximate extent of contaminants identified at the Site following the completion of interim action activities (summarized in Section 4.0) are shown on Figure 6 and in cross-section on Figure 7.

4.0 CAP SANTE MARINE INTERIM ACTION

In accordance with the requirements of the Agreed Order, the Port completed an interim remedial action at the Site between October and December 2007. Objectives of the interim action were:

- Removal of petroleum-contaminated soil from the UST fuel system source area to reduce the potential for off-site transport of contamination via the groundwater pathway.
- Removal of metals-contaminated soil exceeding preliminary Site cleanup levels.
- Restore the Site including the shoreline habitat.

Activities completed as part of the Cap Sante Marine Interim Action are summarized in the following sections. A detailed description of these activities is presented in the Cap Sante Marine Interim Action Report (GeoEngineers, 2008).

4.1. UST Closure and Contaminated Soil Excavation Activities

Two steel, single-walled, 12,000-gallon USTs (one gasoline UST and one diesel UST), associated fuel lines and all remaining components of the former fueling system were decommissioned and removed from the Site on November 1, 2007 by a licensed contractor, Clearcreek Contractors, Inc. (Clearcreek), in accordance with the UST Regulations presented in Chapter 173-360 WAC.

Concurrent with UST decommissioning activities, approximately 2,400 cubic yards of clean overburden soil (soil in which contaminants either were not detected or were detected at concentration less than soil cleanup levels) and approximately 9,900 cubic yards of petroleum and metals contaminated soil were removed from the Site during remedial excavation activities. Clean soil generated during remedial excavation activities were transferred to a nearby Port property for use as fill. Contaminated soil generated during remedial excavation activities were transferred off-site for permitted landfill disposal.

Based on field screening and chemical analytical results of confirmation soil samples, petroleum and metals contaminated soil within the interim action area were successfully removed from the Site. The Cap Sante Marine Interim Action area is shown relative to the Site on Figure 6.

4.2. Site Restoration and Habitat Improvements

Restoration and habitat improvements for the Site included backfilling of the remedial excavations, construction of an engineered block wall and a public access walkway (esplanade), and installation of shoreline habitat substrate and plantings. The engineered block wall was constructed to separate the upland portion of the Site from the shoreline/habitat restoration area. The concrete esplanade was constructed parallel to the upland side of the engineered block wall to provide public access along the waterfront. Construction of the shoreline habitat area consisted of grading to habitat-specific elevations and placement of habitat substrate material (sand and gravel) to create approximately 0.15 acre of intertidal habitat. Native plants and large woody debris (i.e., logs) were installed in the upper intertidal and backshore area as advised by Ecology and the Washington State Department of Fish and Wildlife.

Current Site conditions including restoration and habitat improvement features as well as the approximate location of remaining Site contamination not addressed by the Cap Sante Marine Interim Action are shown relative to the Site on Figure 6.

4.3. Confirmational Groundwater Monitoring Results

In accordance with the Ecology-approved Interim Action Work Plan Supplement, compliance groundwater monitoring wells MW-1A through MW-4A were installed at the Site in May 2008 to evaluate the effectiveness of the interim action. Between June 2008 and December 2009, six rounds of groundwater monitoring was completed to evaluate groundwater conditions at the Site, With the exception of a slight petroleum hydrocarbon exceedance in monitoring well MW-2A observed during the first groundwater monitoring event, contaminants of concern BETX, petroleum hydrocarbons, PAHs and lead either were not detected or were detected at concentrations less than groundwater cleanup levels.

Results of the confirmational groundwater monitoring are detailed in separate groundwater monitoring reports (GeoEngineers, 2009b; GeoEngineers, 2009c). Groundwater monitoring wells are shown relative to the interim action area on Figure 6.

Following Ecology's determination that the groundwater monitoring results demonstrated the protectiveness of the interim action completed in part of the Site, groundwater monitoring wells used to document post-construction groundwater conditions for the Cap Sante Marine Interim Action were decommissioned by a licensed well driller in accordance with WAC 173-160-460 on February 1, 2010.

5.0 FEASIBILITY STUDY

5.1. Conceptual Site Model

The Conceptual Site Model (CSM) is a model of the potential contaminant sources, release mechanisms, and transport mechanisms currently present at the Site. The CSM also identifies

potential receptors and associated exposure pathways for Site contaminants. The CSM does not quantify potential risks to human health or the environment posed by Site-related contamination. It is intended to focus remedial actions (site investigations, monitoring, cleanup actions, etc.) on those areas of the Site that may warrant further consideration.

As discussed in Section 2.2, the Site was historically a tidal mudflat which was later in filled with dredge materials from the adjacent federal waterway. Previous Site use included operations to support boat maintenance and repair. Petroleum hydrocarbon (gasoline- and diesel-range hydrocarbons) contamination at the Site was likely the result of releases associated with historical Site operations/use. An interim action completed by the Port has removed contamination related to the underground storage tanks and associated piping (discussed in Section 4.0). The approximate location of historical boat operation and maintenance buildings are shown relative to the Site on Figures 4 and 5. Current Site features and the approximate location of petroleum hydrocarbon contamination is shown relative to the Site in Figure 6.

Vertical and horizontal transport may have been facilitated by groundwater flow and water level fluctuations at the Site however, groundwater within and downgradient of the remaining petroleum and PAH contaminant plumes are currently not adversely impacted based on the results of recent groundwater samples obtained from the Site. Additionally, sediments located east (downgradient) of the Site were not adversely impacted by the transport of contamination as confirmed by the results of sediment sampled obtained within the Cap Sante Boat Haven (discussed in Section 3.4). The sources of the remaining localized areas petroleum and PAH-impacted soil is not clear but is likely to have resulted from historical operations at the Site.

5.1.1. Soil

As discussed in Section 2.3.1 of this report, soil types consist of dredged fill material from the surface to depths of approximately 5 to 12 feet bgs overlying native marine sediments and glacial deposits. The unsaturated zone extends from ground surface to 5 feet bgs, and the top of the saturated zone begins at approximately 5 feet bgs. Contaminants including gasoline-range petroleum hydrocarbons and cPAHs were detected at concentrations exceeding preliminary soil cleanup levels at depths ranging from approximately 3.5 to 14 feet bgs.

Based on the geology, hydrogeology and the distribution of remaining contaminants at the Site, the potential exposure pathways to contaminated soil at the Site include:

- Direct contact (dermal, incidental ingestion or inhalation) with contaminated soil by Site workers; and
- Leaching/migration of contamination from soil into groundwater.

5.1.2. Groundwater

As discussed in Section 2.3.2, three hydrogeologic units have been identified at the Site, including: (1) a shallow, unconfined dredge fill sand aquifer; (2) a marine silt confining unit typically 10 to 20 plus feet thick; and (3) a deep, confined aquifer consisting of silty sand (Landau, 2007a). Depth to groundwater in the shallow unconfined aquifer is approximately 4 to 6 feet bgs, and the flow direction is predominantly east toward Fidalgo Bay. Based on the Landau 2007 tidal evaluation,

tidal influence on groundwater levels and flow direction appears to be limited to the near shore areas.

Historic groundwater samples obtained from the Site identified gasoline- and diesel-range petroleum hydrocarbons and benzene downgradient of the former UST and product lines. However, results of groundwater samples obtained from post-interim action compliance groundwater monitoring wells indicated that the interim action was successful in addressing groundwater contamination at this location.

In addition, historic groundwater samples obtained from soil boring CSM12 located at the southwest corner of the Former Cap Sante Marine Lease Area identified diesel and heavy oil-range petroleum hydrocarbons. However, recent groundwater results downgradient of this location show that concentrations of these contaminants as well as, other contaminants of concern detected in soil are less than preliminary groundwater cleanup levels.

Because groundwater at the Site is not a potential source of drinking water (Section 2.3.2) and contaminants of concern have not been detected at concentrations exceeding preliminary groundwater cleanup levels in groundwater samples obtained from within and/or down gradient of areas in which contaminants remain in soil, human ingestion of hazardous substances in groundwater, exposure of aquatic organisms to hazardous substances and human consumption of marine organisms are not potential exposure pathways.

5.2. Basis for Cleanup Action

This section presents the basis for the site-wide cleanup action. There are two distinct elements that form the basis for the cleanup action: (1) the site-specific cleanup standards, and (2) the locations and media requiring cleanup action evaluation.

5.2.1. Cleanup Standards

Cleanup standards consist of: (1) cleanup levels that are protective of human health and the environment, and (2) the point of compliance at which the cleanup levels must be met, and (3) additional regulatory requirements, specified in applicable state and federal laws, that apply to a cleanup action because of the type of action and/or the location of the site. Preliminary site-specific cleanup levels for soil and groundwater were developed in the Cap Sante Work Plan (Landau, 2007). As discussed in Section 3.1, the preliminary cleanup levels developed in the Work Plan are adopted as the proposed final cleanup levels in this FS, for the purpose of developing cleanup action objectives and alternatives for the Site. The proposed points of compliance are presented in Section 3.1 have also been adopted. The additional regulatory requirements potentially applicable to the cleanup action will be presented and evaluated in the DCAP.

The proposed final soil cleanup levels are presented in Table 2. The proposed final groundwater cleanup levels are presented in Table 3. Cleanup action objectives for the Site are presented in Section 5.2.3.

5.2.2. Locations and Media Requiring Cleanup Action Evaluation

Based on the results of the RI (Section 3.0) and interim action (Section 4.0), limited soil areas within the former Cap Sante Marine Lease Area and the Fisherman's Work and Parking Area

require evaluation of cleanup action alternatives based on the presence of gasoline-, diesel-, and heavy-oil range petroleum hydrocarbons and/or cPAHs at concentrations exceeding cleanup levels protective of human health and the environment.

The existing groundwater sampling data confirm that the contaminated soil at the Site is not adversely impacting groundwater. Therefore the primary environmental concern at the Site is contaminated soil. The estimated total in-situ volume of impacted soil requiring cleanup action (i.e., the volume exceeding soil cleanup levels) is approximately 1,800 cubic yards. The impacted soil is distributed approximately as follows:

- Fisherman's Work and Parking Area – Approximately 700 cubic yards
- Cap Sante Marine Leas Area – Approximately 1,100 cubic yards

Because of the similarity in physical characteristics, natural resources, accessibility and likely release mechanisms, these areas of the Site warrant similar approaches to cleanup. Cleanup approaches are discussed further in Section 5.3 – Identification and Description of Cleanup Action Alternatives.

5.2.3. Cleanup Action Objectives

Cleanup action objectives (CAOs) consist of chemical- and medium-specific goals for protecting human health and the environment. The CAOs specify the media and contaminants of concern, potential exposure routes and receptors, and proposed cleanup goals.

The objective of the proposed cleanup action is to eliminate, reduce, or otherwise control to the extent feasible and practicable, unacceptable risks to human health and the environment posed by hazardous substances in soil at the Site in accordance with the MTCA Cleanup Regulation (WAC 173-340) and other applicable regulatory requirements. Specifically, the objective of the cleanup action is to mitigate risks associated with the following potential receptors and exposure routes:

- Direct contact (dermal, incidental ingestion or inhalation) with contaminated soil by Site, workers; and
- Leaching/migration of contamination from soil into groundwater.

The cleanup goal is to mitigate these risks by meeting the proposed soil and groundwater cleanup standards identified in Section 3.1. The proposed final cleanup levels, which were derived from regulatory criteria, are considered to be protective of human health and ecological receptors.

5.3. Identification and Description of Cleanup Action Alternatives

Table 4 presents the results of a screening evaluation of potentially applicable remediation technologies for the cleanup action. Based on the screening evaluation, selected technologies are carried forward for use in the development of cleanup action alternatives.

The general response actions considered in the screening evaluation include no action, institutional controls/access control, soil containment, soil removal and disposal, soil removal with ex-situ soil treatment, and in-situ soil treatment. The potential remediation technologies for soil

were screened on the basis of effectiveness, implementability, and relative cost. The screening process determined the most appropriate technologies that warrant development into cleanup action alternatives for further evaluation. Remediation technologies were screened out from further consideration if they were unable to meet MTCA threshold requirements, if they had limited effectiveness or implementability, and/or if another technology was similarly effective and implementable but had a significantly lower cost.

Remediation technologies and process options for Site cleanup that were retained through the screening evaluation, as summarized in Table 4, were used to develop three cleanup action alternatives to address contaminated media at the Site. Each alternative addresses contaminated media with one or a combination of technologies appropriate for Site conditions. Cleanup action alternatives selected for evaluation represent a reasonable range of potentially applicable cleanup options to provide a basis for evaluation. The design parameters used to develop these cleanup action alternatives are based on engineering judgment and current knowledge of Site conditions. The final design for the selected alternative may require additional characterization and analysis to better define the scope and costs associated with the final cleanup action. Cleanup action alternatives were developed to be generally consistent with the current and anticipated future land uses at the Site; however, some of the alternatives are more compatible with preserving the existing Site use than others. Components of the cleanup action alternatives evaluated for the Site are described below and are summarized in Table 5.

5.3.1. Alternative 1 – Engineering and Institutional Controls

Remedial Alternative 1 relies on the existing empirical data that groundwater downgradient of the impacted soils is not adversely impacted by the presence of the identified contamination. Alternative 1 uses engineering controls (protective concrete, asphalt and/or topsoil caps) that currently exist at the Site combined with institutional controls to prevent human exposure to soil in which contaminant concentrations exceed cleanup levels. This alternative requires the least amount of remediation construction and has the lowest costs related to monitoring of soil and groundwater contaminant concentrations and administrative costs associated with developing the components of the institutional controls. The remedy under this alternative would be subject to periodic review by Ecology to ensure long-term protectiveness.

Alternative 1 has the following components:

- Maintain existing protective concrete, asphalt and/or topsoil cover materials to cap and to isolate contaminants from human contact.
- Confirmational groundwater monitoring on a quarterly basis for at least one year following the cleanup action to verify that contaminant concentrations do not exceed groundwater cleanup levels, confirm plume stability and monitor natural attenuation performance. Additional groundwater monitoring may be necessary if initial groundwater monitoring indicates the potential for contaminant transfer from remaining contaminated soil to groundwater over time.
- Institutional controls in the form of environmental covenants, signage, and other notification measures would be utilized as appropriate to address residual inorganic contaminants and any remaining organic contaminants remaining in place in areas of the Site.

- Additional response actions would be implemented should the remedy be determined to not be effective after the monitoring period.

5.3.2. Alternative 2 – In-Situ Soil Treatment

Remedial Alternative 2 relies on the existing empirical data that groundwater downgradient of the impacted soils is not adversely impacted by the presence of the identified contamination but also includes actions to enhance the natural reduction of contamination over-time. Remedial Alternative 2 utilizes all of the cleanup action components described above for Alternative 1, with the addition of the injection of chemical reagents into subsurface soil to degrade/oxidize petroleum-related compounds at the Site exceeding cleanup levels. Prevention of exposure to contaminated soil during the treatment period continues to rely on the use of institutional controls. The remedy under this alternative would be subject to periodic review by Ecology to ensure long-term protectiveness.

Alternative 2 has the following components:

- Maintain existing protective concrete, asphalt and/or topsoil surfaces to cap and isolate contaminants from human contact during treatment.
- Inject chemical reagents into the subsurface soil through direct-push injection methods to desorb and destroy petroleum-related compounds in soil. Overall contaminant mass reduction will be evaluated after the in-situ soil treatment using supplemental soil samples collected at the Site.
- Confirmational groundwater monitoring performed on a quarterly basis following treatment for at least one year following the cleanup action to verify that contaminant concentrations do not exceed groundwater cleanup levels, confirm plume stability and monitor attenuation performance. Additional groundwater monitoring may be necessary if initial groundwater monitoring indicates the potential for contaminant transfer from remaining contaminated soil to groundwater over time.
- Institutional controls in the form of environmental covenants, signage, and other notification measures would be utilized as appropriate to address any residual remaining contaminants remaining in place in areas of the Site following in-situ treatment.
- Additional response actions would be implemented should the remedy be determined to be not effective.

5.3.3. Alternative 3 – Complete Removal

Remedial Alternative 3 does not rely on the existing empirical data that groundwater downgradient of the impacted soils is not adversely impacted by the presence of the identified contamination but rather, focuses on immediate contaminant mass reduction. Remedial Alternative 3 achieves complete removal of soil that exceeds cleanup levels. Contaminated soil exceeding cleanup levels at the Site would be excavated to the extent practicable and disposed of at an off-site, permitted landfill. Alternative 3 includes the following components:

- Excavate to the extent practicable approximately 1,800 cubic yards of contaminated soil using commonly available excavation techniques. Existing utility infrastructure (power, phone, sewer,

water, etc.), and asphalt and concrete surfaces would need to be temporality relocated and/or demolished and restored to facilitate removal of the contaminated soil. In addition, significant shoring or temporary relocation/demolition and re-construction of an office building located at the southwest corner of the Cap Sante Marine Lease Area would need to be completed to access contaminated soil at this location.

- Transport excavated soil to an approved landfill facility. Excavated soil would be characterized for disposal as required by MTCA and the selected disposal facility. The contaminated soil is expected to designate as non-dangerous waste suitable for disposal at a Subtitle D landfill.
- Confirmation soil samples will be obtained during remedial excavation activities to verify the successful removal of contaminants from the Site.
- Backfill excavated areas with clean imported fill to restore original Site topography and restore damaged or rerouted infrastructure (utilities, sidewalks and roads).
- Confirmation groundwater monitoring will be performed on a quarterly basis for at least one year following the cleanup action to verify that contaminant concentrations do not exceed groundwater cleanup levels.
- If necessary, develop institutional controls in the form of environmental covenants, signage, and other notification measures to address any remaining contaminated soil left in place in areas of the Site where excavation is found to be impracticable during construction.

5.4. MTCA Evaluation Criteria

This section presents a description of the threshold requirements for cleanup actions under MTCA and the additional criteria used in this FS to evaluate the cleanup action alternatives.

5.4.1. Threshold Requirements

Cleanup actions performed under MTCA must comply with several threshold requirements. Cleanup action alternatives that do not comply with these requirements are not considered suitable cleanup actions under MTCA. As provided in WAC 173-340-360(2)(a), cleanup actions must:

- Protect human health and the environment;
- Comply with cleanup standards;
- Comply with applicable state and federal laws; and
- Provide for compliance monitoring.

5.4.1.1. PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Cleanup actions performed under MTCA must ensure that human health and the environment are protected.

5.4.1.2. COMPLIANCE WITH CLEANUP STANDARDS

Compliance with cleanup standards requires, in part, that cleanup levels are met at the applicable points of compliance. If a remedial action does not comply with cleanup standards, the remedial action is an interim action, not a cleanup action. Where a cleanup action involves containment of soils with hazardous substance concentrations exceeding cleanup levels at the point of

compliance, the cleanup action may be determined to comply with cleanup standards, provided the requirements specified in WAC 173-340-740(6)(f) are met.

5.4.1.3. COMPLIANCE WITH APPLICABLE STATE AND FEDERAL LAWS

Cleanup actions conducted under MTCA must comply with applicable state and federal laws. The term "applicable state and federal laws" includes legally applicable requirements and those requirements that Ecology determines to be relevant and appropriate as described in WAC 173-340-710.

5.4.1.4. PROVISION FOR COMPLIANCE MONITORING

The cleanup action must allow for compliance monitoring in accordance with WAC 173-340-410. Compliance monitoring consists of protection monitoring, performance monitoring and confirmational monitoring. Protection monitoring is conducted to confirm that human health and the environment are adequately protected during the construction, operation, and maintenance phases of a cleanup action. Performance monitoring is conducted to confirm that the cleanup action has attained cleanup standards and/or, if applicable, remediation levels or other performance standards. Confirmational monitoring is conducted to confirm the long-term effectiveness of the cleanup action once cleanup standards and/or, if applicable, remediation levels or other performance standards have been attained.

5.4.2. Other Requirements

Under MTCA, when selecting from the cleanup action alternatives that meet the threshold requirements described above, the alternatives must be further evaluated against the following additional criteria:

- **Use permanent solutions to the maximum extent practicable (WAC 173-340-360[2][b][i]):** MTCA Cleanup Regulation requires that when selecting from cleanup action alternatives that fulfill the threshold requirements, the selected action shall use permanent solutions to the maximum extent practicable (WAC 173-340-360[2][b][i]). MTCA specifies that the permanence of these qualifying alternatives shall be evaluated by balancing the costs and benefits of each of the alternatives using a “disproportionate cost analysis” in accordance with WAC 173-340-360(3)(e). The criteria for conducting a disproportionate cost analysis are described in Section 4.4.3 below.
- **Provide a reasonable restoration time frame (WAC 173-340-360[2][b][ii]):** In accordance with WAC 173-340-360(2)(b)(ii), selected cleanup actions must provide for a reasonable restoration time frame. The MTCA Cleanup Regulation lists factors to be considered in evaluating whether a cleanup action provides for a reasonable restoration time frame (WAC 173-340-360[4][b]).
- **Consideration of Public Concerns (WAC 173-340-360[2][b][iii]):** Ecology will consider public comments submitted during the RI/FS process in making its preliminary selection of an appropriate cleanup action alternative. This preliminary selection is subject to further public review and comment when the proposed remedy is published in the Draft Cleanup Action Plan.

5.4.3. MTCA Disproportionate Cost Analysis

The MTCA disproportionate cost analysis (DCA) is used to evaluate which of the cleanup action alternatives that meet the threshold requirements are permanent to the maximum extent practicable. This analysis involves comparing the costs and benefits of the alternatives and selecting the alternative whose incremental costs are not disproportionate to the incremental benefits. The evaluation criteria for the DCA are specified in WAC 173-340-360(2) and (3), and include protectiveness, permanence, cost, long-term effectiveness, management of short-term risks, implementability, and consideration of public concerns.

As outlined in WAC 173-340-360(3)(e), the MTCA Cleanup Regulation provides a methodology that uses the criteria described below to determine whether the costs associated with each cleanup action alternative are disproportionate relative to the incremental benefit of the alternative over the next lowest cost alternative. The comparison of benefits relative to costs may be quantitative, but will often be qualitative. When possible for this FS, quantitative factors such as mass of contaminant removed or percentage of area of impacts remaining were compared to costs for the alternatives evaluated, but many of the benefits associated with the criteria described below were necessarily evaluated qualitatively. Costs are disproportionate to benefits if the incremental costs of the more permanent alternative exceed the incremental degree of benefits achieved over the lower-cost alternative (WAC 173-340-360[e][i]). Where two or more alternatives are equal in benefits, Ecology selects the less costly alternative (WAC 173-340-360[e][ii][c]).

The MTCA criteria used in the DCA are described below.

5.4.3.1. PROTECTIVENESS

The overall protectiveness of a cleanup action alternative is evaluated based on several factors. First, the extent to which human health and the environment are protected and the degree to which overall risk at a site is reduced are considered. Both on-site and off-site reduction in risk resulting from implementing the alternative are considered.

5.4.3.2. PERMANENCE

MTCA specifies that when selecting a cleanup action alternative, preference shall be given to actions that are "permanent solutions to the maximum extent practicable." Evaluation criteria include the degree to which the alternative permanently reduces the toxicity, mobility or mass of hazardous substances, including the effectiveness of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of waste treatment processes, and the characteristics and quantity of treatment residuals generated.

5.4.3.3. COST

The analysis of cleanup action alternative costs under MTCA includes all costs associated with implementing an alternative, including design, construction, confirmational monitoring, and institutional controls. Costs are intended to be comparable among different alternatives to assist in the overall analysis of relative costs and benefits of the alternatives. The costs to implement an alternative include the cost of construction, the net present value of any long-term costs, and agency oversight costs. Long-term costs include operation and maintenance costs, monitoring costs, equipment replacement costs, and the cost of maintaining institutional controls. Unit costs used to develop cost estimates for the cleanup action alternatives in this FS were derived using a

combination of published engineering reference manuals (i.e., R.S. Means), construction cost estimates solicited from applicable vendors and contractors, review of actual costs incurred during similar, applicable projects, and professional judgment.

5.4.3.4. LONG-TERM EFFECTIVENESS

Long-term effectiveness is a parameter that expresses the degree of certainty that the cleanup action alternative will be successful in maintaining compliance with cleanup standards over the long-term performance of the cleanup action. The MTCA Cleanup Regulation contains a specific preference ranking for different types of technologies that is to be considered as part of the comparative analysis. The ranking gives the highest preference to technologies such as reuse/recycling, treatment, immobilization/solidification, and disposal in an engineered, lined, and monitored facility. Lower preference rankings are given to technologies such as on-site isolation/containment with attendant engineered controls, and institutional controls and monitoring.

5.4.3.5. MANAGEMENT OF SHORT-TERM RISKS

Evaluation of this criterion considers the relative magnitude and complexity of actions required to maintain protection of human health and the environment during implementation of the cleanup action. Cleanup actions carry short-term risks, such as potential mobilization of contaminants during construction, or safety risks typical of large construction projects. Some short-term risks can be managed through the use of best practices during project design and construction, while other risks are inherent to project alternatives and can offset the long-term benefits of an alternative.

5.4.3.6. IMPLEMENTABILITY

Implementability is an overall metric expressing the relative difficulty and uncertainty of implementing the cleanup action. Evaluation of implementability includes consideration of technical factors such as the availability of technologies and experienced contractors to accomplish the cleanup work. It also includes administrative factors associated with permitting and completing the cleanup.

5.4.3.7. CONSIDERATION OF PUBLIC CONCERNS

The public involvement process under MTCA is used to identify potential public concerns regarding cleanup action alternatives. The extent to which an alternative addresses those concerns is considered as part of the evaluation process. This includes concerns raised by individuals, community groups, local governments, tribes, federal and state agencies, and other organizations that may have an interest in or knowledge of the site. In particular, the public concerns for this Site would generally be associated with environmental concerns and performance of the cleanup action, which are addressed under other criteria such as protectiveness and permanence.

5.5. Evaluation of Cleanup Action Alternatives

Each alternative is evaluated with respect to the MTCA evaluation criteria described in Section 5.4 and then compared to the other alternatives relative to its expected performance under each criterion. The components of the three Alternatives are described above in Section 4.3 and are summarized in Table 5. A MTCA DCA was completed to determine which cleanup action alternative that otherwise meets threshold requirements is permanent to the maximum extent practicable.

The results of the detailed alternatives evaluation and DCA are presented in Tables 6 and 7, and illustrated in Figure 8.

5.5.1. Threshold Requirements

All of the alternatives developed for the Site meet the four MTCA threshold requirements described for cleanup actions:

- Protection of human health and the environment;
- Compliance with cleanup standards;
- Compliance with applicable state and federal regulations; and
- Provision for compliance monitoring.

5.5.2. MTCA Disproportionate Cost Analysis

The DCA compares cleanup costs and benefits and allows selection of a cleanup action alternative that provides the greatest benefits relative to cost. Cleanup Action Alternatives 1 through 3 were evaluated based on the MTCA DCA criteria described in Section 5.4.3. The alternatives were ranked on a scale of 1 (lowest) to 10 (highest) for each of the DCA criteria. Each of the DCA criteria was assigned a weighting factor as determined by Ecology, that ranged between 10 percent and 30 percent (the sum of the weighting factors equaled 100 percent). Results of the DCA are as follows:

- Alternative 1: 6.2 (out of 10) benefit ranking; estimated cleanup cost of $330,000
- Alternative 2: 6.6 (out of 10) benefit ranking; estimated cleanup cost of $1,140,000
- Alternative 3: 8.2 (out of 10) benefit ranking; estimated cleanup cost of $2,500,000.

The high ranking of Alternative 3, and to a lesser degree Alternatives 2 and 1, is due to the higher level of contaminant mass removal achieved through excavation and disposal of contaminated soil with these Alternatives. Alternative 2 has a lower ranking than Alternative 3 due to the lower degree of immediate contaminant mass removal and uncertainty in short-term and long-term risks associated with in-situ treatment technologies. Alternative 1 is the least protective of each of the alternatives evaluated given the short- and long-term risks associated with leaving the contaminant mass in place. However, the marginal gains in protectiveness and permanence resulting from Alternatives 2 and 3 are determined to be disproportionately more costly given the potential for short-term risks and greater complexities related to implementability in comparison to Alternative 1. As a result, Alternative 1 is the alternative with the highest overall ranking.

Detailed scoring of Alternatives 1 through 3 is presented in Table 6. A summary of the relative benefits ranking and disproportionate cost analysis is presented in Table 7. A comparison of the relative benefits ranking and disproportionate cost analysis is shown on Figure 8. Conceptual-level cost estimates for the cleanup action alternatives 1, 2 and 3 are presented in Table C-1, C-2 and C-3 of Appendix C respectively.

5.5.3. Reasonable Restoration Time Frame

The restoration time frame, which includes project design, contracting and construction, for all of the proposed Remedial Alternatives is expected to be on the order of one to three years. However, it should be noted that there are unknowns and intangibles related to the restoration timeframe for Alternative 2. There is a lag time between in-situ treatment and verification of that the treatment was successful in achieving the site cleanup objectives. Furthermore, multiple treatment events may be required before the Site cleanup objectives are met. Acceptable restoration timeframes cannot be predicted with certainty for Alternative 2.

Alternatives 1 and 2 would require monitoring of contaminant concentrations in groundwater for a period of approximately five to ten years to ensure long-term effectiveness of the Cleanup Action.

5.6. Preferred Cleanup Action Alternative

Based on the comparative analysis summarized in Section 5.5, Tables 6 and 7, and on Figure 8, the preferred cleanup action alternative for the Site is Alternative 1. This alternative will result in:

- Continued monitoring of groundwater conditions to confirm current plume stability and natural attenuation performance;
- Minimal disturbance to property infrastructure, and Site use and operations; and
- Reduction of human health risks to Site users and terrestrial wildlife.

Although contamination will be left in place above soil cleanup levels as part of Alternative 1, exposure to these contaminants is prevented through the use of engineering controls in the form or soil capping by concrete and asphalt paved surfaces and institutional controls in the form of environmental covenants, signage, and other notification measures at the Site.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of the Port of Anacortes, their authorized agents and regulatory agencies in their evaluation of the Cap Sante Marine Site in Anacortes, Washington. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions express or implied should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

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TABLES

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Table 1

Remedial Investigation Sampling and Analysis Summary

Cap Sante Marine Site

Anacortes, Washington

Sample Location	Sample Identification	Sample Depth (feet)	Sample Date	Sampled By	Petroleum Hydrocarbons				Volatile Organic Compounds (VOCs)	Polycyclic Aromatic Hydrocarbons (PAHs)	Polychlorinated Biphenyls (PCBs)	Metals				
					HCID	Gasoline-Range	Diesel-Range	Heavy Oil-Range				Arsenic	Cadmium	Chromium	Lead	Mercury
Soil Investigation																
GP1	GP1-5.0	5.0	5/4/2004	Floyd Snider	X	X	X	X								
	GP1-8.0	8.0	5/4/2004	Floyd Snider	X	X	X	X								
GP2	GP2-5.0	5.0	5/4/2004	Floyd Snider		X	X	X	X							
	GP2-10.0	10.0	5/4/2004	Floyd Snider	X	X	X	X								
GP3	GP3-6.0	6.0	5/4/2004	Floyd Snider	X	X	X	X	X							
	GP3-7.0	7.0	5/4/2004	Floyd Snider		X	X	X	X							
	GP3-9.0	9.0	5/4/2004	Floyd Snider	X	X	X	X								
GP4	GP4-7.0	7.0	5/4/2004	Floyd Snider		X	X	X	X							
	GP4-10.0	10.0	5/4/2004	Floyd Snider	X	X	X	X								
GP5B	GP5B-6.0	6.0	5/4/2004	Floyd Snider		X	X	X	X							
	GP5B-9.0	9.0	5/4/2004	Floyd Snider	X	X	X	X								
GP6	GP6-2.5	2.5	5/4/2004	Floyd Snider	X	X	X	X								
	GP6-5.0	5.0	5/4/2004	Floyd Snider	X	X	X	X								
CSM01	CSM01-S1	4.0 - 5.0	8/24/2005	Floyd Snider	X		X	X								
	CSM01-S2	4.0 - 5.0	8/24/2005	Floyd Snider	X											
CSM02	CSM02-S1	8.0 - 8.7	8/24/2005	Floyd Snider	X		X	X								
CSM03	CSM03-S1	4.0 - 5.0	8/24/2005	Floyd Snider	X		X	X								
	CSM03-S2	8.0 - 9.0	8/24/2005	Floyd Snider		X	X	X	X							
CSM04	CSM04-S1	4.5 - 5.8	8/25/2005	Floyd Snider	X											
	CSM04-S2	10.3 - 12	8/25/2005	Floyd Snider	X											
CSM05	CSM05-S1	5.0-6.5	8/25/2005	Floyd Snider	X											
	CSM05-S2	8.0-10.0	8/25/2005	Floyd Snider	X											
CSM06	CSM06-S1	1.6-3.0	8/25/2005	Floyd Snider	X											
CSM07	CSM07-S1	8.0-9.5	8/25/2005	Floyd Snider		X	X	X	X							
CSM08	CSM08-S1	4.0-5.7	8/25/2005	Floyd Snider		X	X	X	X							
CSM09	CSM09-S1	8.0-10.0	8/25/2005	Floyd Snider		X	X	X	X							
	CSM09-S2	10.0-12.0	8/25/2005	Floyd Snider		X	X	X	X							
CSM10	CSM10-S1	12.0-13.0	8/25/2005	Floyd Snider		X	X	X	X							
CSM11	CSM11-S1	4.0-5.3	8/25/2005	Floyd Snider		X	X	X	X							
	CSM11-S2	8.0-10.3	8/25/2005	Floyd Snider		X	X	X	X							
CSM12	CSM12-S1	5.0-6.0	8/26/2005	Floyd Snider	X		X	X								
	CSM12-S2	10.0-11.0	8/26/2005	Floyd Snider		X	X	X	X							
CSM13	CSM13-S1	5.0-5.5	8/26/2005	Floyd Snider	X											
	CSM13-S2	10.5-11.5	8/26/2005	Floyd Snider		X	X	X	X							

Sample Location	Sample Identification	Sample Depth (feet)	Sample Date	Sampled By	Petroleum Hydrocarbons				Volatile Organic Compounds (VOCs)	Polycyclic Aromatic Hydrocarbons (PAHs)	Polychlorinated Biphenyls (PCBs)	Metals				
					HCID	Gasoline-Range	Diesel-Range	Heavy Oil-Range				Arsenic	Cadmium	Chromium	Lead	Mercury
Soil Investigation																
CSM14	CSM14-S1	4.3-6.0	8/26/2005	Floyd Snider	X											
MW-3D	MW-3D-6.5-7.0	6.5-7.0	4/25/2007	Landau		X	X	X	X	X					X	
	MW-3D-8.0-8.5	8.0-8.5	4/25/2007	Landau		X	X	X	X	X					X	
	MW-3D-9.5-10.0	9.5-10.0	4/25/2007	Landau		X	X	X	X	X					X	
SB-1	SB-1-1.0-2.0	1.0-2.0	5/24/2007	Landau		X	X	X	X	X					X	
	SB-1-4.0-5.0	4.0-5.0	5/24/2007	Landau		X	X	X	X	X					X	
	SB-1-5.0-6.0	5.0-6.0	5/24/2007	Landau		X	X	X	X	X					X	
SB-2	SB-2-1.0-2.0	1.0-2.0	5/24/2007	Landau		X	X	X	X	X					X	
	SB-2-8.0-9.0	8.0-9.0	5/24/2007	Landau		X	X	X	X	X					X	
	SB-2-9.0-10.0	9.0-10.0	5/24/2007	Landau		X	X	X	X	X					X	
SB-3	SB-3-0.5-1.5	0.5-1.5	5/24/2007	Landau		X	X	X	X	X					X	
	SB-3-1.5-2.5	1.5-2.5	5/24/2007	Landau		X	X	X	X	X					X	
	SB-3-6.0-7.0	6.0-7.0	5/24/2007	Landau		X	X	X	X	X					X	
SB-4	SB4-0.0-1.0	0.0-1.0	5/25/2007	Landau		X	X	X	X	X					X	
	SB4-5.0-6.0	5.0-6.0	5/25/2007	Landau		X	X	X	X	X					X	
	SB4-7.0-8.0	7.0-8.0	5/25/2007	Landau		X	X	X	X	X					X	
SB-5	SB5-0.5-1.5	0.5-1.5	5/25/2007	Landau		X	X	X	X	X					X	
	SB5-1.5-2.5	1.5-2.5	5/25/2007	Landau		X	X	X	X	X					X	
	SB5-5.0-6..0	5.0-6..0	5/25/2007	Landau		X	X	X	X	X					X	
SB-6	SB6-0.5-1.5	0.5-1.5	5/25/2007	Landau		X	X	X	X	X					X	
	SB6-1.5-2.5	1.5-2.5	5/25/2007	Landau		X	X	X	X	X					X	
	SB6-5.0-6.0	5.0-6.0	5/25/2007	Landau		X	X	X	X	X					X	
SB-7	SB-7-0.5-1.0	0.5-1.0	5/24/2007	Landau		X	X	X	X	X	X			X	X	
	SB-7-1.0-2.0	1.0-2.0	5/24/2007	Landau		X	X	X	X	X	X			X	X	
	SB-7-5.0-6.0	5.0-6.0	5/24/2007	Landau		X	X	X	X	X	X			X	X	
SB-8	SB8-0.5-1.5	0.5-1.5	5/24/2007	Landau		X	X	X	X	X					X	
	SB8-7.0-8.0	7.0-8.0	5/24/2007	Landau		X	X	X	X	X					X	
	SB8-8.0-9.5	8.0-9.5	5/24/2007	Landau		X	X	X	X	X					X	
SB-9	SB-9-0.0-0.5	0.0-0.5	5/24/2007	Landau		X	X	X	X	X					X	
	SB-9-1.0-2.0	1.0-2.0	5/24/2007	Landau		X	X	X	X	X					X	
	SB-9-6.0-7.0	6.0-7.0	5/24/2007	Landau		X	X	X	X	X					X	
SB-10	SB-10-0.0-0.5	0.0-0.5	5/24/2007	Landau		X	X	X	X	X					X	
	SB-10-1.0-2.0	1.0-2.0	5/24/2007	Landau		X	X	X	X	X					X	
	SB-10-5.0-6.0	5.0-6.0	5/24/2007	Landau		X	X	X	X	X					X	
SB-11	SB11-0.5-1.5	0.5-1.5	5/25/2007	Landau		X	X	X	X	X					X	
	SB11-1.5-2.5	1.5-2.5	5/25/2007	Landau		X	X	X	X	X					X	
	SB11-5.0-6.0	5.0-6.0	5/25/2007	Landau		X	X	X	X	X					X	
SB-12	SB12-0.75-1.75	0.75-1.75	5/25/2007	Landau		X	X	X	X	X					X	
	SB12-2.0-3.0	2.0-3.0	5/25/2007	Landau		X	X	X	X	X					X	
	SB12-5.0-6.0	5.0-6.0	5/25/2007	Landau		X	X	X	X	X					X	

Sample Location	Sample Identification	Sample Depth (feet)	Sample Date	Sampled By	Petroleum Hydrocarbons				Volatile Organic Compounds (VOCs)	Polycyclic Aromatic Hydrocarbons (PAHs)	Polychlorinated Biphenyls (PCBs)	Metals				
					HCID	Gasoline-Range	Diesel-Range	Heavy Oil-Range				Arsenic	Cadmium	Chromium	Lead	Mercury
Soil Investigation																
SB-13	SB13-0.5-1.5	0.5-1.5	5/25/2007	Landau		X	X	X	X	X					X	
	SB13-1.5-3.0	1.5-3.0	5/25/2007	Landau		X	X	X	X	X					X	
	SB13-5.0-6.0	5.0-6.0	5/25/2007	Landau		X	X	X	X	X					X	
SB-14	SB14-0.5-1.5	0.5-1.5	5/25/2007	Landau		X	X	X	X	X					X	
	SB14-8.0-9.0	8.0-9.0	5/25/2007	Landau		X	X	X	X	X					X	
	SB14-9.0-10.0	9.0-10.0	5/25/2007	Landau		X	X	X	X	X					X	
GEI-1	GEI-1-3.0-4.0	3.0-4.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-2	GEI-2-5.0-6.0	5.0-6.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-3	GEI-3-3.0-4.0	3.0-4.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-4	GEI-4-3.0-4.0	3.0-4.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-5	GEI-5-1.0-2.0	1.0-2.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-6	GEI-6-5.0-6.0	5.0-6.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-7	GEI-7-2.0-3.0	2.0-3.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-8	GEI-8-3.0-4.0	3.0-4.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-9	GEI-9-3.0-4.0	3.0-4.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-10	GEI-10-3.0-4.0	3.0-4.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-11	GEI-11-3.0-4.0	3.0-4.0	9/11/2007	GeoEngineers		X	X	X	X	X					X	
GEI-19	GEI-19-5.0	5.0	9/29/2011	GeoEngineers		X	X	X	X						X	
	GEI-19-10.0	10.0	9/29/2011	GeoEngineers		X	X	X	X						X	
GEI-20	GEI-20-5.0	5.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
	GEI-20-10.0	10.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
GEI-21	GEI-21-5.0	5.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
	GEI-21-10.0	10.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
	GEI-21-15.0	15.0	9/29/2011	GeoEngineers						X						
GEI-22	GEI-22-5.0	5.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
	GEI-22-12.5	12.5	9/29/2011	GeoEngineers		X	X	X	X	X					X	
	GEI-22-15.0	15.0	9/29/2011	GeoEngineers						X						
GEI-23	GEI-23-7.5	7.5	9/29/2011	GeoEngineers		X	X	X	X						X	
	GEI-23-12.5	12.5	9/29/2011	GeoEngineers		X	X	X	X						X	
	GEI-23-15.0	15.0	9/29/2011	GeoEngineers			X	X								
GEI-24	GEI-24-5.0	5.0	9/29/2011	GeoEngineers		X	X	X	X						X	
	GEI-24-10.0	10.0	9/29/2011	GeoEngineers		X	X	X	X						X	
GEI-25	GEI-25-5.0	5.0	9/29/2011	GeoEngineers		X	X	X	X						X	
	GEI-25-10.0	10.0	9/29/2011	GeoEngineers		X	X	X	X						X	
GEI-26	GEI-26-5.0	5.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
	GEI-26-10.0	10.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
GEI-27	GEI-27-7.5	7.5	9/29/2011	GeoEngineers		X	X	X	X	X	X				X	
	GEI-27-11.0	11.0	9/29/2011	GeoEngineers		X	X	X	X	X	X				X	
	GEI-27-13.0	13.0	9/29/2011	GeoEngineers		X	X	X	X	X	X				X	

Sample Location	Sample Identification	Sample Depth (feet)	Sample Date	Sampled By	Petroleum Hydrocarbons				Volatile Organic Compounds (VOCs)	Polycyclic Aromatic Hydrocarbons (PAHs)	Polychlorinated Biphenyls (PCBs)	Metals				
					HCID	Gasoline-Range	Diesel-Range	Heavy Oil-Range				Arsenic	Cadmium	Chromium	Lead	Mercury
Soil Investigation																
GEI-28	GEI-28-5.0	5.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
	GEI-28-10.0	10.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
GEI-29	GEI-29-5.0	5.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
	GEI-29-10.0	10.0	9/29/2011	GeoEngineers		X	X	X	X	X					X	
Groundwater Investigation																
GP1	GP1	NA	5/4/2004	Floyd Snider		X	X	X	X							
GP2	GP2	NA	5/5/2004	Floyd Snider		X	X	X	X							
GP3	GP3	NA	5/6/2004	Floyd Snider		X	X	X	X							
GP4	GP4	NA	5/7/2004	Floyd Snider		X	X	X	X							
GP5B	GP5B	NA	5/8/2004	Floyd Snider		X	X	X	X							
GP6	GP6	NA	5/9/2004	Floyd Snider		X	X	X	X							
CSM01	CSM01-W1	NA	8/24/2005	Floyd Snider		X	X	X	X							
CSM02	CSM02-W1	NA	8/24/2005	Floyd Snider		X	X	X	X							
CSM03	CSM03-W1	NA	8/24/2005	Floyd Snider		X	X	X	X							
CSM07	CSM07-W1	NA	8/25/2005	Floyd Snider		X	X	X	X							
CSM08	CSM07-W1	NA	8/25/2005	Floyd Snider		X	X	X	X							
CSM09	CSM07-W1	NA	8/25/2005	Floyd Snider		X	X	X	X							
CSM10	CSM07-W1	NA	8/25/2005	Floyd Snider		X	X	X	X							
CSM11	CSM07-W1	NA	8/25/2005	Floyd Snider		X	X	X	X							
CSM12	CSM12-W1	NA	8/26/2005	Floyd Snider		X	X	X	X							
CSM13	CSM13-W1	NA	8/26/2005	Floyd Snider		X	X	X	X							
MW-01	MW-01	NA	5/3/2007	Landau		X			X	X				X	X	
MW-02	MW-02	NA	5/3/2007	Landau		X			X	X				X	X	
MW-03	MW-03S	NA	5/3/2007	Landau		X			X	X				X	X	
MW-04	MW-04	NA	5/3/2007	Landau		X			X	X				X	X	
SBW-1	SBW-1	NA	5/24/2007	Landau		X			X	X				X	X	
SBW-1b	SBW-1b	NA	5/24/2007	Landau		X			X	X				X	X	
MW-1A	MW-1A	NA	2008-2009	GeoEngineers		X	X	X	X	X					X	
MW-2A	MW-2A	NA	2008-2009	GeoEngineers		X	X	X	X	X					X	
MW-3A	MW-3A	NA	2008-2009	GeoEngineers		X	X	X	X	X					X	
MW-4A	MW-4A	NA	2008-2009	GeoEngineers		X	X	X	X	X					X	
GEI-MW-6	GEI-MW-6	NA	3/6/2012	GeoEngineers		X	X	X	X	X					X	
GEI-MW-7	GEI-MW-7	NA	3/6/2012	GeoEngineers		X	X	X	X	X					X	

Table 2

Proposed Final Soil Cleanup Levels

Cap Sante Marine Site

Anacortes, Washington

Constituent	Soil Cleanup Levels (mg/kg)	
	Soil - Unsaturated Zone[1]	Soil - Saturated Zone[2]
Petroleum Hydrocarbons		
Gasoline-Range	30/100[3]	30/100[3]
Diesel-Range	2,000	2,000
Heavy Oil-Range	2,000	2,000
Non-Carcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)		
Acenaphthene	66	3
Acenaphthylene	NE	NE
Anthtracene	12,285	617
Benzo(ghi)perylene	NE	NE
Fluoranthene	89	4
Fluorene	547	28
Naphthalenes	138	7
Phenanthrene	NE	NE
Pyrene	2,400	177
Carcinogenic PAHs		
Benzo(a)anthracene	see TEQ	see TEQ
Benzo(a)pyrene	see TEQ	see TEQ
Benzo(b)fluoranthene	see TEQ	see TEQ
Benzo(k)fluoranthene	see TEQ	see TEQ
Chrysene	see TEQ	see TEQ
Dibenz(a,h)anthracene	see TEQ	see TEQ
Indeno(1,2,3-cd)pyrene	see TEQ	see TEQ
Total cPAHs (TEQ)	0.137	0.137

Notes:

[1]Unsaturated zone - from ground surface to 5 feet bgs.

[2]Saturated zone - 5 feet bgs or greater.

[3]Cleanup level is 30 mg/kg when benzene is present.

NE = not established.

mg/kg = milligrams per kilogram.

TEQ = toxicity equivalency

Table 3

Proposed Final Groundwater Cleanup Levels

Cap Sante Marine Site

Anacotes, Washington

Constituent	Groundwater Cleanup Level (µg/L)
Petroleum Hydrocarbons	
Gasoline-Range	800/1,000[1]
Diesel-Range	500
Heavy Oil-Range	500
Non-Carcinogenic Polycyclic Aromatic Hydrocarbons (PAHs)	
Acenaphthene	643
Acenaphthylene	NE
Anthtracene	25,900
Benzo(ghi)perylene	NE
Fluoranthene	90
Fluorene	3,460
Naphthalenes	4,940
Phenanthrene	NE
Pyrene	2,590
Carcinogenic PAHs	
Benzo(a)anthracene	0.018
2-Methylnaphthalene	NE
1-Methylnaphthalene	4,900
Benzo(a)anthracene	0.018
Chrysene	0.018
Benzo(b)fluoranthene	0.018
Benzo(k)fluoranthene	0.018
Benzo(a)pyrene	0.018
Indeno(1,2,3-cd)pyrene	0.018
Dibenz(a,h)anthracene	0.018
Total cPAHs (TEQ)	0.100

Notes:

[1]Cleanup level is 800 µg/L when benzene is present.

NE = not established

µg/L = microgram per liter

TEQ = toxicity equivalency

Table 4

Soil Remediation Technology Screening

Cap Sante Marine Site
Anacortes, Washington

General Response Action	Remediation Technology	Process Option	Description	Effectiveness	Implementability	Relative Cost	Summary of Screening
No Action	No Action	None	No institutional controls or treatment.	Not effective for protecting human health and environment.	Implementable but not acceptable to the general public or government agencies.	None	Generally used as a baseline for comparison.
Institutional / Engineering Controls	Institutional Controls	Deed Notification / Restriction	Implement deed notification to inform future owners of the presence of potentially hazardous substances at the site and /or implement deed restriction to restrict certain specific future site activities.	Effectiveness for protection of human health would depend on enforcement of and compliance with deed restrictions	Technically implementable. Specific legal requirements and authority would need to be met.	Low capital	Potentially applicable in combination with other technologies.
	Engineering Controls	Passive Soil Venting / Vapor Intrusion Prevention	This engineering control involves constructing a barrier between soil contaminated with VOCs and indoor space through the use of passive soil vents installed below the building foundation and/or installation of vapor barrier material during construction of new floor slab and/or basement walls.	Effective for eliminating migration pathway from soil to indoor air. Passive venting allows some mass removal by providing a preferential path for vapor containing VOCs.	Technically implementable using common building construction products and methods.	Low capital.	Applicable for areas where new building is constructed where VOCs are left in place in subsurface soil.
	Access Controls	Fencing / Warning Signage	Construct or maintain existing site fencing and signage to control site access by the general public thereby reducing potential exposure to contaminants	Effective for reducing exposure risk to the general public provided fencing and signage is maintained in the long term.	Technically implementable but not consistent with current and proposed future land use.	Low capital.	Not consistent with current and future land use.
Soil Containment	Capping	Surface Cap	Installation of surface cap over contaminated soil areas to prevent or reduce contaminant migration and to prevent exposure. Multiple-component cap may include asphalt or concrete paving, synthetic membranes, low permeability soil caps over geotextiles in landscaped areas, and existing or new buildings or structures.	Effective for preventing direct contact exposure (i.e. dermal contact or ingestion). Limits infiltration and leachate formation, but less effective than source removal options for protection of groundwater.	Technically implementable. The selected capping technology must be consistent with proposed future land use. Existing asphalt and concrete pavement and concrete building foundations currently cap a significant volume of shallow impacted soil.	Low capital	Potentially applicable in combination with other technologies.
Soil Removal	Removal / Off-Site Disposal	Excavation	Excavation of impacted material using common excavation methods for upland soil removal. Excavation at the site will likely require shoring methods to allow excavation near buildings and dewatering techniques to allow dry excavation.	Effective for complete range of contaminant groups. Loss of effectiveness where impacted soil is inaccessible due to presence of structures (i.e., roads, buildings, foundations, etc.).	Technically implementable in most areas of contaminated soil.	Moderate to high capital. Negligible O&M.	Potentially applicable in areas not occupied by buildings. Retained.
Off-Site Management	Land Disposal	Permitted Subtitle D Landfill	Disposal of impacted soil at a permitted, off-site Subtitle D landfill.	Effective for most contaminant groups.	Technically implementable. Impacted soil must be profiled and meet land disposal restrictions. Pretreatment of excavated material may be required to meet land disposal restrictions.	Moderate to high capital depending on types of waste present. Negligible O&M	Common disposal option for excavated soils, where appropriate.

General Response Action	Remediation Technology	Process Option	Description	Effectiveness	Implementability	Relative Cost	Summary of Screening
Ex-Situ Soil Treatment	Physical / Chemical Treatment	Stabilization	Contaminants are physically bound or enclosed within a stabilized mass or chemical reactions are induced between stabilizing agent and contaminants to reduce their mobility.	Stabilization is a common and effective technology for reducing the leachability of metals in soil, when TCLP concentrations prohibit non-hazardous disposal.	Technically implementable. However most processes result in moderate increase in volume.	Moderate capital. Low O&M. Moderate cost relative to other ex-situ physical/chemical options. Significant cost savings for disposal.	Not warranted for known Site contaminant levels.
		Thermal Desorption	Wastes are heated within a continuous flow reactor to 320 to 560 ^{o} C to volatilize organic contaminants. A carrier gas or vacuum system transports volatilized organics to the gas treatment system.	Effective for VOCs, SVOCs and fuels. Fine grained soils increase treatment time as a result of binding of contaminants to soil.	Technically implementable. However, particles size screening, dewatering to achieve acceptable moisture content, and off-gas treatment may be required. Special permitting may be required.	High capital. High O&M. Lower cost than incineration.	High cost relative other ex-situ technologies. Extensive preparation for treatment will be required and requires significant space and time and potentially special permits.
	Biological Treatment	Biopiles	Excavated soils are mixed with soil amendments and placed on a treatment area that includes leachate collection systems and some form of aeration.	Solid-phase (soil) process is most effective for non-halogenated VOCs and fuel hydrocarbons.	Difficult to implement. Treatment area may require complete enclosure. Addition of amendment material results in volumetric increase in treated material. Leachate and off-gas may require treatment.	Moderate capital and O&M. Moderate cost relative to other ex-situ biological options	Difficult to implement and requires space that is not readily available.
		Composting	Controlled biological process by which excavated soils are mixed with bulking agents and organic amendments to enhance microorganism conversion of organic contaminants to innocuous, stabilized byproducts.	Most effective for treatment of fuels and PAHs. Moderately effective for treatment of halogenated VOCs.	Difficult to implement. Treatment area may require complete enclosure. Addition of amendment material results in volumetric increase in treated material. Off-gas may require treatment.	Moderate capital and O&M. Moderate cost relative to other ex-situ biological options	Difficult to implement and generally not cost effective for volatile compounds compared to other in-situ technologies. Requires space that is not readily available.
In-Situ Soil Treatment	Biological Treatment	Bioventing	Oxygen is supplied through direct low-flow air injection into residual contamination in soil.	Effective in higher permeability soil for petroleum hydrocarbons and VOCs amenable to aerobic bioremediation. Degradation is relatively slow. Ineffective for inorganics and non-degradable organic constituents.	Technically implementable. Monitoring of off-gasses at ground surface may be required. Venting requires infrastructure of air injection piping, blower, controls, etc.	Moderate capital and O&M. Low cost relative to other in-situ options.	Implentation requirs long time period. Not effective for metals or other recalcitrant contaminants.
		Bioremediation	Stimulation of naturally occurring microbes by circulating water-based solutions through contaminated soils to enhance in-situ biological degradation of organic contaminants or immobilize inorganic contaminants by injection and/or mixing a bioremediation product (solid or liquid) directly into the soil, generally using common drilling/tilling methods.	Effective at treating the specific contaminants found at the Site with the exception of metals or recalcitrant organic contaminants.	Technically implementable. May be implemented with standard construction equipment.	Moderate capital and O&M. Moderate cost relative to other in-situ options.	Longer time frame. Not effective for metals or recalcitrant organic contaminants.

General Response Action	Remediation Technology	Process Option	Description	Effectiveness	Implementability	Relative Cost	Summary of Screening
In-Situ Soil Treatment	Biological Treatment	Natural Attenuation	Natural biotransformation processes such as volatilization, biodegradation, adsorption, and chemical reactions with soil materials can reduce contaminant concentrations to acceptable levels.	Moderate effectiveness. Effective for petroleum hydrocarbons.	Moderate implementability.	low capital. Low O&M. Low cost relative to other in-situ options	Longer time frame. Not effective for metals or recalcitrant organic contaminants.
In-Situ Soil Treatment (Continued)	Physical / Chemical Treatment	Soil Flushing	The extraction of contaminants from soil with aqueous solution accomplished by passing fluid and/or surfactant through in-place soils using an injection or infiltration process. Extraction fluids must be recovered from underlying aquifer.	Effective for VOCs and inorganic chemicals. Presence of fine grained soils limits effectiveness. Effectiveness relies on ability to capture and treat flushed contaminants.	Technically implementable. However, there has been little commercial application. Regulatory concerns over potential to wash contaminants beyond fluid capture zones and introduction of surfactants in to the subsurface make permitting difficult.	High capital and O&M. High cost relative to other in-situ options	High cost relative to other in-situ soil treatment technologies.
		Chemical Oxidation	Contaminant destruction by injecting or mixing chemical oxidizers directly into the contaminated soil to destroy chemical contaminants in place generally using common drilling/tilling methods.	Effectiveness at treating the specific contaminants found at the Site with the exception of metals or recalcitrant organic contaminants.	Technically implementable. May be implemented with standard construction equipment.	Moderate capital and O&M. Moderate cost relative to other in-situ options.	longer time frame. Not effective for metals or recalcitrant organic contaminants.
		Soil Vapor Extraction	Vacuum is applied through extraction pipes to create a pressure/concentration gradient in impacted areas, which induces gas-phase volatiles to diffuse through soil to extraction wells. The process includes a system for treating off-gas. Air flow also induces aerobic bioremediation of petroleum hydrocarbons and degradable VOCs.	Effective for volatile petroleum hydrocarbons and VOCs in granular soils. Presence of fine grained soils reduces effectiveness. Not significantly effective for heavier hydrocarbons or in low permeability soil. Ineffective for inorganics and non-volatile organic constituents.	Technically implementable. Typical application involves numerous extraction wells, conveyance piping, and large scale vacuum blowers. Installation under existing building would require installation using horizontal directionally drilled wells, significantly reducing implementability.	High capital and O&M. High cost relative to other in-situ options	High cost relative to other in-situ soil treatment technologies.

Notes:

Shaded Process Options are retained.

Table 5

Description of Cleanup Action Alternatives

Cap Sante Marine Site

Anacortes, Washington

Contaminants of Concern	Matrix	Objective	Cleanup Action Alternative Components		
			Alternative 1 - Engineering and Institutional Control	**Alternative 2 - In-Situ Soil Treatment**	**Alternative 3 - Complete Removal**
Gasoline-, Diesel-, Heavy Oil-Range Hydrocarbons, and cPAHs	Soil	■ Prevent direct contact (dermal, incidental ingestion or inhalation) with contaminated soil by site visitors, workers and potential future residents and/or other site users ■ Prevent potential leaching/migration of contamination from soil into groundwater.	■ Leave in place soil with contaminant concentrations exceeding proposed cleanup levels. Empiracle data shows that down gradient groundwater is not adverssely impacted by contaminated soil. ■ Maintain existing protective concrete, asphalt and/or soil caps isolating Site contaminants from human contact. ■ Monitor groundwater conditions quarterly for at least one year and periodically as agreed with Ecology over a period of approximately approximately ten years to evaluate contaminant concentrations, plume stability and natural attenuation performance. ■ Implement deed notifications to inform future owners of the presence of potentially hazardous substances at the Property and /or Implement deed restrictions to restrict certain specific site activities.	■ Maintain existing protective concrete, asphalt and/or soil surfaces outside of the in-situ treatment area to isolate Site contaminants from human contact. Empiracle data shows that down gradient groundwater is not adverssely impacted by contaminated soil. ■ Injection of a chemical oxidant and an oxygen releasing material to break down and/or enhance bioremediation/degradation of organic contaminants and/or immobilize inorganic contaminants. ■ Monitor groundwater conditions quarterly for at least one year following treatment and then periodically as agreed with Ecology to evaluate contaminant concentrations, plume stability and attenuation performance. ■ Develop institutional controls in the form of environmental covenants, signage, and other notification measures to address any remaining contaminated soil remaining in place in areas of the Site following in-situ treatment.	■ Excavate contaminated soil using commonly available excavation techniques. ■ Transport excavated soil to an approved landfill facility. ■ Protect or relocate existing utility infrastructure (power, phone, sewer, water, etc.) during construction. ■ Reroute vehicular and pedestrian traffic around the Site during construction. ■ Backfill and restore the Site to current conditions. ■ Monitor groundwater conditions quarterly for at least one year following construction.
Estimated Alternative Cost (+50%/-30%, rounded)[1]			$330,000	$1,140,000	$2,500,000
Estimated Volume of Contaminated Soil Removed			0 Cubic Yards	0 Cubic Yards	1,800 In-Place Cubic Yards
Estimated Timeframe to Closure			5-10 Years	5-10 Years	2-3 Years

Notes:

[1] Alternative cost estimates are presented in Appendix C.

Table 6

Evaluation of Cleanup Action Alternatives

Cap Sante Marine Site

Anacortes, Washington

Evaluation Criteria	Alternative 1 - Engineering and Institutional Controls	Alternative 2 - In-Situ Soil Treatment	Alternative 3 - Complete Removal
Compliance with MTCA Threshold Criteria			
Protection of Human Health and the Environment	**Yes** - Alternative would protect human health and the environment through a combination of engineering and institutional controls.	**Yes -** Alternative would protect human health and the environment through a combination of soil treatment and institutional/access controls.	**Yes -** Alternative would protect human health and the environment through complete source removal.
Compliance With Cleanup Standards	**Yes** - Alternative is expected to comply with cleanup standards. This alternative relies on the empirical demonstration that groundwater is not adversely impacted by the presence of contaminated soils and utilizes institutional controls to prevent exposure to contaminants in the subsurface. Compliance would rely on confirmational groundwater monitoring and maintenance of institutional controls. Future development of property could potentially require additional environmental cleanup or special provisions.	**Yes -** Alternative is expected to comply with cleanup standards. This alternative relies on the empirical demonstration that groundwater is not adversely impacted by the presence of contaminated soils and utilizes institutional controls to prevent exposure to contaminants in the subsurface. Compliance would rely on verification soil sampling, comfirmational groundwater monitoring and maintenance of institutional controls. Future development of property could potentially require additional environmental cleanup or special provisions.	**Yes -** Alternative is expected to comply with cleanup standards to the greatest extent practicable. All contaminant exceedance will be removed to the extent practical.
Compliance With Applicable State and Federal Regulations	**Yes** - Alternative complies with applicable state and federal regulations.	**Yes -** Alternative complies with applicable state and federal regulations.	**Yes -** Alternative complies with applicable state and federal regulations.
Provision for Compliance Monitoring	**Yes** - Alternative includes provisions for compliance monitoring.	**Yes -** Alternative includes provisions for compliance monitoring.	**Yes -** Alternative includes provisions for compliance monitoring.
Restoration Time Frame			
Restoration Time Frame	Restoration time frame is short. Primary cleanup action components have already been implemented. The time frame for confirmational groundwater monitoring is unknown. Potential future maintenance of institutional controls will extend the restoration time frame of this alternative.	Restoration time frame is moderate. Primary cleanup action components have already been implemented. In-situ soil treatment is expected to achieve cleanup objectives in 3-5 years. The time frame for long-term monitoring is unknown and depends on the effectiveness of the treatment. Potential future maintenance of institutional controls may extend the restoration time frame of this alternative.	Restoration time frame is expected to require two to three years for design and construction. Groundwater monitoring will be required to verify effectiveness of treatment. The time frame for confirmational groundwater monitoring is unknown.
Relative Benefits Ranking (Scored from 1-lowest to 10-highest)			
Protectiveness (30% weighting factor)	**Score = 6** Achieves a medium level of overall protectiveness as a result of institutional and engineering controls. Protectiveness would rely on maintenance of institutional and engineering controls to prevent exposure. Existing environmental risks are not significantly reduced however the empirical demonstration shows that groundwater is protected.	**Score = 7** Achieves a medium-high level of overall protectiveness as a result of in-situ soil treatment. Protectiveness during in-situ treatment would rely on maintenance of engineering controls to prevent exposure.	**Score = 9** Achieves a high level of overall protectiveness as a result of full source removal of the soil that poses risk to human and ecological receptors at the Site. Some contaminated soil may remain at the site following the excavation due to the large amount of obstructions that are expected to be encountered within the construction area.

Evaluation Criteria	Alternative 1 - Engineering and Institutional Controls	Alternative 2 - In-Situ Soil Treatment	Alternative 3 - Complete Removal
Relative Benefits Ranking (Scored from 1-lowest to 10-highest) - continued			
Permanence (20% weighting factor)	**Score = 5** Achieves a medium level of permanence, primarily through the use of the paved road surfaces and soil cap. This alternative relies on natural attenuation methods to achieve a reduction of mass. Future development may require modification of the remedy.	**Score = 7** Achieves a medium-high level of permanence through permanent reduction of toxicity and mobility of Site contaminants through the use of capping and in-situ soil treatment. This alternative provides for enhanced reduction of mass of the Site. However, there is a possibility of leaving residual contamination in-place exceeding cleanup levels following in-situ treatment and like Alternative 1; this alternative might eventually rely on use of capping to achieve permanence.	**Score = 9** Achieves a high level of permanent reduction of mass, toxicity, and mobility of hazardous substances at the Site through soil excavation. This alternative would reduce to the extent feasible the need to perform additional actions. Some contaminated soil may remain at the site following the excavation due to the large amount of obstructions that are expected to be encountered within the construction area.
Long-Term Effectiveness (20% weighting factor)	**Score = 5** This Alternative achieves a medium level of long-term effectiveness. The use of existing paved surfaced and soil cap provide for long-term reduction of risk to human health, but leaves soil at the Site exceeding cleanup levels. Existing data demonstrates that contaminated soils are not adversely impacting groundwater. The use of institutional controls reduces the risk to human health and the environment from the residual contamination left in place. Future development may require modification of the remedy.	**Score = 7** Achieves a medium-high level of permanence through permanent reduction of toxicity and mobility of Site contaminants through the use of capping and in-situ soil treatment. Existing data demonstrates that contaminated soils are not adversely impacting groundwater. This alternative provides for enhanced reduction of mass of the Site. However, there is a possibility of leaving residual contamination in-place exceeding cleanup levels following in-situ treatment and like Alternative 1; this alternative might eventually rely on use of institutional controls to reduce the risk to human health and the environment from the residual contamination left in place. Future development may require modification of the remedy.	**Score = 10** Removes hazardous substances from the Site to the greatest degree feasible and utilizes approved off-site disposal facilities for final disposition.
Management of Short-Term Risks (10% weighting factor)	**Score = 10** Short-term risks are low with this alternative due to the lack of construction activities involved in completing the components of the alternative. The capping components are already in place.	**Score = 5** Short-term risks are moderate with this alternative. The in-situ soil treatment included in this Alternative is not expected to pose significant risks to the public. However, may require multiple rounds of treatment to meet the cleanup objectives.	**Score = 4** Short-term risks associated with this alternative would be moderately high. This alternative involves greatest disturbance and off-site transport of contaminated soil relative to other alternatives, selective structure modification of the surface roads and buried utilities to access contaminated soil.
Technical and Administrative Implementability (10% weighting factor)	**Score = 10** Readily implemented. No active cleanup activities required. Administrative implementability of institutional controls is high.	**Score = 7** Moderate challenge to implement. Administrative implementability of institutional controls is high.	**Score = 5** Difficult to implement due to the design and coordination associated with shoring and rerouting of utilities in adjacent rights-of-way. Cleanup alternative does not require development of institutional controls.
Consideration of Public Concerns (10% weighting factor)	**Score = 4** Residual contamination remaining in place could result in concerns by the public and nearby property owners.	**Score = 5** Soil contamination is addressed by this Alternative. However, there is a possibility that residual contamination may remain following in-situ treatment. In addition, use of an oxidation product in the vicinity of marine water may cause public concern. The remaining contaminated soil left in place would require maintenance of institutional controls and impose limitations on future use and development of the property.	**Score = 8** Soil contamination would be removed to the extent practical under this alterative. Concerns by the public and nearby property owners could result from the temporary closure and rerouting of surface streets and buried utilities. However, closure and rerouting of surface streets and buried utilities would be on a short term basis.

Table 7

Summary of MTCA Evaluation and Ranking of Cleanup Action Alternatives

Cap Sante Marine Site

Anacortes, Washington

Remedial Alternative	Alternative 1 - Engineering and Institutional Controls	Alternative 2 - In-Situ Soil Treatment	Alternative 3 - Complete Removal
Evaluation			
Compliance with MTCA Threshold Criteria	Yes	Yes	Yes
Restoration Time Frame	1-2 years	2-3 years	2-3 years
Relative Benefits Ranking[1]			
Protectiveness (weighted as 30%)	1.8	2.1	2.7
Permanence (weighted as 20%)	1	1.4	1.8
Long-Term Effectiveness (weighted as 20%)	1	1.4	2
Management of Short-Term Risks (weighted as 10%)	1	0.5	0.4
Technical and Administrative Implementability (weighted as 10%)	1	0.7	0.5
Consideration of Public Concerns (weighted as 10%)	0.4	0.5	0.8
Total of Scores	**6.2**	**6.6**	**8.2**
Disproportionate Cost Analysis			
Probable Remedy Cost (+50%/-30%, rounded)	$330,000	$1,140,000	$2,500,000
Costs Disproportionate to Incremental Benefits	No	Yes	Yes
Practicability of Remedy	Practicable	Practicable	Practicable
Remedy Permanent to Maximum Extent Practicable	Yes	Yes	Yes
Overall Alternative Ranking	**1st**	**3rd**	**2nd**

Note:

[1] Weightings were established by Ecology as referenced in their Opinion Letter dated December 28, 2009.

FIGURES

GeoEngineers

N
W E
S

2,000 0 2,000

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
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Data Sources: ESRI Data & Maps

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Cap Sante Marine
Anacortes, Washington

GeoEngineers

Figure 1

Path: \\seal\projects\5\5147005\GIS\5147005_VicinityMap.mxd Map Revised: 14 August 2012 amanza

F DOCK
E DOCK
D DOCK
C DOCK
B DOCK
CAP SANTE BOAT HAVEN
CENTRAL PIER
UNDERGROUND STORAGE TANKS PRODUCT LINES (REMOVED)
A DOCK
SEAFARER'S WY
BOAT LAUNCH
T DOCK
HISTORICAL PETROLEUM RECOVERY TRENCH (REMOVED)
PETROLEUM SHEEN (2007 OBSERVATION)
UNDERGROUND STORAGE TANKS (REMOVED)
HISTORICAL BULKHEAD (APPROXIMATE)
OILY SOIL OBSERVED IN CITY EXCAVATION (2007)
FORMER CAP SANTE MARINE LEASE AREA
FISHERMAN'S WORK AND PARKING AREA
HISTORICAL BULKHEAD (APPROXIMATE)
Q AVE
CITY OF ANACORTES STORM DRAIN (ABANDONED)
10TH ST
11TH ST
SAFEWAY
FORMER SHELL TANK FARM SITE
13TH ST
14TH ST
SUBSTATION
15TH ST
RETAIL BUILDING

Path: \\sea\projects\5\5147005\GIS\5147005_SitePlan.mxd Map Revised: 27 December 2012 amanza

Data Source: Aerial image from Google Earth Pro, 2011. Skagit County GIS.

Projection: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

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Legend

- 2007 Cap Sante Marine Interim Action
- Historical UST
- Historical Fuel Supply Lines
- Historical Petroleum Recovery Trench
- City of Anacortes Storm Drain (Abandoned)
- UST Underground Storage Tank

N W E S

0 60 120 240
Feet

Site Plan

Cap Sante Marine
Anacortes, Washington

GeoEngineers

Figure 2

Path: \\sea\projects\5\51470056\GIS\51470508_SoilInvestigationSampleLocations.mxd Map Revised: 27 December 2012 amanza

Data Source: Aerial image from Port of Anacortes, 2007. Skagit County GIS.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Legend

- GeoEngineers (2011)
- GeoEngineers (2007)
- Landau (2007)
- Floyd Snider (2005)
- Floyd Snider (2004)
- Hart Crowser (1983)
- Hart Crowser Observation Well (1983)
- Historical UST
- Historical Petroleum Recovery Trench
- City of Anacortes Storm Drain (Abandoned)

N E S W

60 0 60

Feet

Soil Investigation Sample Locations

Cap Sante Marine
Anacortes, Washington

GeoEngineers

Figure 3

Path: \\seal\projects\5\51470051GIS\514700508_GroundwaterInvestigationSampleLocations.mxd Map Revised: 27 December 2012 amanza

Data Source: Aerial image from Port of Anacortes, 2007. Skagit County GIS.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes:
1. The locations of all features shown are approximate.
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Legend

- GeoEngineers (2012)
- GeoEngineers (2008 & 2009)
- Landau (2007)
- Landau (2007)
- Floyd Snider (2005)
- Floyd Snider (2004)
- Historical UST
- Historical Petroleum Recovery Trench
- City of Anacortes Storm Drain (Abandoned)

N E S W

60 0 60

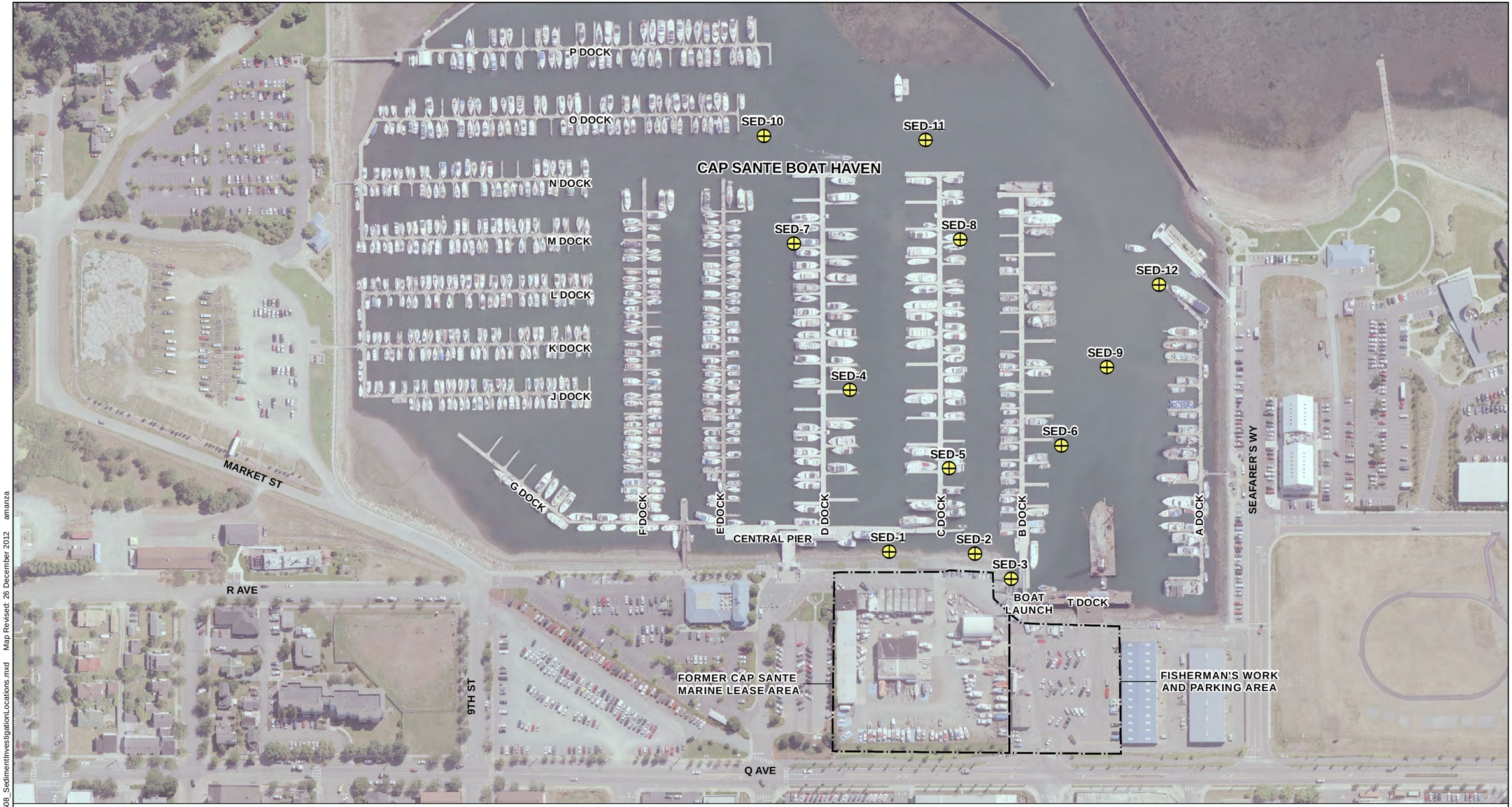
Feet

Groundwater Investigation Sample Locations

Cap Sante Marine
Anacortes, Washington

GeoEngineers

Figure 4



Path: \\sea\projects\515\147005\GIS\515147005GIS_SedimentInvestigationLocations.mxd Map Revised: 26 December 2012 amanza

Data Source: Aerial image from Port of Anacortes, 2007.

Projection: NAD 1983 HARN StatePlane Washington North FIPS 4601 Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Legend

⊕ Landau Associates (2007)

N E S W

200 0 200

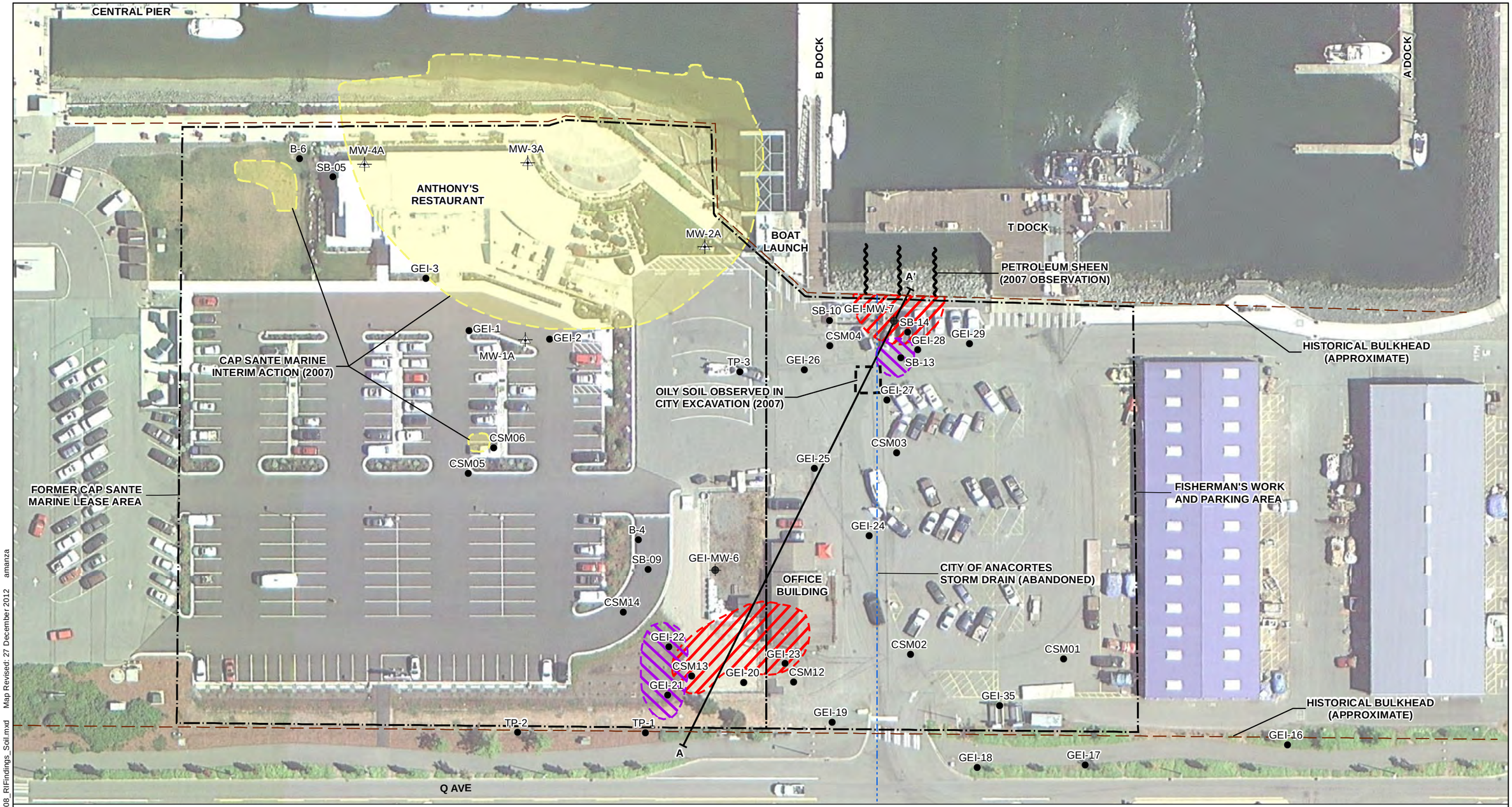
Feet

Sediment Investigation Sample Locations

Cap Sante Marine
Anacortes, Washington

GeoEngineers

Figure 5



Path: \\sea\projects\51\51470050\GIS\51470508_RIFindings_Soil.mxd Map Revised: 27 December 2012 amanza

Data Source: Aerial image from Google Earth Pro, 2011. Skagit County GIS.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Legend

- Soil Sample Location
- Monitoring Well Location
- Decomissioned Monitoring Well Location
- City of Anacortes Storm Drain (Abandoned)
- Cross Section A-A'
- Approximate Area of PAH Exceedance in Soil
- Approximate Area of TPH Exceedance in Soil

PAH - Polycyclic Aromatic Hydrocarbons

TPH - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil)

N W E S

60 0 60

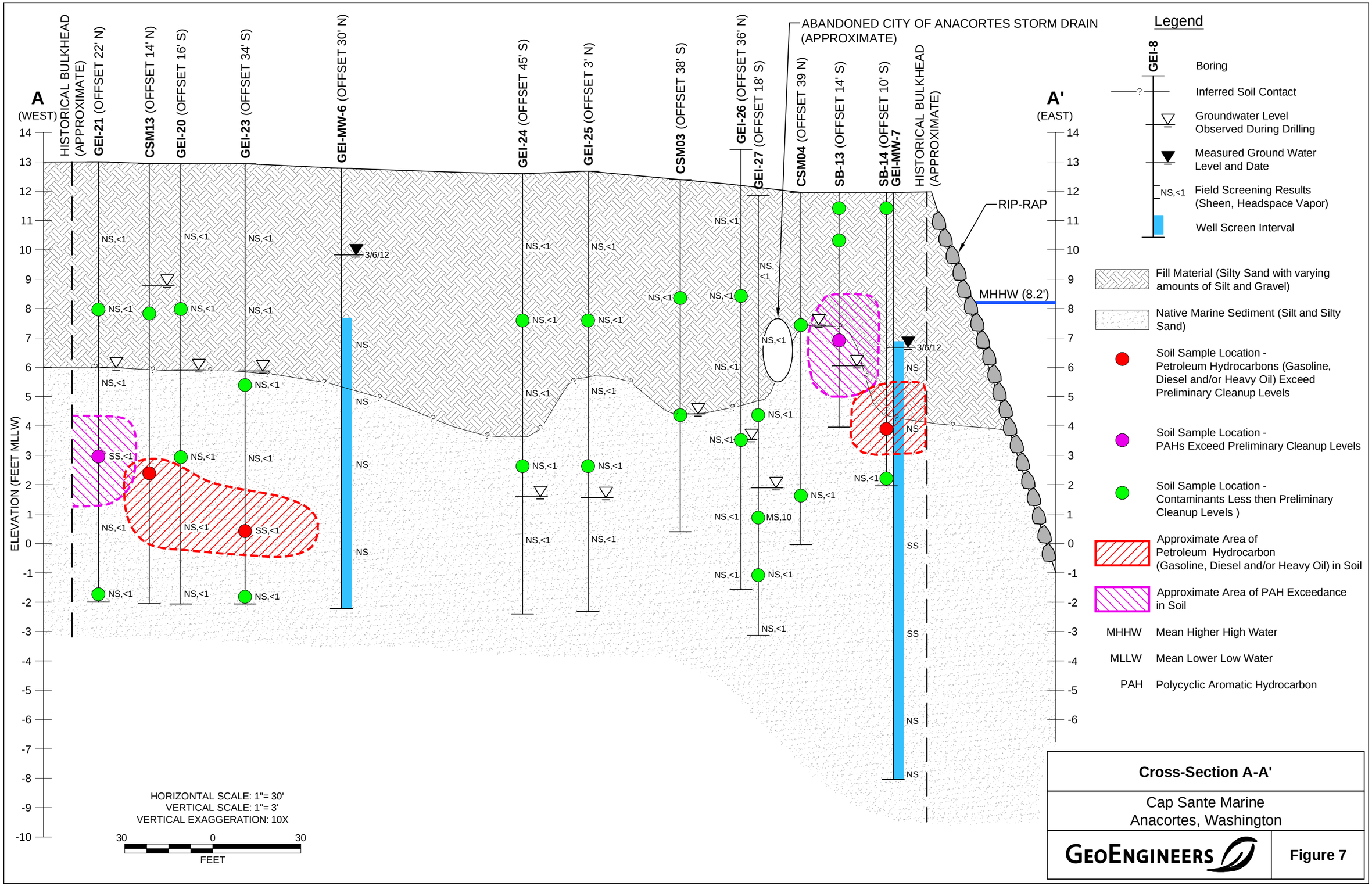
Feet

Summary of Remedial Investigaton Findings

Cap Sante Marine
Anacortes, Washington

GeoEngineers

Figure 6

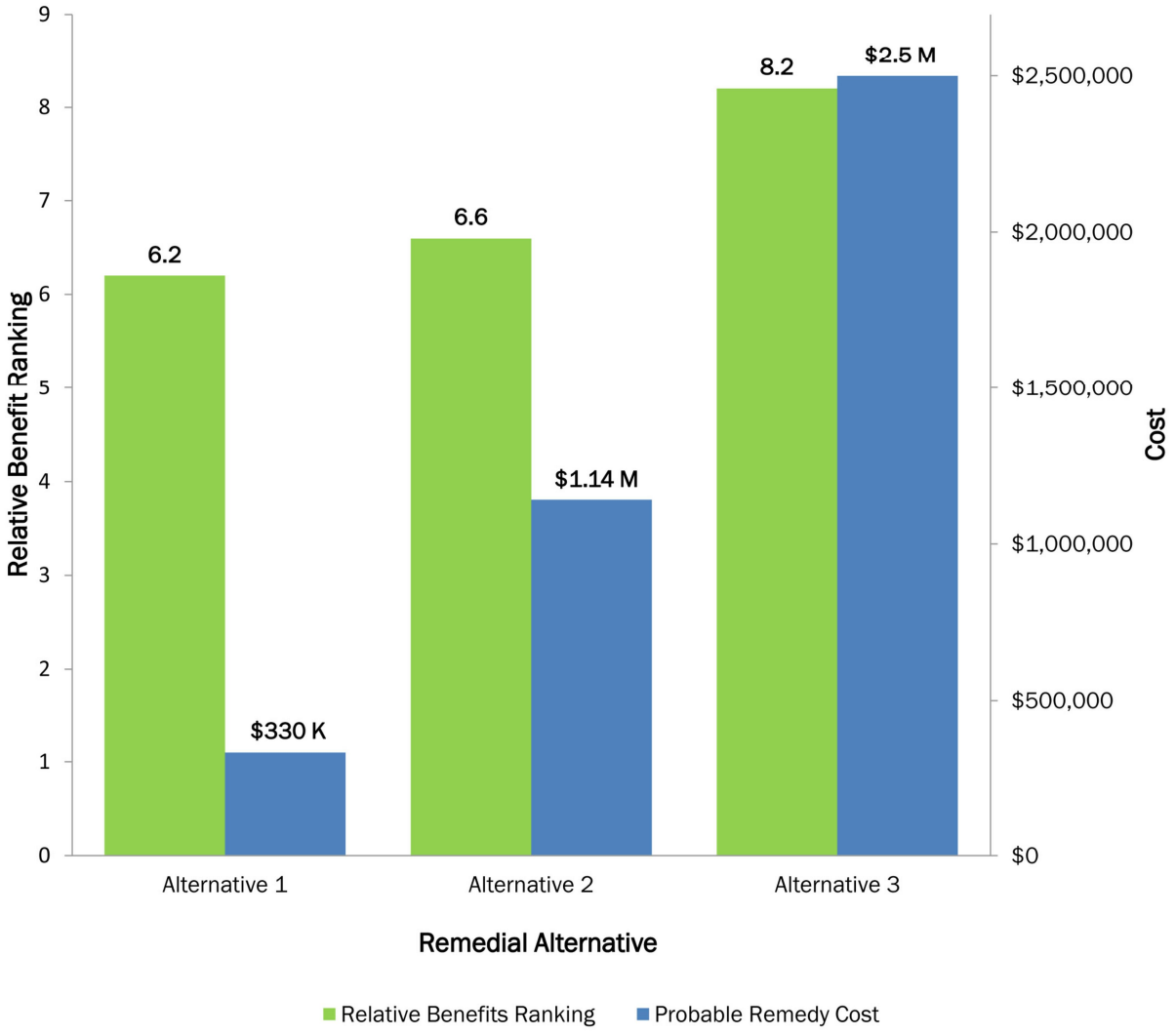


Cross-Section A-A'

Cap Sante Marine
Anacortes, Washington

GeoEngineers | **Figure 7**

P:\15\15\47005\08\CAD\15\47005-05 Fig 7 CrossSection AA.dwg\TAB:Cross-Section AA modified by tmichaud on Sep 18, 2012 - 10:19



Disproportionate Cost Analysis

Cap Sante Marine
Anacortes, Washington

GeoEngineers

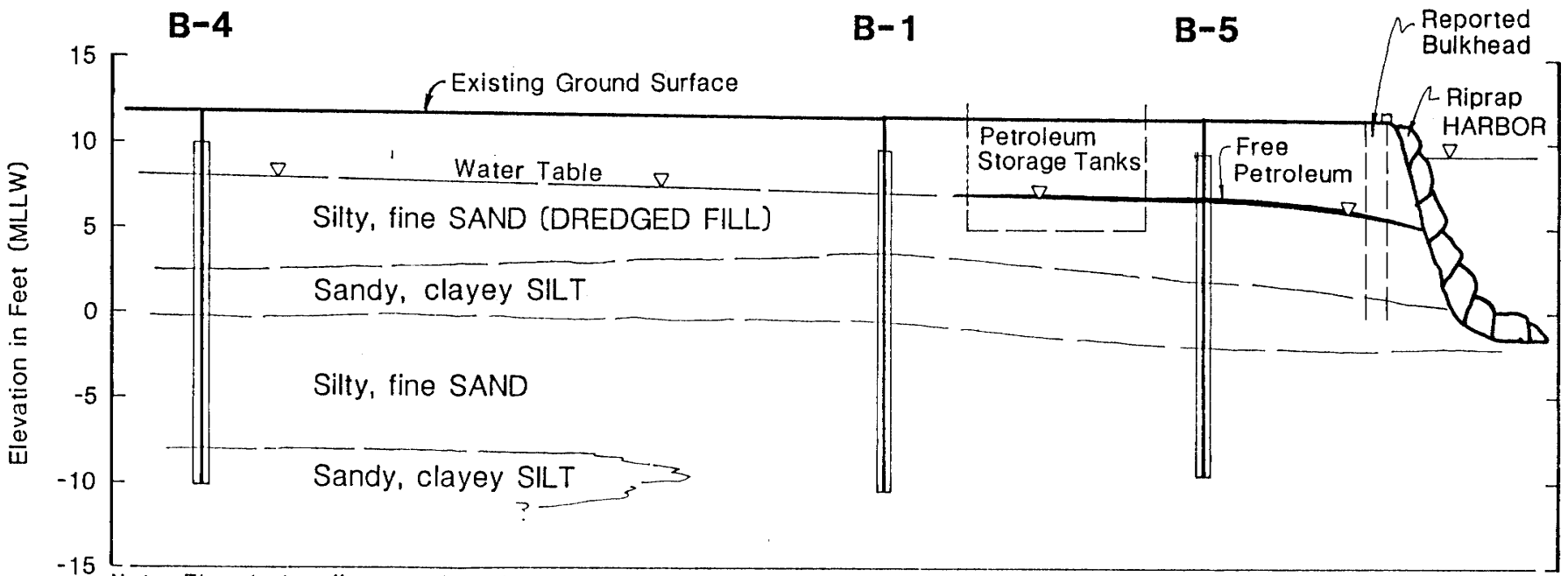
Figure 8

P:\15\15147005\08\CAD\15147005-05 Fig 8 DCA.dwg\Tab:PORTRAIT Modified by TMichaud on Dec 21, 2012 - 9:13

APPENDIX A
Remedial Investigation Results

1983 Port of Anacortes Petroleum Seepage Study Results

Generalized Subsurface Cross Section



Note: The stratum lines are based upon interpolation between observation wells and may not represent actual subsurface conditions.

B-1 Observation Well Number and Location

Water Level

Screened Section

0 40 80

Horizontal Scale in Feet

0 10 20

Vertical Scale in Feet

Vertical Exaggeration x 4

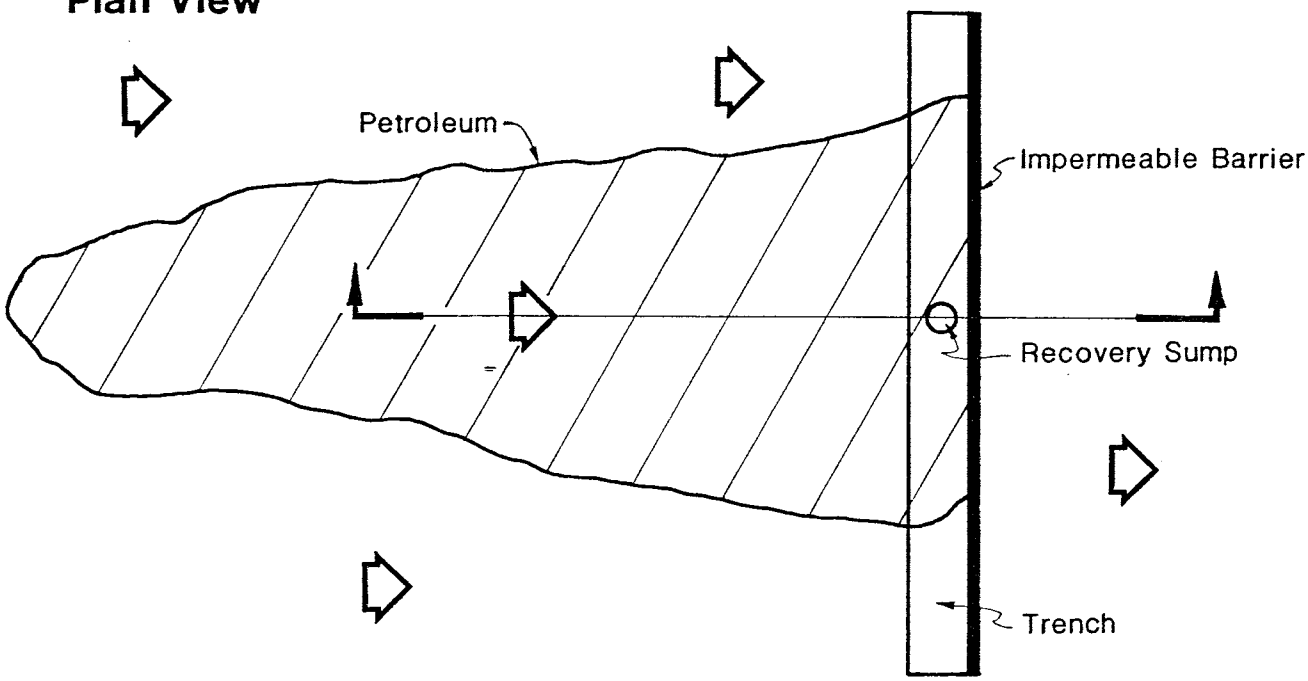
J-1302 October 1983

HART-CROWSER & associates inc.

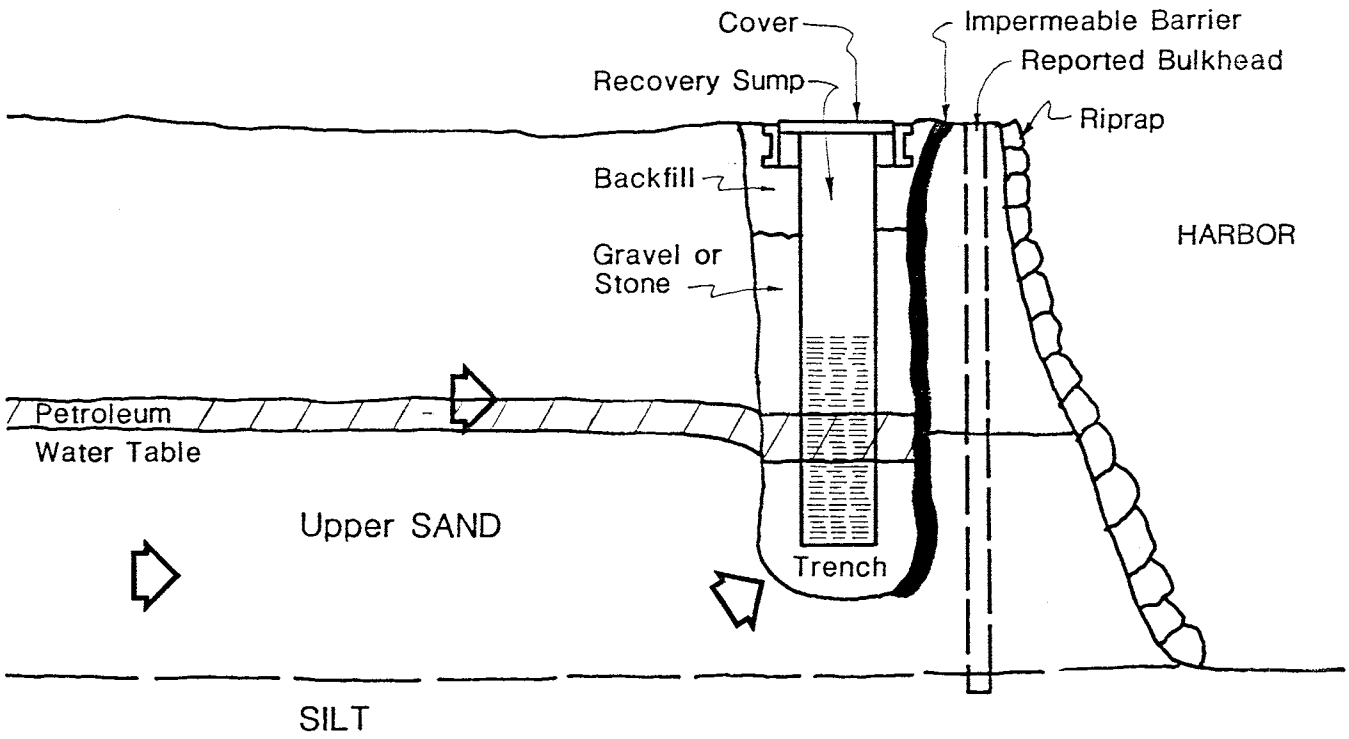
Figure 2

Proposed Interceptor Trench

Plan View



Cross Section



J-1302 October 1983
HART-CROWSER & associates inc.
Figure 3

TABLE A-1 Water Table Elevation and Product Thickness Data

OBSERVATION WELL NUMBER	MEASURING POINT ELEVATION IN FEET	September 26, 1983			October 12, 1983		
		DEPTH TO WATER IN FEET	WATER TABLE ELEVATION IN FEET	PRODUCT THICKNESS IN FEET	DEPTH TO WATER IN FEET	WATER TABLE ELEVATION IN FEET	PRODUCT THICKNESS IN FEET
B-1	11.67	4.52	7.15	0.01	3.79	7.97	ND
B-2	11.58	6.22	5.36	0.58	4.74	6.84	0.26
B-3	12.10	6.09	6.01	0.04	5.00	7.10	ND
B-4	11.92	3.48	8.44	0.01	NA	NA	NA
B-5	11.70	5.75	5.95	0.81	4.98	6.72	0.89
B-6	11.71	NA	NA	NA	4.09	7.62	ND
B-7	11.61	NA	NA	NA	5.37	6.24	0.38
B-8	11.95	NA	NA	NA	5.79	6.16	0.05

Note: Measuring point for all observation wells is top of metal monument bolt flange. Elevation datum referenced to MLLW with "B" Dock elevation assumed to be 12.00 feet.

NA - Not Available
ND - None Detected

2000 Dredge Material Characterization Study Results

Table 1 - Summary of Field Sampling Results

Sample Location	North Coordinate	West Coordinate	Time	Tide Height in Feet	Mudline Elevation in Feet MLLW	Depth to Sediment in Feet	Core Length in Feet
DMMU C1							
C1-01	48° 30.804'	122°36.534'	12:00	4	-9.7	13.7	3.3
C1-02	48° 30.737'	122° 36.535'	13:40	4.3	-6.7	11.0	4.5
C1-03	48°30.752'	122°36.306'	15:00	5.7	-10.1	15.8	2.9
C1-04	No Data	No Data	NA	NA	NA	NA	NA
C1-05	48° 30.752'	122°36.306'	15:53	6.2	-8.3	14.5	4.7
C1-06	48°30.785'	122°36.269'	17:30	7.2	9.8	17.0	3.2
DMMU C2							
C2-01	48° 30.914'	122° 36.498'	15:20	1.3	-8.2	9.5	3.4
C2-02	48°30.936'	122°36.467'	17:00	1.4	-8.1	9.5	4.9
C2-03	48°30.941'	122°36.389'	17:40	1.9	-5.8	7.7	5.0
C2-04	No Data	No Data	16:30	1.2	1.2	0.0	3.8
DMMU C3							
C3-01	48° 30.933'	122° 36.259'	8:25	3.0	-8.0	3.3	5.0
C3-02	48°30.914'	122°36.253'	9:00	8.3	-0.2	8.5	5.0
C3-03	48°30.894'	122°36.224'	9:40	8.4	0.4	8.0	5.0
C3-04	48° 30.225'	122°36.211'	10:10	8.4	-0.9	7.5	5.0
DMMU C4							
C4-01	48° 30.858'	122° 36.227'	12:15	6.6	-2.7	9.3	5.0
C4-02	48° 30.847	122° 36.203'	11:40	7.4	-1.7	9.1	5.0
C4-03	48° 30.828'	122° 36.227'	12:30	6.3	-2.5	8.8	5.0
C4-04	48° 30.819'	122° 36.204'	12:00	6.9	-2.3	9.2	5.0
DMMU C5							
C4-01	48° 30.792'	122° 36.209'	14:15	2.5	-1.3	3.8	5.0
C4-02	48° 30.763'	122° 36.235'	13:00	3.3	-2.9	6.2	5.0
C4-03	48° 30.752'	122° 36.284'	11:00	4.3	-3.7	8.0	5.0
C4-04	No Data	No Data	10:00	6.9	-6.7	13.6	5.0
DMMU C6							
C6-01	No Data	No Data	15:00	4.0	-9.4	13.4	3.6
C6-02	48° 30.911'	122° 36.430'	15:20	4.3	-10.1	14.4	2.9
C6-03	48° 30.885'	122° 36.393'	15:45	4.8	-9.8	14.6	3.2
C6-04	48° 30.909'	122° 36.365'	16:15	5.3	-9.2	14.5	3.8
DMMU C7							
C7-01	48° 30.909'	122° 36.306'	15:45	1.2	10.5	11.7	2.5
C7-02	48° 30.877'	122° 36.251'	15:00	2.3	10.2	12.5	2.8
C7-03	48° 30.834'	122° 36.304'	16:00	1	11	12	2
C7-04	48° 30.831'	122° 36.267'	15:15	1.7	11.3	13	1.7

Table 1 - Summary of Field Sampling Results

Sample Location	North Coordinate	West Coordinate	Time	Tide Height in Feet	Mudline Elevation in Feet MLLW	Depth to Sediment in Feet	Core Length in Feet
DMMU C8							
C8-01	48° 30.894'	122° 36.505'	12:00	4.8	10.2	15	3
C8-02	48° 30.854'	122° 36.507'	1420	6.3	-9.9	16.2	3.4
C8-03	48° 30.839'	122° 36.436'	14:45	6.5	-10.5	17	2.5
C8-04	48° 30.842'	122° 36.352'	15:17	6.9	-10.1	17	2.9
DMMU C9							
C9-01	48° 30.825'	122° 36.496'	8:50	7.2	-10.5	17.7	2.5
C9-02	48° 30.80'	122° 36.469'	11:15	4.7	-9.9	14.6	3.1
C9-03	No Data	No Data	10:00	5.7	-11	16.7	2
C9-04	48° 30.800'	122° 36.389'	10:30	5.2	-10.1	15.3	2.9
DMMU C10							
C10-01	No Data	No Data	11:15	6.6	-9.3	15.8	3.7
C10-02	No Data	No Data	11:15	6.6	-8.2	14.8	4.8
C10-03	No Data	No Data	11:15	6.6	-9.6	16.2	3.4
C10-04	No Data	No Data	11:15	6.6	-9.9	16.5	3.1
DMMU C11							
C11-01	48° 30.753'	122° 36.502'	9:00	7.8	-9.2	17	3.8
C11-02	48° 30.753'	122° 36.470'	9:30	6.7	-8.6	15.3	4.4
C11-03	48° 30.755'	122° 36.421'	10:15	5.7	-9.1	14.8	3.9
C11-04	48° 30.755'	122° 36.391'	10:40	5.1	-9	14.1	4
DMMU C12							
C12-01	48° 30.745'	122° 36.497'	12:00	3.4	-10.3	13.7	2.7
C12-02	48° 30.723'	122° 36.444'	12:40	3.2	-9.5	12.7	3.5
C12-03	No Data	No Data	13:45	3.3	-9	12.3	4
C12-04	48° 30.723'	122° 36.395'	13:15	3.2	-8.8	12	4.2

NA- Not Applicable

No Data- Data were not collected due to GPS outages. Samples were located using hand survey techniques.

Table 2 - Sample Compositing Plan

Composite Sample Number	Core Sections
C1	C1-01A, C1-02A, C1-03A, C1-05A, C1-06A
C2	C2-01A, C2-02A, C2-03A, C2-04A
C3	C3-01A, C3-02A, C3-03A, C3-04A
C4	C4-01A, C4-02A, C4-03A, C4-04A
C5	C5-01A, C5-02A, C5-03A, C5-04A
C6	C6-01A, C6-02A, C6-03A, C6-04A
C7	C7-01A, C7-02A, C7-03A, C7-04A
C8	C8-01A, C8-02A, C8-03A, C8-04A
C9	C9-01A, C9-02A, C9-03A, C9-04A
C10	C10-01A, C10-02A, C10-03A, C10-04A
C11	C11-01A, C11-02A, C11-03A, C11-04A
C12	C12-01A, C12-02A, C12-03A, C12-04A
Comp-1	C1-01A, C1-02A, C1-03A, C1-05A, C1-06A, C10-01A, C10-02A, C10-03A, C10-04A, C7-01A, C7-02A, C7-03A, C7-04A
Comp-2	C2-01A, C2-02A, C2-03A, C2-04A, C6-01A, C6-02A, C6-03A, C6-04A, C8-01A, C8-02A, C8-03A, C8-04A, C9-01A, C9-02A, C9-03A, C9-04A, C11-01A, C11-02A, C11-03A, C11-04A, C12-01A, C12-02A, C12-03A, C12-04A

Smple Identification	Sample Depth Interval in Feet	Visual Sediment Description
C1-01	0.0 to 1.5	Soft, wet, brown organic SILT; trace shell fragments and worms.
	1.5 to 3.3	Medium stiff, wet, brown, organic SILT; wood fragments at 3.2 feet.
C1-02	0.0 to 0.6	Soft, wet, black SILT; trace shell fragments.
	0.6 to 2.6	Medium stiff, wet, brown, organic SILT; wood fragments at 3.2 feet; sand lens at 2.0 feet.
	2.6 to 3.2	Dense, wet, gray, silty, gravelly SAND; shell fragments.
C1-03	0.0 to 1.2	Medium stiff, wet, black, slightly gravelly, sandy SILT; metal scale; wood/shell fragments; slight sheen.
	1.2 to 2.7	Hard, green, silty CLAY.
C1-04	NA	NA
C1-05	0.0 to 1.1	Very soft, wet, brown, organic SILT.
	1.1 to 2.8	Soft, wet, brown, organic SILT;trace shell fragments/wood at 1.1 and 1.6 feet.
	2.8 to 3.2	Medium stiff, gray SILT.
C1-06	0.0 to 1.1	Soft, wet, brown, organic SILT; worms and shell fragments.
	1.1 to 1.2	Loose, wet, brown SAND.
	1.2 to 2.3	Soft, wet, brown approximately 50% wood chip/sawdust in SILT matrix.
C2-01	0.0 to 1.3	Very soft, wet, brown SILT; trace shells.
	1.3 to 2.6	Hard, wet, gray SILT.
C2-02	0.0 to 1.1	Soft, wet, brown, organic SILT.
	1.1 to 2.2	Medium dense, wet, gray, silty, fine SAND; abundant shell fragments.
	2.2 to 2.4	Hard, wet, gray SILT.
C2-03	0.0 to 1.0	Soft, wet, dark gray SILT; scattered shells.
	1.0 to 2.1	Dense, wet, gray, very sandy GRAVEL; mix of round and angular.
	2.1 to 3.55	Very stiff, wet, gray, clayey SILT.
C2-04	0.0 to 1.6	Soft, wet, brown, slightly sandy, slightly gravelly SILT; trace wood.
	1.6 to 2.7	Medium dense, wet, gray, silty, fine SAND; abundant shell fragments.
C3-01	0.0 to 0.25	Very soft, wet, brown SILT.
	0.25 to 0.8	Medium dense, wet, gray, silty SAND.
	0.8 to 1.63	Dense, wet, gray, slightly silty, very gravelly SAND.
	1.63 to 1.83	Stiff, wet, gray SILT.
	1.83 to 2.8	Dense, wet, gray, slightly silty, gravelly SAND.
C3-02	0.0 to 1.1	Soft, wet, brown, organic SILT; trace shell/wood fragments.
	1.1 to 3.0	Medium dense, wet, gray, silty, fine SAND; abundant shell fragments.
	3.0 to 3.8	Dense, wet, gray, gravelly SAND.
C3-03	0.0 to 2.8	Soft, wet, brown to gray, slightly sandy SILT; shell fragments; areas of organics; occasional gravel; rusted iron.
	2.8 to 3.0	Soft, wet, gray SILT; shell fragments.
	3.0 to 3.7	Dense, wet, gray, silty, gravelly SAND.
C3-04	0.0 to 2.8	Soft, wet, dark gray, slightly sandy SILT; abundant shell fragments; live worm; trace wood.
	2.8 to 3.5	Dense, wet, gray, silty, gravelly SAND.
C4-01	0.0 to 0.4	Very soft, wet, brown SILT.
	0.4 to 1.3	Soft, wet, gray, slightly sandy SILT; scattered shell fragments.
	1.3 to 3.4	Stiff, wet, gray SILT; abundant shell fragments; trace wood.
	3.4 to 3.8	Fibrous PEAT, w/gray SILT interbeds.
C4-02	0.0 to 0.9	Very soft, wet, dark gray, slightly sandy SILT; scattered shell fragments.
	0.9 to 3.0	Medium stiff, wet, gray SILT; abundant shell fragments.
	3.0 to 4.1	Fibrous PEAT, w/ 1-inch SILT interbeds; scattered twigs and wood.

4974/CapTables.xls - Table 3

Smple Identification	Sample Depth Interval in Feet	Visual Sediment Description
C4-03	0.0 to 1.0	Very soft, wet, dark gray, slightly sandy SILT.
	1.0 to 3.9	Medium stiff, wet, gray SILT; abundant shell fragments.
C4-04	0.0 to 1.2	Soft, wet, dark gray, slightly sandy SILT; wood and trace shells.
	1.2 to 2.8	Medium stiff, wet, gray SILT; abundant shell fragments.
	2.8 to 3.6	PEAT, w/silt interbeds (up to 2inches).
C5-01	0.0 to 0.8	Very soft, wet, brown SILT; live clams; trace eel grass.
	0.8 to 2.2	Soft, wet, gray, slightly sandy SILT; abundant shell fragments.
	2.2 to 3.2	Soft, wet, brown, organic SILT; twigs and wood.
	3.2 to 3.6	Soft, wet, brown, clayey SILT.
	3.6 to 4.4	Soft, wet, brown, organic SILT; wood fragments.
C5-02	0.0 to 0.2	Very soft, wet, brown SILT; eelgrass.
	0.2 to 1.9	Medium dense, wet, gray, silty SAND; abundant shell fragments.
	1.9 to 3.8	Medium dense, wet, gray, very silty, fine SAND; abundant shell fragments.
	3.9 to 4.0	White, chalky volcanic ASH layer (1-inch).
	4.0 to 4.6	Soft, wet, brown, fibrous PEAT.
C5-03	0.0 to 1.0	Soft, wet, organic SILT; trace shells.
	1.0 to 2.0	Medium dense, wet, gray, slightly silty, gravelly SAND; abundant shells.
	2.0 to 2.55	Stiff, wet, gray, slightly sandy SILT; shells.
	2.55 to 3.0	Medium dense, wet, gray, slightly sandy SILT; scattered GRAVEL/shells.
	3.0 to 3.4	Stiff, wet, gray, sandy SILT; shells.
	3.4 to 4.3	Dense, wet, gray, fine SAND; shell fragments.
C5-04	0.0 to 0.25	Soft, wet, brown SILT.
	0.25 to 1.2	Medium dense, wet, gray, slightly silty, gravelly SAND; trace shell fragments.
	1.2 to 3.2	Soft, wet, brown to gray, organic SILT; abundant wood; trace shells; fibrous peat at 2.5 to 3.0 feet.
	3.2 to 4.3	Soft, wet, yellow ASH with abundant shells; SILT laminae interbedded.
C6-01	0.0 to 1.2	Very soft, wet, brown, organic SILT.
	1.2 to 2.0	Soft, wet, brown, organic SILT.
	2.0 to 3.0	Very stiff, wet, gray, clayey SILT; trace SAND.
C6-02	0.0 to 1.0	Very soft, wet, brown, organic SILT; trace shell fragments.
	1.0 to 2.2	Soft, wet, brown, organic SILT; approximately 20% sawdust and wood; SILT lenses (1.8 and 2.0 feet).
C6-03	0.0 to 1.6	Soft, wet, black to brown SILT; trace shell fragments; H_2S odor.
	1.6 to 2.3	Soft, wet, brown SILT; approximately 50% sawdust and wood chips.
C6-04	0.0 to 1.8	Soft, wet, brown, organic SILT; approximately 50% wood chips (1.0 to 1.2 feet).
	1.8 to 3.1	Dense, wet, gray, medium to fine SAND; brown, silty SAND laminae.
C7-01	0.0 to 0.6	Very soft, wet, dark gray SILT.
	0.6 to 2.6	Medium stiff, wet, gray SILT; abundant shell fragments.
C7-02	0.0 to 1.4	Very soft, wet, brown, organic SILT; wood and trace shells.
	1.4 to 2.0	Medium stiff, wet, gray SILT; abundant shells.
	2.0 to 2.3	Dense, wet, gray, gravelly SAND; shells.
C7-03	0.0 to 0.5	Soft, wet, gray SILT.
	0.5 to 1.8	Medium stiff, wet, gray SILT; abundant shell fragments.
C7-04	0.0 to 0.6	Very soft, wet, brown, organic SILT.
	0.6 to 2.2	Fibrous PEAT.
C8-01	0.0 to 0.8	Soft, wet, black SILT; trace shells.
	0.8 to 1.2	Medium dense, wet, gray, silty SAND.
	1.2 to 2.4	Hard, moist to wet, gray SILT; fine stratification/laminae.

4974/CapTables.xls - Table 3

Smple Identification	Sample Depth Interval in Feet	Visual Sediment Description
C8-02	0.0 to 2.9	Soft, wet, black, organic SILT; shell fragments at surface and 2.0 feet.
C8-03	0.0 to 1.4	Soft, wet, brown, organic SILT.
	1.4 to 2.0	Medium stiff, wet, brown, organic SILT.
C8-04	0.0 to 2.2	Soft, wet, brown, organic SILT; wood at 0.4 and 1.8 feet.
C9-01	0.0 to 1.5	(Light green SILT dusting over) soft, wet, brown, organic SILT; trace shell fragments.
	1.5 to 2.7	Medium stiff, wet, brown, organic SILT.
C9-02	0.0 to 1.6	Soft, wet, brown, organic SILT; trace shells; strong H_2S odor.
	1.6 to 2.3	Soft, wet, brown, organic SILT; approximaely 25% sawdust/wood fiber.
C9-03	0.0 to 1.4	Soft, wet, brown, organic SILT; trace shell fragments; H_2S odor; metal scale at approximately 1.0 foot.
	1.4 to 2.2	Medium stiff, wet, brown, organic SILT; wood.
C9-04	0.0 to 1.5	Soft, wet, brown, organic SILT; trace shell fragments; H_2S odor.
	1.5 to 2.0	Soft-med. stiff, wet, brown, organic SILT; trace wood.
C10-01	0.0 to 0.8	Very soft, wet, brown, organic SILT; trace shell fragments/wood.
	0.8 to 2.1	Soft, wet, brown, organic SILT; occasional shell fragments.
	2.1 to 2.5	Medium stiff, wet, gray SILT; occasional shell fragments.
	2.5 to 2.9	Dense, wet, gray, slightly gravelly, silty SAND.
C10-02	0.0 to 0.7	Very soft, wet, brown, organic SILT; trace shell fragments.
	0.7 to 3.1	Soft, wet, brown, organic SILT; trace wood/ grasses.
	3.1 to 3.9	Medium stiff, wet, brown, organic SILT; abundant shell fragments; trace wood.
C10-03	0.0 to 0.8	Very soft, wet, dark gray SILT.
	0.8 to 1.6	Soft, wet, brown, organic SILT.
	1.6 to 2.3	Medium stiff, wet, light brown, clayey SILT.
C10-04	0.0 to 1.0	Very soft, wet, dark gray SILT.
	1.0 to 2.2	Soft, wet, brown, organic SILT.
C11-01	0.0 to 0.6	Very soft, wet, green-brown SILT.
	0.6 to 2.4	Soft, wet, brown, organic SILT; scattered shell fragments; trace wood.
	2.4 to 2.8	Medium stiff to stiff, wet, brown SILT; abundant shell fragments; trace wood.
	2.8 to 3.2	Dense, wet, gray, slightly silty, gravelly SAND; abundant shell fragments.
C11-02	0.0 to 1.3	Very soft, wet, green-brown, organic SILT; trace shell fragments; slight sheen.
	1.3 to 3.1	Soft, wet, brown, organic SILT; scattered shell fragments; 2- by 3-inch aluminum sheeting at 2.4 feet.
C11-03	0.0 to 2.0	Soft, wet, brown, organic SILT; shell fragments; wood/bark at 2.0 feet.
	2.0 to 2.8	Soft to medium stiff, wet, brown, organic SILT; wood/bark at 2.1 feet.
C11-04	0.0 to 1.1	Very soft, wet, brown, organic SILT.
	1.1 to 1.8	Soft, wet, brown, organic SILT.
	1.8 to 2.6	Medium stiff, wet, brown, organic SILT; trace shell fragments.
C12-01	0.0 to 0.63	Soft, wet, brown, organic SILT; trace shell fragments.
	0.63 to 0.96	Wood and sawdust.
	0.96 to 1.00	SAND lens.
	1.0 to 2.2	Stiff, wet, gray, slightly sandy SILT; abundant shell fragments.
C12-02	0.0 to 1.15	Soft, wet, brown, organic SILT; trace sea grasses/shell fragments.
	1.15 to 1.25	Sawdust and wood chips; trace SAND layer at 1.25 feet.
	1.25 to 2.4	Stiff, gray, slightly sandy SILT; abundant shell fragments.

Smple Identification	Sample Depth Interval in Feet	Visual Sediment Description
C12-03	0.0 to 1.8	Very soft, wet, gray-black, organic SILT; piece of nylon rope at 0.6 foot.
	1.8 to 2.4	Sawdust and wood chips; trace SAND at 2.4 feet.
	2.4 to 3.0	Medium stiff, wet, gray SILT; abundant shell fragments.
C12-04	0.0 to 0.8	Very soft, wet, brown, organic SILT; trace shell fragments; H_2S odor.
	0.8 to 1.3	Sawdust and wood chips.
	1.3 to 1.34	Small SAND lens; scattered shells.
	1.34 to 3.1	Medium stiff, wet, gray, slightly sandy SILT; abundant shell fragments.

Table 4 - Summary of Grain Size Characterization Results

Sample Identification	Gravel in Percent	Sand in Percent	Silt in Percent	Clay in Percent	Sediment Description
C1	0	26	54	20	Clayey, sandy SILT
C2	3	27	50	20	Clayey, sandy SILT
C3	12	47	35	6	Slightly clayey, slightly gravelly silty SAND
C4	1	21	57	21	Clayey, sandy SILT
C5	15	47	28	10	Slightly clayey, slightly gravelly silty SAND
C6	0	44	41	15	Clayey, very sandy SILT
C7	0	13	65	22	Sandy, clayey SILT
C8	0	15	71	14	Clayey, sandy SILT
C9	0	5	73	22	Clayey SILT
C10	0	7	68	25	Slightly sandy, clayey SILT
C10 Dup	0	7	68	25	Slightly sandy, clayey SILT
C10 Trip	0	9	69	22	Slightly sandy, clayey SILT
C11	0	4	70	26	Clayey SILT
C12	0	16	59	25	Sandy, clayey SILT

Table 5 - Chemical Analysis Results for Sediment Samples

Lab ID	PSDDA	902026-8	902036-8	902036-11	902036-14	902036-2
Sample ID	SL	C1	C2	C3	C4	C5
Conventionals in %						
Ammonia As Nitrogen		66	22	5.3	12	24
Moisture			50	34	40	56
Total Organic Carbon		3.6	3.5	1.4	1.8	4.5
Total Solids		53	53.4	68.6	60.7	59.2
Total Sulfide		270	200	310	100	200
Total Volatile Solids		9.39	6.94	3.36	4.35	8.29
Metals in mg/kg						
Antimony	150	5.8 U	5.5 U	3.9 U	4.6 U	4.7 U
Arsenic	57	6.4	5.2	5.1	4.8	5.5
Cadmium	5.1	0.58 U	0.55 U	0.39 U	0.46 U	0.47 U
Copper	390	55	43	21	20	22
Lead	450	26	12	7.6	7.2	8.6
Mercury	0.41	0.21 U	0.2 U	0.16 U	0.17 U	0.18 U
Nickel	140	26	28	15	19	18
Silver	6.1	1.2 U	1.1 U	0.78 U	0.92 U	0.95 U
Zinc	410	95 J	77 J	49 J	46	44 J
Pore Water TBT in µg/L						
Tributyltin	0.15 *	0.47	0.20	0.015	0.02	0.03
Tetra-n-butyltin						
Di-n-butyltin						
n-Butyltin						
LPAHs in mg/kg						
2-Methylnaphthalene	0.67	0.036	0.011 J	0.007 J	0.032 U	0.014 J
Acenaphthene	0.5	0.05	0.008 J	0.017 U	0.019 U	0.024
Acenaphthylene	0.56	0.023	0.033	0.012 J	0.021 U	0.005 J
Anthracene	0.96	0.11	0.072	0.034 J	0.01 J	0.034 J
Fluorene	0.54	0.045	0.027	0.021	0.016 J	0.028
Naphthalene	2.1	0.11	0.094	0.058	0.06	0.085
Phenanthrene	1.5	0.22	0.23	0.16	0.061	0.16
Total LPAHs	5.2	0.558	0.464	0.285	0.147	0.336
HPAHs in mg/kg						
Benzo(a)anthracene	1.3	0.2	0.26	0.093	0.025 J	0.082
Benzo(a)pyrene	1.6	0.13	0.29	0.099	0.026	0.067
Benzo(b)fluoranthene		0.33 T	0.61 T	0.15 T	0.052 TJ	0.17 T
Benzo(g,h,i)perylene	0.67	0.067	0.18	0.059	0.016 J	0.036
Benzo(k)fluoranthene		0.33 T	0.61 T	0.15 T	0.052 TJ	0.17 T
Chrysene	1.4	0.29	0.46	0.11	0.043	0.18
Dibenz(a,h)anthracene	0.23	0.035	0.027	0.012 J	0.021 U	0.019 U
Fluoranthene	1.7	1.1	0.47	0.39	0.089	0.34
Indeno(1,2,3-cd)pyrene	0.6	0.065	0.16	0.051	0.022 U	0.032
Pyrene	2.6	0.44	0.59	0.22	0.1	0.35
Total Benzofluoranthenes	3.2	0.33	0.61	0.15	0.052 J	0.17
Total HPAHs	12	2.987	3.657	1.334	0.403	1.427
Semivolatiles in mg/kg						
1,2,4-Trichlorobenzene	0.031	0.023 U	0.031 U	0.028 U	0.031 U	0.028 U
Dibenzofuran	0.54	0.047	0.009 J	0.02 U	0.022 U	0.024
N-Nitrosodiphenylamine	0.028	0.017 U	0.023 U	0.021 U	0.023 U	0.021 U
Semivolatiles in µg/kg						
Benzoic Acid	650	49 J	50 J	14 J	14 J	19 J

Table 5 - Chemical Analysis Results for Sediment Samples

Lab ID Sample ID	PSDDA SL	902026-8 C1	902036-8 C2	902036-11 C3	902036-14 C4	902036-2 C5
Benzyl Alcohol	57	3.2 J	0.77 J	33 U	36 U	0.74 J
Phenols in µg/kg						
2,4-Dimethylphenol	29	3.4 J	1.3 J	0.65 J	15 U	0.96 J
2-Methylphenol	63	3.5 J	33 U	30 U	33 U	29 U
4-Methylphenol	670	190	74	51	67	63
Pentachlorophenol	400	6.5 J	2.7 J	48 U	53 U	1 J
Phenol	420	39 J	15 J	18 J	18 J	10 U
Phthalates in mg/kg						
Bis(2-ethylhexyl)phthalate	8.3	0.15	0.18	0.023 UJ	0.046 UJ	0.055 UJ
Butylbenzylphthalate	0.97	0.02 J	0.11 U	0.049 U	0.053 U	0.048 U
Di-n-butylphthalate	5.1	0.021 UJ	0.036 U	0.033 U	0.036 U	0.032 U
Di-n-octylphthalate	6.2	0.038 U	0.13	0.047 U	0.052 U	0.047 U
Diethylphthalate	1.2	0.028 U	0.038 U	0.035 U	0.038 U	0.034 U
Dimethylphthalate	1.4	0.025	0.014 J	0.031 U	0.034 U	0.03 U
Pesticide/PCBs in mg/kg						
Aroclor 1016		0.071 U	0.067 U	0.051 U	0.056 U	0.06 U
Aroclor 1221		0.071 U	0.067 U	0.051 U	0.056 U	0.06 U
Aroclor 1232		0.071 U	0.067 U	0.051 U	0.056 U	0.06 U
Aroclor 1242		0.071 U	0.067 U	0.051 U	0.056 U	0.06 U
Aroclor 1248		0.071 U	0.067 U	0.051 U	0.056 U	0.06 U
Aroclor 1254		0.071 U	0.067 U	0.051 U	0.056 U	0.06 U
Aroclor 1260		0.077 U	0.067 U	0.051 U	0.056 U	0.06 U
Total PCBs	0.13	0.071 U	0.067 U	0.051 U	0.056 U	0.06 U
Aldrin	0.01	0.004 U	0.003 U	0.003 U	0.003 U	0.003 U
Alpha-Chlordane		0.004 U	0.003 U	0.003 U	0.003 U	0.003 U
Dieldrin	0.01	0.007 U	0.007 U	0.005 U	0.006 U	0.006 U
Gamma-BHC (Lindane)		0.004 U	0.003 U	0.003 U	0.003 U	0.003 U
Heptachlor	0.01	0.004 U	0.003 U	0.003 U	0.003 U	0.003 U
Hexachlorobenzene	0.022	0.004 U	0.003 U	0.003 U	0.003 U	0.003 U
Hexachlorobutadiene	0.029	0.004 U	0.003 U	0.003 U	0.003 U	0.003 U
Hexachloroethane	1.4	0.029 U	0.04 UJ	0.037 UJ	0.04 UJ	0.036 UJ
P,P'-DDD		0.004 U	0.003 U	0.003 U	0.003 U	0.003 U
P,P'-DDE		0.004 U	0.003 U	0.003 U	0.003 U	0.003 U
P,P'-DDT		0.004 U	0.003 U	0.003 U	0.003 U	0.003 U
Volatiles in mg/kg						
1,2-Dichlorobenzene	0.035	0.004 U	0.004 U	0.003 U	0.003 U	0.005 U
1,3-Dichlorobenzene	0.17	0.004 U	0.004 U	0.003 U	0.003 U	0.005 U
1,4-Dichlorobenzene	0.11	0.004 U	0.004 U	0.003 U	0.003 U	0.005 U
Ethylbenzene	0.01	0.004 U	0.004 U	0.003 U	0.003 U	0.005 U
Tetrachloroethene	0.057	0.004 U	0.004 U	0.003 U	0.003 U	0.005 U
Total Xylenes	0.04	0.004 U	0.004 U	0.003 U	0.003 U	0.005 U
Trichloroethene		0.004 U	0.004 U	0.003 U	0.003 U	0.005 U

Table 5 - Chemical Analysis Results for Sediment Samples

Lab ID	PSDDA	902028-8	902036-17	902026-2	902026-5	902036-5
Sample ID	SL	C6	C7	C8	C9	C10
Conventionals in %						
Ammonia As Nitrogen		20	40	58	80	67
Moisture		43	54			57
Total Organic Carbon		1.9 J	3	3.2	3.9	3.7
Total Solids			45.3	40	59	47.3
Total Sulfide		380	220	870	930	130
Total Volatile Solids		4.34	9.22	7.51	9.3	16.4
Metals in mg/kg						
Antimony	150	4.8 U	5.8 U	5.5 U	6.5 U	6.2 U
Arsenic	57	4.2	5.9	5.5	6.4	5.3
Cadmium	5.1	0.48 U	0.58 U	0.55 U	0.65	0.62 U
Copper	390	33	48	51	59	64
Lead	450	7.7	10	19	26	25
Mercury	0.41	0.18 U	0.21 U	0.2 U	0.24 U	0.27
Nickel	140	21	24	30	32	27
Silver	6.1	0.97 U	1.2 U	1.1 U	1.3 U	1.2 U
Zinc	410	58	120 J	90 J	110 J	92 J
Pore Water TBT in µg/L						
Tributyltin	0.15	0.18	0.34	0.29	0.24	0.32
Tetra-n-butyltin						
Di-n-butyltin						
n-Butyltin						
LPAHs in mg/kg						
2-Methylnaphthalene	0.67	0.022 U	0.017 J	0.003 J	0.004 J	0.005 J
Acenaphthene	0.5	0.011 J	0.02	0.03 J	0.024	0.019 U
Acenaphthylene	0.56	0.017	0.059	0.031 J	0.02	0.004 J
Anthracene	0.96	0.023 J	0.15	0.11	0.033	0.027 J
Fluorene	0.54	0.022	0.056	0.1	0.03	0.019 J
Naphthalene	2.1	0.016 J	0.063	0.014 J	0.027	0.028 J
Phenanthrene	1.5	0.071	0.34	1.8	0.13	0.13
Total LPAHs	5.2	0.16	0.688	2.085	0.264	0.208
HPAHs in mg/kg						
Benzo(a)anthracene	1.3	0.063	0.33	0.47	0.091	0.083
Benzo(a)pyrene	1.6	0.064	0.29	0.25	0.087	0.074
Benzo(b)fluoranthene		0.19 T	0.47 T	1.9 T	0.16 T	0.17 T
Benzo(g,h,i)perylene	0.67	0.035	0.21	0.13	0.058	0.042
Benzo(k)fluoranthene		0.19 T	0.47 T	1.9 T	0.16 T	0.17 T
Chrysene	1.4	0.12	0.41	1.5	0.14	0.19
Dibenz(a,h)anthracene	0.23	0.014 J	0.071	0.062 J	0.027	0.021 U
Fluoranthene	1.7	0.19	0.78	5.2	0.25	0.27
Indeno(1,2,3-cd)pyrene	0.6	0.034	0.18	0.14	0.054	0.037
Pyrene	2.6	0.22	0.7	3	0.25	0.26
Total Benzofluoranthenes	3.2	0.19	0.47	1.9	0.16	0.17
Total HPAHs	12	1.12	3.911	14.55	1.277	1.296
Semivolatiles in mg/kg						
1,2,4-Trichlorobenzene	0.031	0.021 U	0.029 U	0.022 U	0.022 U	0.031 U
Dibenzofuran	0.54	0.009 J	0.028	0.055 J	0.019	0.022 U
N-Nitrosodiphenylamine	0.028	0.016 U	0.022 U	0.016 U	0.016 U	0.023 U
Semivolatiles in µg/kg						
Benzoic Acid	650	18 J	26 J	43 J	43 J	53 J

Table 5 - Chemical Analysis Results for Sediment Samples

Lab ID	PSDDA	902028-8	902036-17	902026-2	902026-5	902036-5
Sample ID	SL	C6	C7	C8	C9	C10
Benzyl Alcohol	57	49 U	0.83 J	1.9 J	1.9 J	5 J
Phenols in µg/kg						
2,4-Dimethylphenol	29	21 U	1.4 J	1.3 J	1.4 J	1.3 J
2-Methylphenol	63	45 U	30 U	1.4 J	2.4 J	33 U
4-Methylphenol	670	26 J	56	55	130	140
Pentachlorophenol	400	2.1 J	2.2 J	11 J	8 J	4.5 J
Phenol	420	8 U	16 J	30 J	36 J	31
Phthalates in mg/kg						
Bis(2-ethylhexyl)phthalate	8.3	0.089	0.14	0.11	0.12	0.13
Butylbenzylphthalate	0.97	0.036 U	0.05 U	0.037 U	0.038 U	0.053 U
Di-n-butylphthalate	5.1	0.025 U	0.034 U	0.025 U	0.02 UJ	0.036 U
Di-n-octylphthalate	6.2	0.036 U	0.049 U	0.036 U	0.037 U	0.052 U
Diethylphthalate	1.2	0.026 U	0.035 U	0.026 U	0.027 U	0.038 U
Dimethylphthalate	1.4	0.009 J	0.008 J	0.014 J	0.017 J	0.034 U
Pesticide/PCBs in mg/kg						
Aroclor 1016		0.061 U	0.072 U	0.068 U	0.079 U	0.078 U
Aroclor 1221		0.061 U	0.072 U	0.068 U	0.079 U	0.078 U
Aroclor 1232		0.061 U	0.072 U	0.068 U	0.079 U	0.078 U
Aroclor 1242		0.061 U	0.072 U	0.068 U	0.079 U	0.078 U
Aroclor 1248		0.061 U	0.072 U	0.068 U	0.079 U	0.078 U
Aroclor 1254		0.061 U	0.072 U	0.068 U	0.079 U	0.078 U
Aroclor 1260		0.061 U	0.072 U	0.068 U	0.079 U	0.078 U
Total PCBs	0.13	0.061 U	0.072 U	0.068 U	0.079 U	0.078 U
Aldrin	0.01	0.003 U	0.004 U	0.003 U	0.004 U	0.004 U
Alpha-Chlordane		0.003 U	0.004 U	0.003 U	0.004 U	0.004 U
Dieldrin	0.01	0.006 U	0.007 U	0.007 U	0.008 U	0.008 U
Gamma-BHC (Lindane)		0.003 U	0.004 U	0.003 U	0.004 U	0.004 U
Heptachlor	0.01	0.003 U	0.004 U	0.003 U	0.004 U	0.004 U
Hexachlorobenzene	0.022	0.003 U	0.004 U	0.003 U	0.004 U	0.004 U
Hexachlorobutadiene	0.029	0.003 U	0.004 U	0.003 U	0.004 U	0.004 U
Hexachloroethane	1.4	0.028 UJ	0.038 UJ	0.028 U	0.029 U	0.04 UJ
P,P'-DDD		0.003 U	0.004 U	0.003 U	0.004 U	0.004 U
P,P'-DDE		0.003 U	0.004 U	0.003 U	0.004 U	0.004 U
P,P'-DDT		0.003 U	0.004 U	0.003 U	0.004 U	0.004 U
Volatiles in mg/kg						
1,2-Dichlorobenzene	0.035	0.004 U	0.004 U	0.003 U	0.005 U	0.004 U
1,3-Dichlorobenzene	0.17	0.004 U	0.004 U	0.003 U	0.005 U	0.004 U
1,4-Dichlorobenzene	0.11	0.004 U	0.004 U	0.003 U	0.005 U	0.004 U
Ethylbenzene	0.01	0.004 U	0.004 U	0.003 U	0.005 U	0.004 U
Tetrachloroethene	0.057	0.004 U	0.004 U	0.003 U	0.005 U	0.004 U
Total Xylenes	0.04	0.004 U	0.004 U	0.003 U	0.005 U	0.004 U
Trichloroethene		0.004 U	0.004 U	0.003 U	0.005 U	0.004 U

Table 5 - Chemical Analysis Results for Sediment Samples

Lab ID	PSDDA	902028-2	902028-5	902026-10	K2000363-002	K2000363-001
Sample ID	SL	C11	C12	TRIP BLANK	COMP-2	COMP-1
Conventionals in %						
Ammonia As Nitrogen		76	35			
Moisture		57	41			
Total Organic Carbon		4.1 J	3.9 J			
Total Solids						
Total Sulfide		640	70			
Total Volatile Solids		9.08	8.48			
Metals in mg/kg						
Antimony	150	6.2 U	5.6 U			
Arsenic	57	6.8	6.3			
Cadmium	5.1	0.78	0.6			
Copper	390	67	280			
Lead	450	33	23			
Mercury	0.41	0.23	0.22 U			
Nickel	140	33	27			
Silver	6.1	2.5 U	1.1 U			
Zinc	410	120	100			
Pore Water TBT in µg/L						
Tributyltin	0.15	0.27	0.20		0.30	0.29
Tetra-n-butyltin					0.05 U	0.05 U
Di-n-butyltin					0.05 U	0.05 U
n-Butyltin					0.05 U	0.05 U
LPAHs in mg/kg						
2-Methylnaphthalene	0.67	0.021 J	0.004 J			
Acenaphthene	0.5	0.022	0.017			
Acenaphthylene	0.56	0.03	0.021			
Anthracene	0.96	0.088	0.051			
Fluorene	0.54	0.036	0.029			
Naphthalene	2.1	0.053	0.04			
Phenanthrene	1.5	0.2	0.21			
Total LPAHs	5.2	0.429	0.368			
HPAHs in mg/kg						
Benzo(a)anthracene	1.3	0.22	0.14			
Benzo(a)pyrene	1.6	0.18	0.16			
Benzo(b)fluoranthene		0.46 T	0.48 T			
Benzo(g,h,i)perylene	0.67	0.14	0.093			
Benzo(k)fluoranthene		0.46 T	0.48 T			
Chrysene	1.4	0.33	0.26			
Dibenz(a,h)anthracene	0.23	0.057	0.045			
Fluoranthene	1.7	0.58	0.5			
Indeno(1,2,3-cd)pyrene	0.6	0.12	0.091			
Pyrene	2.6	0.56	0.39			
Total Benzofluoranthenes	3.2	0.46	0.48			
Total HPAHs	12	3.107	2.639			
Semivolatiles in mg/kg						
1,2,4-Trichlorobenzene	0.031	0.023 U	0.023 U			
Dibenzofuran	0.54	0.016 U	0.016			
N-Nitrosodiphenylamine	0.028	0.017 U	0.017 U			
Semivolatiles in µg/kg						
Benzoic Acid	650	46 J	32 J			

Table 5 - Chemical Analysis Results for Sediment Samples

Lab ID	PSDDA	902028-2	902028-5	902026-10	K2000363-002	K2000363-001
Sample ID	SL	C11	C12	TRIP BLANK	COMP-2	COMP-1
Benzyl Alcohol	57	2.1 J	1.6 J			
Phenols in µg/kg						
2,4-Dimethylphenol	29	2.9 J	1.9 J			
2-Methylphenol	63	2.7 J	2.4 J			
4-Methylphenol	670	140	190			
Pentachlorophenol	400	26 J	24 J			
Phenol	420	30 J	20 J			
Phthalates in mg/kg						
Bis(2-ethylhexyl)phthalate	8.3	0.16	0.2			
Butylbenzylphthalate	0.97	0.039 U	0.04 U			
Di-n-butylphthalate	5.1	0.026 U	0.021 J			
Di-n-octylphthalate	6.2	0.076 U	0.039 U			
Diethylphthalate	1.2	0.028 U	0.028 U			
Dimethylphthalate	1.4	0.015 J	0.017 J			
Pesticide/PCBs in mg/kg						
Aroclor 1016		0.078 U	0.072 U			
Aroclor 1221		0.078 U	0.072 U			
Aroclor 1232		0.078 U	0.072 U			
Aroclor 1242		0.078 U	0.072 U			
Aroclor 1248		0.078 U	0.072 U			
Aroclor 1254		0.078 U	0.072 U			
Aroclor 1260		0.078 U	0.072 U			
Total PCBs	0.13	0.078 U	0.072 U			
Aldrin	0.01	0.004 U	0.004 U			
Alpha-Chlordane		0.004 U	0.004 U			
Dieldrin	0.01	0.008 U	0.007 U			
Gamma-BHC (Lindane)		0.004 U	0.004 U			
Heptachlor	0.01	0.004 U	0.004 U			
Hexachlorobenzene	0.022	0.004 U	0.004 U			
Hexachlorobutadiene	0.029	0.004 U	0.004 U			
Hexachloroethane	1.4	0.029 UJ	0.03 UJ			
P,P'-DDD		0.004 U	0.004 U			
P,P'-DDE		0.004 U	0.004 U			
P,P'-DDT		0.004 U	0.004 U			
Volatiles in mg/kg						
1,2-Dichlorobenzene	0.035	0.005 U	0.003 U	0.002 U		
1,3-Dichlorobenzene	0.17	0.005 U	0.003 U	0.002 U		
1,4-Dichlorobenzene	0.11	0.005 U	0.003 U	0.002 U		
Ethylbenzene	0.01	0.005 U	0.003 U	0.001 U		
Tetrachloroethene	0.057	0.005 U	0.003 U	0.001 U		
Total Xylenes	0.04	0.005 U	0.003 U	0.001 U		
Trichloroethene		0.005 U	0.003 U	0.001 U		

* Bioaccumulation trigger.
U = Not detected at indicated detection limit.
J = Estimated value.
T = Value represents the total of benzo(b) and benzo(k)fluoranthene.
[ ] = Concentration exceeds screening level.

Table 6- Results of Amphipod Sediment Bioassay (Percent Mortality Endpoint)

			Replicate Percent Mortality						Dispersive Disposal Site Interpretation Guidelines	
Test	Test Species	Sample ID	1	2	3	4	5	Mean	1-hit rule M_T-M_C > 20% and M_T vs M_R SD (p=.05) and M_T-M_R > 10%	2-hit rule M_T-M_C > 20% and M_T vs M_R SD (p=.05)
Amphipod Mortality	*Ampelisca abdita*	Control	5	0	15	0	0	4		
		Reference (CR-02)	5	5	10	25	35	16		
		C8	10	20	20	30	15	19		Pass

SD: Statistically different

M: Percent mortality

Subscripts: R = reference sediment, C = negative control, T = test sediment

X: Bioassay exceeds the criteria

Table 7- Results of Sediment Larval Bioassay (Normality Endpoint)

Test	Test Species	Sample ID	Replicate Raw Counts of Normal Larvae 1	2	3	4	5	Mean	Dispersive Disposal Site Interpretation Guidelines: 1-hit rule N_T/N_C < 0.80 and N_T/N_C vs N_R/N_C SD (p=.10) and N_R/N_C-N_T/N_C > 0.15	2-hit rule N_T/N_C < 0.80 and N_T/N_C vs N_R/N_C SD (p=.10)
Sediment Larval (unscreened)	*Strongylocentrotus purpuratus*	Control	233	221	183	187	157	196.20		
(Initial Count - 245 embryos)		Reference (CR-02)	163	163	181	110	157	154.80		
		C8	171	124	148	100	144	137.40		NSD

SD: Statistically different

NSD: Not statistically different

N: Counts of normal larvae

Subscripts: R = reference sediment, C = negative control, T = test sediment

X: Bioassay exceeds the criteria

Table 8- Results of Juvenile Polychaete Sediment Bioassay (Mean Individual Growth Rate Endpoint)

			Replicate Mean Individual Growth Rate in mg/ind/d						Dispersive Disposal Site Interpretation Guidelines	
Test	Test Species	Sample ID	1	2	3	4	5	Mean	1-hit rule MIG_T/MIG_C < 0.80 and MIG_T vs MIG_R SD (p=.05) and MIG_T/MIG_R < 0.70	2-hit rule MIG_T/MIG_C < 0.80 and MIG_T vs MIG_R SD (p=.05)
Juvenile Polychaete	Neanthes	Control	0.83	0.89	0.96	0.94	0.97	0.92		
		Reference (CR-02)	1.01	0.95	0.95	1.00	1.03	0.98		
		C8	0.84	0.92	0.84	0.54	0.78	0.78		Pass

* Reference sediment failed to meet performance criteria.

SD: Statistically different

NSD: Not statistically different

MIG: Mean individual growth rate (mg/individual/day)

Subscripts: R = reference sediment, C = negative control, T = test sediment

Table 9 - Analytical Results for Bioaccumulation Testing

	Concentration in mg/kg wet weight				
	Tetra-n-butyltin	Tri-n-butyltin	Di-n-butyltin	n-Butyltin	Lipids
DMMP Tissue Guideline	0.6	0.6	0.6	0.6	in %
Comp-1					
MAC-2	0.001 U	0.011	0.0028	0.0003 J	1.05
MAC-3	0.001 U	0.01	0.0025	0.001 U	1.07
MAC-8	0.001 U	0.011	0.0027	0.001 U	0.97
MAC-12	0.001 U	0.015	0.0036	0.001 U	1.23
MAC-17	0.001 U	0.013	0.0025	0.001 U	1.16
Average	0.001 U	0.012	0.0028	0.0009 J	1.10
Variance	0	3E-06	2E-07	8E-08	0.0081
T-Test	NA	-5E+05	-9E+06	-2E+07	NA
NEP-2	0.001 U	0.0013	0.0011	0.001 U	1.11
NEP-3	0.001 U	0.0012	0.001 J	0.0002 J	1.20
NEP-8	0.001 U	0.0011	0.0008 J	0.001 U	1.20
NEP-12	0.001 U	0.001	0.0013	0.0003 J	1.25
NEP-17	0.001 U	0.0013	0.0005 J	0.0002 J	1.16
Average	0.001 U	0.0012	0.0009	0.0005 J	1.18
Variance	0	1E-08	7E-08	1E-07	0.0022
T-Test	NA	-1E+08	-2E+07	-1E+07	NA
Comp-2					
MAC-1	0.001 U	0.015	0.0035	0.0013	1.39
MAC-7	0.001 U	0.018	0.0043	0.0005 J	1.08
MAC-10	0.001 U	0.018	0.0029	0.001 U	1.07
MAC-11	0.001 U	0.017	0.0032	0.001 U	1.32
MAC-20	0.001 U	0.021	0.0048	0.0005 J	1.16
Average	0.001 U	0.0178	0.0037	0.0009	1.20
Variance	0	4E-06	5E-07	1E-07	0.0167
T-Test	NA	-4E+05	-3E+06	-1E+07	NA
NEP-1	0.001 U	0.0017	0.0013	0.001 U	1.66
NEP-7	0.001 U	0.0018	0.0016	0.0003 J	1.15
NEP-10	0.001 U	0.0021	0.0007 J	0.0005 J	1.24
NEP-11	0.001 U	0.002	0.0012	0.0003 J	1.21
NEP-20	0.001 U	0.0017	0.0013	0.001 U	1.20
Average	0.001 U	0.0019	0.0012	0.0006 J	1.29
Variance	0	3E-08	9E-08	1E-07	0.0347
T-Test	NA	-6E+07	-2E+07	-1E+07	NA

Table 9 - Analytical Results for Bioaccumulation Testing

	Concentration in mg/kg wet weight				
	Tetra-n-butyltin	Tri-n-butyltin	Di-n-butyltin	n-Butyltin	Lipids
DMMP Tissue Guideline	0.6	0.6	0.6	0.6	in %
Reference					
MAC-5	0.001 U	0.0012	0.0024	0.001 U	1.01
MAC-6	0.001 U	0.0016	0.0018	0.001 U	1.25
MAC-9	0.001 U	0.0014	0.0016	0.001 U	1.04
MAC-15	0.001 U	0.0019	0.0034	0.001 U	1.06
MAC-19	0.001 U	0.0016	0.0014	0.001 U	1.06
Average	0.001 U	0.0015	0.0021	0.001 U	1.08
Variance	0	5E-08	5E-07	0	0.0072
T-Test	NA	-3E+07	-3E+06	NA	NA
NEP-5	0.001 U	0.001 U	0.0008 J	0.001 U	1.35
NEP-6	0.001 U	0.001 U	0.0006 J	0.001 U	1.24
NEP-9	0.001 U	0.001 U	0.0004 J	0.001 U	1.15
NEP-15	0.001 U	0.001 U	0.0014	0.0002 J	1.07
NEP-19	0.001 U	0.001 U	0.001 U	0.001 U	1.20
Average	0.001 U	0.001 U	0.0008	0.0008	1.20
Variance	0	0	1E-07	1E-07	0.0087
T-Test	NA	NA	-1E+07	-1E+07	NA
Background					
MAC-21	0.001 U	0.0067	0.0028	0.0009 J	1.26
MAC-22	0.001 U	0.0023	0.0021	0.001 U	1.27
MAC-23	0.001 U	0.0032	0.0027	0.001 U	1.29
Average	0.001 U	0.0041	0.0025	0.001 U	1.27
Variance	0	4E-06	1E-07	2E-09	0.0002
T-Test	NA	-3E+05	-1E+07	-5E+08	NA
NEP-24	0.001 U	0.001 U	0.001 U	0.001 U	1.19
NEP-25	0.001 U	0.001 U	0.001 U	0.001 U	1.48
NEP-26	0.001 U	0.001 U	0.001 U	0.001 U	1.41
Average	0.001 U	0.001 U	0.001 U	0.001 U	1.36
Variance	0	0	0	0	0.0153
T-Test	NA	NA	NA	NA	NA

U = Not detected at indicated detection limit.
J = Estimated value.

Table 10- Summary of Bioaccumulation Testing Analytical Results

	Concentration in mg/kg (wet weight)					
	Tetra-n-butyltin	Tri-n-butyltin		Di-n-butyltin	n-Butyltin	Lipids
DMMP Tissue Guideline	None	0.6		None	None	in %
Comp-1						
Initial testing (TBT porewater)		max value 0.47 ug/l				
Retest of composite (TBT porewater)		0.29 ug/l	Adjusted tissue			
ratio I/R		1.62	chemistry values			
MAC-2	0.001 U	0.011	0.0178	0.0028	0.0003 J	1.05
MAC-3	0.001 U	0.01	0.0162	0.0025	0.001 U	1.07
MAC-8	0.001 U	0.011	0.0178	0.0027	0.001 U	0.97
MAC-12	0.001 U	0.015	0.0243	0.0036	0.001 U	1.23
MAC-17	0.001 U	0.013	0.0211	0.0025	0.001 U	1.16
Average	0.001 U	0.012	0.0194	0.00282	0.00086 J	1.096
Variance	0	0.0000040	0.0000105	0.000000207	0.000000098	0.0102
t statistic (test vs guidelines)	NA	-657.4039854	-400.4940475 SD	NA	NA	NA
NEP-2	0.001 U	0.0013	0.0021	0.0011	0.001 U	1.11
NEP-3	0.001 U	0.0012	0.0019	0.001 J	0.0002 J	1.20
NEP-8	0.001 U	0.0011	0.0018	0.0008 J	0.001 U	1.20
NEP-12	0.001 U	0.001	0.0016	0.0013	0.0003 J	1.25
NEP-17	0.001 U	0.0013	0.0021	0.0005 J	0.0002 J	1.16
Average	0.001 U	0.00118	0.0019	0.00094	0.00054 J	1.18
Variance	0	0.00000002	0.00000004	0.0000001	0.0000001	0.0022
t statistic (test vs guidelines)	NA	-10269.67828	-6328.859723 SD	NA	NA	NA
Comp-2						
Initial testing (TBT porewater)		max value 0.29 ug/l				
Retest of composite (TBT porewater)		0.30 ug/l				
ratio I/R		0.966666667				
MAC-1	0.001 U	0.015		0.0035	0.0013	1.39
MAC-7	0.001 U	0.018		0.0043	0.0005 J	1.08
MAC-10	0.001 U	0.018		0.0029	0.001 U	1.07
MAC-11	0.001 U	0.017		0.0032	0.001 U	1.32
MAC-20	0.001 U	0.021		0.0048	0.0005 J	1.16
Average	0.001 U	0.0178		0.00374	0.00086	1.20
Variance	0	0.0000047		0.0000006	0.0000001	0.0167
t statistic (test vs guidelines)	NA	-600.4934496		NA	NA	NA
NEP-1	0.001 U	0.0017		0.0013	0.001 U	1.66
NEP-7	0.001 U	0.0018		0.0016	0.0003 J	1.15
NEP-10	0.001 U	0.0021		0.0007 J	0.0005 J	1.24
NEP-11	0.001 U	0.002		0.0012	0.0003 J	1.21
NEP-20	0.001 U	0.0017		0.0013	0.001 U	1.20
Average	0.001 U	0.00186		0.00122	0.00062 J	1.29
Variance	0	0.00000003		0.0000001	0.0000001	0.0347
t statistic (test vs guidelines)	NA	-7362.594441		NA	NA	NA
Reference						
MAC-5	0.001 U	0.0012		0.0024	0.001 U	1.01
MAC-6	0.001 U	0.0016		0.0018	0.001 U	1.25
MAC-9	0.001 U	0.0014		0.0016	0.001 U	1.04
MAC-15	0.001 U	0.0019		0.0034	0.001 U	1.06
MAC-19	0.001 U	0.0016		0.0014	0.001 U	1.06
Average	0.001 U	0.00154		0.00212	0.001 U	1.08
Variance	0	0.0000001		0.0000007	0.0000000	0.009
NEP-5	0.001 U	0.001 U		0.0008 J	0.001 U	1.35
NEP-6	0.001 U	0.001 U		0.0006 J	0.001 U	1.24
NEP-9	0.001 U	0.001 U		0.0004 J	0.001 U	1.15
NEP-15	0.001 U	0.001 U		0.0014	0.0002 J	1.07
NEP-19	0.001 U	0.001 U		0.001 U	0.001 U	1.20
Average	0.001 U	0.001 U		0.00084	0.00084	1.20
Variance	0	0		0.000000148	0.000000128	0.0109
Background						
MAC-21	0.001 U	0.0067		0.0028	0.0009 J	1.26
MAC-22	0.001 U	0.0023		0.0021	0.001 U	1.27
MAC-23	0.001 U	0.0032		0.0027	0.001 U	1.29
Average	0.001 U	0.004066667		0.002533333	0.000966667 U	1.27
Variance	0	0.0000054		0.0000001	0.000000003	0.0002
NEP-24	0.001 U	0.001 U		0.001 U	0.001 U	1.19
NEP-25	0.001 U	0.001 U		0.001 U	0.001 U	1.48
NEP-26	0.001 U	0.001 U		0.001 U	0.001 U	1.41
Average	0.001 U	0.001 U		0.001 U	0.001 U	1.36
Variance	0	0		0	0	0.0229

Notes:

SD- Result is significantly different than the tributyltin tissue guideline (0.6 mg/kg wet weight/ 3 mg/kg dry weight)

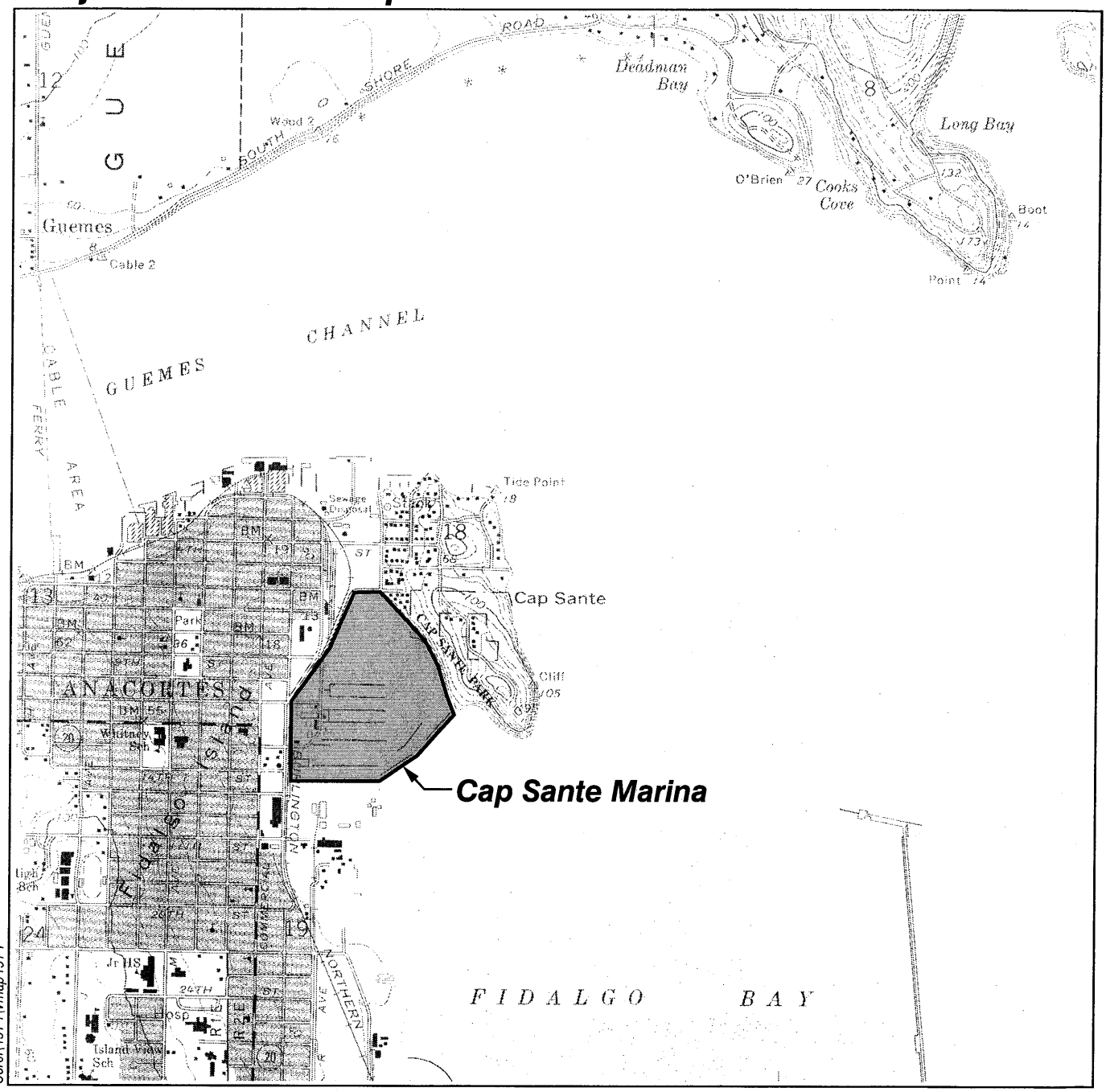
U = Not detected at indicated detection limit.

J = Estimated value.

NA = Not applicable.

4974/CapTables.xls - Table 10

Project Location Map



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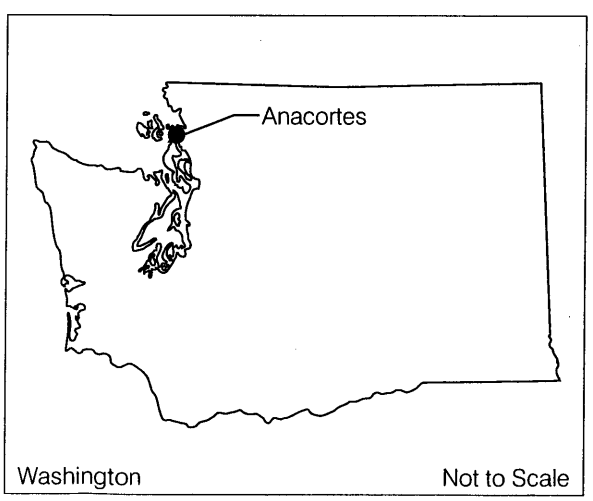

0 2000 4000

Scale in Feet

Note: Base map prepared from USGS 7.5 minute quadrangle map of Anacortes, Washington, dated 1973.

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Figure 1

Confirmed Sampling Location Plan

Cap Sante Marina

(1) SURFACE DMMU DESIGNATION

C2-01 CONFIRMED SAMPLE LOCATION AND NUMBER

C1-04 PROPOSED LOCATION NOT SAMPLED

· FOUND C.O.E. BRASS CAP MONUMENTS.

/ FOUND PREVIOUS SURVEY CONTROL POINTS

0 SET 2" AL CAP ON #5 REBAR

* SET PN&D NAIL WITH SHINER

- WOOD PILE

— - - WOOD PILE WAVE BARRIER

=====(CULVERT LOCATION

Note: Base map prepared from drawing provided by Pertorvich, Nottingham & Drage, Inc. entitled "Plan View", dated September 7, 1998.

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Figure 2

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TBT Bioaccumulation Testing
Sampling Location Plan
Cap Sante Marina

DMMUs INCLUDED IN BIOACCUMULATION TEST SAMPLE COMP 1

DMMUs INCLUDED IN BIOACCUMULATION TEST SAMPLE COMP 2

(1) SURFACE DMMU DESIGNATION

C2-01 CONFIRMED SAMPLE LOCATION AND NUMBER

C1-04 PROPOSED LOCATION NOT SAMPLED

· FOUND C.O.E. BRASS CAP MONUMENTS.

/ FOUND PREVIOUS SURVEY CONTROL POINTS

0 SET 2" AL CAP ON #5 REBAR

* SET PN&D NAIL WITH SHINER

- WOOD PILE

— - - WOOD PILE WAVE BARRIER

=====(CULVERT LOCATION

Note: Base map prepared from drawing provided by Pertorvich, Nottingham & Drage, Inc. entitled "Plan View", dated September 7, 1998.

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Figure 3

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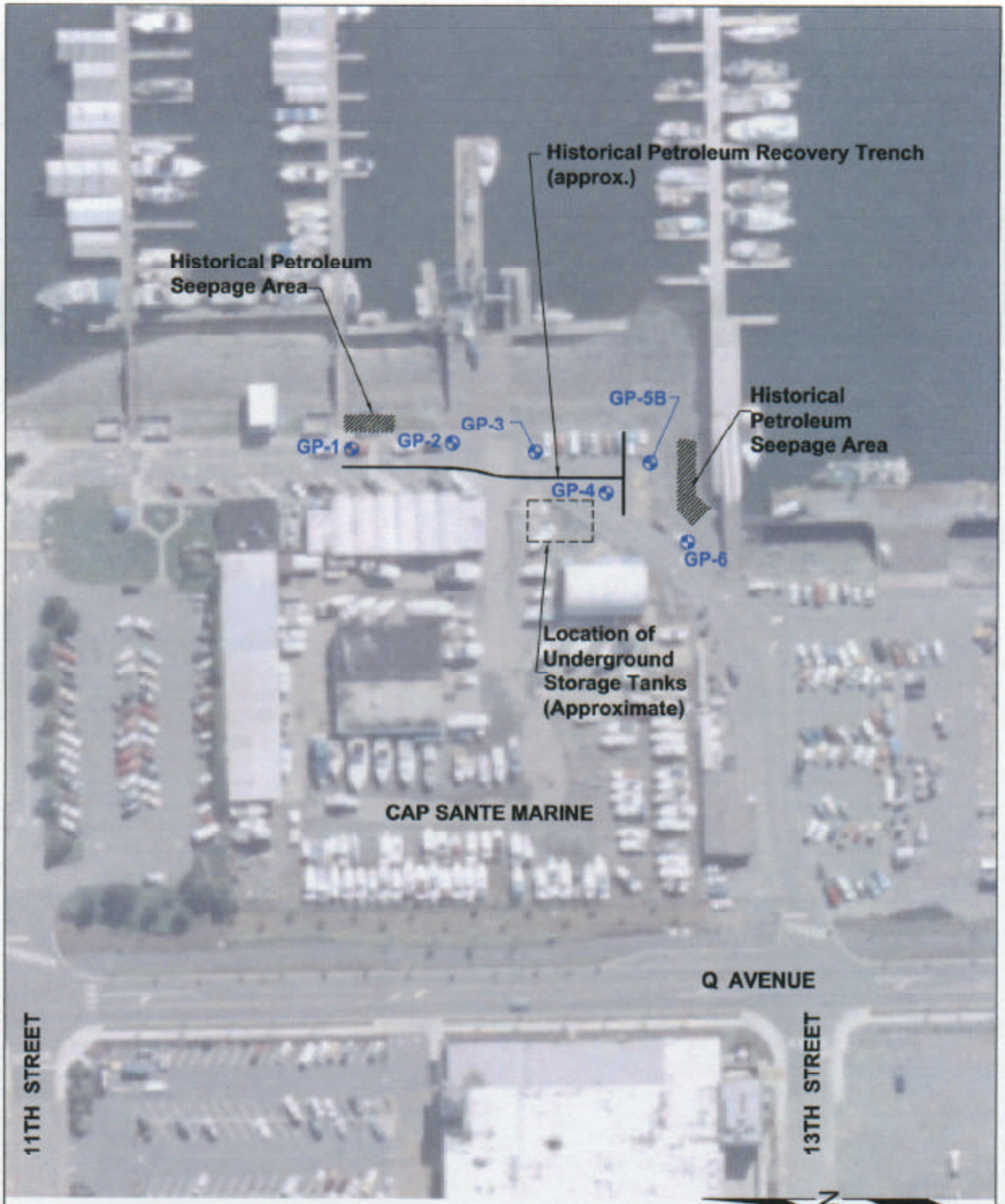

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DATE: 06/02/04 12:14pm

Floyd Snider McCarthy, Inc.
Strategy & Technical Solutions for Contaminated Properties

Port of Anacortes
Cap Sante Boat Haven
Anacortes, Washington

Figure 1
Site Map: Exploration Locations and Existing Site Features

Table 1
Summary of Laboratory Testing Program

Sample ID	Matrix	TPH-HCID	TPH-Gasoline/ BTEX	TPH-Dx	Comments
GP1-5.0	Soil	X			
GP1-8.0	Soil	X			
GP2-5.0	Soil		X	X	
GP2-10.0	Soil	X			
GP3-6.0	Soil	X	X		
GP3-7.0	Soil		X		Insufficient sample for HCID
GP3-9.0	Soil	X			
GP4-7.0	Soil		X	X	
GP4-10.0	Soil	X			
GP5B-6.0	Soil		X		
GP5B-9.0	Soil	X			
GP6-2.5	Soil	X			
GP6-5.0	Soil	X			
GP1	Water		X	X	
GP2	Water		X	X	
GP3	Water		X		Insufficient sample for TPH-Dx
GP4	Water		X	X	
GP5B	Water		X	X	
GP6	Water		X	X	

Table 2
Summary of Soil Testing

Sample ID	Benzene	Toluene	Ethyl-benzene	Xylenes	Gasoline[a,b]	Diesel[a,b]	Heavy Oil
GP1-5.0	NA	NA	NA	NA	35 U	50 U	100 U
GP1-8.0	NA	NA	NA	NA	31 U	50 U	100 U
GP2-5.0	**0.270**	0.140	0.033 U	0.189	**250**	1800	67 U
GP2-10.0	NA	NA	NA	NA	40 U	50 U	100 U
GP3-6.0	**2.30**	0.600	4.60	**19.2**	**630**	410	340 U
GP3-7.0	**2.30**	0.430	3.10	**12.4**	**320**	NA	NA
GP3-9.0	NA	NA	NA	NA	38 U	50 U	100 U
GP4-7.0	**0.150**	0.035 U	0.035 U	0.071 U	20.0	20	45
GP4-10.0	NA	NA	NA	NA	190 U	190 U	390 U
GP5B-6.0	**0.580**	0.350	0.710	0.560	**510**	NA	NA
GP5B-9.0	NA	NA	NA	NA	**230**	390	330 U
GP6-2.5	NA	NA	NA	NA	31 U	50 U	100 U
GP6-5.0	NA	NA	NA	NA	37 U	50 U	100 U
MTCA Method A Cleanup Level							
	0.03	7.0	6.0	9.0	100/30	2000	2000

Notes:

Concentrations are in mg/Kg dry weight.
Bold font indicates a cleanup level exceedance.
[a] = HCID test results are not shown if NWTPH-G and NWTPH-DX results are also available.
[b] = The cleanup level for gasoline is 30 mg/Kg if benzene is present and 100 mg/Kg if not present.
U = Not detected at the given reporting limit.
NA = Not analyzed.

Table 3
Summary of Groundwater Test Results

Sample ID	Benzene	Toluene	Ethyl-benzene	Xylenes	TPH-Gasoline[a]	TPH-Diesel	TPH-Motor Oil
GP1	1.0 U	1.0 U	1.0 U	1.0 U	0.25 U	250 U	500 U
GP2	1.0 U	1.0 U	1.0 U	1.3	460	**2400**	500 U
GP3	**390**	18	65	212	**4100**	NA	NA
GP4	1.0 U	1.0 U	1.0 U	1.0 U	250 U	250	500 U
GP5B	3.4	1.4	2.3	1.9	400	370	500 U
GP6	1.0 U	1.0 U	1.0 U	1.0 U	250 U	250 U	500 U
MTCA Method A Cleanup Level							
	5.0	1,000	700	1000	800/1,000	500	500

Notes:

Concentrations are in µg/L.
Bold font indicates a cleanup level exceedance.
[a] = The cleanup level for gasoline is 800 µg/L if benzene is present and 1000 µg/L if not present.
U = Not detected at the given reporting limit.
NA = Not analyzed.

2005 LIMITED ENVIRONMENTAL DUE DILIGENCE STUDY RESULTS

Table 1A
Sampling Location Objectives—Former Shell Oil Tank Farm

Sampling Location	Objective
SHL01	Lateral boundary at NE corner of Former Shell Oil Tank Farm.
SHL02	Lateral boundary along east perimeter of Former Shell Oil Tank Farm (near historical supply line).
SHL03	Lateral boundary at SE corner of Former Shell Oil Tank Farm (near historical pump house).
SHL04	Lateral boundary along south perimeter of Former Shell Oil Tank Farm (near historical aboveground storage tank).
SHL05	Interior Former Shell Oil Tank Farm (near historical underground storage tank and supply line).
SHL06	Lateral boundary at NW corner of Former Shell Oil Tank Farm.
SHL07	Lateral boundary along north perimeter of Former Shell Oil Tank Farm.
CSM01	Downgradient boundary, approximately 150 feet east of Former Shell Oil Tank Farm.
CSM02	Downgradient boundary, approximately 150 feet east of Former Shell Oil Tank Farm.
CSM03	Downgradient boundary, approximately 250 feet east of Former Shell Oil Tank Farm.
CSM04	Downgradient boundary, approximately 350 feet east-northeast of Former Shell Oil Tank Farm.
CSM12	Downgradient boundary, approximately 150 feet northeast of Former Shell Oil Tank Farm.
CSM13	Downgradient boundary, approximately 200 feet northeast of Former Shell Oil Tank Farm.
CSM14	Downgradient boundary, approximately 250 feet northeast of Former Shell Oil Tank Farm.

Table 1B
Sampling Location Objectives—Cap Sante Marine Lease Area

Sampling Location	Objective
CSM04	Lateral boundary along south perimeter of Cap Sante Marine Lease Area.
CSM05	Lateral boundary along north perimeter of Cap Sante Marine Lease Area (near former waste oil tank).
CSM06	Lateral boundary along north perimeter of Cap Sante Marine Lease Area (near former waste oil tank).
CSM07	Interior Cap Sante Marine Lease Area (near underground storage tanks).
CSM08	Interior Cap Sante Marine Lease Area (near underground storage tanks).
CSM09	Interior Cap Sante Marine Lease Area (near underground storage tanks).
CSM10	Interior Cap Sante Marine Lease Area (near underground storage tanks).
CSM11	Lateral boundary at NE corner of Cap Sante Marine Lease Area.
CSM14	Upgradient boundary at SW corner of Cap Sante Marine Lease Area.

Table 2
Former Shell Oil Tank Farm Summary of Laboratory Analyses

Sample ID	Matrix	Depth (feet)	TPH-HCID	TPH-Gasoline/ BTEX	NWTPH-Dx	Archive
SHL01-S1	Soil	8.0 - 8.5		X	X	
SHL01-W1	Water	> 4.9		X	X	
SHL02-S1	Soil	4.0 - 5.0		X	X	
SHL02-S2	Soil	5.0 - 6.0		X	X	
SHL02-S3	Soil	8.0 - 9.5	X	X	X	
SHL02-W1	Water	> 4.5		X	X	
SHL03-S1	Soil	4.0 - 5.5	X			
SHL03-S2	Soil	5.5 - 6.2		X	X	
SHL03-W1	Water	> 5.5		X	X	
SHL04-S1	Soil	2.0 - 3.5	X			
SHL04-S2	Soil	9.5 - 10.5		X	X	
SHL04-W1	Water	> 8.0		X	X	
SHL05-S1	Soil	2.0 - 3.5		X	X	
SHL05-S2	Soil	4.4 - 6.2		X	X	
SHL05-S3	Soil	8.0 - 10.0		X	X	
SHL05-W1	Water	> 9.0		X	X	
SHL06-S1	Soil	4.0 - 6.0	X			
SHL06-W1	Water	> 5.0		X	X	
SHL07-S1	Soil	4.0 - 5.1	X			
SHL07-W1	Water	> 5.5		X	X	
CSM01-S1	Soil	4.0 - 5.0	X		X	
CSM01-S2	Soil	10.0 - 11.8	X			
CSM01-W1	Water	> 5.0		X	X	
CSM02-S1	Soil	8.0 - 8.7	X		X	
CSM02-W1	Water	> 8.0		X	X	
CSM03-S1	Soil	4.0 - 5.0	X		X	
CSM03-S2	Soil	8.0 - 9.0		X	X	

Table 2
Former Shell Oil Tank Farm Summary of Laboratory Analyses

Sample ID	Matrix	Depth (feet)	TPH-HCID	TPH-Gasoline/ BTEX	NWTPH-Dx	Archive
CSM03-W1	Water	> 8.0		X	X	
CSM04-S1	Soil	4.5 - 5.8	X			
CSM04-S2	Soil	10.3 - 12.0	X			
CSM04-W1	Water	> 4.5				X
CSM12-S1	Soil	5.0 - 6.0	X		X	
CSM12-S2	Soil	10.0 - 11.0		X	X	
CSM12-W1	Water	> 4.0		X	X	
CSM13-S1	Soil	5.0 - 5.5	X			
CSM13-S2	Soil	10.5 - 11.5		X	X	
CSM13-W1	Water	> 4.0		X	X	
CSM14-S1	Soil	4.3 - 6.0	X			
CSM14-W1	Water	> 4.5				X

Table 3
Former Shell Oil Tank Farm Analytical Results for Soil

Sample ID	Interval (feet bgs)		Total Petroleum Hydrocarbons (mg/kg)			Volatile Organic Compounds (mg/kg)			
	Upper	Lower	Gas[1]	Diesel	Heavy Oil	Benzene	Toluene	Ethylbenzene	Xylenes
SHL01-S1	8.0	8.5	26 UJ	7.6 U	21	0.064 UJ	0.130 UJ	0.130 UJ	0.260 UJ
SHL02-S1	4.0	5.0	**1,600 J**	**22,000**	1,200 U	0.036 UJ	0.071 UJ	0.670 J	0.400 J
SHL02-S2	5.0	6.0	**1,100 J**	510	720	0.024 UJ	0.048 UJ	0.660 J	0.360 J
SHL02-S3	8.0	9.5	**2,200 J**	**5,100**	620 U	0.040 UJ	0.100 J	1.800 J	0.001 J
SHL03-S2	5.5	6.2	58 J	11	20	0.027 UJ	0.053 UJ	0.110 J	0.064 J
SHL04-S2	9.5	10.5	21 UJ	110	150	0.053 UJ	0.110 UJ	0.110 UJ	0.210 UJ
SHL05-S1	2.0	3.5	13 UJ	120	11 U	0.032 UJ	0.065 UJ	0.065 UJ	0.130 UJ
SHL05-S2	4.4	6.2	**2,100 J**	1,100	64 U	0.037 UJ	0.074 UJ	1.700 J	1.100 J
SHL05-S3	8.0	10.0	84 J	180	92	0.029 UJ	0.057 UJ	0.057 UJ	0.110 UJ
CSM01-S1[2]	4.0	5.0	NA	180	1,300	NA	NA	NA	NA
CSM02-S1[2]	8.0	8.7	NA	87	330	NA	NA	NA	NA
CSM03-S1[2]	4.0	5.0	NA	85	280	NA	NA	NA	NA

Table 3
Former Shell Oil Tank Farm Analytical Results for Soil

Sample ID	Interval (feet bgs)		Total Petroleum Hydrocarbons (mg/kg)			Volatile Organic Compounds (mg/kg)			
	Upper	Lower	Gas[1]	Diesel	Heavy Oil	Benzene	Toluene	Ethylbenzene	Xylenes
CSM03-S2	8.0	9.0	15 UJ	32 U	140	0.037 UJ	0.074 UJ	0.074 UJ	0.150 UJ
CSM12-S1[2]	5.0	6.0	NA	110 U	440	NA	NA	NA	NA
CSM12-S2	10.0	11.0	34 UJ	800	1,900	0.084 U	0.17 UJ	0.17 UJ	0.34 UJ
CSM13-S2	10.5	11.5	110 J	**16,000**	1,100 U	0.095 U	0.19 UJ	0.19 UJ	0.38 UJ
MTCA Method A Cleanup Level (mg/kg)									
			100/30	2,000	2,000	0.03	7.0	6.0	9.0

Notes:

Concentrations in **bold** exceed MTCA Method A cleanup levels.

1 If benzene and the total of ethylbenzene, toluene, and xylenes are greater than 1% of the gasoline concentration, then the MTCA Method A cleanup level is 30 mg/kg.

2 TPH-G and volatile analyses were not performed.

J Sample exceeded allowable holding time at analytical laboratory.

NA Not analyzed

U Not detected

Table 4
Former Shell Oil Tank Farm Analytical Results for Groundwater

	Total Petroleum Hydrocarbons (µg/L)			Volatile Organic Compounds (µg/L)			
Sample ID	**Gas**	**Diesel**	**Heavy Oil**	**Benzene**	**Toluene**	**Ethylbenzene**	**Xylenes**
SHL01-W1	250 U	250 U	500 U	1.4	1.0 U	1.0 U	1.0 U
SHL02-W1	670	**5,600**	1,000 U	1.0 U	1.0 U	1.0 U	1.0 U
SHL03-W1	500	250 U	500 U	1.0 U	1.0 U	1.0 U	1.6
SHL04-W1	520	**7,200**	1,000 U	1.0 U	1.0 U	1.0 U	1.0
SHL05-W1	250 U	250 U	500 U	1.0 U	1.0 U	1.0 U	1.0 U
SHL06-W1	250 U	250 U	500 U	1.0 U	1.0 U	1.0 U	1.0 U
SHL07-W1	250 U	250 U	500 U	1.0 U	1.0 U	1.0 U	1.0 U
CSM01-W1	250 U	260	500 U	1.0 U	1.0 U	1.0 U	1.0 U
CSM02-W1	250 U	330	500 U	1.0 U	1.0 U	1.0 U	1.0 U
CSM03-W1	250 U	370	500 U	1.0 U	1.0 U	1.0 U	1.0 U
CSM12-W1	250 U	**1900**	**5000**	1.0 U	1.0 U	1.0 U	1.0 U
CSM13-W1	250 U	250 U	500 U	1.0 U	1.0 U	1.0 U	1.0 U
MTCA Method A Cleanup Level (µg/L)							
	1,000/800	500	500	5.0	1,000	700	1,000

Notes:

Concentrations in **bold** exceed MTCA Method A cleanup levels.

1 If benzene and the total of ethylbenzene, toluene, and xylenes are greater than 1% of the gasoline concentration, then the MTCA Method A cleanup level is 800 µg/L.

2 TPH-G and volatile organic compound analyses were not performed.

U Not detected

Table 5
Cap Sante Marine Lease Area Summary of Laboratory Analyses

Sample ID	Matrix	Depth in Feet	TPH-HCID	TPH-Gasoline/ BTEX	TPH-Dx	Archive
CSM04-S1	Soil	4.5 - 5.8	X			
CSM04-S2	Soil	10.3 - 12.0	X			
CSM04-W1	Water	> 4.5				X
CSM05-S1	Soil	5.0 - 6.5	X			
CSM05-S2	Soil	8.0 - 10.0	X			
CSM05-W1	Water	> 5.0				X
CSM06-S1	Soil	1.6 - 3.0	X			
CSM06-W1	Water	> 5.5				X
CSM07-S1	Soil	8.0 - 9.5		X	X	
CSM07-W1	Water	> 4.0		X	X	
CSM08-S1	Soil	4.0 - 5.7		X	X	
CSM08-W1	Water	> 4.0		X	X	
CSM09-S1	Soil	8.0 - 10.0		X	X	
CSM09-S2	Soil	10.0 - 12.0		X	X	
CSM09-W1	Water	> 5.5		X	X	
CSM10-S1	Soil	12.0 - 13.0		X	X	
CSM10-W1	Water	NA		X	X	
CSM11-S1	Soil	4.0 - 5.3		X	X	
CSM11-S2	Soil	8.0 - 10.3		X	X	
CSM11-W1	Water	> 5.5		X	X	
CSM14-S1	Soil	4.3 - 6.0	X			
CSM14-W1	Water	> 4.5				X

Table 6
Cap Sante Marine Lease Area Analytical Results for Soil

Sample ID	Interval (feet bgs)		Total Petroleum Hydrocarbons (mg/kg)			Volatile Organic Compounds (mg/kg)			
	Upper	Lower	Gas[1]	Diesel	Heavy Oil	Benzene	Toluene	Ethylbenzene	Xylenes
CSM07-S1	8.0	9.5	**320 J**	1,800	120 U	**0.032 J**	0.064 UJ	0.064 UJ	0.11 J
CSM08-S1	4.0	5.7	**1,500 J**	**4,100**	240 U	**2.5 J**	0.86 J	1.5 J	1.73 J
CSM09-S1	8.0	10.0	**490 J**	1,900	130 U	**0.62 J**	0.22 J	0.82 J	0.53 J
CSM09-S2	10.0	12.0	36 J	280	120	0.086 U	0.17 UJ	0.17 UJ	0.34 UJ
CSM10-S1	12.0	13.0	**1,100 J**	**2,600**	140 U	**0.54 J**	0.25 J	6.7 J	0.97 J
CSM11-S1	4.0	5.3	**400 J**	**3,800**	270 U	**0.25 J**	0.092 UJ	0.56 J	0.12 J
CSM11-S2	8.0	10.3	38 J	6.8 U	14 U	0.04 U	0.08 UJ	0.08 UJ	0.16 UJ
MTCA Method A Cleanup Level (mg/kg)									
			100/30	2,000	2,000	0.03	7.0	6.0	9.0

Notes:

Concentrations in **bold** exceed MTCA Method A cleanup levels.

1 If benzene and the total of ethylbenzene, toluene, and xylenes are greater than 1% of the gasoline concentration, then the MTCA Method A cleanup level is 30 mg/kg.

J Sample exceeded allowable holding time at analytical laboratory.

NA Not analyzed

U Not detected

Table 7
Cap Sante Marine Lease Area Analytical Results for Groundwater

Sample ID	Total Petroleum Hydrocarbons (µg/L)			Volatile Organic Compounds (µg/L)			
	Gas	Diesel	Heavy Oil	Benzene	Toluene	Ethylbenzene	Xylenes
CSM07-W1	**1,000**	**2100**	500 U	**80**	3.5	1.0	4.1
CSM08-W1	**3,500**	**6500**	2500 U	**530**	22	34	36.0
CSM09-W1	**6,700**	**14000**	2500 U	**21**	22	190	72.8
CSM10-W1	**4,000**	**28000**	10000 U	**930**	20	260	76.0
CSM11-W1	**2,900**	**12000**	2500 U	**270**	3.9	71	4.0
MTCA Method A Cleanup Level (µg/L)							
	1,000/800	500	500	5.0	1,000	700	1,000

Notes:

Concentrations in **bold** exceed MTCA Method A cleanup levels.

1 If benzene and the total of ethylbenzene, toluene, and xylenes are greater than 1% of the gasoline concentration, then the MTCA Method A cleanup level is 800 µg/L.

U Not detected

Note : All historical feature locations are approximate.

⊕ MW-1	Previous Monitoring Well Location and Number (Hart Crowser 1987)
◐ SHL01	Sampling Location and Number
◐	Sampling Location Exceeds MTCA A Criteria for Soil
◑	Sampling Location Exceeds MTCA A Criteria for Groundwater

N

0 100 200

Approximate Scale in Feet

DWG NAME: F:\projects\PortOfAnacortes\POA-CSMSHELL\Figures\Figure1.dwg
DATE: 9/29/2005

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Port of Anacortes
Limited Environmental Due Diligence Investigation

Figure 1
Former Shell Oil Tank Farm
Exploration Locations &
Existing Site Features

Note : All historical feature and UST locations are approximate.

● GP-1	Previous Sampling Location and Number (FSM 2004)
⦶ SHL01	Sampling Location and Number
◍	Sampling Location Exceeds MTCA A Criteria for Soil
◑	Sampling Location Exceeds MTCA A Criteria for Groundwater

N

0 100 200

Approximate Scale in Feet

DWG NAME: F:\projects\PortOfAnacortes\POA-CSM Shell\Figures\Figure2.dwg
DATE: 9/29/2005

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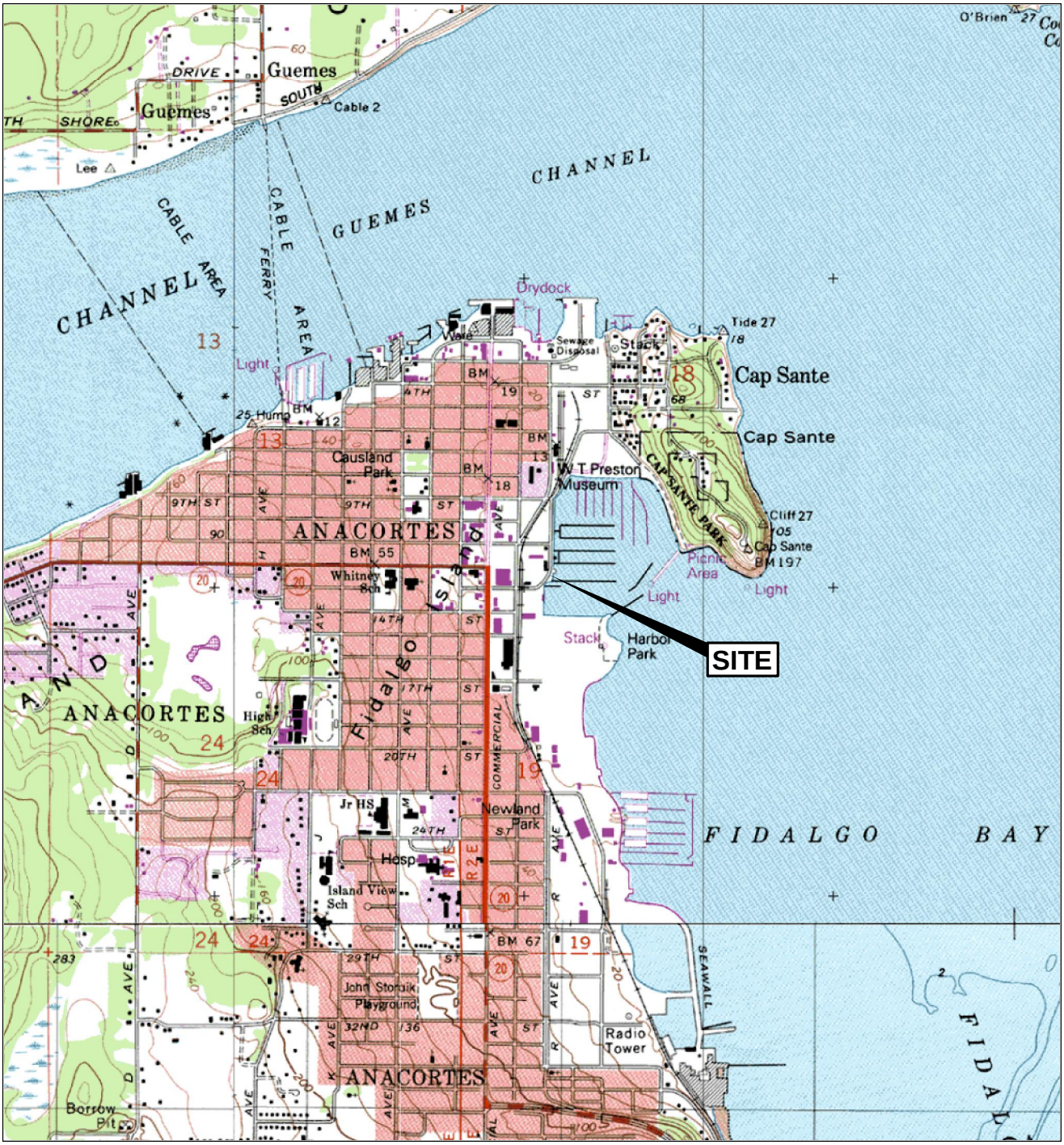
Limited Environmental Due Diligence Investigation

Figure 2
Cap Sante Marine
Exploration Locations &
Existing Site Features

2007 Cap Sante Marine Lease Area Investigation Study Results



Cap Sante Marine | V:\529\013\014\Investigation Data Report\D\Fig1.dwg (A) "Figure 1" 7/9/2007

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Cap Sante Marine Anacortes, Washington	**Vicinity Map**	Figure 1

Historical Data Source: Floyd Snider 2006

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Cap Sante Marine Anacortes, WA	**Site Plan**	Figure 2

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N

0 300 600

Scale in Feet

Historical Data Source: Floyd Snider 2006

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Cap Sante Marine
Anacortes, WA

Sediment Sampling Locations

Figure 3

Historical Data Source: Floyd Snider 2006

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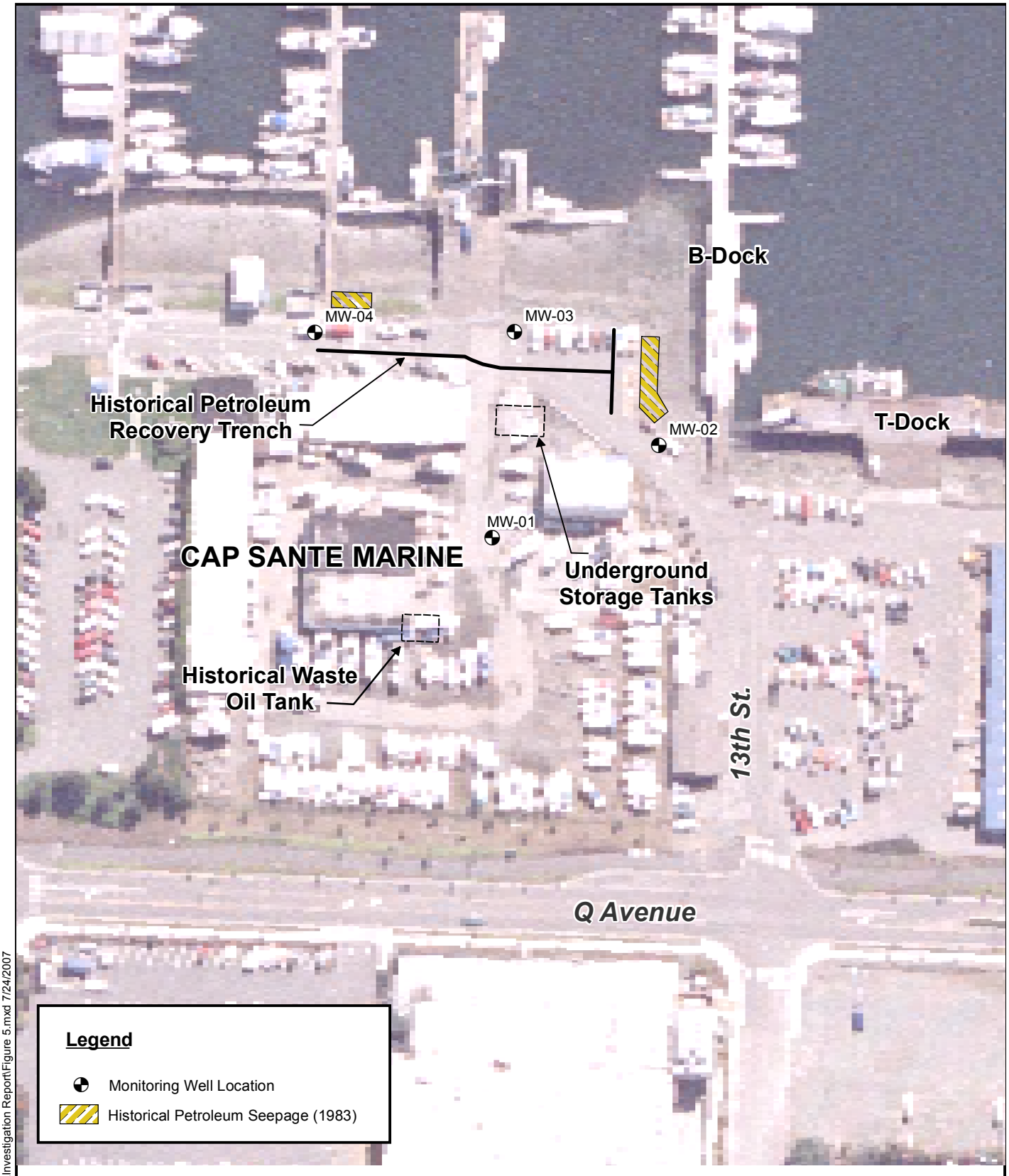
Cap Sante Marine
Anacortes, WA

2007 and Previous Soil Sampling Locations

Figure 4



Historical Data Source: Floyd Snider 2006

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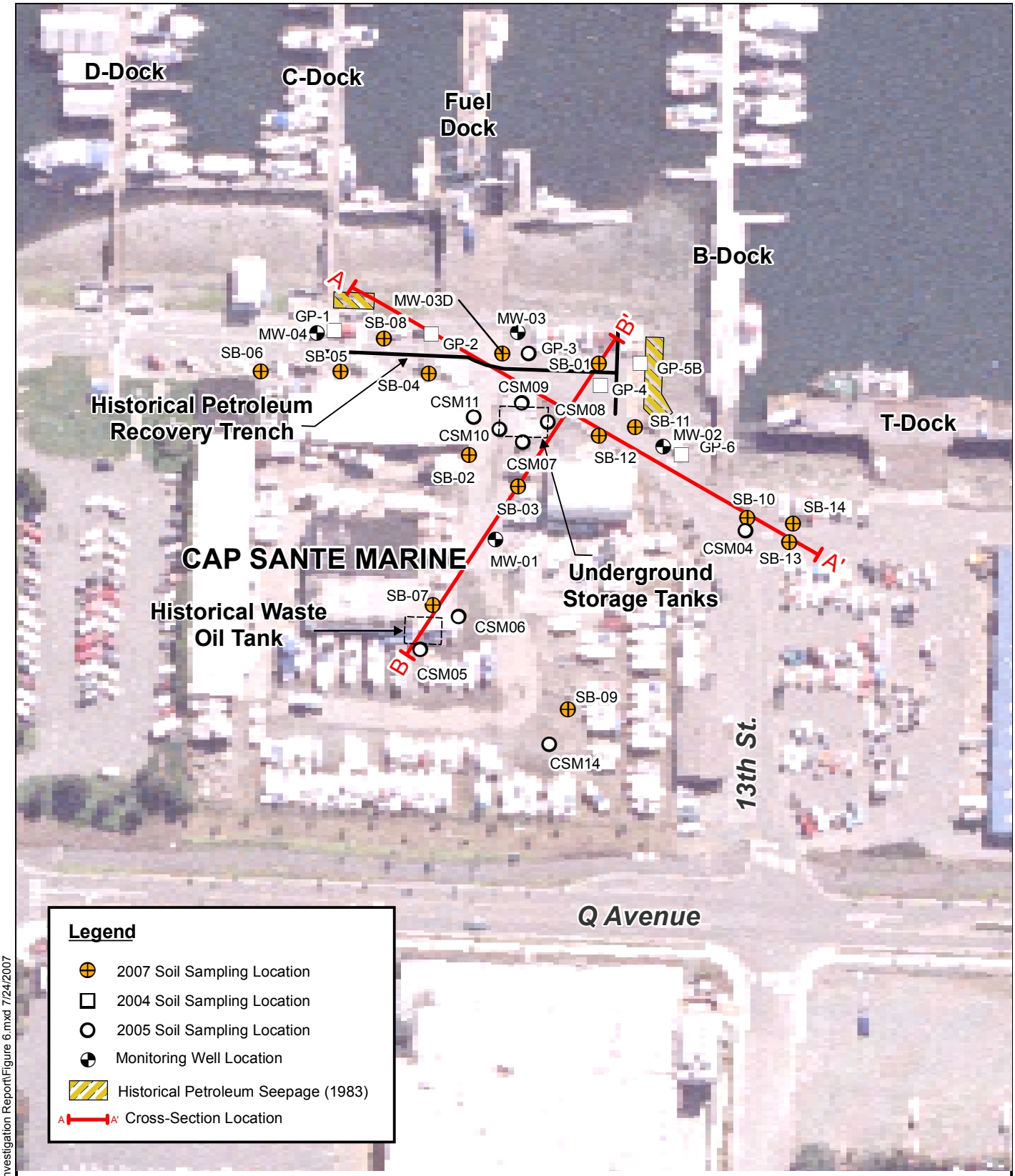
Cap Sante Marine Anacortes, WA	**Monitoring Well Locations**	Figure 5



Historical Data Source: Floyd Snider 2006

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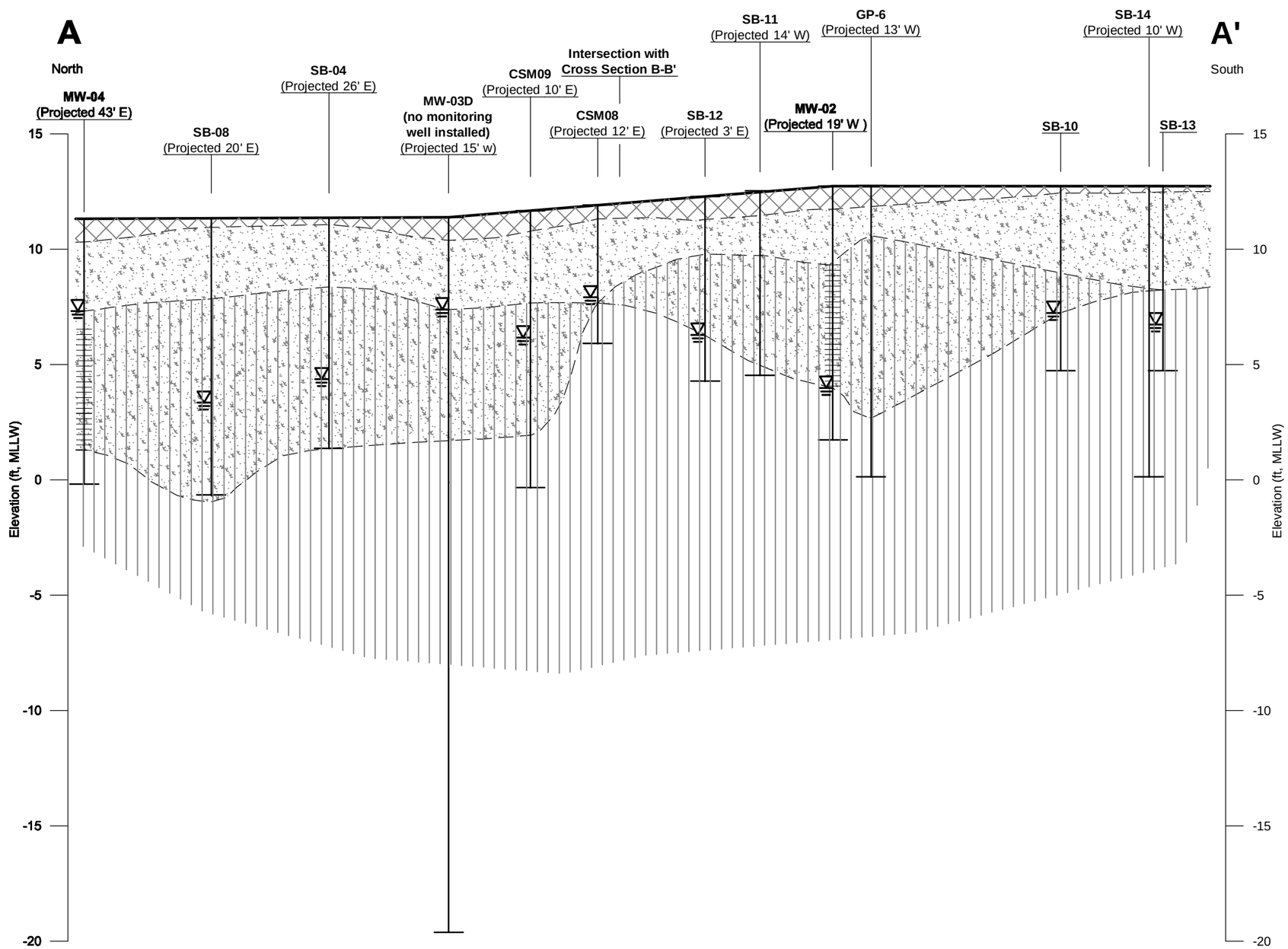
Cap Sante Marine
Anacortes, WA

Cross Sections Locations

Figure
6



Legend

- Groundwater Level at Time of Drilling or Excavation
- Pavement and Granular Base Coarse
- Fill Material (Sandy with Varying Amount of Gravel and Silt) (SP/GP/SM)
- Fill Material (Silty Sand with Interbedded Silt)(SM/ML)
- Native Silt (ML)
- Well Screen Interval

Note

This cross section has been interpreted and generalized from project file data. Variations between this cross section and actual conditions may exist. The project boring logs and written reports must be referenced for a proper understanding of the nature of the subsurface conditions.

0 40 80

Scale in Feet
Vertical Exaggeration = 8X

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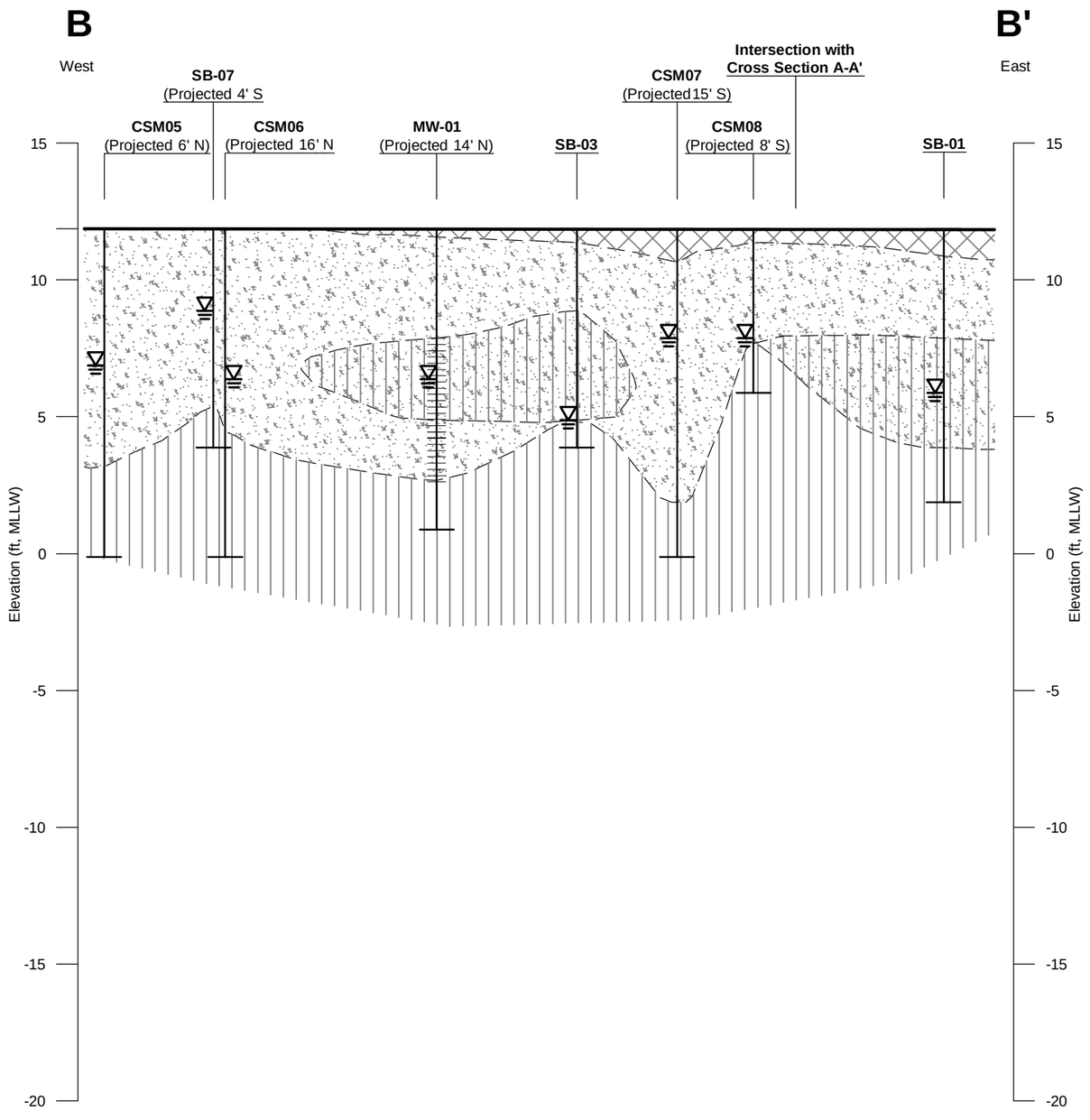
Cap Sante Marine Anacortes, WA	**Cross Section A-A'**	Figure 7

Cap Sante Marine | V:\529013\014\Investigation Data Report\DF\fig7_8.dwg (A) "Figure 7" 7/9/2007



Legend

- Groundwater Level at Time of Drilling or Excavation
- Pavement and Granular Base Coarse
- Fill Material (Sandy with Varying Amount of Gravel and Silt) (SP/GP/SM)
- Fill Material (Silty Sand with Interbedded Silt)(SM/ML)
- Native Silt (ML)
- Well Screen Interval

Note

This cross section has been interpreted and generalized from project file data. Variations between this cross section and actual conditions may exist. The project boring logs and written reports must be referenced for a proper understanding of the nature of the subsurface conditions.

Cap Sante Marine Anacortes, WA	**Cross Section B-B'**	Figure 8

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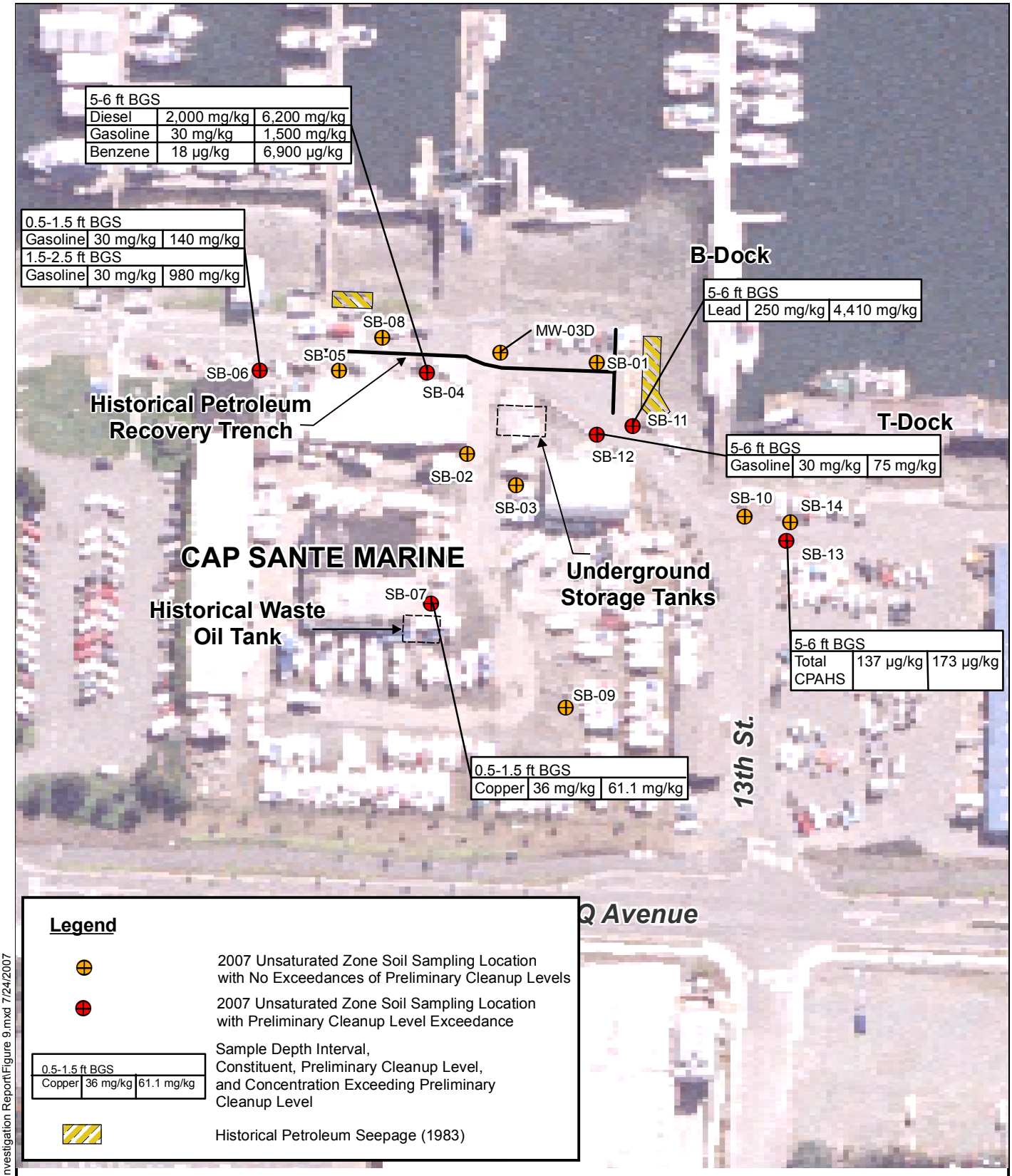
Cap Sante Marine | V:\5290\0130\14\Investigation Data Report\DF\ig7_8.dwg (A) "Figure 8" 7/9/2007



Historical Data Source: Floyd Snider 2006

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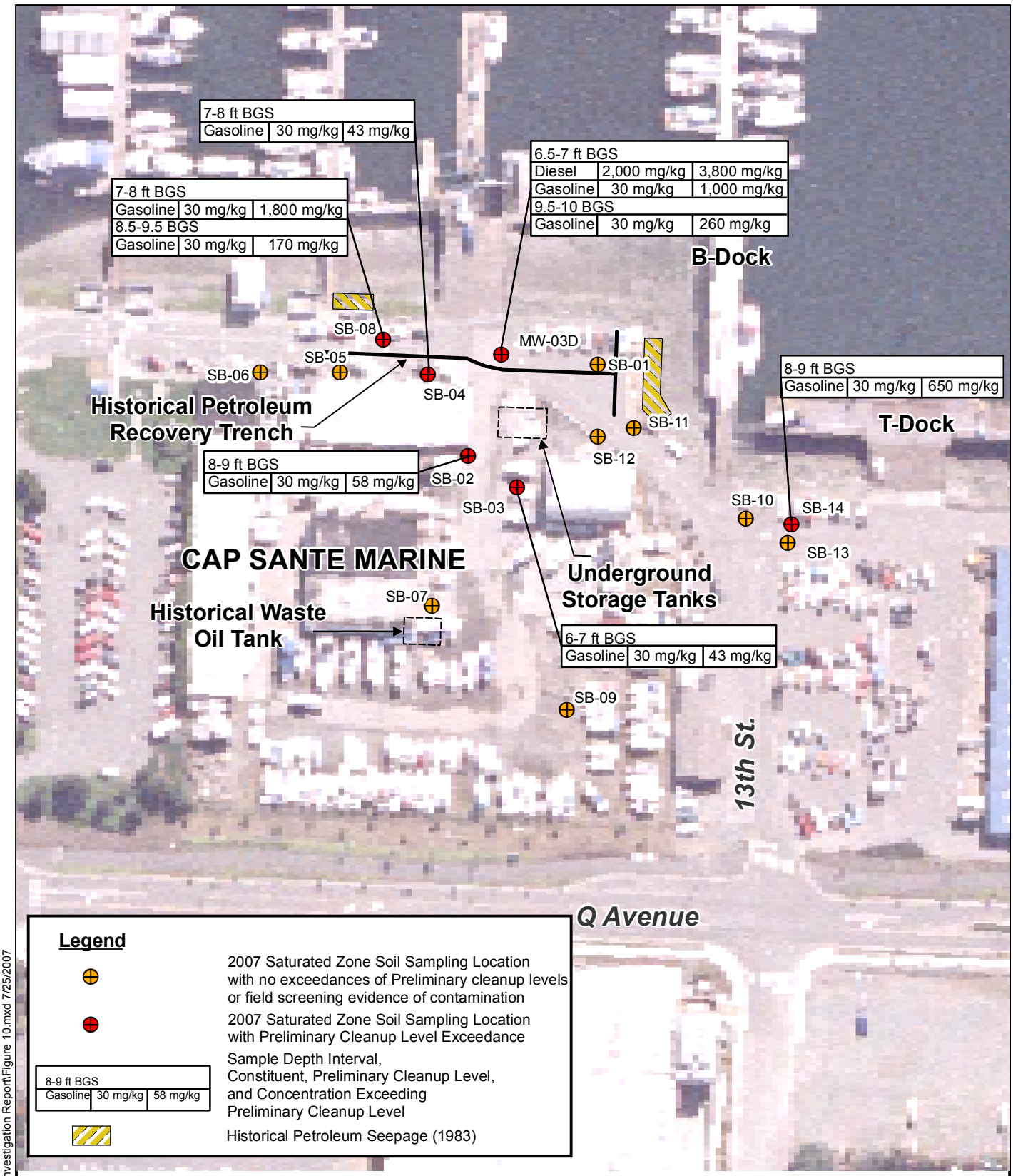
Cap Sante Marine
Anacortes, WA

2007 Investigation Soil Sampling Locations with Preliminary Cleanup Level Exceedances in the Unsaturated Zone

Figure
9



Historical Data Source: Floyd Snider 2006

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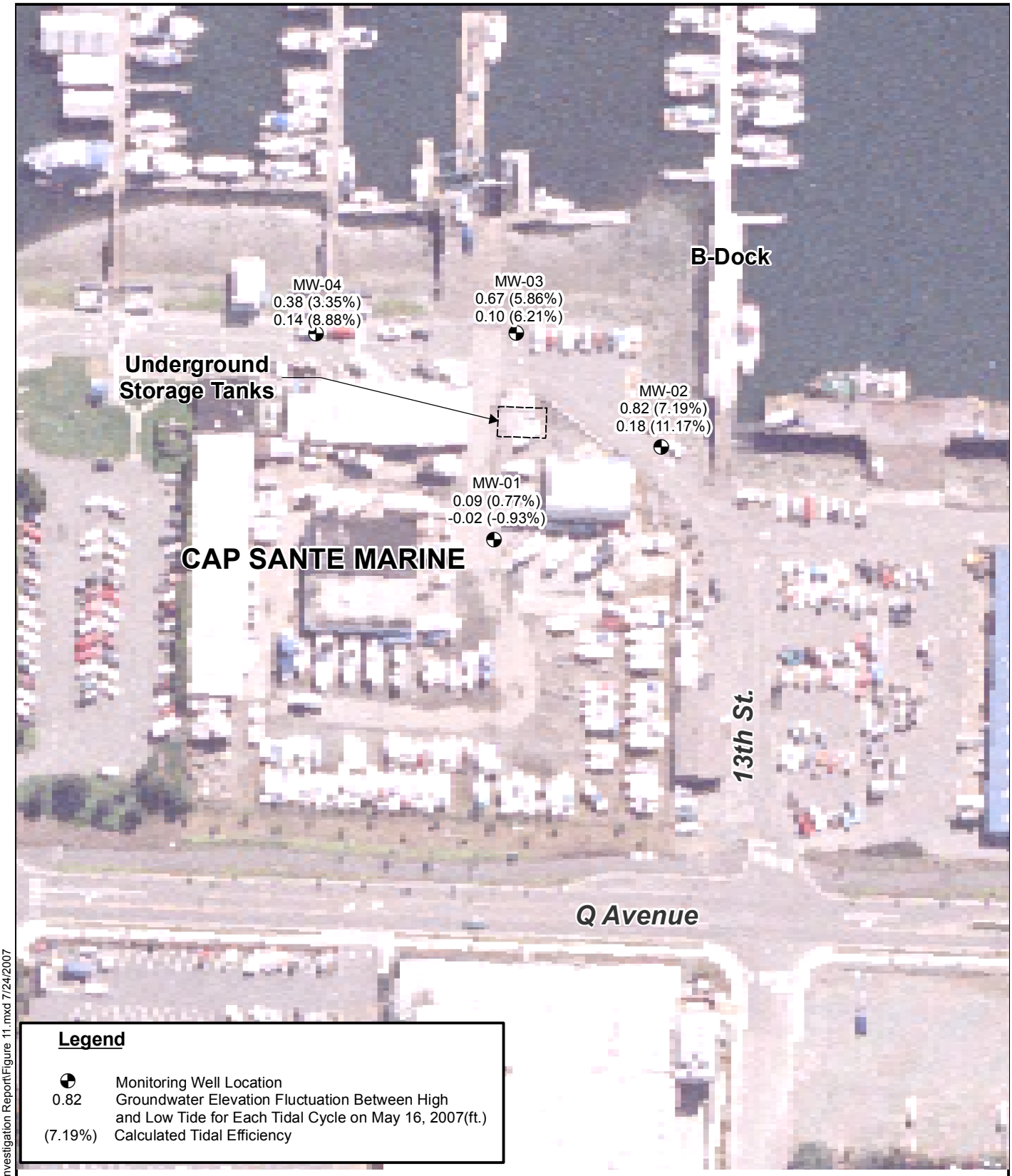
Cap Sante Marine
Anacortes, WA

2007 Soil Sampling Locations with TPH Preliminary Cleanup Level Exceedances in the Saturated Zone

Figure
10



Legend

⊕	Monitoring Well Location
0.82	Groundwater Elevation Fluctuation Between High and Low Tide for Each Tidal Cycle on May 16, 2007(ft.)
(7.19%)	Calculated Tidal Efficiency

N

0 100 200

Scale in Feet

Historical Data Source: Floyd Snider 2006

Y:\Projects\529013\014\Investigation Report\Figure 11.mxd 7/24/2007

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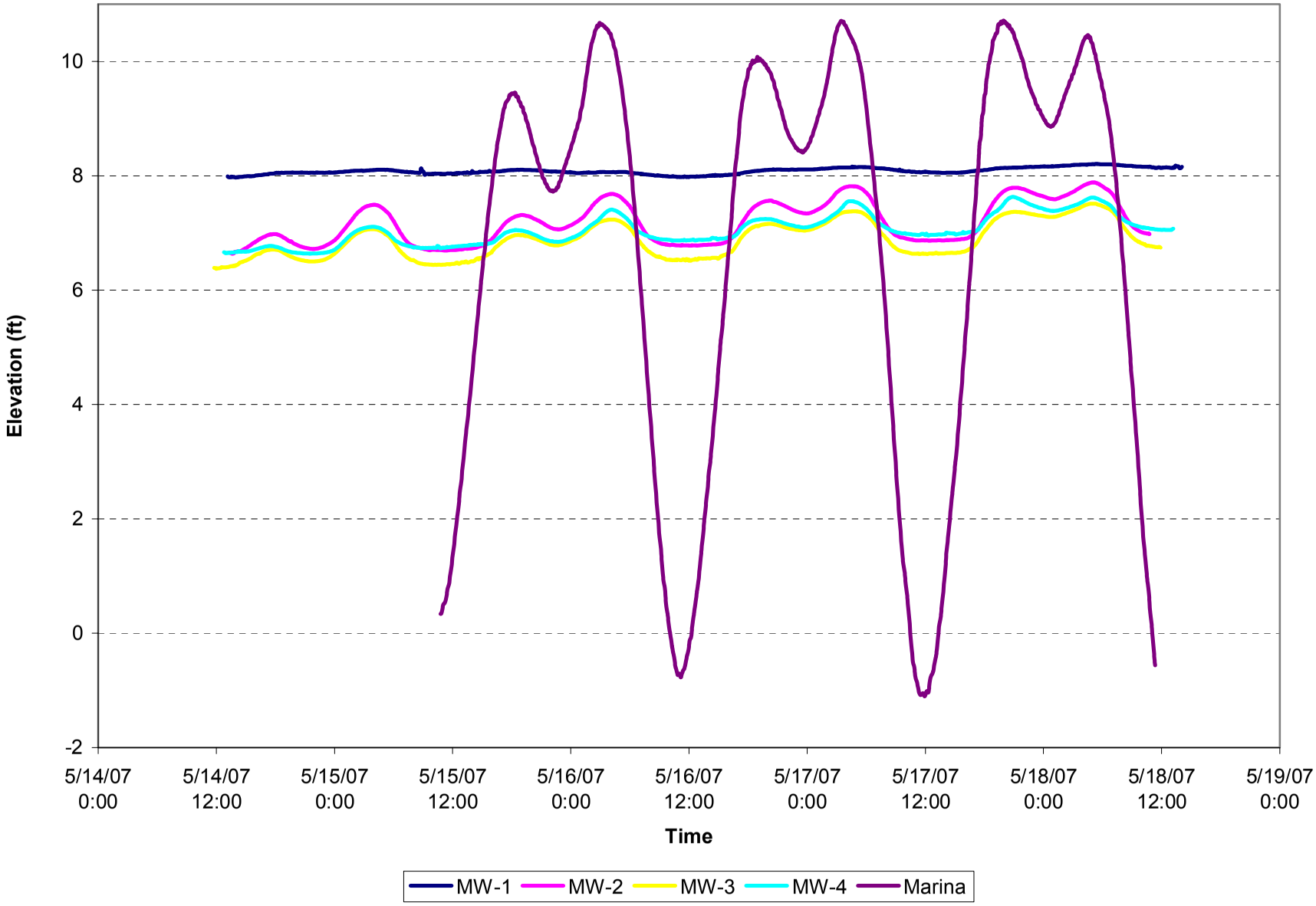
Cap Sante Marine
Anacortes, WA

Tidal Influence on Groundwater Elevations

Figure 11

Source: S:\Projects\529\013\WIP\T\POA Datalogger Files\72 Hour Tests\Elevation Data Plots.xls



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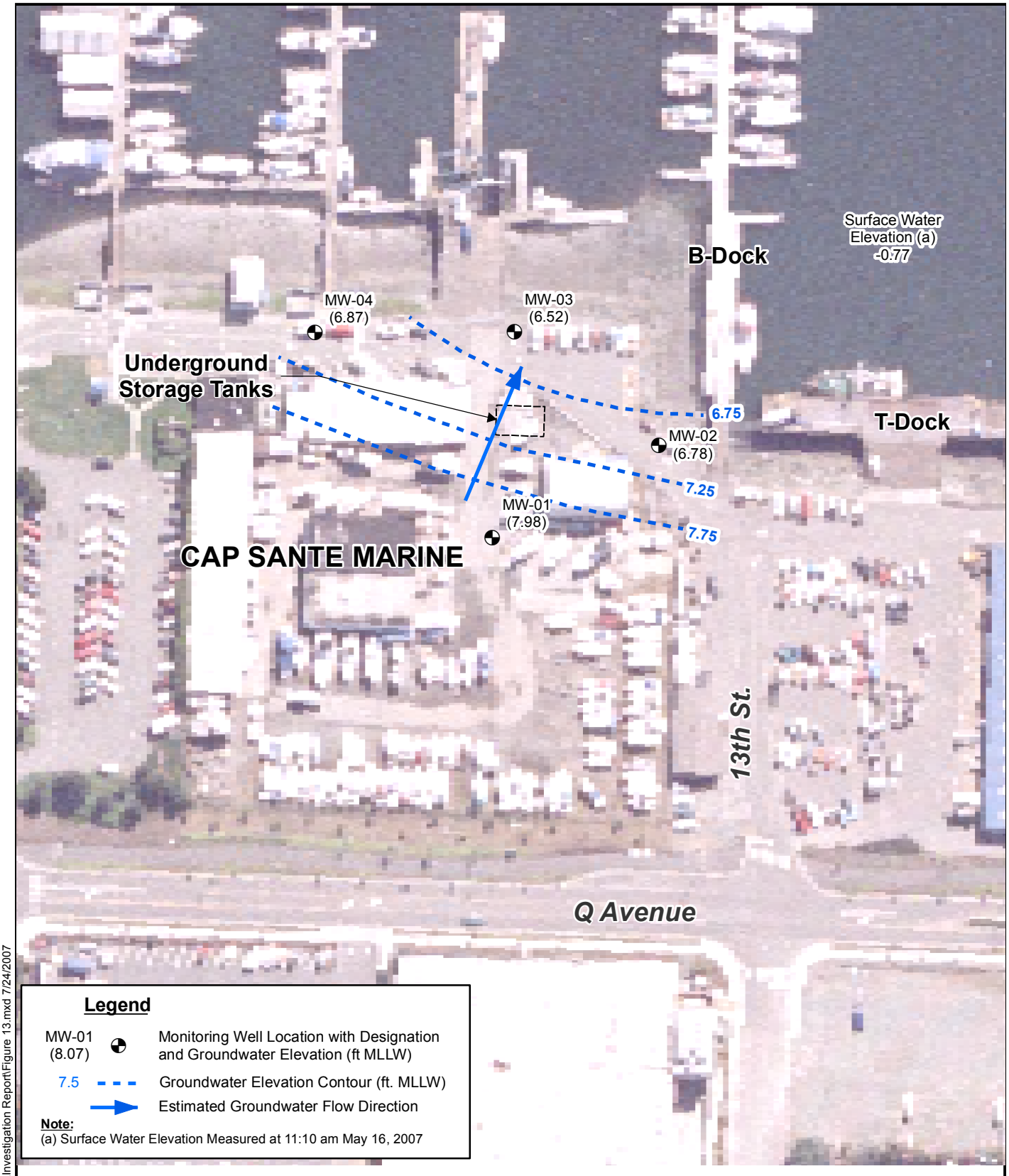
Cap Sante Marine
Anacortes, Washington

Groundwater and Surface Water Elevations vs Time

Figure
12



Legend

MW-01 (8.07) — Monitoring Well Location with Designation and Groundwater Elevation (ft MLLW)

7.5 — Groundwater Elevation Contour (ft. MLLW)

Estimated Groundwater Flow Direction

Note:
(a) Surface Water Elevation Measured at 11:10 am May 16, 2007

N

0 100 200

Scale in Feet

Historical Data Source: Floyd Snider 2006

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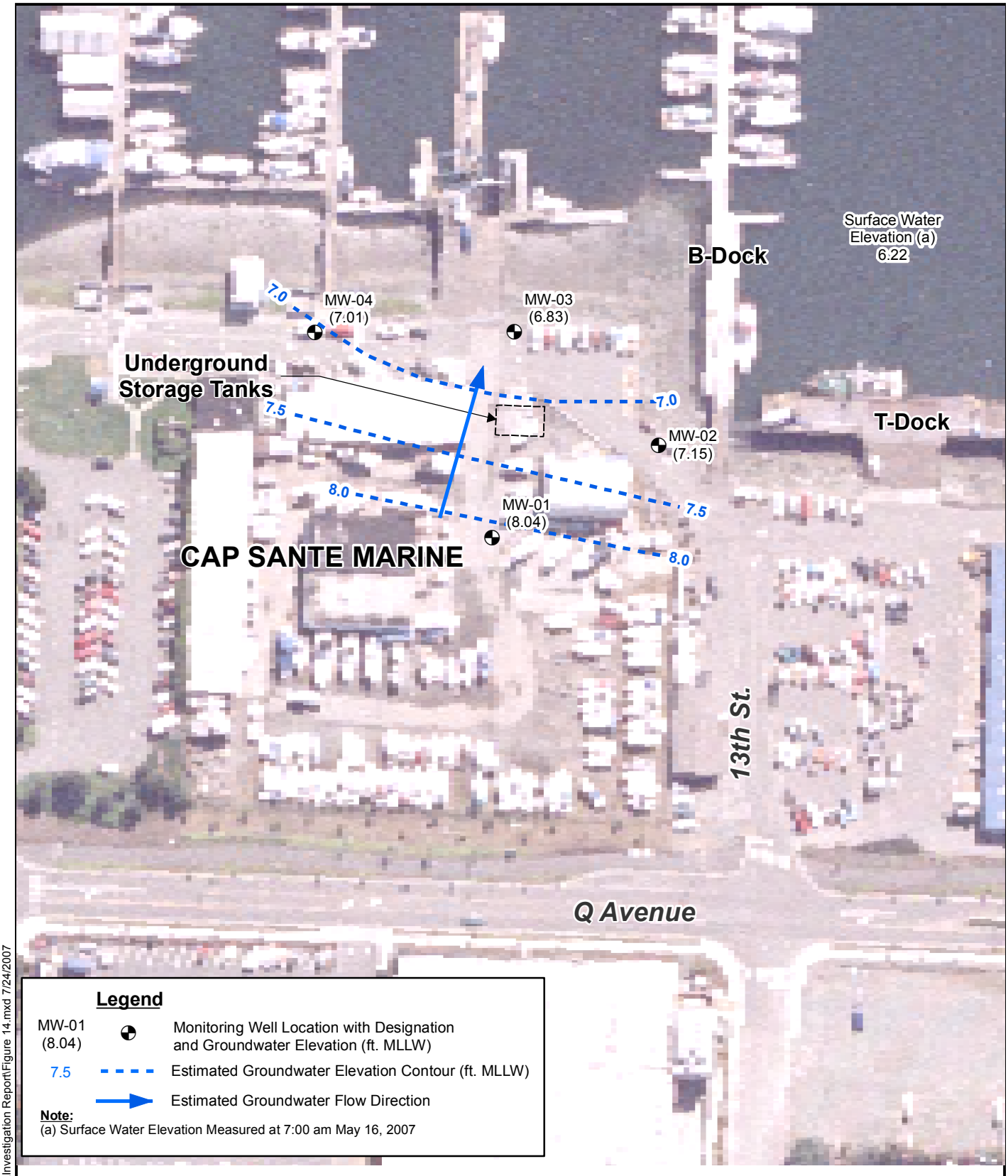
Cap Sante Marine
Anacortes, WA

Groundwater Elevation Contours At Low Tide May 16, 2007

Figure 13



Historical Data Source: Floyd Snider 2006

Y:\Projects\529013\014\Investigation Report\Figure 14.mxd 7/24/2007

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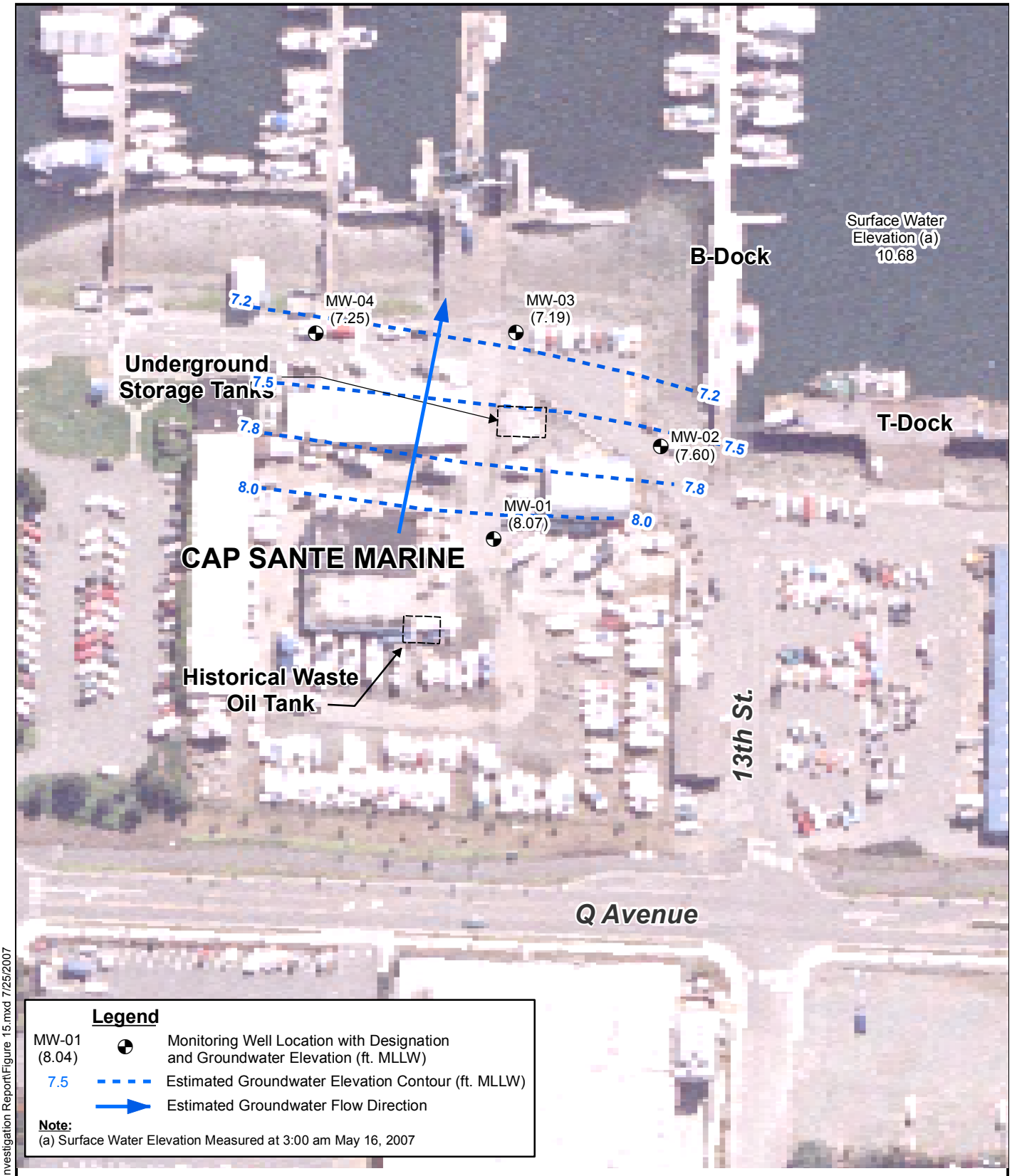
Cap Sante Marine Anacortes, WA	**Groundwater Elevation Contours At Mid Tide May 16, 2007**	Figure **14**

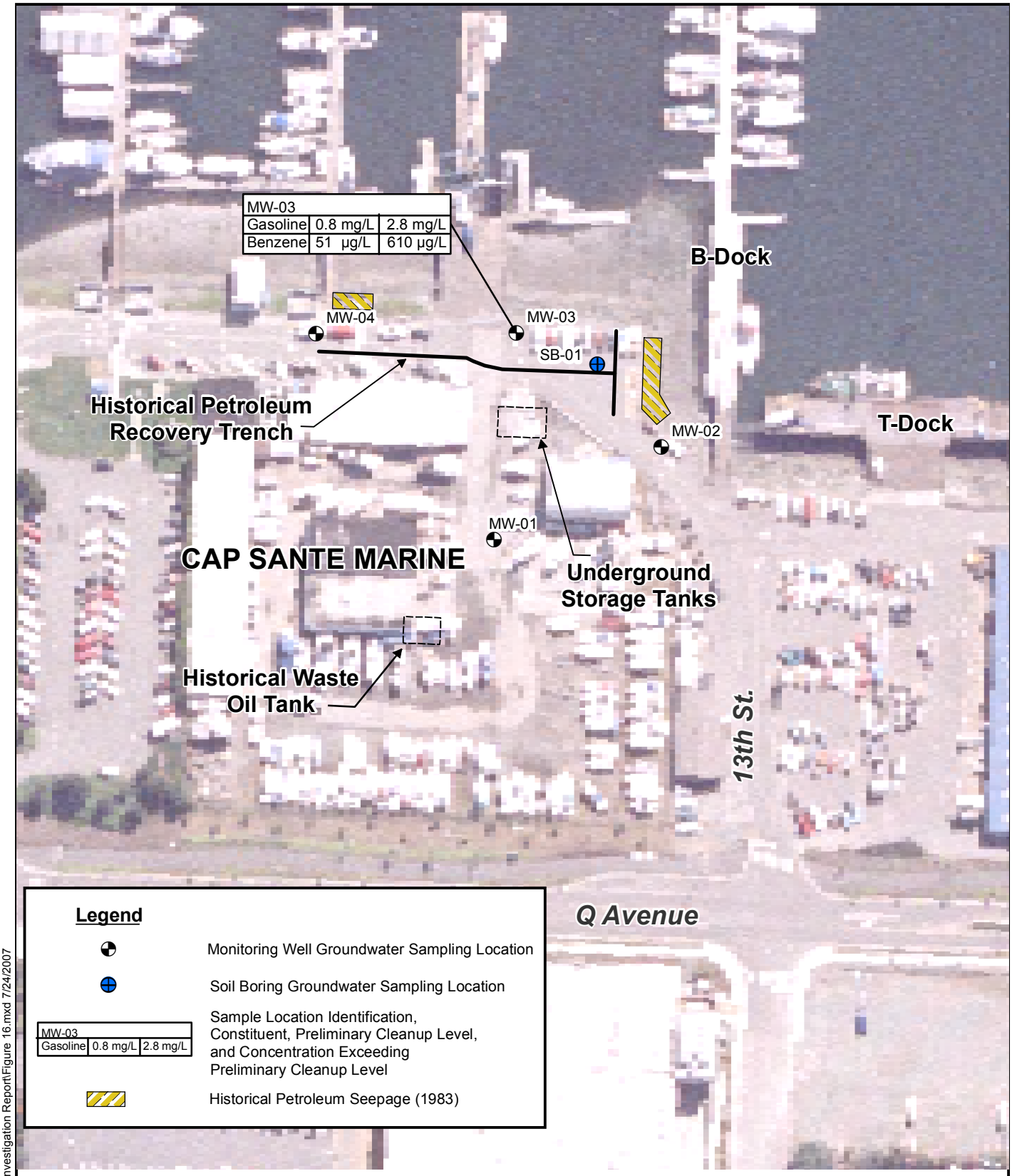


Historical Data Source: Floyd Snider 2006

Y:\Projects\529013\014\Investigation Report\Figure 15.mxd 7/25/2007

LANDAU ASSOCIATES

Cap Sante Marine Anacortes, WA	**Groundwater Elevation Contours At High Tide May 16, 2007**	Figure **15**



Historical Data Source: Floyd Snider 2006

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Cap Sante Marine
Anacortes, WA

Monitoring Well Location with Preliminary Cleanup Level Exceedances

Figure
16

TABLE 1
SUMMARY OF SEDIMENT SAMPLE CHEMICAL CHARACTERIZATION RESULTS
CAP SANTE MARINE CLEANUP
PORT OF ANACORTES

	SED-1 KW08A/KW09A/KW10A 4/23/2007	SED-2 KW08B/KW09B/KW10B 4/23/2007	SED-3 KW08C/KW09C/KW10C 4/23/2007	SED-4 KW08D/KW10D 4/23/2007	SED-5 KW08E/KW10E 4/23/2007	SED-6 KW08F/KW10F 4/23/2007
DIESEL-RANGE HYDROCARBONS						
NWTPH-Dx (mg/kg)						
Diesel Range	36	92	27	87	110	65
Motor Oil Range	100	200	67	240	260	210
GASOLINE-RANGE HYDROCARBONS						
NWTPH-G (mg/kg)						
Gasoline Range	20 U	23 U	12 U	NA	NA	NA
EXTRACTIBLE PETROLEUM HYDROCARBONS						
Method WA-EPH (µg/kg)						
Extractable Petroleum Hydrocarbons, C8-C10 Aromatics	4,100 U	4,100 U	2,900 U	5,500 U	4,600 U	5,500 U
Extractable Petroleum Hydrocarbons, >C10-C12 Aromatics	4,100 U	4,100 U	2,900 U	5,500 U	4,600 U	5,500 U
Extractable Petroleum Hydrocarbons, >C12-C16 Aromatics	4,100 U	4,100 U	2,900 U	5,500 U	4,600 U	5,500 U
Extractable Petroleum Hydrocarbons, >C16-C21 Aromatics	6,600	24,000	3,200	5,500 U	15,000	6,000
Extractable Petroleum Hydrocarbons, >C21-C34 Aromatics	17,000	37,000	11,000	18,000	32,000	18,000
Extractable Petroleum Hydrocarbons, C8-C10 Aliphatics	4,100 U	4,100 U	2,900 U	5,500 U	4,600 U	5,500 U
Extractable Petroleum Hydrocarbons, >C10-C12 Aliphatics	4,100 U	4,100 U	2,900 U	5,500 U	4,600 U	5,500 U
Extractable Petroleum Hydrocarbons, >C12-C16 Aliphatics	4,100 U	14,000	2,900 U	5,500 U	15,000	5,500 U
Extractable Petroleum Hydrocarbons, >C16-C21 Aliphatics	4,100 U	39,000	2,900 U	6,100	34,000	16,000
Extractable Petroleum Hydrocarbons, >C21-C34 Aliphatics	37,000	100,000	25,000	83,000	130,000	93,000
VOLATILE PETROLEUM HYDROCARBONS						
Method WA-VPH (µg/kg)						
Benzene	2,100 UJ	1,900 UJ	1,100 U	3,100 UJ	2,500 UJ	3,100 UJ
Toluene	2,100 UJ	1,900 UJ	1,100 U	3,100 UJ	2,500 UJ	3,100 UJ
Ethylbenzene	2,100 UJ	1,900 UJ	1,100 U	3,100 UJ	2,500 UJ	3,100 UJ
m,p-Xylene	4,200 UJ	3,800 UJ	2,300 U	6,200 UJ	5,000 UJ	6,200 UJ
o-Xylene	2,100 UJ	1,900 UJ	1,100 U	3,100 UJ	2,500 UJ	3,100 UJ
Methyl tert-Butyl Ether	2,100 UJ	1,900 UJ	1,100 U	3,100 UJ	2,500 UJ	3,100 UJ
Volatile Petroleum Hydrocarbons, >C8-C10 Aromatics	21,000 UJ	19,000 UJ	11,000 U	31,000 UJ	25,000 UJ	31,000 UJ
Volatile Petroleum Hydrocarbons, >C10-C12 Aromatics	21,000 UJ	19,000 UJ	11,000 U	31,000 UJ	25,000 UJ	31,000 UJ
Volatile Petroleum Hydrocarbons, >C12-C13 Aromatics	21,000 UJ	19,000 UJ	11,000 U	31,000 UJ	25,000 UJ	31,000 UJ
Volatile Petroleum Hydrocarbons, C5-C6 Aliphatics	21,000 UJ	19,000 UJ	11,000 U	31,000 UJ	25,000 UJ	31,000 UJ
Volatile Petroleum Hydrocarbons, >C6-C8 Aliphatics	21,000 UJ	19,000 UJ	11,000 U	31,000 UJ	25,000 UJ	31,000 UJ
Volatile Petroleum Hydrocarbons, >C8-C10 Aliphatics	21,000 UJ	19,000 UJ	11,000 U	31,000 UJ	25,000 UJ	31,000 UJ
Volatile Petroleum Hydrocarbons, >C10-C12 Aliphatics	21,000 UJ	19,000 UJ	11,000 U	31,000 UJ	25,000 UJ	31,000 UJ
CONVENTIONAL CHEMISTRY PARAMETERS (%)						
Total Solids (EPA Method 160.3)	48.80	47.70	63.80	35.80	44.10	35.40
Total Organic Carbon (PLUMB 81 TC)	2.08	1.77	1.33	3.27	1.65	1.69

TABLE 1
SUMMARY OF SEDIMENT SAMPLE CHEMICAL CHARACTERIZATION RESULTS
CAP SANTE MARINE CLEANUP
PORT OF ANACORTES

	SED-7 KW08G/KW10G 4/23/2007	SED-8 KW08H/KW10H 4/23/2007	SED-9 KW08I/KW10I 4/24/2007	SED-10 KW08J/KW10J 4/24/2007	SED-11 KW08K/KW10K 4/24/2007	SED-12 KW08L/KW10L 4/24/2007	REF-2 KW44M 4/25/2007	REF-4 KW44N 4/25/2007
DIESEL-RANGE HYDROCARBONS								
NWTPH-Dx (mg/kg)								
Diesel Range	42	83	72	35	70	72	6.5 U	8.4 U
Motor Oil Range	110	200	220	110	370	180	13 U	17 U
GASOLINE-RANGE HYDROCARBONS								
NWTPH-G (mg/kg)								
Gasoline Range	NA	NA	NA	NA	NA	NA	NA	NA
EXTRACTIBLE PETROLEUM HYDROCARBONS								
Method WA-EPH (µg/kg)								
Extractable Petroleum Hydrocarbons, C8-C10 Aromatics	4,800 U	5,100 U	5,000 U	5,200 U	5,200 U	5,400 U	2,600 U	3,400 U
Extractable Petroleum Hydrocarbons, >C10-C12 Aromatics	4,800 U	5,100 U	5,000 U	5,200 U	5,200 U	5,400 U	2,600 U	3,400 U
Extractable Petroleum Hydrocarbons, >C12-C16 Aromatics	4,800 U	5,100 U	5,000 U	5,200 U	5,200 U	5,400 U	2,600 U	3,400 U
Extractable Petroleum Hydrocarbons, >C16-C21 Aromatics	4,800 U	7,100	9,100	5,200 U	6,000	12,000	2,600 U	3,400 U
Extractable Petroleum Hydrocarbons, >C21-C34 Aromatics	13,000	8,600	14,000	8,200	12,000	15,000	2,600 U	3,400 U
Extractable Petroleum Hydrocarbons, C8-C10 Aliphatics	4,800 U	5,100 U	5,000 U	5,200 U	5,200 U	5,400 U	2,600 U	3,400 U
Extractable Petroleum Hydrocarbons, >C10-C12 Aliphatics	4,800 U	5,100 U	5,000 U	5,200 U	5,200 U	5,400 U	2,600 U	3,400 U
Extractable Petroleum Hydrocarbons, >C12-C16 Aliphatics	4,800 U	5,300	5,000 U	5,200 U	5,200 U	5,400 U	2,600 U	3,400 U
Extractable Petroleum Hydrocarbons, >C16-C21 Aliphatics	9,400	19,000	19,000	15,000	20,000	6,800	2,600 U	3,400 U
Extractable Petroleum Hydrocarbons, >C21-C34 Aliphatics	50,000	89,000	110,000	84,000	110,000	94,000	3,500	3,400 U
VOLATILE PETROLEUM HYDROCARBONS								
Method WA-VPH (µg/kg)								
Benzene	2,500 UJ	2,800 UJ	2,500 UJ	2,500 UJ	2,800 UJ	3,100 UJ	930 U	1,200 U
Toluene	2,500 UJ	2,800 UJ	2,500 UJ	2,500 UJ	2,800 UJ	3,100 UJ	930 U	1,200 U
Ethylbenzene	2,500 UJ	2,800 UJ	2,500 UJ	2,500 UJ	2,800 UJ	3,100 UJ	930 U	1,200 U
m,p-Xylene	5,000 UJ	5,600 UJ	5,000 UJ	5,000 UJ	5,600 UJ	6,200 UJ	1,900 U	2,500 U
o-Xylene	2,500 UJ	2,800 UJ	2,500 UJ	2,500 UJ	2,800 UJ	3,100 UJ	930 U	1,200 U
Methyl tert-Butyl Ether	2,500 UJ	2,800 UJ	2,500 UJ	2,500 UJ	2,800 UJ	3,100 UJ	930 U	1,200 U
Volatile Petroleum Hydrocarbons, >C8-C10 Aromatics	25,000 UJ	28,000 UJ	25,000 UJ	25,000 UJ	28,000 UJ	31,000 UJ	9,300 U	12,000 U
Volatile Petroleum Hydrocarbons, >C10-C12 Aromatics	25,000 UJ	28,000 UJ	25,000 UJ	25,000 UJ	28,000 UJ	31,000 UJ	9,300 U	12,000 U
Volatile Petroleum Hydrocarbons, >C12-C13 Aromatics	25,000 UJ	28,000 UJ	25,000 UJ	25,000 UJ	28,000 UJ	31,000 UJ	9,300 U	12,000 U
Volatile Petroleum Hydrocarbons, C5-C6 Aliphatics	25,000 UJ	28,000 UJ	25,000 UJ	25,000 UJ	28,000 UJ	31,000 UJ	9,300 U	12,000 U
Volatile Petroleum Hydrocarbons, >C6-C8 Aliphatics	25,000 UJ	28,000 UJ	25,000 UJ	25,000 UJ	28,000 UJ	31,000 UJ	9,300 U	12,000 U
Volatile Petroleum Hydrocarbons, >C8-C10 Aliphatics	25,000 UJ	28,000 UJ	25,000 UJ	25,000 UJ	28,000 UJ	31,000 UJ	9,300 U	12,000 U
Volatile Petroleum Hydrocarbons, >C10-C12 Aliphatics	25,000 UJ	28,000 UJ	25,000 UJ	25,000 UJ	28,000 UJ	31,000 UJ	9,300 U	12,000 U
CONVENTIONAL CHEMISTRY PARAMETERS (%)								
Total Solids (EPA Method 160.3)	39.40	38.90	38.80	39.00	37.20	35.40	70.90	58.50
Total Organic Carbon (PLUMB 81 TC)	2.44	2.87	2.36	2.49	1.99	3.20	1.33	1.53

mg/kg = milligrams per kilogram (ppm).
µg/kg = micrograms per kilogram (ppb).
U = The compound was not detected at the given reporting limit
UJ = The compound was not detected; the given reporting limit is an estimate
NA = Not Analyzed.

TABLE 2
PRELIMINARY SOIL CLEANUP LEVELS FOR CONSTITUENTS OF POTENTIAL CONCERN AND OTHER DETECTED CONSTITUENTS IN SOIL
CAP SANTE MARINE
ANACORTES, WASHINGTON

Constituent	Protection of Human Health		Protection of Groundwater		Other Factors		Preliminary Cleanup Level (a)	
			Unsaturated Zone	Saturated Zone				
	MTCA Method B Soil-Direct Contact Unrestricted Land Use Carcinogen	MTCA Method B Soil-Direct Contact Unrestricted Land Use Non Carcinogen	MTCA Method B Protective of Groundwater as Marine Surface Water (b)	MTCA Method B Protective of Groundwater as Marine Surface Water (c)	MTCA Method A Unrestricted Land Use	Soil Background (d)	Unsaturated Zone	Saturated Zone
Total Metals (mg/kg)								
Chromium III	--	120,000	1,000,000	1,000,000	2,000	42 (e)	120,000	120,000
Hexavalent Chromium	--	240	19	1	19	--	19	1
Copper	--	2960	1.4	0.07	--	36	36	36
Lead	--	--	1,600	81	250	17	250	81
Zinc	--	24,000	101	5	--	86	101	86
TOTAL PETROLEUM HYDROCARBONS (mg/kg)								
Gasoline-Range	--	--	--	--	100/30 (f)		100/30 (f)	100/30 (f)
Diesel-Range	--	--	--	--	2,000	--	2,000 (f)	2,000 (f)
Motor Oil-Range	--	--	--	--	2,000	--	2,000 (f)	2,000 (f)
PAHs (µg/kg)								
Naphthalene	--	1,600,000	138,000	7,000	5	--	138,000	7,000
2-Methylnaphthalene	--	--	--	--	--	--	--	--
1-Methylnaphthalene	--	--	--	--	--	--	--	--
Acenaphthylene	--	--	--	--	--	--	--	--
Acenaphthene	--	4,800,000	66,000	3,000	--	--	66,000	3,000
Fluorene	--	3,200,000	547,000	28,000	--	--	547,000	28,000
Phenanthrene	--	--	--	--	--	--	--	--
Anthracene	--	24,000,000	12,285,000	617,000	--	--	12,285,000	617,000
Fluoranthene	--	3,200,000	89,000	4,000	--	--	89,000	4,000
Pyrene	--	2,400,000	3,536,000	177,000	--	--	2,400,000	177,000
Benzo(ghi)perylene	--	--	--	--	--	--	--	--
Dibenzofuran	--	--	--	--	--	--	--	--
Benzo(a)pyrene	137	--	350	17 (g)	100	--	137	17 (g)
Benzo(a)anthracene	--	--	130	6.4 (g)	--	--	--	6.4 (g)
Benzo(b)fluoranthene	--	--	440	22 (g)	--	--	--	22 (g)
Benzo(k)fluoranthene	--	--	440	22 (g)	--	--	--	22 (g)
Chrysene	--	--	140	7.2 (g)	--	--	--	7.2 (g)
Dibenzo(a,h)anthracene	--	--	640	32 (g)	--	--	--	32 (g)
Indeno(1,2,3-cd)pyrene	--	--	1,200	62 (g)	--	--	--	62 (g)
Total cPAH - benzo(a)pyrene TEQ (h)	137	--	--	--	100	--	137	--
VOLATILES (µg/kg)								
Chloromethane	76,900	--	850	43	--	--	850	43
Methylene Chloride	133,300	4,800,000	2,570	175	20	--	2,570	175
Acetone	--	8,000,000	--	--	--	--	8,000,000	8,000,000
Carbon Disulfide	--	8,000,000	--	--	--	--	8,000,000	8,000,000
2-Butanone	--	--	--	--	--	--	--	--
Trichloroethene							100	5.7
1,2-Dichlorobenzene							15,000	865
1,3,5-Trimethylbenzene	--	4,000,000	--	--	--	--	4,000,000	4,000,000
1,2,4-Trimethylbenzene	--	4,000,000	--	--	--	--	4,000,000	4,000,000
Isopropylbenzene	--	--	--	--	--	--	--	--
n-Propylbenzene	--	--	--	--	--	--	--	--
sec-Butylbenzene	--	--	--	--	--	--	--	--
4-Isopropyltoluene	--	--	--	--	--	--	--	--
n-Butylbenzene	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	--	8,000,000	2,600	136	--	--	2,600	136
Methyl tert-butyl ether (MTBE)	--	--	--	--	100	--	100	100
1,2-Dibromoethane (EDB)	11.8	--	--	--	5	--	12	12
1,2-Dichloroethane (EDC)	11,000	--	180	12	--	--	180	12
n-Hexane	--	4,800,000	--		--	--	4,800,000	4,800,000
Benzene	18,200	240,000	290	18	30	--	290	18
Ethylbenzene	--	8,000,000	18,000	1,030	6,000	--	18,000	1,030
Toluene	--	16,000,000	109,000	6,400	7,000	--	109,000	6,400
Xylene	--	160,000,000	--	--	--	--	160,000,000	160,000,000
PCBs (µg/kg)								
Total PCBs	500	--	0.4	0.020	1,000	--	0.4	0.020

TABLE 2
PRELIMINARY SOIL CLEANUP LEVELS FOR CONSTITUENTS OF POTENTIAL CONCERN
AND OTHER DETECTED CONSTITUENTS IN SOIL
CAP SANTE MARINE
ANACORTES, WASHINGTON

(a) Preliminary cleanup level based on lowest soil criteria corrected for background, as indicated by shading. Further adjustments to those preliminary cleanup levels that are found to be lower than the practical quantitation limits may be necessary, in accordance with WAC 173-340-740(5)(c).

(b) Calculated using fixed parameter 3-phase partitioning model, WAC 173-340-747(4) and preliminary groundwater cleanup levels shown in Table 3 of this report.

(c) Calculated using fixed parameter 3-phase partitioning model, WAC 173-340-747(4)(e) and preliminary groundwater cleanup levels shown in Table 3 of this report.

(d) Natural background (statewide 90th percentile value) from Natural Background Soil Metals Concentrations in Washington State, Ecology 1994.

(e) Background concentration is for total chromium.

(f) MTCA Method A cleanup level is 100 mg/kg when benzene is not present and 30 mg/kg when benzene is present.

(g) Preliminary cleanup levels protective of groundwater as marine surface water from cPAHs in the saturated zone soil are shown for informational purposes. Concentrations of cPAHs higher than these preliminary cleanup levels are present in the saturated zone. It can be empirically demonstrated that these higher concentrations are protective of groundwater as marine surface water.

(h) Toxicity equivalency methodology in WAC 173-340-708(8).

Note: Shaded cell indicates basis for preliminary cleanup level.

TABLE 3
SUMMARY OF DETECTED CONSTITUENTS IN UNSATURATED ZONE SOIL
AND COMPARISON OF ANALYTICAL RESULTS TO PRELIMINARY SOIL CLEANUP LEVELS
CAP SANTE MARINE ANACORTES, WA

	Unsaturated Zone Preliminary Soil Cleanup Level	SB-1 (1-2) LA89P 5/24/2007	SB-1 (4-5) LA89Q 5/24/2007	SB-1 (5-6) LA89R 5/24/2007	SB-2 (1-2) LA89M 5/24/2007	SB-3 (0.5-1.5) LA89J 5/24/2007	SB-3 (1.5-2.5) LA89K 5/24/2007	SB4 (0-1) LB08G 5/25/2007	SB4 (5-6) LB08H 5/25/2007	SB5 (0.5-1.5) LB08M 5/25/2007	SB5 (1.5-2.5) LB08N 5/25/2007	SB5 (5-6) LB08O 5/25/2007	SB6 (0.5-1.5) LB08P 5/25/2007	SB6 (1.5-2.5) LB08Q 5/25/2007	SB6 (5-6) LB08R 5/25/2007	SB-7 (0.5-1) LA89G 5/24/2007	SB-7 (1-2) LA89H 5/24/2007	SB8 (0.5-1.5) LB08J 5/25/2007	SB-9 (0-0.5) LA89D 5/24/2007	SB-9 (1-2) LA89E 5/24/2007
DIESEL-RANGE HYDROCARBONS																				
NWTPH-Dx (mg/kg)																				
Diesel	2,000	**6.8**	**11**	7.5 U	6.5 U	5.8 U	6.7 U	5.7 U	**6,200**	**15**	6.7 U	**33**	**40**	**490**	7.3 U	**9.0**	6.1 U	6.2 U	**17**	7.0 U
Motor Oil	2,000	**92**	**120**	**23**	**15**	**12**	13 U	11 U	530	**150**	**20**	**99**	**110**	**120**	**18**	**72**	12 U	**16**	**96**	14 U
GASOLINE-RANGE HYDROCARBONS																				
NWTPH-G (mg/kg)																				
Gasoline	30	4.4 U	9.9 U	5.9 U	4.2 U	4.0 U	5.2 U	5.1 U	**1,500**	**7.5**	**7.3** U	**10**	**140**	**980**	**20**	**3.7** U	5.1 U	6.0 U	3.0 U	5.8 U
VOLATILE ORGANIC COMPOUNDS (VOCs)																				
EPA Method 8260B (µg/kg)																				
Chloromethane	850	**0.8** M	**9.0**	0.8 U	**1.0**	0.8 U	0.7 U	1.0 U	65 U	0.8 U	1.2 U	1.2 U	0.8 U	68 U	1.2 U	0.8 U	0.8 U	1.1 U	0.6 U	1.0 U
Methylene Chloride	2,570	**1.5**	3.7 U	1.6 U	1.6 U	1.5 U	1.4 U	1.9 U	130 U	1.6 U	2.4 U	2.3 U	1.7 U	140 U	2.3 U	1.6 U	1.5 U	2.1 U	1.2 U	2.0 U
Acetone	--	**65**	**260**	**29**	**94**	**30**	**82**	**61**	330 U	**76**	**61**	**39**	**49**	340 U	**78**	**48**	**55**	**60**	**89**	**57**
Carbon Disulfide	--	**21**	**11**	**2.3**	**1.6**	**3.7**	3.7 U	**9.7**	65 U	**2.5**	**1.3**	**1.2**	**6.8**	68 U	**6.5**	**3.8**	**2.9**	**12**	**0.9**	**3.9**
2-Butanone	8,000,000	**9.2**	**25**	**4.2**	**12**	3.8 U	**20**	**5.2**	330 U	**7.1**	6.1 U	5.8 U	**4.9**	340 U	**7.2**	**6.2**	**7.5**	**6.8**	**7.1**	**9.5**
Trichloroethene	100	0.7 U	1.8 U	0.8 U	**0.9**	0.8 U	0.7 U	1.0 U	65 U	0.8 U	1.2 U	1.2 U	0.8 U	68 U	1.2 U	0.8 U	0.8 U	1.1 U	0.6 U	1.0 U
Benzene	290	**1.3**	**3.4**	**2.6**	0.9 U	0.8 U	**1.6**	1.0 U	**6,900**	0.8 U	1.2 U	1.2 U	0.8 U	68 U	1.2 U	**12**	**1.8**	1.1 U	**0.9**	1.0 U
Toluene	109,000	0.7 U	1.8 U	0.8 U	0.8 U	0.8 U	**1.0**	1.0 U	**2,200**	0.8 U	1.2 U	1.2 U	**0.9**	68 U	1.2 U	**24**	0.8 U	1.1 U	**1.5**	1.0 U
Ethylbenzene	18,000	0.7 U	1.8 U	0.8 U	0.8 U	0.8 U	0.7 U	1.0 U	**52,000**	0.8 U	1.2 U	1.2 U	0.8 U	68 U	1.2 U	**2.7**	0.8 U	1.1 U	**0.7**	1.0 U
m,p-Xylene	--	0.7 U	1.8 U	0.8 U	**0.9**	0.8 U	**1.1**	1.0 U	**110,000**	0.8 U	1.2 U	1.2 U	**1.8** M	**110**	1.2 U	**18**	**1.2**	1.1 U	**3.3**	1.0 U
o-Xylene	--	0.7 U	1.8 U	0.8 U	0.8 U	0.8 U	**0.8 M**	1.0 U	**1,600**	0.8 U	1.2 U	1.2 U	0.8 U	68 U	1.2 U	**7.4**	0.8 U	1.1 U	**1.2**	1.0 U
Total Xylenes	160,000,000	ND	ND	ND	**0.9**	ND	**1.9**	ND	**111,600**	ND	ND	ND	**1.8**	**110**	ND	**25.4**	**1.2**	ND	**4.5**	ND
1,2-Dichlorobenzene	15,000	0.7 U	1.8 U	0.8 U	**0.8**	0.8 U	0.7 U	1.0 U	65 U	0.8 U	1.2 U	1.2 U	0.8 U	68 U	1.2 U	0.8 U	0.8 U	1.1 U	0.6 U	1.0 U
1,3,5-Trimethylbenzene	--	0.7 U	1.8 U	0.8 U	**0.8**	0.8 U	0.7 U	1.0 U	**37,000**	0.8 U	1.2 U	1.2 U	0.8 U	68 U	1.2 U	**1.8**	0.8 U	1.1 U	0.6 U	1.0 U
1,2,4-Trimethylbenzene	4,000,000	0.7 U	1.8 U	0.8 U	**1.1**	0.8 U	**0.8** M	1.0 U	**110,000**	0.8 U	1.2 U	1.2 U	**4.3** M	**190** M	1.2 U	**5.9**	0.8 U	1.1 U	**1.0**	1.0 U
Isopropylbenzene	--	0.7 U	1.8 U	0.8 U	**0.9**	0.8 U	0.7 U	1.0 U	**5,500**	0.8 U	1.2 U	1.2 U	**2.4**	68 U	1.2 U	0.8 U	0.8 U	1.1 U	0.6 U	1.0 U
n-Propylbenzene	--	0.7 U	1.8 U	0.8 U	0.8 U	0.8 U	0.7 U	1.0 U	**24,000**	0.8 U	1.2 U	1.2 U	**3.6** M	**150** M	1.2 U	**1.2**	0.8 U	1.1 U	0.6 U	1.0 U
sec-Butylbenzene	--	0.7 U	1.8 U	0.8 U	**0.9**	0.8 U	0.7 U	1.0 U	**3,400**	0.8 U	1.2 U	1.2 U	**9.8**	**380** M	1.2 U	0.8 U	0.8 U	1.1 U	0.6 U	1.0 U
4-Isopropyltoluene	--	0.7 U	1.8 U	0.8 U	**0.9**	0.8 U	**1.1**	1.0 U	**4,000**	0.8 U	1.2 U	1.2 U	**4.4**	**160** M	1.2 U	0.8 U	0.8 U	1.1 U	0.6 U	1.0 U
n-Butylbenzene	--	0.7 U	1.8 U	0.8 U	0.8 U	0.8 U	0.7 U	1.0 U	**16,000** M	0.8 U	1.2 U	1.2 U	**4.6** M	**280** M	1.2 U	1.2 U	0.8 U	1.1 U	0.6 U	1.0 U
Naphthalene	138,000	3.6 U	9.2 U	3.9 U	3.9 U	3.8 U	3.6 U	4.8 U	**50,000**	4.1 U	6.1 U	5.8 U	4.1 U	340 U	5.9 U	5.9 U	5.9 U	5.3 U	3.1 U	5.1 U
n-Hexane	4,800,000	3.6 U	9.2 U	3.9 U	**4.0**	3.8 U	**14**	4.8 U	**6,900**	4.1 U	6.1 U	5.8 U	4.1 U	340 U	5.9 U	3.9 U	3.8 U	5.3 U	3.1 U	5.1 U
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)																				
EPA Method 8270D-SIM (µg/kg)																				
Naphthalene	138,000	6.4 U	**9.1**	**10**	**20**	6.4 U	**8.3**	**98**	**15,000**	**19**	**71**	**65**	**8.4**	**130**	**23**	**6.5**	6.4 U	**9.3**	6.5 U	**15**
2-Methylnaphthalene	--	6.4 U	6.5 U	6.5 U	6.6 U	6.4 U	6.4 U	**6.9**	**47,000**	**8.0**	6.1 U	**12**	**19**	**260**	6.6 U	6.5 U	6.4 U	6.2 U	**7.2**	6.6 U
1-Methylnaphthalene	--	6.4 U	6.5 U	**8.0**	6.6 U	6.4 U	6.4 U	**6.9**	**17,000**	6.1 U	6.1 U	**8.0**	**17**	**500**	6.6 U	6.5 U	6.4 U	6.2 U	6.5 U	6.6 U
Acenaphthylene	--	6.4 U	6.5 U	6.5 U	6.6 U	6.4 U	6.4 U	6.3 U	320 U	6.1 U	**6.1**	**15**	6.5 U	26 U	6.6 U	6.5 U	6.4 U	6.2 U	6.5 U	6.6 U
Acenaphthene	66,000	6.4 U	6.5 U	9.8	6.6 U	6.4 U	6.4 U	6.3 U	**1,400**	6.1 U	6.1 U	**10**	6.5 U	**31**	6.6 U	6.5 U	6.4 U	6.2 U	6.5 U	6.6 U
Fluorene	547,000	6.4 U	6.5 U	6.5 U	6.6 U	6.4 U	6.4 U	6.3 U	**2,000**	6.1 U	6.1 U	**16**	6.5 U	**63**	6.6 U	6.5 U	6.4 U	6.2 U	6.5 U	6.6 U
Phenanthrene	--	**18**	**22**	**18**	**26**	**9.0**	**12**	**28**	**6,200**	**33**	**36**	**120**	**6.5**	**86**	**21**	**7.2**	**8.9**	**18**	**18**	**31**
Anthracene	12,285,000	6.4 U	6.5 U	**6.5**	6.6 U	6.4 U	6.4 U	6.3 U	**360**	**6.8**	**6.7**	**22**	6.5 U	**14**	6.6 U	6.5 U	6.4 U	6.2 U	6.5 U	**7.3**
Fluoranthene	89,000	**15**	**22**	**31**	**53**	**17**	**15**	**28**	**140**	**61**	**56**	**260**	**9.7**	**100**	**32**	**18**	**12**	**38**	**57**	**36**
Pyrene	2,400,000	**19**	**21**	**28**	**52**	**14**	**14**	**31**	**230**	**58**	**58**	**240**	**12**	**110**	**32**	**16**	**11**	**37**	**42**	**36**
Benzo(ghi)perylene	--	**9.0**	**6.5**	6.5 U	**11**	6.4 U	6.4 U	6.3 U	32 U	**15**	**6.7**	**39**	6.5 U	**14**	6.6 U	**10**	6.4 U	**7.4**	**27**	6.6 U
Dibenzofuran	--	6.4 U	6.5 U	6.5 U	6.6 U	6.4 U	6.4 U	6.3 U	**730**	6.1 U	6.1 U	**9.8**	6.5 U	**27**	6.6 U	6.5 U	6.4 U	6.2 U	6.5 U	6.6 U
Benzo(a)anthracene	See Total cPAHs	**6.4**	**7.2**	**8.5**	**16**	6.4 U	6.4 U	**8.2**	32 U	**19**	**14**	**82**	6.5 U	**22**	**8.6**	**10**	6.4 U	**15**	**27**	**12**
Chrysene	See Total cPAHs	**24**	**18**	**10**	**20**	10	6.4 U	**11**	**36**	**24**	**15**	**100**	6.5 U	**24**	**11**	**16**	6.4 U	**17**	**44**	**14**
Benzo(b)fluoranthene	See Total cPAHs	18 U	12 U	**13**	**25**	9.6	6.4 U	**10**	32 U	**31**	**16**	**120**	**6.5**	**35**	**14**	**25**	6.4 U	**24**	**71**	**11**
Benzo(k)fluoranthene	See Total cPAHs	18 U	12 U	6.5 U	**9.8**	6.4 U	6.4 U	6.3 U	32 U	**11**	**6.7**	**49**	6.5 U	13 U	6.6 U	**7.8**	6.4 U	**8.6**	**22**	6.6 U
Benzo(a)pyrene	See Total cPAHs	**10**	**9.8**	**9.8**	**19**	**7.7**	6.4 U	**7.6**	32 U	**19**	**13**	**90**	6.5 U	**21**	**9.9**	**11**	6.4 U	**17**	**38**	**11**
Indeno(1,2,3-cd)pyrene	See Total cPAHs	6.4 U	6.5 U	6.5 U	**9.2**	6.4 U	6.4 U	6.3 U	32 U	**9.8**	6.1 U	**36**	6.5 U	13 U	6.6 U	**8.5**	6.4 U	**7.4**	**23**	6.6 U
Dibenzo(a,h)anthracene	See Total cPAHs	6.4 U	6.5 U	6.5 U	6.6 U	6.4 U	6.4 U	6.3 U	32 U	6.1 U	6.1 U	**9.2**	6.5 U	13 U	6.6 U	6.5 U	6.4 U	6.2 U	**6.5**	6.6 U
Total cPAHs - TEQ (a)	137	**10.9**	**10.7**	**12.1**	**25.2**	**8.8**	ND	**9.5**	**0.36**	**26.3**	**16.8**	**123**	ND	**26.9**	**12.3**	**16.3**	ND	**22.7**	**55.3**	**13.4**
TOTAL METALS																				
EPA Method 6010B (mg/kg)																				
Chromium	120,000 (b)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**37.0**	**15.1**	NA	NA	NA
Copper	36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**61.1**	**8.6**	NA	NA	NA
Lead	250	**4**	**4**	3 U	**3**	**2**	2 U	**3**	6 U	**14**	3 U	**10**	**4**	**3**	3 U	**21**	2 U	**3**	**48**	3 U
Zinc	101	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**59**	**23**	NA	NA	NA

TABLE 3
SUMMARY OF DETECTED CONSTITUENTS IN UNSATURATED ZONE SOIL
AND COMPARISON OF ANALYTICAL RESULTS TO PRELIMINARY SOIL CLEANUP LEVELS
CAP SANTE MARINE ANACORTES, WA

	Unsaturated Zone Preliminary Soil Cleanup Level	SB-9 (6-7) LA89F 5/24/2007	SB-10 (0-0.5) LA89A 5/24/2007	SB-10 (1-2) LA89B 5/24/2007	SB-10 (5-6) LA89C 5/24/2007	SB11 (0.5-1.5) LB08A 5/25/2007	SB11 (1.5-2.5) LB08B 5/25/2007	SB11 (5-6) LB08C 5/25/2007	SB12 (0.75-1.75) LB08D 5/25/2007	SB12 (2-3) LB08E 5/25/2007	SB12 (5-6) LB08F 5/25/2007	SB13 (0.5-1.5) LB09A 5/25/2007	SB13 (1.5-3) LB09B 5/25/2007	SB13 (5-6) LB09C 5/25/2007	SB14 (0.5-1.5) LB09D 5/25/2007
DIESEL-RANGE HYDROCARBONS															
NWTPH-Dx (mg/kg)															
Diesel	2,000	6.7 U	**8.9**	5.3 U	**24**	5.2 U	8.7	**6.9**	5.4 U	6.2 U	**12**	**21**	5.4 U	**100**	5.3 U
Motor Oil	2,000	14 U	**160**	**17**	**220**	**22**	**150**	**34**	**19**	12 U	**120**	**170**	11 U	**230**	**11**
GASOLINE-RANGE HYDROCARBONS															
NWTPH-G (mg/kg)															
Gasoline	30	5.6 U	3.0 U	3.1 U	3.4 U	**6.5**	4.8 U	5.5 U	5.0 U	5.6 U	**75**	4.3 U	4.2 U	**23**	5.1 U
VOLATILE ORGANIC COMPOUNDS (VOCs)															
EPA Method 8260B (µg/kg)															
Chloromethane	850	1.2 U	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	1.1 U	0.8 U	0.8 U	1.9 U	1.2 U
Methylene Chloride	2,570	2.3 U	1.1 U	1.2 U	1.3 U	2.0 U	**22**	**14**	**15**	**56**	2.2 U	**13**	**13**	3.9 U	**4.0**
Acetone	--	**140**	**31**	**14**	**44**	**33**	**35**	**64**	**56**	**100**	5.6 U	**36**	**30**	**96**	**41**
Carbon Disulfide	--	1.2 U	0.5 U	0.6 U	2.1	1.0 U	1.0 U	**3.0**	**16**	**22**	**20**	0.8 U	**2.9**	**3.6**	**3.8**
2-Butanone	8,000,000	**33**	2.7 U	2.9 U	**5.0**	5.0 U	5.0 U	5.5 U	5.5 U	**9.5**	**38** M	**4.9**	4.1 U	9.7 U	5.9 U
Trichloroethene	100	1.2 U	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	1.1 U	0.8 U	0.8 U	1.9 U	1.2 U
Benzene	290	1.2 U	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	**4.2**	**14**	0.8 U	0.8 U	1.9 U	1.2 U
Toluene	109,000	1.2 U	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**3.7**	0.8 U	0.8 U	1.9 U	1.2 U
Ethylbenzene	18,000	1.8 U	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**3.2** M	0.8 U	0.8 U	1.9 U	1.2 U
m,p-Xylene	--	1.3 U	0.5 U	0.6 U	**1.2**	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**5.4** M	0.8 U	0.8 U	1.9 U	1.2 U
o-Xylene	--	1.3 U	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**1.5** M	0.8 U	0.8 U	1.9 U	1.2 U
Total Xylenes	160,000,000	ND	ND	ND	**1.2**	ND	ND	ND	ND	ND	**6.9**	ND	ND	ND	ND
1,2-Dichlorobenzene	15,000	1.2 U	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	1.1 U	0.8 U	0.8 U	1.9 U	1.2 U
1,3,5-Trimethylbenzene	--	1.2 U	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**1.6** M	0.8 U	0.8 U	1.9 U	1.2 U
1,2,4-Trimethylbenzene	4,000,000	1.2 U	0.5 U	0.6 U	**0.9**	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**7.8** M	0.8 U	0.8 U	1.9 U	1.2 U
Isopropylbenzene	--	**18**	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**2.9** M	0.8 U	0.8 U	1.9 U	1.2 U
n-Propylbenzene	--	**65**	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**3.8** M	0.8 U	0.8 U	1.9 U	1.2 U
sec-Butylbenzene	--	**68**	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**20**	0.8 U	0.8 U	1.9 U	1.2 U
4-Isopropyltoluene	--	1.2 U	0.5 U	0.6 U	**5.9**	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	1.1 U	0.8 U	0.8 U	1.9 U	1.2 U
n-Butylbenzene	--	**70** M	0.5 U	0.6 U	0.7 U	1.0 U	1.0 U	1.1 U	1.1 U	1.1 U	**5.6** M	0.8 U	0.8 U	1.9 U	1.2 U
Naphthalene	138,000	19 U	2.7 U	2.9 U	3.3 U	5.0 U	5.0 U	5.5 U	5.5 U	5.7 U	5.6 U	3.9 U	4.1 U	9.7 U	5.9 U
n-Hexane	4,800,000	**18**	2.7 U	2.9 U	3.3 U	5.0 U	5.0 U	5.5 U	5.5 U	**8.7**	**7.1**	3.9 U	4.1 U	9.7 U	5.9 U
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)															
EPA Method 8270D-SIM (µg/kg)															
Naphthalene	138,000	**8.3**	6.2 U	6.6 U	**10**	6.5 U	6.5 U	**12**	6.0 U	6.2 U	**29**	**9.2**	6.4 U	**69**	6.6 U
2-Methylnaphthalene	--	6.4 U	6.2 U	6.6 U	**12**	6.5 U	6.5 U	**7.4**	6.0 U	6.2 U	**45**	**12**	6.4 U	**24**	6.6 U
1-Methylnaphthalene	--	6.4 U	6.2 U	6.6 U	**12**	6.5 U	6.5 U	6.2 U	6.0 U	6.2 U	**40**	6.6 U	6.4 U	**15**	6.6 U
Acenaphthylene	--	6.4 U	6.2 U	6.6 U	6.4 U	6.5 U	6.5 U	**9.3**	6.0 U	6.2 U	6.2 U	6.6 U	6.4 U	**23**	6.6 U
Acenaphthene	66,000	6.4 U	6.2 U	6.6 U	**14**	6.5 U	6.5 U	6.2 U	6.0 U	6.2 U	6.2 U	6.6 U	6.4 U	**31**	6.6 U
Fluorene	547,000	6.4 U	6.2 U	6.6 U	**12**	6.5 U	6.5 U	6.2 U	6.0 U	6.2 U	6.2 U	6.6 U	6.4 U	**43**	6.6 U
Phenanthrene	--	**24**	**11**	6.6 U	**28**	6.5 U	6.5 U	**65**	**6.0**	**11**	**32**	**42**	6.4 U	**170**	6.6 U
Anthracene	12,285,000	6.4 U	6.2 U	6.6 U	6.4 U	6.5 U	6.5 U	**14**	6.0 U	6.2 U	6.2 U	**7.2**	6.4 U	**44**	6.6 U
Fluoranthene	89,000	**27**	6.2 U	6.6 U	**52**	6.5 U	6.5 U	**89**	**8.3**	**21**	**13**	**110**	6.4 U	**480**	6.6 U
Pyrene	2,400,000	**32**	**13**	6.6 U	**48**	6.5 U	6.5 U	**100**	**8.9**	**21**	**23**	**170**	6.4 U	**420**	6.6 U
Benzo(ghi)perylene	--	6.4 U	**19**	6.6 U	**16**	6.5 U	6.5 U	**61**	6.0 U	**6.8**	**8.0**	**36**	6.4 U	**87**	6.6 U
Dibenzofuran	--	6.4 U	6.2 U	6.6 U	**7.1**	6.5 U	6.5 U	6.2 U	6.0 U	6.2 U	6.2 U	6.6 U	6.4 U	**25**	6.6 U
Benzo(a)anthracene	See Total cPAHs	**10**	**9.4**	6.6 U	**19**	6.5 U	6.5 U	**43**	6.0 U	**6.8**	**8.7**	**73**	6.4 U	**140**	6.6 U
Chrysene	See Total cPAHs	**9.6**	**39**	6.6 U	**39**	6.5 U	6.5 U	**68**	**6.6**	**9.3**	**40**	**110**	6.4 U	**160**	6.6 U
Benzo(b)fluoranthene	See Total cPAHs	**6.4**	**18**	6.6 U	**27**	6.5 U	6.5 U	**53**	6.0 U	**11**	32 U	**160**	6.4 U	**170**	6.6 U
Benzo(k)fluoranthene	See Total cPAHs	**6.4**	6.2 U	6.6 U	**7.1**	6.5 U	6.5 U	**53**	6.0 U	6.2 U	32 U	**57**	6.4 U	**69**	6.6 U
Benzo(a)pyrene	See Total cPAHs	**9.6**	**14**	6.6 U	**18**	6.5 U	6.5 U	**63**	6.0 U	**8.0**	**9.9**	**82**	6.4 U	**120**	6.6 U
Indeno(1,2,3-cd)pyrene	See Total cPAHs	6.4 U	6.2 U	6.6 U	**7.1**	6.5 U	6.5 U	**46**	6.0 U	6.2 U	6.2 U	**29**	6.4 U	**66**	6.6 U
Dibenzo(a,h)anthracene	See Total cPAHs	6.4 U	6.2 U	6.6 U	6.4 U	6.5 U	6.5 U	**14**	6.0 U	6.2 U	6.2 U	**7.2**	6.4 U	**17**	6.6 U
Total cPAHs - TEQ (a)	137	**12.0**	**17.1**	ND	**24.4**	ND	ND	**88.8**	**0.07**	**9.9**	**11.2**	**117.9**	ND	**173**	ND
TOTAL METALS															
EPA Method 6010B (mg/kg)															
Chromium	120,000 (b)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	250	3 U	**2**	2 U	**7**	**3**	**2**	**4,410**	**3**	2 U	2 U	**9**	5 U	**26**	**2**
Zinc	101	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

mg/kg = milligrams per kilogram (ppm).
µg/kg = micrograms per kilogram (ppb).
U = The compound was not detected at the given reporting limit.
M = Estimated value detected and confirmed by analyst, but with low spectral match parameters.
ND = Not detected.
NA = Not analyzed.

(a) Toxicity equivalency methodology is WAC 173-340-708(8).
(b) Listed value is for chromium (III). Hexavalent chromium was analyzed for and not detected.

Notes:
Bold indicates a detected compound.
Boxed values exceed preliminary cleanup levels.

TABLE 4
SUMMARY OF DETECTED CONSTITUENTS IN SATURATED ZONE SOIL
AND COMPARISON OF ANALYTICAL RESULTS TO PRELIMINARY SOIL CLEANUP LEVELS
CAP SANTE MARINE ANACORTES, WA

	Preliminary Soil Cleanup Level	MW-3D (6.5-7) KW69C 4/25/2007	MW-3D (8-8.5) KW69A 4/25/2007	MW-3D (9.5-10) KW69B 4/25/2007	SB-2 (8-9) LA89N 5/24/2007	SB-2 (9-10) LA89O 5/24/2007	SB-3 (6-7) LA89L 5/24/2007	SB4 (7-8) LB08I 5/25/2007	SB-7 (5-6) LA89I 5/24/2007	SB8 (7-8) LB08K 5/25/2007	SB8 (8.5-9.5) LB08L 5/25/2007	SB-9 (6-7) LA89F 5/24/2007	SB14 (8-9) LB09E 5/25/2007	SB14 (9-10) LB09F 5/25/2007
DIESEL-RANGE HYDROCARBONS														
NWTPH-Dx (mg/kg)														
Diesel	2,000	**3,800** J	**6.3** J	**260** J	**190**	7.3 U	**460**	**32**	6.4 U	**910**	**66**	6.7 U	**48**	**11**
Motor Oil	2,000	**49** J	12 UJ	12 UJ	13 U	15 U	**14**	12 U	13 U	67 U	16 U	14 U	**120**	**60**
GASOLINE-RANGE HYDROCARBONS														
NWTPH-G (mg/kg)														
Gasoline	30	**1,000**	**17**	**260**	**58**	5.7 U	**58**	**43**	5.2 U	**1,800**	**170**	5.6 U	**650**	11 U
BTEX														
EPA Method 8021BMod (µg/kg)														
Benzene	18	**1,200**	19 U	20 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	6,400	**740**	19 U	**73**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1,030	**8,900**	19 U	**550**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	--	**27,000**	39 U	**1,200**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	--	**990**	19 U	**110**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Xylenes	160,000,000	**27,990**	ND	**1,310**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOLATILE ORGANIC COMPOUNDS (VOCs)														
EPA Method 8260B (µg/kg)														
Chloromethane	43	NA	NA	NA	0.7 U	0.9 U	0.7 U	1.2 U	1.0 U	73 U	81 U	1.2 U	74 U	1.3 U
Methylene Chloride	175	NA	NA	NA	1.4 U	1.7 U	1.3 U	2.3 U	2.0 U	200 U	160 U	2.3 U	290 U	2.6 U
Acetone	--	NA	NA	NA	**100**	**37**	**44**	5.7 U	**84**	370 U	400 U	**140**	370 U	**58**
Carbon Disulfide	8,000,000	NA	NA	NA	**4.0**	**3.5**	**1.2** M	**5.2** M	**12**	73 U	81 U	1.2 U	74 U	**1.8**
2-Butanone	--	NA	NA	NA	**19**	**5.3**	**7.0**	5.7 U	**10**	370 U	400 U	**33**	370 U	6.4 U
Benzene	18	NA	NA	NA	**1.6**	0.9 U	**1.1**	**3.8**	1.0 U	**230**	**86**	1.2 U	74 U	1.3 U
Toluene	6,400	NA	NA	NA	**1.8**	0.9 U	**0.7**	**1.4**	1.0 U	**2,500**	**520**	1.2 U	74 U	1.3 U
Ethylbenzene	1,030	NA	NA	NA	**1.6** M	0.9 U	0.7 U	**13**	1.0 U	**12,000**	**2,000**	1.8 U	74 U	1.3 U
m,p-Xylene	--	NA	NA	NA	**4.3**	**1.1**	**0.8**	**19**	1.0 U	**43,000**	**6,700**	1.3 U	74 U	1.3 U
o-Xylene	--	NA	NA	NA	**1.4**	0.9 U	0.7 U	**1.2**	1.0 U	**23,000**	**3,300**	1.3 U	74 U	1.3 U
Total Xylenes	160,000,000	NA	NA	NA	**5.7**	**1.1**	**0.8**	**20.2**	ND	**66,000**	**10,000**	ND	ND	ND
1,3,5-Trimethylbenzene	4,000,000	NA	NA	NA	0.7 U	0.9 U	0.7 U	**20**	1.0 U	**8,000**	**1,700**	1.2 U	74 U	1.3 U
1,2,4-Trimethylbenzene	4,000,000	NA	NA	NA	2.2 U	0.9 U	0.7 U	**98**	1.0 U	**43,000**	**6,300**	1.2 U	74 U	1.3 U
Isopropylbenzene	--	NA	NA	NA	**55**	**13**	0.7 U	**11**	1.0 U	**1,600**	**350**	**18**	74 U	1.3 U
n-Propylbenzene	--	NA	NA	NA	**69**	**9.5**	0.7 U	**50**	1.0 U	**4,500**	**990**	**65**	74 U	1.3 U
sec-Butylbenzene	--	NA	NA	NA	**46**	**6.4**	0.7 U	**15**	1.0 U	73 U	81 U	**68**	**86**	1.3 U
4-Isopropyltoluene	--	NA	NA	NA	0.7 U	0.9 U	0.7 U	**9.3**	1.0 U	**1,400**	**160**	1.2 U	74 U	1.3 U
n-Butylbenzene	--	NA	NA	NA	**49**	**1.3**	0.7 U	**49** M	1.0 U	**5,700** M	**710** M	**70** M	**220**	1.3 U
1,2,4-Trichlorobenzene	--	NA	NA	NA	3.4 U	4.4 U	3.3 U	5.7 U	5.0 U	370 U	400 U	5.8 U	370 U	6.4 U
Naphthalene	7,000	NA	NA	NA	9.2 U	4.4 U	3.3 U	**110**	5.0 U	**11,000**	**1,300**	19 U	370 U	6.4 U
Hexane	4,800,000	NA	NA	NA	**160** J	**4.8**	3.3 U	**190**	5.0 U	**6,900**	**3,900**	**18**	370 U	6.4 U
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)														
EPA Method 8270D-SIM (µg/kg)														
Naphthalene	7,000	**5,200** J	**21** J	**330** J	**26** M	**11**	**18** M	**52**	**9.6**	**9,100**	**510**	**8.3**	**16**	**29**
2-Methylnaphthalene	--	**26,000** J	**33** J	**1,200** J	**1,500**	**72**	**16**	**720**	6.4 U	**20,000**	**1,300**	6.4 U	**7.2**	6.5 U
1-Methylnaphthalene	--	**19,000** J	**600** J	**1,700** J	**1,400**	**190**	**200**	**630**	6.4 U	**11,000**	**750**	6.4 U	**46**	6.5 U
Acenaphthylene	--	320 UJ	**16** M,J	32 UJ	27 U	6.4 U	22 U	10 U	6.4 U	140 U	10 U	6.4 U	6.5 U	**7.8**
Acenaphthene	3,000	**1,300** J	**43** J	**150** J	**110**	**9.6**	**83**	**65**	6.4 U	**360**	**28**	6.4 U	**7.8**	**12**
Fluorene	28,000	**1,800** J	**15** J	**130** J	**180**	**9.0**	**160**	**91**	6.4 U	**730**	**55**	6.4 U	6.5 U	**21**
Phenanthrene	--	**4,200** J	**66** J	**360** J	**380**	**16**	**280**	**90**	**9.6**	**1,300**	**110**	**24**	**14**	**130**
Anthracene	617,000	**320** J	**13** J	**34** J	**18**	6.4 U	**13** M	6.2 U	6.4 U	**54**	**6.8**	6.4 U	6.5 U	**25**
Fluoranthene	4,000	**91** J	**11** J	**8.2** J	**21**	**13**	**28**	**9.3**	**13**	**58**	**16**	**27**	**30**	**260**

TABLE 4
SUMMARY OF DETECTED CONSTITUENTS IN SATURATED ZONE SOIL
AND COMPARISON OF ANALYTICAL RESULTS TO PRELIMINARY SOIL CLEANUP LEVELS
CAP SANTE MARINE ANACORTES, WA

	Preliminary Soil Cleanup Level	MW-3D (6.5-7) KW69C 4/25/2007	MW-3D (8-8.5) KW69A 4/25/2007	MW-3D (9.5-10) KW69B 4/25/2007	SB-2 (8-9) LA89N 5/24/2007	SB-2 (9-10) LA89O 5/24/2007	SB-3 (6-7) LA89L 5/24/2007	SB4 (7-8) LB08I 5/25/2007	SB-7 (5-6) LA89I 5/24/2007	SB8 (7-8) LB08K 5/25/2007	SB8 (8.5-9.5) LB08L 5/25/2007	SB-9 (6-7) LA89F 5/24/2007	SB14 (8-9) LB09E 5/25/2007	SB14 (9-10) LB09F 5/25/2007
Pyrene	177,000	**160** J	**11** J	**13** J	**22**	**9.6**	**36**	**9.9**	**12**	**87**	**18**	**32**	**26**	**200**
Benzo(a)anthracene	6.4	65 UJ	**11** J	6.4 UJ	6.6 U	6.4 U	6.6 U	6.2 U	6.4 U	**15**	6.2 U	**10**	**7.2**	**60**
Chrysene	7	65 UJ	**9.9** J	6.4 UJ	**6.6**	6.4 U	**7.2**	6.2 U	6.4 U	**15**	6.2 U	**9.6**	**10**	**73**
Benzo(b)fluoranthene	22	65 UJ	**9.9** J	6.4 UJ	6.6 U	6.4 U	6.6 U	6.2 U	6.4 U	**13**	6.2 U	**6.4**	**9.1**	**72**
Benzo(k)fluoranthene	22	65 UJ	**9.9** J	6.4 UJ	6.6 U	6.4 U	6.6 U	6.2 U	6.4 U	13 U	6.2 U	**6.4**	6.5 U	**38**
Benzo(a)pyrene	17	65 UJ	**9.3** J	**7** J	6.6 U	6.4 U	6.6 U	6.2 U	6.4 U	13 U	6.2 U	**9.6**	**6.5**	**62**
Indeno(1,2,3-cd)pyrene	62	65 UJ	**9.3** J	6.4 UJ	6.6 U	6.4 U	6.6 U	6.2 U	6.4 U	13 U	6.2 U	6.4 U	6.5 U	**34**
Dibenzo(a,h)anthracene	32	65 UJ	**8.6** J	6.4 UJ	6.6 U	6.4 U	6.6 U	6.2 U	6.4 U	13 U	6.2 U	6.4 U	6.5 U	**7.8**
Benzo(ghi)perylene	--	65 UJ	**8.6** J	6.4 UJ	6.6 U	6.4 U	6.6 U	6.2 U	6.4 U	13 U	6.2 U	6.4 U	**6.5**	**44**
Dibenzofuran	--	**680** J	**36** J	**79** J	**54**	6.4 U	**43**	**44**	6.4 U	**280**	**26**	6.4 U	6.5 U	**9.8**
TOTAL METALS														
EPA Method 6010B (mg/kg)														
Total Chromium	120,000 (a)	NA	NA	NA	NA	NA	NA	NA	**16.9**	NA	NA	NA	NA	NA
Copper	36	NA	NA	NA	NA	NA	NA	NA	**6.9**	NA	NA	NA	NA	NA
Lead	81	2 U	2 U	6 U	3 U	3 U	2 U	2 U	3 U	3 U	3 U	3 U	**3**	**6**
Zinc	86	NA	NA	NA	NA	NA	NA	NA	**20**	NA	NA	NA	NA	NA

ND = Not Detected
NA = Not Analyzed
U = The compound was not detected at the given reporting limit.
UJ = The compound was not detected; the given reporting limit is an estimate.
J = The compound was detected; the given concentration is an estimate.
M = Estimated value detected and confirmed by analyst, but with low spectral match parameters.

(a) Listed value is for chromium(III). Hexavalent chromium was anlyzed for and not detected.

Notes:
Bolded value indicates a detected result.
Solid-lined boxed values exceed preliminary cleanup levels.
Dashed-lined boxed values exceed preliminary cleanup levels protective of groundwater as marine surface water, but an empirical demonstration shows these values are protective of groundwater as marine surface water. Values are less than preliminary cleanp levels protective of direct human contact.

TABLE 5
SUMMARY OF SURVEYED ELEVATIONS AND CALCULATED GROUNDWATER ELEVATIONS
CAP SANTE MARINE
ANACORTES, WASHINGTON

Well	Ground Surface Elevation (ft, MLLW)	Reference Elevation (a) (ft, MLLW)	5/3/2007 Calculated Groundwater Elevation (ft, MLLW)	5/3/2007 Measured Depth to Groundwater (ft)
MW-01	11.87	11.59	8.06	3.53
MW-02	12.74	12.30	6.76	5.54
MW-03	11.39	11.04	6.45	4.59
MW-04	11.32	11.02	6.64	4.38
Surface Water, Cap Sante Waterway			1.47 (b)	

(a) Top of PVC well casing.
(b) Based on staff gauge located at Cap Sante Marina.

TABLE 6
SUMMARY OF ESTIMATED HYDRAULIC CONDUCTIVITIES FOR SHALLOW SATURATED SOIL
CAP SANTE MARINE
ANACORTES, WASHINGTON

Monitoring Well	Estimated Hydraulic Conductivity (cm/sec)
MW-01	1.37E-02
MW-02	6.08E-02
MW-03	6.33E-02
MW-04	7.32E-02

cm/sec = Centimeters per second.

TABLE 7
PRELIMINARY GROUNDWATER CLEANUP LEVELS FOR CONSTITUENTS OF CONCERN AND OTHER DETECTED CONSTITUENTS
CAP SANTE MARINE
ANACORTES, WASHINGTON

Constituent	AWQC for Protection of Aquatic Life - Acute (b)	AWQC for Protection of Aquatic Life - Chronic (b)	AWQC for Protection of Human Health - Organisms Only (c)	National Recommended Water Quality Criteria (a)			MTCA Method B Standard Formula Surface Water Values Carcinogen	MTCA Method B Standard Formula Surface Water Values Non Carcinogen	Concentration Associated with 10^{-5} Risk (if carcinogen)	MTCA Method A	Background (d)	Preliminary Cleanup Level (e)
				Protection of Aquatic Life - Acute	Protection of Aquatic Life - Chronic	Protection of Human Health - Organisms Only						
TOTAL METALS (mg/L)												
Chromium (III)	--	--	--	--	--	--	--	240	--	0.05 (f)	0.01 (g)	240
Chromium (VI)	1.1	0.05	--	1.1	0.05	--	--	0.49		0.05 (f)	--	0.05
Copper	0.005	0.003	--	0.0048	0.003	--	--	2.7	--		0.020	0.02
Lead	0.21	0.01	--	0.21	0.0081	--	--	--	--		--	0.0081
Zinc	0.090	0.081	--	0.09	0.081	26	--	16.5	--		0.16	0.16
TOTAL DIESEL RANGE PETROLEUM HYDROCARBONS (µg/L)												
Gasoline-Range	--	--	--	--	--	--	--	--	--	800/1,000 (h,i)	--	800/1,000 (i)
Diesel-Range	--	--	--	--	--	--	--	--	--	500 (h)	--	500
Motor Oil-Range	--	--	--	--	--	--	--	--	--	500 (h)	--	500
VOLATILES (µg/L)												
Acetone	--	--	--	--	--	--	--	--	--	--	--	--
Carbon Disulfide	--	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	--	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	--	--	--	--	--	--	--	--	--	--	--	--
n-Propylbenzene	--	--	--	--	--	--	--	--	--	--	--	--
sec-Butylbenzene	--	--	--	--	--	--	--	--	--	--	--	--
4-Isopropyltoluene	--	--	--	--	--	--	--	--	--	--	--	--
Methyl tert-butyl ether (MTBE)	--	--	--	--	--	--	--	--	--	20	--	20
1,2-Dibromoethane (EDB)	--	--	--	--	--	--	--	--	--	0.01	--	0.01
1,2-Dichloroethane (EDC)	--	--	99	--	--	37	59.4	--	594	5	--	37
n-Hexane			--	--	--	--	--	--	--	--	--	--
Benzene	--	--	71	--	--	51	22.7	1,496	227	5	--	51
Ethylbenzene	--	--	2900	--	--	2100	--	6,914	--	700	--	2100
Toluene	--	--	200,000	--	--	15,000	--	19,000	--	1,000	--	15,000
Xylene	--	--	--	--	--	--	--	--	--	1000 (j)	--	1000 (j)
PAHs (µg/L)												
Acenaphthylene	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	--	--	--	--	--	990	--	643	--	--	--	643
Fluorene	--	--	14,000	--	--	5300	--	3,460	--	--	--	3,460
Phenanthrene	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	--	--	110,000	--	--	40,000	--	25,900	--	--	--	25,900
Fluoranthene	--	--	370	--	--	140	--	90.2	--	--	--	90
Pyrene	--	--	11,000	--	--	4,000	--	2,590	--	--	--	2,590
Dibenzofuran	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene	--	--	--	--	--	--	--	4,940	--	160 (k)	--	4940
2-Methylnaphthalene			--	--	--	--	--	--	--	-- (k)	--	--
1-Methylnaphthalene			--	--	--	--	--	--	--	-- (k)	--	--
Benzo(a)pyrene	--	--	0.031	--	--	0.018	0.0296	--	0.296	0.1	--	0.018
Benzo(a)anthracene	--	--	0.031	--	--	0.018	0.0296	--	0.296	--	--	0.018
Benzo(b)fluoranthene	--	--	0.031	--	--	0.018	0.0296	--	0.296	--	--	0.018
Benzo(k)fluoranthene	--	--	0.031	--	--	0.018	0.0296	--	0.296	--	--	0.018
Chrysene	--	--	0.031	--	--	0.018	0.0296	--	0.296	--	--	0.018
Dibenzo(a,h)anthracene	--	--	0.031	--	--	0.018	0.0296	--	0.296	--	--	0.018
Indeno(1,2,3-cd)pyrene	--	--	0.031	--	--	0.018	0.0296	--	0.296	--	--	0.018
cPAH TEQ	--	--	0.031	--	--	--	--	--	--	0.1	--	0.1
PCBs (µg/L)												
Total PCBs	10	0.03	0.00017	--	0.03	0.000064	--	--	--	0.1	--	0.000064

TABLE 7
PRELIMINARY GROUNDWATER CLEANUP LEVELS FOR CONSTITUENTS OF CONCERN
AND OTHER DETECTED CONSTITUENTS
CAP SANTE MARINE
ANACORTES, WASHINGTON

(a) National Recommmended Water Quality Criteria (EPA 2006).

(b) Ambient water quality criteria for protection of aquatic life from WAC 173-201A-040 and 40 C.F.R. Part 131.

(c) Ambient water quality criteria for protection of human health from 40 C.F.R. Part 131d (National Toxics Rule).

(d) Natural background based on "Draft Report, Sections 1-7 Background Concentrations of Selected Chemicals in Water, Soil, Sediments, or Air of Washington State (PTI 1989).

(e) Preliminary cleanup level based on lowest groundwater criteria corrected for background, as indicated by shading. Further adjustments to those preliminary cleanup levels that are found to be lower than the practical quantitation limits may be necessary, in accordance with WAC 173-340-720(7)(c).

(f) MTCA Method a cleanup level is for total chromium.

(g) Background concentration is for total chromium.

(h) Preliminary cleanup level based on MTCA Method A groundwater cleanup level in accordance with WAC 173-340-730(a)(b)(iii)(c).

(i) MTCA Method A cleanup level is 800 µg/L when benzene is present and 1,000 µg/L when benzene is not present.

(j) MTCA Method A cleanup level is for total xylenes.

(k) MTCA Method A cleanup level is a total value for naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

Note: Shaded cell indicates basis for preliminary cleanup level.

TABLE 8
SUMMARY OF DETECTED CONSITITUENTS IN GROUNDWATER AND COMPARISON OF ANALYTICAL RESULTS TO PRELIMINARY CLEANUP LEVELS
CAP SANTE MARINE
ANACORTES, WAHSINGTON

	Preliminary Groundwater Cleanup Levels	MW-01 KX91C/H 5/3/2007	MW-02 KX91A/F 5/3/2007	MW-03S KX91B/G 5/3/2007	MW-04 KX91D/I 5/3/2007	SBW-1 LA86A,C / LD18A 5/24/2007	SBW-1b LA86B,D / LD18B 5/24/2007
GASOLINE-RANGE HYDROCARBONS							
NWTPH-G (mg/L)							
Gasoline	0.8	0.25 U	0.25 U	**2.8**	0.25 U	0.25 U	0.25 U
VOLATILE ORGANIC COMPOUNDS (VOCs)							
EPA Method 8260 (µg/L)							
Acetone	--	15 U	15 U	**290**	3.0 U	3.0 U	3.0 U
Carbon Disulfide	--	1.0 U	1.0 U	**0.6**	**0.3**	0.2 U	0.2 U
Benzene	51	1.0 U	1.0 U	**610**	0.2 U	0.2 U	**1.0**
Toluene	15,000	1.0 U	1.0 U	**39**	0.2 U	0.2 U	0.2 U
Ethylbenzene	2,100	1.0 U	1.0 U	**85**	0.2 U	0.2 U	0.2 U
m,p-Xylene	1,000	2.0 U	2.0 U	**290**	0.4 U	0.4 U	0.4 U
o-Xylene	1,000	1.0 U	1.0 U	**37**	0.2 U	0.2 U	0.2 U
1,3,5-Trimethylbenzene	--	1.0 U	1.0 U	**26**	0.2 U	0.2 U	0.2 U
Isopropylbenzene	--	1.0 U	1.0 U	**12**	0.2 U	0.2 U	0.2 U
n-Propylbenzene	--	1.0 U	1.0 U	**12**	0.2 U	0.2 U	0.2 U
sec-Butylbenzene	--	1.0 U	1.0 U	**1.8**	0.2 U	0.2 U	0.2 U
4-Isopropyltoluene	--	1.0 U	1.0 U	**1.7**	0.2 U	0.2 U	0.2 U
Naphthalene	--	2.5 U	2.5 U	**25 J**	0.5 U	0.5 U	0.5 U
Methyl tert-Butyl Ether	20	**1.6**	1.0 U	0.2 U	0.2 U	0.2 U	0.2 U
Hexane	--	0.2 U	0.2 U	**16**	0.2 U	0.2 U	0.2 U
POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)							
EPA Method 8270 (µg/L)							
Acenaphthene	643	0.10 U	**0.27**	**1.6**	0.10 U	0.10 U	0.10 U
Fluorene	3,460	0.10 U	**0.15**	**0.79**	0.10 U	0.10 U	0.10 U
Phenanthrene	--	0.10 U	**0.24**	**0.80**	0.10 U	0.10 U	0.10 U
Anthracene	25,900	0.10 U	0.10 U	**0.11**	0.10 U	0.10 U	0.10 U
Dibenzofuran	32	0.10 U	0.10 U	**0.39**	0.10 U	0.10 U	0.10 U
Naphthalene	4,940	0.10 U	0.10 U	**30**	0.10 U	0.10 U	0.10 U
2-Methylnaphthalene	--	0.10 U	0.10 U	**26**	0.10 U	0.10 U	0.10 U
1-Methylnaphthalene	--	0.10 U	0.10 U	**19**	0.10 U	0.10 U	0.10 U
Total Napthalenes	160	0.10 U	0.10 U	**75**	0.10 U	0.10 U	0.10 U
METALS							
EPA Method 6010 (µg/L)							
Total Lead	8.1	1 U	**4**	1 U	1 U	1 U	2 U
Dissolved Lead	8.1	1 U	1 U	1 U	2 U	2 U	2 U

TABLE 8
SUMMARY OF DETECTED CONSITITUENTS IN GROUNDWATER AND COMPARISON OF ANALYTICAL RESULTS TO PRELIMINARY CLEANUP LEVELS
CAP SANTE MARINE
ANACORTES, WAHSINGTON

	Preliminary Groundwater Cleanup Levels	MW-01 KX91C/H 5/3/2007	MW-02 KX91A/F 5/3/2007	MW-03S KX91B/G 5/3/2007	MW-04 KX91D/I 5/3/2007	SBW-1 LA86A,C / LD18A 5/24/2007	SBW-1b LA86B,D / LD18B 5/24/2007
HEXAVALENT CHROMIUM							
EPA Method 3500CRD (mg/L)							
Hexavalent chromium	0.05	0.010 UJ	0.010 UJ	**0.012** J	0.010 UJ	0.011 UJ	0.011 U
CONVENTIONAL CHEMISTRY PARAMETERS							
Conductivity (umhos/cm)		2600	12900	14800	23800	21800	21000
Total Dissolved Solids (mg/L)		1460	7770	9030	15500	14800	14400
Salinity (ppt)		1.30	7.20	8.50	14.2	12.9	12.5
Chloride (mg/L)		495	3950	4950	8940	8130	7900
FIELD PARAMETERS							
pH (Standard Units)		7.65	7.42	7.42	7.92	7.41	7.41
Conductivity (µS/cm)		1,926	12,375	11,284	22,800	17,973	17,973
Turbidity (NTU)		low	999	low	361	4.5	4.5
Dissolved Oxygen (mg/L)		0.00	-0.05	0.00	-0.06	1.75	1.75
Temperature (°C)		13.2	10.7	11.3	11.9	17.0	17.0
Ferrous Iron (mg/L)		0.8	0.9	0.4	0.6	1.8	1.8

mg/L = milligrams per liter (ppm).
µg/L = micrograms per liter (ppb).
U = The compound was not detected at the given reporting limit
UJ = The compound was not detected; the given reporting limit is an estimate
J = The compound was detected; the given concentration is an estimate

Notes:
Box indicates concentration greater than the preliminary cleanup level
Bold indicates detected concentration.

2008 Cap Sante Marine Interim Action Results

TABLE 1
SUMMARY OF SOIL FIELD SCREENING RESULTS AND CHEMICAL ANALYTICAL DATA
PETROLEUM HYDROCARBONS AND VOLATILES
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Sample Name[1]	Sample Depth (feet bgs)	Date Sampled	Field Screening Results[2]		Petroleum Hydrocarbons[3] (mg/kg)			Volatile Organic Compounds (VOCs)[4] (mg/kg)			
			Headspace Vapors (ppm)	Sheen	Gasoline-Range	Diesel-Range	Heavy Oil-Range	Benzene	Ethyl-benzene	Toluene	Xylenes
EX-1-7.0[5]	7.0	10/26/07	2	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.020
EX-2-4.0	4.0	10/26/07	2	NS	<3	<26	<51	<0.010	<0.05	<0.05	<0.2
EX-3-7.0[6]	7.0	10/26/07	<1	NS	<3	<25	<50	**0.06**	<0.05	<0.05	<0.2
EX-3-9.0	9.0	11/05/07	<1	NS	<4	--	--	<0.010	<0.08	<0.08	<0.23
EX-4-7.5[5]	7.5	10/26/07	<1	NS	<7	<25	<50	<0.010	<0.01	**0.011**	<0.02
EX-5-7.5[6]	7.5	10/26/07	<1	NS	**8**	<25	<50	**0.22**	**0.37**	**0.1**	**0.38**
EX-5-10.5	10.5	11/29/07	<1	NS	<3	--	--	<0.010	<0.010	<0.010	<0.010
EX-6-8.0[6]	8.0	10/26/07	<1	NS	**11**	<25	<50	**0.15**	**0.11**	<0.05	**0.27**
EX-6-10.0	10.0	11/05/07	<1	NS	<3	--	--	<0.010	<0.05	<0.05	<0.2
EX-7-8.0	8.0	10/26/07	6	NS	<4	<25	<50	<0.010	<0.08	<0.08	<0.2
EX-8-7.0	7.0	10/26/07	<1	NS	<3	<25	<50	<0.010	<0.05	<0.05	<0.2
EX-9-4.0	4.0	11/01/07	<1	NS	<3	<25	<50	<0.010	<0.05	<0.05	<0.2
EX-10-4.0	4.0	11/01/07	<1	NS	<3	<26	<51	<0.010	<0.05	<0.05	<0.2
EX-11-8.0	8.0	11/01/07	<1	NS	<6	<31	<61	<0.010	<0.11	<0.11	<0.33
EX-12-8.0	8.0	11/01/07	<1	NS	<3	<29	<58	<0.010	<0.05	<0.05	<0.2
EX-13-8.0	8.0	11/01/07	<1	NS	<3	<25	<50	<0.010	<0.05	<0.05	<0.2
EX-14-7.0	7.0	11/01/07	<1	NS	<5	<25	<50	<0.010	<0.11	<0.11	<0.32
EX-15-4.0	4.0	11/01/07	<1	NS	<8	<29	<57	<0.010	<0.17	<0.17	<0.51
EX-16-8.0	8.0	11/05/07	<1	NS	<3	<25	<50	<0.010	<0.05	<0.05	<0.2
EX-17-8.0	8.0	11/05/07	<1	NS	<3	<25	<50	<0.010	<0.05	<0.05	<0.2
EX-18-8.0	8.0	11/05/07	<1	NS	<6	<25	<50	<0.010	<0.13	<0.13	0.38
EX-19-8.0	8.0	11/05/07	<1	NS	<3	<25	<50	<0.010	<0.05	<0.05	<0.2
EX-20-9.0	9.0	11/06/07	<1	NS	<3	<27	<50	<0.010	<0.06	<0.06	<0.2
EX-26-8.0	8.0	11/08/07	--	NS	<3	<28	<57	<0.010	<0.010	<0.010	<0.010
EX-27-9.0	9.0	11/08/07	--	NS	<3	<26	<52	<0.010	<0.010	<0.010	<0.010
EX-28-9.0	9.0	11/08/07	--	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-29-8.0	8.0	11/08/07	--	NS	**4**	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-30-16.0[6]	16.0	11/08/07	--	NS	**20**	<25	<50	**0.45**	**1.2**	**0.015**	**1.14**
EX-30-18.0	18.0	11/14/07	<1	NS	<3	--	--	<0.010	<0.010	<0.010	<0.010
EX-31-9.0	9.0	11/08/07	--	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-32-7.0	7.0	11/13/07	<1	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-33-7.0	7.0	11/13/07	<1	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-34-14.0	14.0	11/13/07	<1	NS	<3	--	--	<0.010	<0.010	<0.010	<0.010
EX-35-14.0	14.0	11/14/07	<1	NS	<4	--	--	<0.010	<0.010	<0.010	<0.010
EX-36-8.0	8.0	11/13/07	<1	NS	<4	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-37-9.0	9.0	11/13/07	<1	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-38-7.0	7.0	11/15/07	<1	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-39-7.0	7.0	11/15/07	<1	NS	<3	<27	<53	<0.010	<0.010	<0.010	<0.010
EX-40-8.0	8.0	11/15/07	--	NS	<6	<32	**86**	<0.010	<0.010	<0.010	<0.010
EX-41-11.0	11.0	11/15/07	--	NS	<3	<26	<53	<0.010	<0.010	<0.010	<0.010
EX-42-11.0	11.0	11//15/07	--	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-43-9.0	9.0	11/15/07	--	NS	<6	<40	**52**	<0.010	<0.010	<0.010	<0.010
EX-44-8.0	8.0	11/15/07	--	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-45-7.0	7.0	11/15/07	--	NS	<3	<26	<53	<0.010	<0.010	<0.010	<0.010
EX-46-8.0	8.0	11/15/07	--	NS	<6	<35	<69	<0.010	<0.010	<0.010	<0.010
EX-47-9.0	9.0	11/15/07	--	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-48-5.0	5.0	11/16/07	--	NS	<3	<25	<50	<0.03	<0.05	<0.05	<0.2
EX-49-5.0	5.0	11/16/07	--	NS	<3	<35	<69	<0.04	<0.06	<0.06	<0.02
EX-50-6.0	6.0	11/16/07	--	NS	<4	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-51-4.0	4.0	11/19/07	--	NS	<3	<25	<50	<0.03	<0.05	<0.05	<0.2
EX-52-4.0	4.0	11/19/07	--	NS	<3	<25	<50	<0.04	<0.06	<0.06	<0.2
EX-53-2.0	2.0	11/19/07	--	NS	<3	<25	<50	<0.04	<0.06	<0.06	<0.2
EX-54-2.0	2.0	11/19/07	--	NS	<3	<25	**60**	<0.03	<0.05	<0.05	<0.2
EX-55-2.0	2.0	11/19/07	--	NS	<3	<25	**77**	<0.03	<0.05	<0.05	<0.2
EX-56-2.0	2.0	11/19/07	--	NS	<3	<25	<50	<0.03	<0.05	<0.05	<0.2
EX-58-3.0	3.0	12/03/07	138	NS	<5	<29	<57	<0.010	<0.010	<0.010	<0.010
EX-59-2.0	2.0	12/03/07	<1	NS	<4	<26	<52	<0.010	<0.010	<0.010	<0.010
EX-60-2.0	2.0	12/04/07	<1	NS	<4	<29	<58	<0.010	<0.010	<0.010	<0.010
EX-61-6.0	6.0	12/10/07	<1	NS	<3	<26	<51	<0.010	<0.010	<0.010	<0.010
EX-62-2.0	2.0	12/04/07	<1	NS	<5	<31	<62	<0.010	<0.010	<0.010	<0.010
EX-63-9.0	9.0	12/05/07	<1	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-64-9.0	9.0	12/05/07	<1	NS	<3	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-65-2.0	2.0	12/05/07	<1	NS	<6	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-66-2.0	2.0	12/05/07	<1	NS	<7	<25	<50	<0.010	<0.010	<0.010	<0.010
DUP-1	9.0	12/05/07	<1	NS	**12**	<25	<50	<0.010	<0.010	<0.010	<0.010
DUP-2	2.0	12/05/07	<1	NS	<5	<25	<50	<0.010	<0.010	<0.010	<0.010
EX-67-2.0	2.0	12/06/07	<1	NS	<6	**160**	**300**	<0.010	<0.010	<0.010	<0.010
EX-68-2.0	2.0	12/06/07	<1	NS	<4	<100	**400**	<0.010	<0.010	<0.010	<0.010
EX-69-2.0	2.0	12/06/07	<1	NS	<4	**97**	**70**	<0.010	<0.010	<0.010	<0.010
DUP-3	2.0	12/06/07	<1	NS	<6	**98**	**160**	<0.010	<0.010	<0.010	<0.010
DUP-4	2.0	12/06/07	<1	NS	<5	**70**	**92**	<0.010	<0.010	<0.010	<0.010
Cleanup Level - Unsaturated Zone[7]					30	2,000	2,000	0.29	18.0	109	160,000
Cleanup Level - Saturated Zone[8]					30	2,000	2,000	0.018	1.03	6.4	160,000

Notes:

[1]The approximate sample locations are shown in Figure 3.

[2]A description of field screening methods is presented in Appendix B.

[3]Petroleum hydrocarbons analyzed using Ecology Method NWTPH-Gx and NWTPH-Dx with acid/silica gel cleanup.

[4]VOCs analyzed using EPA Method 8021B for the unsaturated zone and EPA Method 8260 for the saturated zone.

[5]Confirmation samples EX-1-7.0 and EX-4-7.5 were analyzed for the full suite of VOCs. Except for a trace detection of toluene in sample EX-4-7.5, VOCs were not detected in these samples. The full list of VOCs that were analyzed is presented in Appendix C.

[6]Soil represented by this sample was subsequently over-excavated and removed from the site for permitted disposal.

[7]Unsaturated zone - from ground surface to 5 feet bgs.

[8]Saturated zone - 5 feet bgs or greater.

bgs = below ground surface.

ppm = parts per million.

mg/kg = milligrams per kilogram.

NS=no sheen.

"--" = not analyzed.

DUP = Duplicate soil sample. Samples DUP-1, DUP-2, DUP-3 and DUP-4 are representative of samples EX-64-9.0, EX-65-2.0, EX-67-2.0 and EX-69-2.0 respectively.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

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TABLE 2
SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA
NONCARCINOGENIC PAHS
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Sample Number[1]	Sample Depth (feet bgs)	Date Sampled	Noncarcinogenic PAHs[2] (mg/kg)								
			Acenaph-thene	Acenaph-thylene	Anthtra-cene	Benzo(ghi)-perylene	Fluoran-thene	Fluorene	Naph-thalenes	Phenan-threne	Pyrene
EX-1-7.0	7.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-2-4.0	4.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-3-7.0	7.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.02**
EX-4-7.5	7.5	10/26/07	<0.02	<0.02	<0.02	**0.02**	<0.02	<0.02	**0.04**	<0.02	<0.02
EX-5-7.5	7.5	10/26/07	<0.02	<0.02	<0.02	**0.04**	**0.1**	<0.02	**0.11**	**0.04**	**0.12**
EX-6-8.0	8.0	10/26/07	**0.05**	<0.02	<0.02	<0.02	**0.03**	<0.02	**0.56**	<0.02	**0.04**
EX-7-8.0	8.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-8-7.0	7.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-9-4.0	4.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-10-4.0	4.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-11-8.0	8.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-12-8.0	8.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-13-8.0	8.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-14-7.0	7.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-15-4.0	4.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-16-8.0	8.0	11/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-17-8.0	8.0	11/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-18-8.0	8.0	11/05/07	**0.20**	**0.04**	<0.02	<0.02	<0.02	**0.15**	**1.45**	**0.05**	<0.02
EX-19-8.0	8.0	11/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-20-9.0	9.0	11/06/07	<0.02	<0.02	<0.02	<0.02	**0.02**	<0.02	<0.02	<0.02	**0.03**
EX-26-8.0	8.0	11/08/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-27-9.0	9.0	11/08/07	<0.02	<0.02	<0.02	**0.03**	**0.11**	<0.02	**0.03**	**0.06**	**0.12**
EX-28-9.0	9.0	11/08/07	<0.02	**0.03**	**0.03**	**0.06**	**0.21**	<0.02	**0.06**	**0.10**	**0.23**
EX-29-8.0	8.0	11/08/07	**0.02**	<0.02	<0.02	<0.02	**0.03**	<0.02	**0.07**	<0.02	**0.03**
EX-30-16.0	16.0	11/08/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**1.29**	<0.02	<0.02
EX-31-9.0	9.0	11/08/07	<0.02	<0.02	<0.02	**0.04**	**0.13**	<0.02	**0.03**	**0.06**	**0.15**
EX-32-7.0	7.0	11/13/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-33-7.0	7.0	11/13/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-36-8.0	8.0	11/13/07	<0.02	**0.04**	**0.03**	**0.08**	**0.24**	<0.02	**0.13**	**0.11**	**0.27**
EX-36-10.0	10.0	11/20/07	<0.02	<0.02	<0.02	**0.03**	**0.10**	<0.02	**0.02**	**0.04**	**0.09**
EX-37-9.0	9.0	11/13/07	<0.02	<0.02	<0.02	<0.02	**0.03**	<0.02	<0.02	<0.02	**0.04**
EX-38-7.0	7.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-39-7.0	7.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-40-8.0	8.0	11/15/07	<0.02	**0.05**	**0.05**	**0.11**	**0.40**	<0.02	**0.05**	**0.17**	**0.51**
EX-40-10.0	10.0	11/20/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-41-11.0	11.0	11/15/07	<0.02	<0.02	<0.02	<0.02	**0.04**	<0.02	<0.02	<0.02	**0.04**
EX-42-11.0	11.0	11/15/07	<0.02	<0.02	<0.02	<0.02	**0.03**	<0.02	<0.02	<0.02	**0.04**
EX-43-9.0	9.0	11/15/07	<0.02	**0.10**	**0.14**	**0.21**	**0.95**	**0.03**	**0.11**	**0.42**	**0.98**
EX-43-11.0	11.0	11/20/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-44-8.0	8.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-45-7.0	7.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-46-8.0	8.0	11/15/07	<0.02	**0.05**	**0.07**	**0.14**	**0.48**	**0.02**	**0.07**	**0.22**	**0.51**
EX-46-10.0	10.0	11/20/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-47-9.0	9.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-48-5.0	5.0	11/16/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.02**
EX-49-5.0	5.0	11/16/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-50-6.0 [3]	6.0	11/16/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**11.9**	**0.2**	<0.02
EX-51-4.0	4.0	11/19/07	<0.02	<0.02	<0.02	<0.02	**0.03**	<0.02	<0.02	<0.02	**0.04**
EX-52-4.0	4.0	11/19/07	<0.02	<0.02	<0.02	<0.02	**0.03**	<0.02	**0.03**	<0.02	**0.04**
EX-53-2.0	2.0	11/19/07	<0.02	**0.02**	**0.02**	**0.05**	**0.21**	<0.02	**0.08**	**0.10**	**0.21**
EX-54-2.0	2.0	11/19/07	<0.02	**0.02**	<0.02	**0.05**	**0.16**	<0.02	**0.04**	**0.07**	**0.16**
EX-55-2.0	2.0	11/19/07	**0.10**	**0.03**	**0.06**	**0.06**	**0.32**	**0.14**	**0.04**	**0.52**	**0.30**
EX-56-2.0	2.0	11/19/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-57-6.0	6.0	11/27/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-58-3.0	3.0	12/03/07	<0.02	**0.03**	**0.03**	**0.07**	**0.25**	<0.02	**0.03**	**0.09**	**0.25**
EX-59-2.0	2.0	12/03/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-60-2.0	2.0	12/04/07	<0.02	**0.08**	**0.07**	**0.16**	**0.56**	**0.02**	**0.05**	**0.24**	**0.66**
EX-60-5.0	5.0	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-61-2.0	2.0	12/04/07	<0.02	**0.05**	**0.07**	**0.13**	**0.44**	<0.02	**0.07**	**0.20**	**0.46**
EX-61-6.0	2.0	12/04/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-62-2.0	2.0	12/04/07	<0.02	**0.09**	**0.10**	**0.20**	**0.79**	**0.04**	**0.05**	**0.35**	**0.78**
EX-62-6.0	6.0	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-63-9.0	9.0	12/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.03**	<0.02	<0.02
EX-64-9.0	9.0	12/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.07**	<0.02	<0.02
EX-65-2.0	2.0	12/05/07	**0.07**	**0.14**	**0.72**	**0.47**	**2.1**	**0.12**	**0.18**	**0.73**	**2.1**
EX-65-6.0	6.0	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-66-2.0	2.0	12/05/07	**0.04**	**0.06**	**0.11**	**0.14**	**0.73**	**0.04**	**0.08**	**0.24**	**0.77**
EX-66-5.0	5.0	12/10/07	<0.02	<0.02	**0.02**	**0.05**	**0.17**	<0.02	**0.08**	**0.08**	**0.17**
DUP-1	9.0	12/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.04**	<0.02	<0.02
DUP-2	2.0	12/05/07	**0.03**	**0.11**	**0.16**	**0.22**	**1.0**	**0.06**	**0.07**	**0.48**	**1.0**
EX-67-2.0	2.0	12/06/07	**3.2**	**0.15**	**0.75**	**0.2**	**4.5**	**0.49**	**1.57**	**1.7**	**3.1**
EX-67-5.0	5.0	12/11/07	<0.02	**0.09**	**0.12**	**0.29**	**0.7**	**0.05**	**0.48**	**0.41**	**0.79**
EX-67-8.0	8.0	12/14/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-68-2.0	2.0	12/06/07	**0.09**	**0.81**	**1.7**	**1.6**	**8.6**	**0.46**	**0.19**	**4.6**	**8.1**
EX-68-5.0	5.0	12/11/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-69-2.0	2.0	12/06/07	**0.05**	**0.28**	**0.38**	**0.44**	**2.3**	**0.22**	**0.19**	**1.5**	**2.2**
EX-69-5.0	5.0	12/11/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
DUP-3	2.0	12/06/07	**1.5**	**0.10**	**0.27**	**0.17**	**1.8**	**0.18**	**0.51**	**0.75**	**1.5**
DUP-4	2.0	12/06/07	**0.03**	**0.22**	**0.28**	**0.47**	**1.8**	**0.09**	**0.15**	**0.81**	**2.3**
EX-70-0.5	0.5	12/10/07	<0.02	<0.02	<0.02	<0.02	**0.05**	<0.02	**0.03**	**0.03**	**0.06**
EX-71-0.5	0.5	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-72-0.5	0.5	12/11/07	<0.02	**0.04**	**0.08**	**0.14**	**0.5**	**0.03**	**0.27**	**0.24**	**0.53**
EX-72-3.5	3.5	12/14/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-74-0.5	0.5	12/14/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Cleanup Level - Unsaturated Zone[4]			66	NE	12,285	NE	89	547	138	NE	2,400
Cleanup Level - Saturated Zone[5]			3	NE	617	NE	4	28	7	NE	177

Notes:

[1]The approximate exploration locations are shown in Figure 3.

[2]Polycyclic aromatic hydrocarbons (PAHs) analyzed using EPA Method 8270SIM. The full list of PAHs that were analyzed is presented in Appendix C.

[3]Soil represented by this sample was subsequently overexcavated and removed from the Site for permitted disposal.

[4]Unsaturated zone -from ground surface to 5 feet bgs.

[5]Saturated zone - 5 feet bgs or greater.

bgs = below ground surface.

mg/kg = milligrams per kilogram.

NE = not established.

DUP = Duplicate soil sample. Samples DUP-1, DUP-2, DUP-3 and DUP-4 are representative of samples EX-64-9.0, EX-65-2.0, EX-67-2.0 and EX-69-2.0 respectively.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

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TABLE 3

SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA

CARCINOGENIC PAHS

INTERIM REMEDIAL ACTION - CAP SANTE MARINE

ANACORTES, WASHINGTON

Sample Number[1]	Sample Depth (feet bgs)	Date Sampled	Carcinogenic PAHs[2] (mg/kg)							
			Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(k)-fluoranthene	Chrysene	Dibenz(a,h)-anthracene	Indeno(1,2,3-cd)-pyrene	Total cPAHs (TEQ)[3]
EX-1-7.0	7.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-2-4.0	4.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-3-7.0	7.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-4-7.5	7.5	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-5-7.5	7.5	10/26/07	**0.04**	**0.04**	**0.03**	**0.03**	**0.05**	<0.02	**0.03**	**0.05**
EX-6-8.0	8.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-7-8.0	8.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-8-7.0	7.0	10/26/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-9-4.0	4.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-10-4.0	4.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-11-8.0	8.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-12-8.0	8.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-13-8.0	8.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-14-7.0	7.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-15-4.0	4.0	11/01/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-16-8.0	8.0	11/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-17-8.0	8.0	11/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-18-8.0	8.0	11/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-19-8.0	8.0	11/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-20-9.0	9.0	11/06/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-26-8.0	8.0	11/08/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-27-9.0	9.0	11/08/07	**0.04**	**0.04**	**0.02**	**0.03**	**0.04**	<0.02	**0.02**	**0.06**
EX-28-9.0	9.0	11/08/07	**0.09**	**0.08**	**0.06**	**0.08**	**0.10**	**0.02**	**0.05**	**0.120**
EX-29-8.0	8.0	11/08/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-30-16.0	16.0	11/08/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-31-9.0	9.0	11/08/07	**0.05**	**0.05**	**0.03**	**0.04**	**0.06**	<0.02	**0.03**	**0.07**
EX-32-7.0	7.0	11/13/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-33-7.0	7.0	11/13/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-36-8.0 [4]	8.0	11/13/07	**0.11**	**0.11**	**0.07**	**0.07**	**0.12**	**0.03**	**0.06**	**0.15**
EX-36-10.0	10.0	11/20/07	**0.03**	**0.04**	**0.03**	**0.03**	**0.04**	<0.02	**0.03**	**0.06**
EX-37-9.0	9.0	11/13/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-38-7.0	7.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-39-7.0	7.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-40-8.0 [4]	8.0	11/15/07	**0.17**	**0.16**	**0.10**	**0.12**	**0.18**	**0.04**	**0.09**	**0.23**
EX-40-10.0	10.0	11/20/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-41-11.0	11.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-42-11.0	11.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-43-9.0 [4]	9.0	11/15/07	**0.40**	**0.33**	**0.23**	**0.23**	**0.39**	**0.06**	**0.18**	**0.46**
EX-43-11.0	11.0	11/20/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-44-8.0	8.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-45-7.0	7.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-46-8.0 [4]	8.0	11/15/07	**0.20**	**0.19**	**0.13**	**0.14**	**0.21**	**0.04**	**0.11**	**0.27**
EX-46-10.0	10.0	11/20/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-47-9.0	9.0	11/15/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-48-5.0	5.0	11/16/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-49-5.0	5.0	11/16/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-50-6.0	6.0	11/16/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-51-4.0	4.0	11/19/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-52-4.0	4.0	11/19/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-53-2.0	2.0	11/19/07	**0.08**	**0.08**	**0.06**	**0.05**	**0.07**	**0.04**	<0.02	**0.095**
EX-54-2.0	2.0	11/19/07	**0.05**	**0.06**	**0.04**	**0.04**	**0.05**	**0.04**	<0.02	**0.069**
EX-55-2.0	2.0	11/19/07	**0.10**	**0.10**	**0.06**	**0.07**	**0.11**	**0.05**	<0.02	**0.130**
EX-56-2.0	2.0	11/19/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-57-6.0	6.0	11/27/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-58-3.0	3.0	12/03/07	**0.09**	**0.09**	**0.05**	**0.07**	**0.10**	**0.05**	<0.02	**0.118**
EX-59-2.0	2.0	12/03/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-60-2.0 [4]	2.0	12/04/07	**0.26**	**0.24**	**0.15**	**0.17**	**0.28**	**0.05**	**0.13**	**0.319**
EX-60-5.0	5.0	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-61-2.0 [4]	2.0	12/04/07	**0.18**	**0.18**	**0.11**	**0.12**	**0.18**	**0.04**	**0.1**	**0.237**
EX-61-6.0	6.0	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-62-2.0 [4]	2.0	12/04/07	**0.33**	**0.30**	**0.20**	**0.22**	**0.35**	**0.06**	**0.17**	**0.402**
EX-62-6.0	6.0	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-63-9.0	9.0	12/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-64-9.0	9.0	12/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-65-2.0 [4]	2.0	12/05/07	**0.88**	**0.72**	**0.72**	**0.65**	**1.5**	**0.16**	**0.41**	**1.017**
EX-65-6.0	6.0	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-66-2.0 [4]	2.0	12/05/07	**0.21**	**0.19**	**0.12**	**0.16**	**0.23**	**0.04**	**0.12**	**0.257**
EX-66-5.0	5.0	12/10/07	**0.06**	**0.06**	**0.04**	**0.05**	**0.06**	<0.02	**0.04**	**0.081**
DUP-1	9.0	12/05/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
DUP-2 [4]	2.0	12/05/07	**0.42**	**0.36**	**0.26**	**0.25**	**0.47**	**0.07**	**0.19**	**0.484**
EX-67-2.0 [4]	2.0	12/06/07	**0.80**	**0.38**	**0.34**	**0.29**	**0.75**	**0.07**	**0.18**	**0.556**
EX-67-5.0 [4]	5.0	12/11/07	**0.29**	**0.33**	**0.24**	**0.22**	**0.34**	**0.07**	**0.21**	**0.436**
EX-67-8.0	8.0	12/14/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-68-2.0 [4]	2.0	12/06/07	**3.9**	**2.6**	**2.2**	**2.0**	**3.8**	**0.59**	**1.5**	**3.657**
EX-68-5.0	5.0	12/11/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-69-2.0 [4]	2.0	12/06/07	**0.96**	**0.73**	**0.60**	**0.57**	**1.2**	**0.15**	**0.40**	**1.010**
EX-69-5.0	5.0	12/11/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.015**
DUP-3 [4]	2.0	12/06/07	**0.48**	**0.28**	**0.22**	**0.21**	**0.48**	**0.06**	**0.15**	**0.397**
DUP-4 [4]	2.0	12/06/07	**1.1**	**0.81**	**0.58**	**0.55**	**1.1**	**0.16**	**0.43**	**1.103**
EX-70-0.5	0.5	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-71-0.5	0.5	12/10/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-72-0.5 [4]	0.5	12/11/07	**0.18**	**0.18**	**0.11**	**0.14**	**0.19**	**0.03**	**0.1**	**0.238**
EX-72-3.5	3.5	12/14/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
EX-73-0.5	0.5	12/11/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
EX-74-0.5	0.5	12/14/07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.015
Cleanup Level - Saturated and Unsaturated Zone			0.137	0.137	0.137	0.137	0.137	0.137	0.137	0.137

Notes:

[1]The approximate sample locations are shown in Figure 3 .

[2]Polycyclic aromatic hydrocarbons (PAHs) analyzed using EPA Method 8270SIM. The full list of PAHs analyzed is detailed in Appendix C.

[3]Total carcinogenic PAHs calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the detection limit for these calculations.

[4]Soil represented by this sample was subsequently overexcavated and removed from the Site for permitted disposal.

bgs = below ground surface.

mg/kg = milligrams per kilogram.

DUP = Duplicate soil sample. Samples DUP-1, DUP-2, DUP-3 and DUP-4 are representative of samples EX-64-9.0, EX-65-2.0, EX-67-2.0 and EX-69-2.0 respectively.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

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TABLE 4
SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA
METALS
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Sample Name[1]	Sample Depth (feet bgs)	Date Sampled	Metals[2] (mg/kg)				
			Chromium	Copper	Lead		Zinc
					Total	TCLP[3]	
EX-20-9.0	9.0	11/06/07	**20**	**12**	<5	--	**33**
EX-21-7.0	7.0	11/06/07	**23**	**13**	<5	--	**37**
EX-22-7.0 [4]	7.0	11/06/07	**22**	**22**	**100**	**--**	**74**
SP-1[5]	surface	11/06/07	**--**	**--**	**--**	<0.04	**--**
EX-23-2.0	2.0	11/07/07	**11**	**5.3**	<5	--	**16**
EX-24-1.0	1.0	11/07/07	**8.3**	**9.6**	<5	--	**14**
EX-25-1.0	1.0	11/07/07	**7.6**	**5.0**	<5	--	**16**
EX-50-6.0	6.0	11/16/07	--	--	**14**	**--**	--
Cleanup Level - Unsaturated Zone[6]			120,000	36	250	--	101
Cleanup Level - Saturated Zone[7]			120,000	36	81	--	86
Dangerous Waste Criteria (WAC 173-303-090)			NA	NA	NA	5.0	NA

Notes:

[1]The approximate sample locations are shown in Figure 3.

[2]Metals analyzed using EPA Method 6010.

[3]Toxicity Characteristic Leaching Procedure (TCLP) analyzed using EPA Method 1311/6010B.

[4]Soil represented by this sample was subsequently overexcavated and removed from the Site for permitted disposal.

[5]SP-1 represents a 3-point composite stockpile sample obtained from the lead-contaminated soil excavation stockpile. This sample was analyzed for TCLP lead for disposal characterization purposes.

[6]Unsaturated zone - from ground surface to 5 feet bgs.

[7]Saturated zone - 5 feet bgs or greater.

bgs = below ground surface.

mg/kg = milligrams per kilogram.

"--" = not analyzed.

NA = not applicable.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

SEAT:\5\5147005\03\Finals\514700503Tables.xls

TABLE 5
SUMMARY OF EXCAVATION DEWATERING CHEMICAL ANALYTICAL DATA
PETROLEUM HYDROCARBONS, VOLATILES, LEAD, pH, TSS AND SODIUM
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Sample Name	Date Sampled	Petroleum Hydrocarbons[1] (mg/l)			Volatile Organic Compounds (VOCs)[2] (µg/l)				Total Lead[3] (µg/l)	pH[4]	Total Settleable Solids (TSS)[5] (mg/l/hr)	Sodium[6] (mg/l)
		Gasoline-Range	Diesel-Range	Heavy Oil-Range	B	E	T	X				
DW-SL1-103007	10/30/07	**0.40**	**0.47**	<0.25	**6**	**3**	<1	**7**	<3	7.4	**6**	**5,000**
DW-SL3-103007	10/30/07	<0.050	**0.17**	<0.25	<1	<1	<1	<3	<3	7.9	**6**	**4,900**
DW-SL3-110207	11/02/07	<0.050	**0.72**	**0.88**	<1	<1	<1	<3	--	8.2	0	--
DW-SL4-110207	11/02/07	<0.050	**19.0**	**24.0**	<1	<1	<1	<3	**3**	8.0	0	--
DW-SL3-110607	11/06/07	<0.050	<0.13	<0.25	<1	<1	<1	<3	<3	8.2	0	--
DW-SL4-110607	11/06/07	<0.050	**0.56**	**0.65**	<1	<1	<1	<3	<3	8.3	0	--
DW-SL3-110907	11/09/07	<0.050	**0.21**	<0.25	<1	<1	<1	<3	--	8.0	0	--
DW-SL4-110907	11/09/07	<0.050	**0.18**	<0.25	<1	<1	<1	<3	<3	8.1	0	--
DW-SL3-111907	11/19/07	<0.050	<0.13	<0.25	<1	<1	<1	<3	--	8.0	0	--
DW-SL4-111907	11/19/07	<0.050	<0.13	<0.25	<2	<1	<1	<3	<3	8.1	0	--
DW-SL3-112707	11/27/07	<0.050	<0.13	<0.25	<1	<1	<1	<3	--	8.0	0	--
DW-SL4-112707	11/27/07	<0.050	<0.13	<0.25	<2	<1	<1	<3	<3	8.1	0	--
City of Anacortes Discharge Criteria		1.00	10.0		5.0	100			5	6.0 - 9.0	0	NE

Notes:

[1]Petroleum hydrocarbons analyzed using Ecology Method NWTPH-Gx and NWTPH-Dx.

[2]VOCs analyzed using EPA Method 8021B.

[3]Total lead analyzed using EPA Method 7421.

[4]Samples DW-SL1-103007 and DW-SL3-103007 were analyzed using EPA Method 150.1. The remaining samples were measured in the field using a Hanna Instraments Combo ph\EC meter.

[5]Samples DW-SL1-103007 and DW-SL3-103007 were analized by the testing laboratory using EPA Method 160.5. The remaining samples were measured in the field using an Imhoff Cone.

[6]Sodium analyzed using EPA Method 200.7.

mg/l = milligrams per liter.

µg/l = micrograms per liter.

mg/l/hr = miligrams per leter per hour.

"--" = not analyzed.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates detected concentration exceeds the City of Anacortes sewer discharge criteria.

SEAT:\5\5147005\03\Finals\514700503Tables.xls

TABLE 6
SUMMARY OF GROUNDWATER LEVELS AND CHEMICAL ANALYTICAL DATA
PETROLEUM HYDROCARBONS, VOLATILES AND LEAD
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Monitoring Well[1]	Date Sampled	Top of Casing Elevation (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Petroleum Hydrocarbons[2] (µg/l)			Volatile Organic Compounds (VOCs)[3] (µg/l)				Lead (µg/l)	
					Gasoline-Range	Diesel-Range	Heavy Oil-Range	Benzene	Ethyl-benzene	Toluene	Xylenes	Total	Dissolved
MW-1A	06/05/08	12.63	4.04	8.59	<50	<130	<250	<1	<1	<1	<3	<3	<3
MW-2A	06/05/08	12.96	4.71	8.25	**150**	**810**	<250	**3**	<1	**1**	<3	**40**	<3
	06/23/08		5.63	7.33	**--**	<130	<250	**--**	--	**--**	--	<3	--
MW-3A	06/05/08	12.03	3.74	8.29	<50	<130	<250	<1	<1	<1	<3	<3	<3
MW-4A	06/05/08	12.41	4.12	8.29	<50	<130	<250	<1	<1	<1	<3	<3	<3
D-060508	06/05/08	--	--	--	<50	<130	<250	<1	<1	<1	<3	<3	<3
Trip Blank	06/06/08	--	--	--	<50	--	--	<1	<1	<1	<3	--	--
Cleanup Level					800/1,000[4]	500	500	51	2,100	15,000	1,000	8.1	NE

Notes:

[1]The approximate monitoring well locations are shown in Figure 4.

[2]Petroleum hydrocarbons analyzed using Ecology Method NWTPH-Gx and NWTPH-Dx with acid/silica gel cleanup.

[3]VOCs analyzed using EPA Method 8021B.

[4]MTCA Method A cleanup level is 800µg/l when benzene is present, 1,000 µg/l when benzene is not present.

µg/l = micrograms per liter.

D = Duplicate groundwater sample. Sample D-060508 is representative of sample MW-4A.

NE = not established.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

SEAT:\5\5147005\03\Finals\514700503Tables.xls

TABLE 7
SUMMARY OF GROUNDWATER CHEMICAL ANALYTICAL DATA
NONCARCINOGENIC PAHS
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Monitoring Well[1]	Date Sampled	Noncarcinogenic PAHs[2] (µg/l)								
		Acenaph-thene	Acenaph-thylene	Anthtra-cene	Benzo(ghi)-perylene	Fluoran-thene	Fluorene	Naph-thalenes	Phenan-threne	Pyrene
MW-1A	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.04**	<0.02	**0.07**
MW-2A	06/05/08	**110**	**2.4**	**6.4**	<0.02	**7.7**	**54**	**434**	**38**	**3.4**
MW-3A	06/05/08	<0.02	**0.03**	<0.02	<0.02	<0.02	<0.02	**0.20**	<0.02	<0.02
MW-4A	06/05/08	**0.04**	<0.02	<0.02	<0.02	<0.02	<0.02	**0.03**	<0.02	<0.02
D-060508	06/05/08	**0.04**	<0.02	<0.02	<0.02	<0.02	<0.02	**0.04**	**0.02**	<0.02
Cleanup Level		643	NE	25,900	NE	90	3,460	4,940	NE	2,590

Notes:

[1]The approximate monitoring well locations are shown in Figure 4.

[2]Polycyclic aromatic hydrocarbons (PAHs) analyzed using EPA Method 8270SIM. The full list of PAHs that were analyzed is presented in Appendix C.

µg/l = micrograms per liter.

NE = not established.

D = Duplicate groundwater sample. Sample D-060508 is representative of sample MW-4A.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

SEAT:\5\5147005\03\Finals\514700503Tables.xls

TABLE 8

SUMMARY OF GROUNDWATER CHEMICAL ANALYTICAL DATA

CARCINOGENIC PAHS

INTERIM REMEDIAL ACTION - CAP SANTE MARINE

ANACORTES, WASHINGTON

Monitoring Well[1]	Date Sampled	Carcinogenic PAHs[2] (µg/l)							
		Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(k)-fluoranthene	Chrysene	Dibenz(a,h)-anthracene	Indeno(1,2,3-cd)-pyrene	Total cPAHs (TEQ)[3]
MW-1A	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
MW-2A	06/05/08	**0.21**	**0.02**	**0.03**	**0.03**	**0.19**	<0.02	<0.02	**0.050**
MW-3A	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
MW-4A	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
D-060508	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02
Cleanup Level		0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.1

Notes:

[1]The approximate monitoring well locations are shown in Figure 4.

[2]Polycyclic aromatic hydrocarbons (PAHs) analyzed using EPA Method 8270SIM. The full list of PAHs that were analyzed is presented in Appendix C.

[3]Total carcinogenic PAHs calculated using toxicity equivalency (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the detection limit for these calculations.

µg/l = micrograms per liter.

D = Duplicate groundwater sample. Sample D-060508 is representative of sample MW-4A.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

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TABLE 9
SUMMARY OF GROUNDWATER FIELD PARAMETERS
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Monitoring Well[1]	Date Measured	pH[2]	Conductivity[2] (mS/cm)	Turbidity[2] (ntu)	Dissolved Oxygen[2] (ppm)	Temperature[2] (^{o}C)
MW-1A	06/05/08	7.0	4.4	17	1.1	13
MW-2A	06/05/08	6.8	7.7	550	1.6	13
	06/23/08	6.3	0.6	27	3.8	16
MW-3A	06/05/08	6.7	8.1	63	2.5	12
MW-4A	06/05/08	7.6	18.9	7	1.1	12

Notes:

[1] The approximate monitoring well locations are shown in Figure 4.

[2]Measurements made using a Horiba-22 water quality meter.

mS/cm = milliSiemens per centimeter ntu = nephelometric turbidity units ppm = parts per million ˚C = Degrees Centigrade

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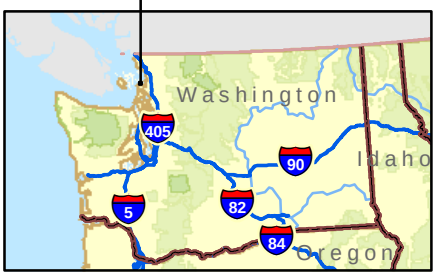

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Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
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Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

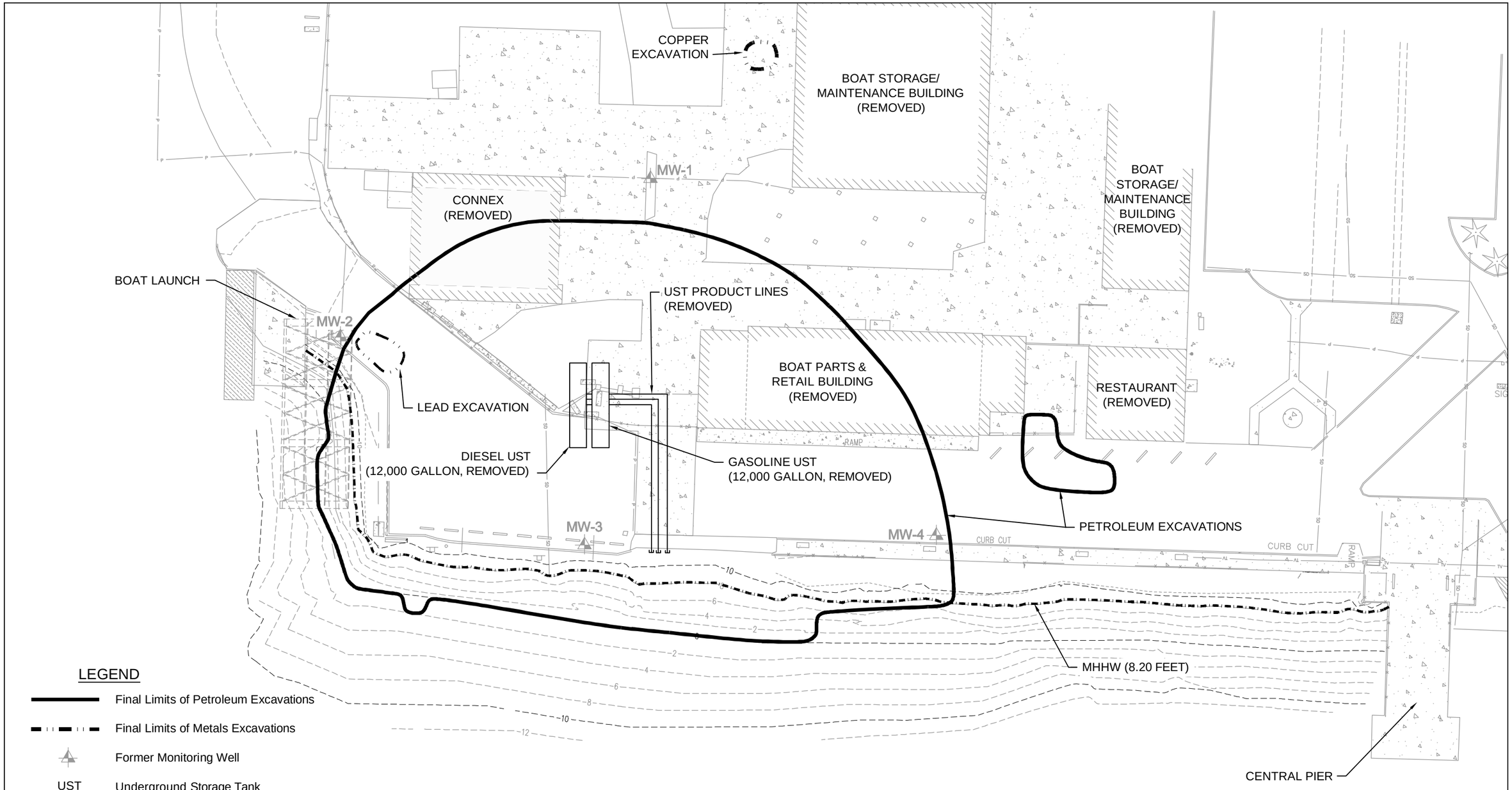
Vicinity Map

Cap Sante Marine RI/FS/CAP
Port of Anacortes, Washington

GeoEngineers

Figure 1

Office: SEA Path: P:\5\5147005\03\GIS\F1-0514700503_F1.mxd MM2 Map Revised: November 21, 2008



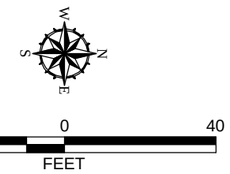
LEGEND

———	Final Limits of Petroleum Excavations
– – –	Final Limits of Metals Excavations
▲	Former Monitoring Well
UST	Underground Storage Tank
MHHW	Mean Higher High Water

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base Map based on Topographic Survey, August 2007 by Leonard, Boudinot & Skodje Inc.



Site Plan and Final Excavation Limits

Cap Sante Marine - Interim Remedial Action
Anacortes, Washington

GeoEngineers

Figure 2

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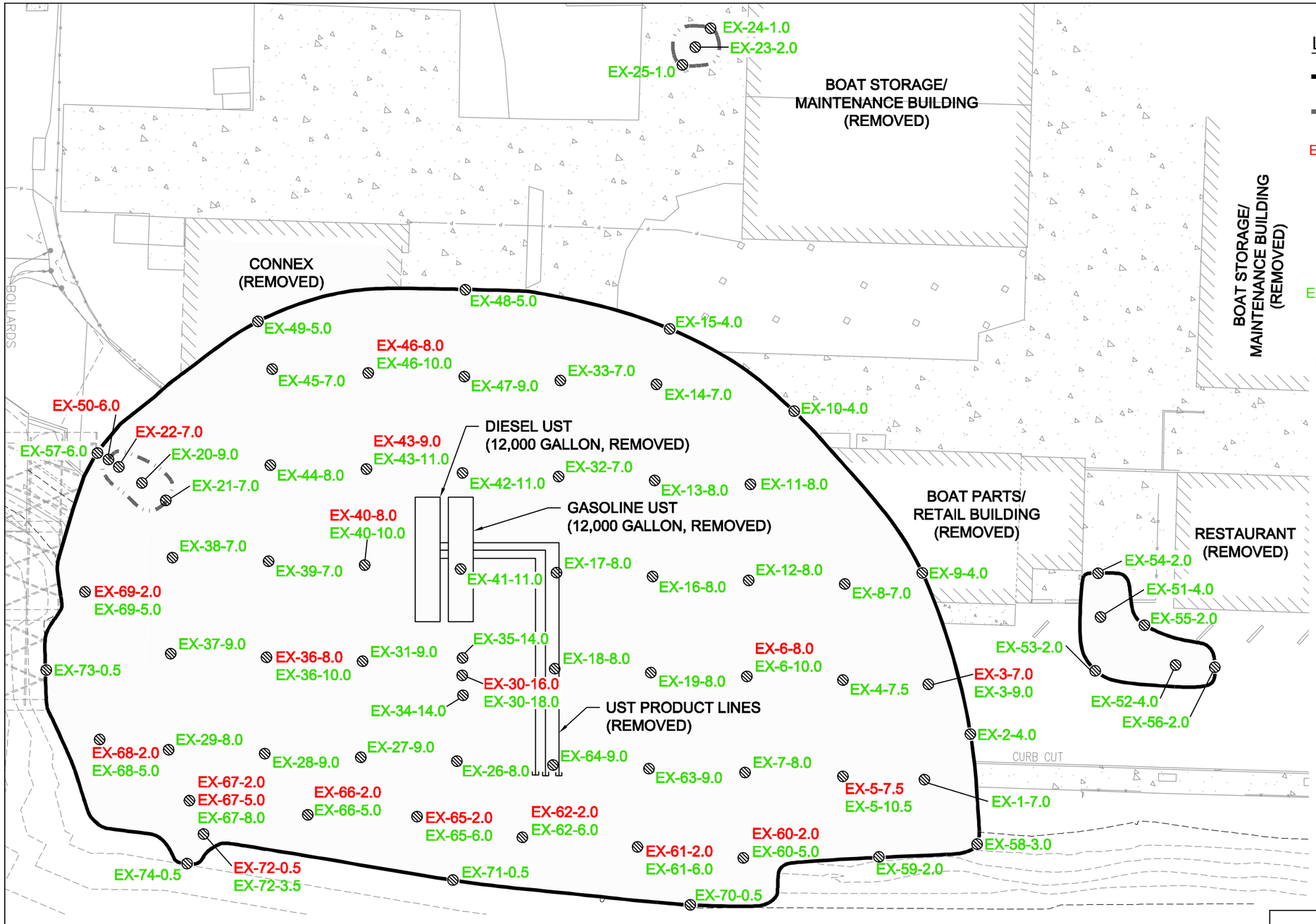

Legend:

- Final Limits of Petroleum Excavations
- Final Limits of Metals Excavations
- EX-5-7.5 — Confirmation soil sample with analyte concentration(s) exceeding Site cleanup levels (see tables 1 through 4). Soil characterized by this sample was subsequently excavated and transported off site for permitted disposal.
- EX-5-10.5 — Confirmation soil sample with analyte concentration(s) less than Site cleanup levels (see tables 1 through 4)
- EX-5-10.5 — The last number in each sample name indicates the depth the sample was obtained in feet below original ground surface.
- UST — Underground Storage Tank

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base Map based on Topographic Survey, August 2007 by Leonard, Boudinot & Skodje Inc.

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Final Excavation Limits and Confirmation Soil Sample Locations

Cap Sante Marine - Interim Remedial Action
Anacortes, Washington

GeoEngineers

Figure 3

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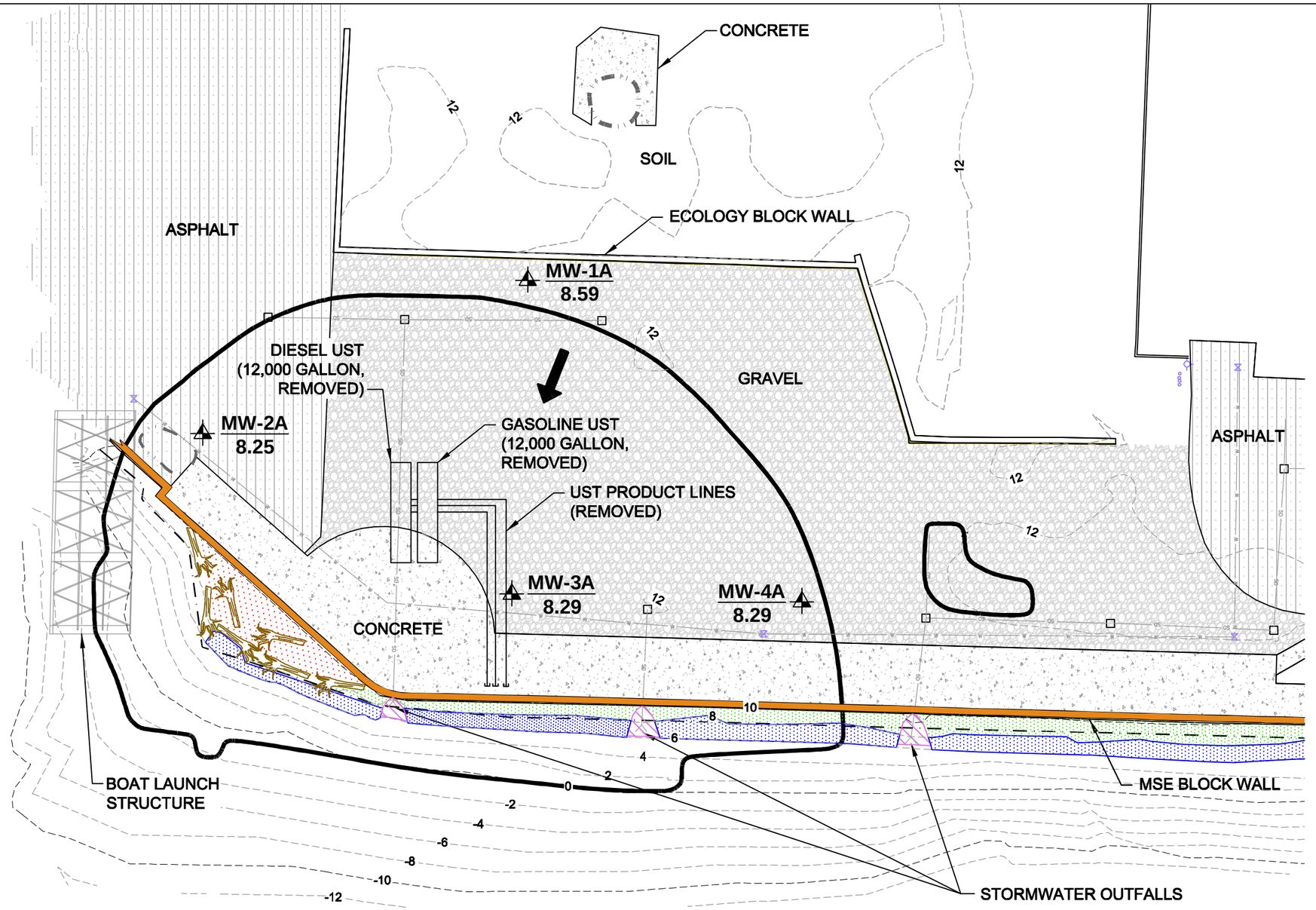

Legend

Backshore Habitat

- Dune Grass

Transitional Habitat

- Tufted Hair Grass, Puget Sound Gumweed

High Marsh Habitat

- Lyngby's Sedge, Sea Coast Bulrush

Stormwater Outfalls Habitat

- Soft Stem Bulrush
- Large Woody Debris
- Concrete
- Asphalt
- Gravel
- Final Limits of Petroleum Excavations
- Final Limits of Metals Excavations
- Mean Higher High Water
- Catch Basin
- MW-2A / 8.25 — Post-Cleanup Compliance Monitoring Well / Groundwater Elevation (ft.)
- Groundwater Flow Direction
- UST — Underground Storage Tank

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base Map based on As-built Survey, April 2008 by Leonard, Boudinot & Skodje Inc.

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Site Restoration Features and Compliance Monitoring Wells

Cap Sante Marine - Interim Remedial Action
Anacortes, Washington

GeoEngineers

Figure 4

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2008/2009 Interim Action Compliance Monitoring Results

TABLE 1
SUMMARY OF GROUNDWATER LEVELS AND CHEMICAL ANALYTICAL DATA
PETROLEUM HYDROCARBONS, VOLATILES AND LEAD
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Monitoring Well[1] (top of casing elevation - feet)	Date Sampled	Depth to Groundwater (feet)	Groundwater Elevation (feet)	Petroleum Hydrocarbons[2] (µg/l)			Volatile Organic Compounds (VOCs)[3] (µg/l)				Lead (µg/l)	
				Gasoline-Range	Diesel-Range	Heavy Oil-Range	Benzene	Ethyl-benzene	Toluene	Xylenes	Total	Dissolved
MW-1A (12.63)	06/05/08	4.04	8.59	<50	<130	<250	<1	<1	<1	<3	<3	<3
	09/09/08	5.47	7.16	<50	<130	<250	<1	<1	<1	<3	<3	--
	12/10/08	4.66	7.97	<50	<130	<250	<1	<1	<1	<3	<3	--
	03/11/09	5.16	7.47	<50	<130	<250	<1	<1	<1	<3	<3	--
	09/10/09	5.35	7.28	--	--	--	--	--	--	--	--	--
	12/03/09	4.21	8.42	--	--	--	--	--	--	--	--	--
MW-2A (12.96)	06/05/08	4.71	8.25	**150**	**810**	<250	**3**	<1	**1**	<3	**40**	<3
	06/23/08	5.63	7.33	--	<130	<250	--	--	--	--	<3	--
	09/09/08	6.11	6.85	**75**	**540**	<250	**1**	<1	<1	<3	<3	--
	12/10/08	5.58	7.38	**140**	**340**	<250	<1	<1	<1	<3	<3	--
	03/11/09	5.74	7.22	**120**	**340**	<250	<1	<1	<1	<3	<3	--
	09/10/09	5.98	6.98	**100**	**500**	<250	<1	<1	<1	<3	<1	--
	12/03/09	4.66	8.30	**130**	**440**	<250	<1	<1	<1	<3	<1	--
MW-3A (12.03)	06/05/08	3.74	8.29	<50	<130	<250	<1	<1	<1	<3	<3	<3
	09/09/08	5.20	6.83	<50	<130	<250	<1	<1	<1	<3	<3	--
	12/10/08	4.51	7.52	<50	<130	<250	<1	<1	<1	<3	<3	--
	03/11/09	4.74	7.29	<50	<130	<250	<1	<1	<1	<3	**5**	--
	09/10/09	5.08	6.95	--	--	--	--	--	--	--	--	--
	12/03/09	3.60	8.43	--	--	--	--	--	--	--	--	--
MW-4A (12.41)	06/05/08	4.12	8.29	<50	<130	<250	<1	<1	<1	<3	<3	<3
	09/09/08	5.33	7.08	<50	<130	<250	<1	<1	<1	<3	<3	--
	12/10/08	4.52	7.89	<50	<130	<250	<1	<1	<1	<3	**4**	--
	03/11/09	4.95	7.46	<50	<130	<250	<1	<1	<1	<3	<3	--
	09/10/09	5.20	7.21	--	--	--	--	--	--	--	--	--
	12/03/09	3.99	8.42	--	--	--	--	--	--	--	--	--
D-060508	06/05/08	--	--	<50	<130	<250	<1	<1	<1	<3	<3	<3
D-9/9/08	09/09/08	--	--	<50	<130	<250	<1	<1	<1	<3	<3	--
D-12/10/08	12/10/08	--	--	<50	<130	<250	<1	<1	<1	<3	<3	--
D-03/11/09	03/11/09	--	--	<50	<130	<250	<1	<1	<1	<3	<3	--
Trip Blank	06/06/08	--	--	<50	--	--	<1	<1	<1	<3	--	--
	09/09/08	--	--	<50	--	--	<1	<1	<1	<3	--	--
	12/10/08	--	--	<50	--	--	<1	<1	<1	<3	--	--
	03/11/09	--	--	<50	--	--	<1	<1	<1	<3	--	--
MTCA Groundwater Cleanup Level				800/1,000 [4]	500	500	51	2,100	15,000	1,000	8.1	NE

Notes:

[1]The approximate monitoring well locations are shown in Figure 2.

[2]Petroleum hydrocarbons analyzed using Ecology Method NWTPH-Gx and NWTPH-Dx with acid/silica gel cleanup.

[3]VOCs analyzed using EPA Method 8021B.

[4]MTCA Method A cleanup level is 800 µg/l when benzene is present, 1,000 µg/l when benzene is not present.

µg/l = micrograms per liter.

D = Duplicate groundwater sample. Samples D-060508 and D-03/11/09 are representative of the June 2008 and March 2009 samples from MW-4A. Samples Dup-9/9/08 and D-12/10/08 are representative of the September and December 2008 samples from MW-3A.

NE = not established.

Chemical analyses performed by CCI Analytical Laboratories/ALS Laboratory Group, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

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TABLE 2
SUMMARY OF GROUNDWATER CHEMICAL ANALYTICAL DATA
NONCARCINOGENIC PAHS
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Monitoring Well[1]	Date Sampled	Noncarcinogenic PAHs[2] (µg/l)								
		Acenaph-thene	Acenaph-thylene	Anthra-cene	Benzo(ghi)-perylene	Fluoran-thene	Fluorene	Naph-thalenes	Phenan-threne	Pyrene
MW-1A	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.04**	<0.02	**0.07**
	09/09/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
	12/10/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
	03/11/09	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	**0.019**	<0.018	<0.018
MW-2A	06/05/08	**110**	**2.4**	**6.4**	<0.02	**7.7**	**54**	**434**	**38**	**3.4**
	09/09/08	**60**	**1.2**	**3.0**	<0.018	**3.2**	**31**	**413**	**20**	**1.4**
	12/10/08	**49**	**1.2**	**1.8**	<0.018	**2.4**	**15**	**322**	**11**	**1.2**
	03/11/09	**61**	**1.1**	**2.2**	<0.018	**2.6**	**24**	**242.6**	**16**	**0.97**
	09/10/09	**71**	**1.4**	**3.7**	<0.018	**2.7**	**27**	**46**	**22**	**1.5**
	12/03/09	**47**	**1.1**	**1.2**	<0.018	**0.94**	**15**	**25.86**	**8.5**	**0.5**
MW-3A	06/05/08	<0.02	**0.03**	<0.02	<0.02	<0.02	<0.02	**0.20**	<0.02	<0.02
	09/09/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
	12/10/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
	03/11/09	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
MW-4A	06/05/08	**0.04**	<0.02	<0.02	<0.02	<0.02	<0.02	**0.03**	<0.02	<0.02
	09/09/08	<0.019	**0.04**	<0.018	<0.018	<0.018	**0.02**	<0.018	**0.03**	<0.018
	12/10/08	**0.02**	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
	03/11/09	**0.019**	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
D-060508	06/05/08	**0.04**	<0.02	<0.02	<0.02	<0.02	<0.02	**0.04**	**0.02**	<0.02
D-9/9/08	09/09/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
D-12/10/08	12/10/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
D-03/11/09	03/11/09	**0.019**	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018
MTCA Groundwater Cleanup Level		643	NE	25,900	NE	90	3,460	4,940	NE	2,590

Notes:

[1]The approximate monitoring well locations are shown in Figure 2.

[2]Polycyclic aromatic hydrocarbons (PAHs) analyzed using EPA Method 8270SIM. The full list of PAHs that were analyzed is presented in Appendix B.

µg/l = micrograms per liter.

NE = not established.

D = Duplicate groundwater sample. Samples D-060508 and D-03/11/09 are representative of the June 2008 and March 2009 samples from MW-4A. Samples Dup-9/9/08 and D-12/10/08 are representative of the September and December 2008 samples from MW-3A.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

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TABLE 3

SUMMARY OF GROUNDWATER CHEMICAL ANALYTICAL DATA

CARCINOGENIC PAHS

INTERIM REMEDIAL ACTION - CAP SANTE MARINE

ANACORTES, WASHINGTON

Monitoring Well[1]	Date Sampled	Carcinogenic PAHs[2] (µg/l)							
		Benzo(a)-anthracene	Benzo(a)-pyrene	Benzo(b)-fluoranthene	Benzo(k)-fluoranthene	Chrysene	Dibenz(a,h)-anthracene	Indeno(1,2,3-cd)-pyrene	Total cPAHs (TEQ)[3]
MW-1A	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.020
	09/09/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
	12/10/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
	03/11/09	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
MW-2A	06/05/08	**0.21**	**0.02**	**0.03**	**0.03**	**0.19**	<0.02	<0.02	**0.050**
	09/09/08	**0.07**	<0.018	<0.018	<0.018	**0.07**	<0.018	<0.018	**0.020**
	12/10/08	**0.1**	<0.018	<0.018	<0.018	**0.09**	<0.018	<0.018	**0.024**
	03/11/09	**0.049**	<0.018	<0.018	<0.018	**0.045**	<0.018	<0.018	**0.018**
	09/10/09	**0.047**	<0.018	<0.018	<0.018	**0.048**	<0.018	<0.018	**0.018**
	12/03/09	**0.036**	<0.018	<0.018	<0.018	**0.03**	<0.018	<0.018	**0.017**
MW-3A	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.020
	09/09/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
	12/10/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
	03/11/09	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
MW-4A	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.020
	09/09/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
	12/10/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
	03/11/09	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
D-060508	06/05/08	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.020
D-9/9/08	09/09/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
D-12/10/08	12/10/08	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
D-03/11/09	03/11/09	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018	0.013
MTCA Groundwater Cleanup Level		0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.100

Notes:

[1]The approximate monitoring well locations are shown in Figure 2.

[2]Polycyclic aromatic hydrocarbons (PAHs) analyzed using EPA Method 8270SIM. The full list of PAHs that were analyzed is presented in Appendix B.

[3]Total carcinogenic PAHs calculated using toxicity equivalency (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the detection limit for these calculations.

µg/l = micrograms per liter.

D = Duplicate groundwater sample. Samples D-060508 and D-03/11/09 are representative of the June 2008 and March 2009 samples from MW-4A. Samples Dup-9/9/08 and D-12/10/08 are representative of the September and December 2008 samples from MW-3A.

Chemical analyses performed by CCI Analytical Laboratories, Everett, Washington.

Bolding indicates analyte was detected. Shading indicates the detected concentration exceeds the respective cleanup level.

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TABLE 4
SUMMARY OF GROUNDWATER FIELD PARAMETERS
INTERIM REMEDIAL ACTION - CAP SANTE MARINE
ANACORTES, WASHINGTON

Monitoring Well[1]	Date Measured	pH[2]	Conductivity[2] (mS/cm)	Turbidity[2] (ntu)	Dissolved Oxygen[2] (ppm)	Temperature[2] (^{o}C)
MW-1A	06/05/08	7.0	4.4	17	1.1	13
	09/09/08	6.9	2.0	16	1.3	18
	12/10/08	6.0	2.0	12	1.2	12
	03/11/09	5.2	1.8	6	2.9	9
MW-2A	06/05/08	6.8	7.7	550	1.6	13
	06/23/08	6.3	0.6	27	3.8	16
	09/09/08	6.5	0.6	29	3.2	18
	12/10/08	5.9	0.7	2	2.7	12
	03/11/09	5.1	10.8	4	2.9	8
	09/10/09	5.3	10.7	4	2.8	12
	12/03/09	5.8	10.2	3	2.8	8
MW-3A	06/05/08	6.7	8.1	63	2.5	12
	09/09/08	6.7	7.8	25	2.4	19
	12/10/08	6.0	6.4	12	2.5	12
	03/11/09	5.0	3.3	7	2.7	8
MW-4A	06/05/08	7.6	18.9	7	1.1	12
	09/09/08	7.4	16.2	12	1.3	18
	12/10/08	6.1	22.6	5	2.1	12
	03/11/09	5.1	30.0	6	2.9	8

Notes:

[1] The approximate monitoring well locations are shown in Figure 2.

[2] Measurements made using a Horiba-22 water quality meter.

mS/cm = milliSiemens per centimeter ntu = nephelometric turbidity units ppm = parts per million
˚C = Degrees Centigrade

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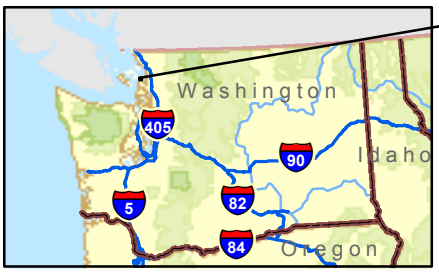

N
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Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

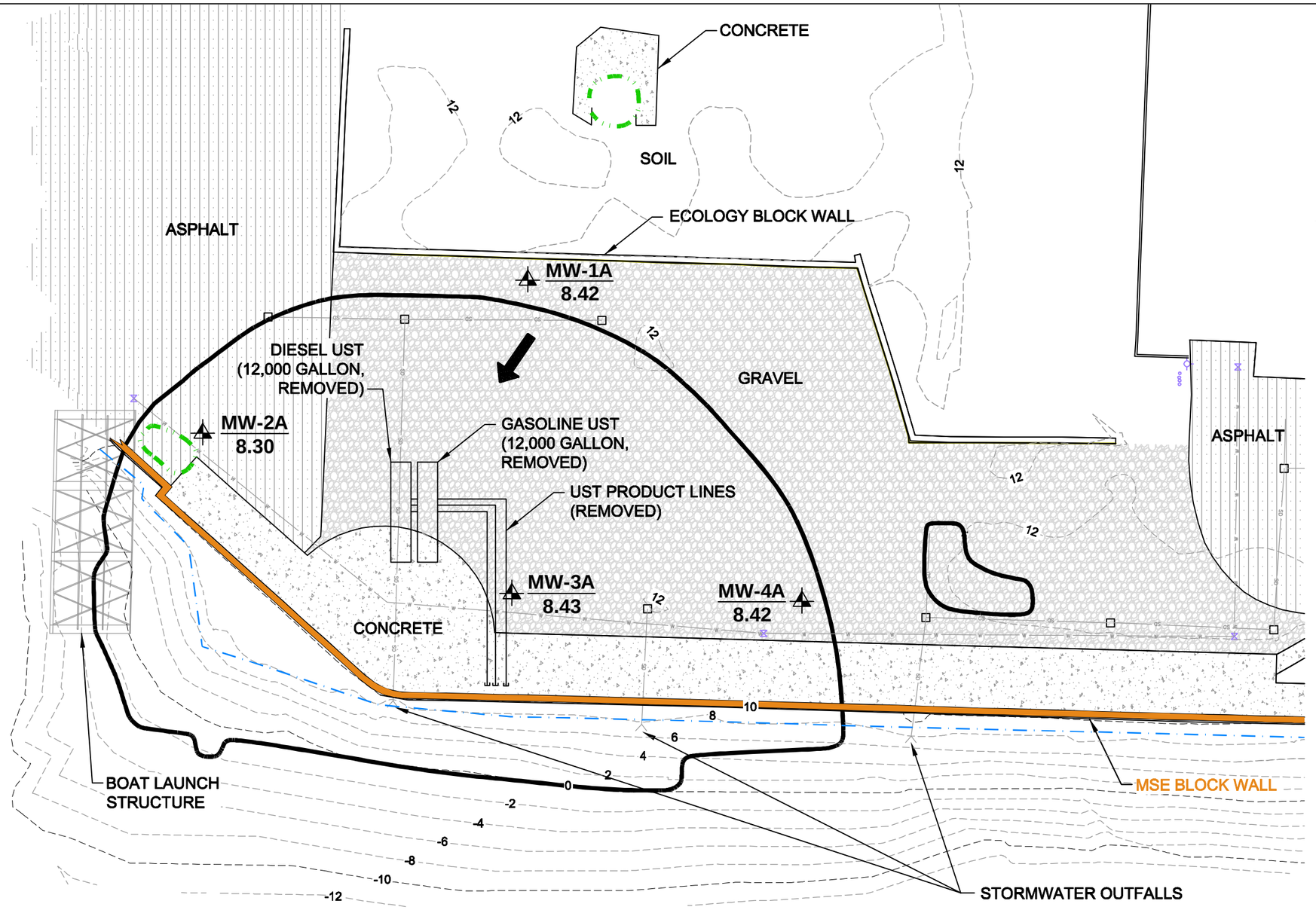
Vicinity Map

Cap Sante Marine Interim Remedial Action
Port of Anacortes, Washington

GeoEngineers

Figure 1

Office: SEA Path: P:\5\5147005\03\GIS\F1-0514700503_F1.mxd MM2 Map Revised: August 29, 2008



Legend

- Final Limits of Petroleum Excavations
- Final Limits of Metals Excavations
- Mean Higher High Water
- Catch Basin
- MW-2A / 8.30 — Post-Cleanup Compliance Monitoring Well / Groundwater Elevation (ft.) - (December 3, 2009)
- Groundwater Flow Direction
- UST — Underground Storage Tank
- Concrete
- Asphalt
- Gravel

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base Map based on As-built Survey, April 2008 by Leonard, Boudinot & Skodje Inc.

W S N E

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FEET

Site Plan: Compliance Monitoring Wells

Cap Sante Marine - Interim Remedial Action
Anacortes, Washington

GeoEngineers

Figure 2

P:\15\14700507\CAD\05\14700507 Fig2 Dec 09.dwg\TAB:Fig 2 MODIFIED BY TMICHAUD ON Dec 09, 2009 - 15:15

2011/2012 Former Shell Tank Farm Investigation Study Results

Table 1

Summary of Historic Soil Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	MW-1 S-4[2]	MW-2 S-2[2]	SHL01-S1	SHL02-S1	SHL02-S2	SHL02-S3	SHL03-S1	SHL03-S2	SHL04-S1	SHL04-S2	SHL05-S1	SHL05-S2	SHL05-S3	SHL06-S1	Preliminary Soil Cleanup Level[3]
Study	**Hart Crowser, 1987**	**Hart Crowser, 1987**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	**Floyd Snider, 2005**	
Sample Date	**4/21/1987**	**4/22/1987**	**8/24/2005**	**8/24/2005**	**8/24/2005**	**8/24/2005**	**8/24/2005**	**8/24/2005**	**8/24/2005**	**8/24/2005**	**8/24/2005**	**8/24/2005**	**8/24/2005**	**8/26/2005**	
Sample Interval (ft bgs)	**10 - 11.5**	**5 - 6.5**	**8 - 8.5**	**41004**	**41035**	**8 - 9.5**	**4 - 5.5**	**5.5 - 6.2**	**2 - 3.5**	**9.5**	**2 - 3.5**	**4.4 - 6.2**	**8 - 10**	**4 - 6**	
Petroleum Hydrocarbons by NWTPH-HCID, NWTPH-G or NWTPH-Dx (mg/kg)															
HCID	--	--	--	--	--	G, D, HO	ND	--	ND	--	--	--	--	ND	NE
Gasoline-Range	--	--	26 UJ	**1,600 J**	**1,100 J**	**2,200 J**	--	**58 J**	--	21 UJ	13 UJ	**2,100 J**	**84 J**	--	30/100[4]
Diesel-Range	20 U	**3,300**	7.6 U	**22,000**	**510**	**5,100**	--	**11**	--	**110**	**120**	**1,100**	**180**	--	2,000
Oil-Range	20 U	--	**21**	1,200 U	**720**	620 U	--	**20**	--	**150**	11 U	64 U	**92**	--	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)															
Benzene	--	--	0.064 UJ	0.036 UJ	0.024 UJ	0.04 UJ	--	0.027 UJ	--	0.053 UJ	0.032 UJ	0.037 UJ	0.029 UJ	--	0.013
Ethylbenzene	--	--	0.13 UJ	**0.67 J**	**0.66 J**	**1.8 J**	--	**0.11 J**	--	0.11 UJ	0.065 UJ	**1.7J**	0.057 UJ	--	109
Toluene	--	--	0.13 UJ	0.071 UJ	0.048 UJ	**0.1 J**	--	0.053 UJ	--	0.11 UJ	0.065 UJ	0.074 UJ	0.057 UJ	--	18
Xylenes	--	--	0.26 UJ	**0.4 J**	**0.36 J**	**0.001 J**	--	**0.064 J**	--	0.21 UJ	0.13 UJ	**1.1 J**	0.11 UJ	--	9
Methyl tert-butyl ether (MTBE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	560
Ethylene Dibromide (EDB)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.012
1,2-Dichloroethane (EDC)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.179
Tetrachloroethylene (PCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Trichloroethylene (TCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.044
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13,957
Vinyl Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Trichlorofluoromethane (freon)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24,000
Carbon tetrachloride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)															
Naphthalenes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	140
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.13
Chrysene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.137
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.43
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.43
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.14
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.65
Dibenz(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3
Total cPAHs (TEQ)[5]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.137
Metals by EPA 6000/7000 Series (mg/kg)															
Arsenic	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20
Cadmium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2
Chromium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	120,000
Lead	10 U	10 U	--	--	--	--	--	--	--	--	--	--	--	--	250
Mercury	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.07
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)															
Total PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Sample was not analyzed with current EPA Methods so results should be considered estimates. Results listed for Heavy Oil are for "total oil and grease."

[3]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated Sepember 1, 2009.

[4]Gasoline cleanup level is 30 mg/kg if benzene is present.

[5]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Table 1

Summary of Historic Soil Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	SHL07-S1	CSM01-S1	CSM01-S2	CSM02-S1	CSM03-S1	CSM03-S2	CSM04-S1	CSM04-S2	CSM12-S1	CSM12-S2	CSM13-S1	CSM13-S2	SB-10	SB-10	Preliminary Soil Cleanup Level[3]
Study	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Landau, 2007b	Landau, 2007b	
Sample Date	8/26/2005	8/24/2005	8/24/2005	8/24/2005	8/24/2005	8/24/2005	8/25/2005	8/25/2005	8/26/2005	8/26/2005	8/26/2005	8/26/2005	5/24/2007	5/24/2007	
Sample Interval (ft bgs)	4 - 5.1	4 - 5	4 - 5	8 - 8.7	4 - 5	8 - 9	4.5 - 5.8	10.3 - 12	5 - 6	10 - 11	5 - 5.5	10.5 - 11.5	0 - 0.5	1 - 2	
Petroleum Hydrocarbons by NWTPH-HCID, NWTPH-G or NWTPH-Dx (mg/kg)															
HCID	ND	D, HO	ND	D, HO	HO	--	ND	ND	HO	D, HO	ND	D	--	--	NE
Gasoline-Range	--	--	--	--	--	15 UJ	--	--	--	34 UJ	--	**110 J**	3 U	3.1 U	30/100[4]
Diesel-Range	--	**180**	--	**87**	**85**	32 U	--	--	110 U	**800**	--	**16,000**	**8.9**	5.3 U	2,000
Oil-Range	--	**1,300**	--	**330**	**280**	**140**	--	--	**440**	**1,900**	--	1,100 U	**160**	**17**	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)															
Benzene	--	--	--	--	--	0.037 UJ	--	--	--	0.084 U	--	0.095 U	0.0005 U	0.0006 U	0.013
Ethylbenzene	--	--	--	--	--	0.074 UJ	--	--	--	0.17 UJ	--	0.19 UJ	0.0005 U	0.0006 U	109
Toluene	--	--	--	--	--	0.074 UJ	--	--	--	0.17 UJ	--	0.19 UJ	0.0005 U	0.0006 U	18
Xylenes	--	--	--	--	--	0.15 UJ	--	--	--	0.34 UJ	--	0.38 UJ	0.0005 U	0.0006 U	9
Methyl tert-butyl ether (MTBE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	560
Ethylene Dibromide (EDB)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.012
1,2-Dichloroethane (EDC)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.179
Tetrachloroethylene (PCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Trichloroethylene (TCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.044
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13,957
Vinyl Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Trichlorofluoromethane (freon)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24,000
Carbon tetrachloride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)															
Naphthalenes	--	--	--	--	--	--	--	--	--	--	--	--	0.0062 U	0.0066 U	140
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	**0.0094**	0.0066 U	0.13
Chrysene	--	--	--	--	--	--	--	--	--	--	--	--	**0.039**	0.0066 U	0.137
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	**0.018**	0.0066 U	0.43
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	0.0062 U	0.0066 U	0.43
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	**0.014**	0.0066 U	0.14
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	0.0062 U	0.0066 U	0.65
Dibenz(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	0.0062 U	0.0066 U	1.3
Total cPAHs (TEQ)[5]	--	--	--	--	--	--	--	--	--	--	--	--	**0.0171**	ND	0.137
Metals by EPA 6000/7000 Series (mg/kg)															
Arsenic	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20
Cadmium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2
Chromium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	120,000
Lead	--	--	--	--	--	--	--	--	--	--	--	--	**2**	2 U	250
Mercury	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.07
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)															
Total PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Sample was not analyzed with current EPA Methods so results should be considered estimates. Results listed for Heavy Oil are for "total oil and grease."

[3]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated Sepember 1, 2009.

[4]Gasoline cleanup level is 30 mg/kg if benzene is present.

[5]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Table 1

Summary of Historic Soil Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	SB-10	SB-13	SB-13	SB-13	SB-14	SB-14	SB-14	TP-1-6.0	TP-1-8.0	TP-2-4.0	TP-3-8.0	TP-4-2.0	Preliminary Soil Cleanup Level[3]
Study	Landau, 2007b	Landau, 2007b	Landau, 2007b	Landau, 2007b	Landau, 2007b	Landau, 2007b	Landau, 2007b	GeoEngineers, 2008a	GeoEngineers, 2008a	GeoEngineers, 2008a	GeoEngineers, 2008a	GeoEngineers, 2008a	
Sample Date	5/24/2007	5/25/2007	5/25/2007	5/25/2007	5/25/2007	5/25/2007	5/25/2007	11/30/2007	11/30/2007	11/30/2007	11/30/2007	11/30/2007	
Sample Interval (ft bgs)	5 - 6	0.5 - 1.5	1.5 - 3	5 - 6	0.5 - 1.5	8 - 9	9 - 10	6 - 6.5	7.5 - 8	4 - 4.5	7.5 - 8	2 - 2.5	
Petroleum Hydrocarbons by NWTPH-HCID, NWTPH-G or NWTPH-Dx (mg/kg)													
HCID	--	--	--	--	--	--	--	--	--	--	--	--	NE
Gasoline-Range	3.4 U	4.3 U	4.2 U	**23**	5.1 U	**650**	11 U	3 U	--	3 U	3 U	3 U	30/100[4]
Diesel-Range	**24**	**21**	5.4 U	**100**	5.3 U	**48**	**11**	50 U	--	25 U	25 U	25 U	2,000
Oil-Range	**220**	**170**	11 U	**230**	**11**	**120**	**60**	**1,300**	--	50 U	50 U	50 U	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)													
Benzene	0.0007 U	0.0008 U	0.0008 U	0.0019 U	0.0012 U	0.074 U	0.0013 U	0.01 U	--	0.01 U	0.01 U	0.01 U	0.013
Ethylbenzene	0.0007 U	0.0008 U	0.0008 U	0.0019 U	0.0012 U	0.074 U	0.0013 U	0.01 U	--	0.01 U	0.01 U	0.01 U	109
Toluene	0.0007 U	0.0008 U	0.0008 U	0.0019 U	0.0012 U	0.074 U	0.0013 U	0.01 U	--	0.01 U	0.01 U	0.01 U	18
Xylenes	**0.0012**	0.0008 U	0.0008 U	0.0019 U	0.0012 U	0.074 U	0.0013 U	0.02 U	--	0.02 U	0.02 U	0.02 U	9
Methyl tert-butyl ether (MTBE)	--	--	--	--	--	--	--						560
Ethylene Dibromide (EDB)	--	--	--	--	--	--	--						0.012
1,2-Dichloroethane (EDC)	--	--	--	--	--	--	--						0.179
Tetrachloroethylene (PCE)	--	--	--	--	--	--	--						0.01
Trichloroethylene (TCE)	--	--	--	--	--	--	--						0.044
1,1,1-Trichloroethane	--	--	--	--	--	--	--						13,957
Vinyl Chloride	--	--	--	--	--	--	--						0.015
Trichlorofluoromethane (freon)	--	--	--	--	--	--	--						24,000
Carbon tetrachloride	--	--	--	--	--	--	--						0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)													
Naphthalenes	**0.01**	**0.0092**	0.0064 U	**0.069**	0.0066 U	**0.016**	**0.029**	0.02 U	--	0.02 U	0.02 U	0.02 U	140
Benzo(a)anthracene	**0.019**	**0.073**	0.0064 U	**0.14**	0.0066 U	**0.0072**	**0.06**	0.02 U	--	0.02 U	0.02 U	0.02 U	0.13
Chrysene	**0.039**	**0.11**	0.0064 U	**0.16**	0.0066 U	**0.01**	**0.073**	**0.06**	--	0.02 U	0.02 U	0.02 U	0.137
Benzo(b)fluoranthene	**0.027**	**0.16**	0.0064 U	**0.17**	0.0066 U	**0.0091**	**0.072**	**0.04**	--	0.02 U	0.02 U	0.02 U	0.43
Benzo(k)fluoranthene	**0.0071**	**0.057**	0.0064 U	**0.069**	0.0066 U	0.0065 U	**0.038**	**0.02**	--	0.02 U	0.02 U	0.02 U	0.43
Benzo(a)pyrene	**0.018**	**0.082**	0.0064 U	**0.12**	0.0066 U	**0.0065**	**0.062**	**0.04**	--	0.02 U	0.02 U	0.02 U	0.14
Indeno(1,2,3-cd)pyrene	**0.0071**	**0.029**	0.0064 U	**0.066**	0.0066 U	0.0065 U	**0.034**	**0.03**	--	0.02 U	0.02 U	0.02 U	0.65
Dibenz(a,h)anthracene	0.0064 U	**0.0072**	0.0064 U	**0.017**	0.0066 U	0.0065 U	**0.0078**	**0.03**	--	0.02 U	0.02 U	0.02 U	1.3
Total cPAHs (TEQ)[5]	**0.0244**	**0.1179**	ND	**0.173**	ND	**0.009205**	**0.08391**	**0.06**	--	ND	ND	ND	0.137
Metals by EPA 6000/7000 Series (mg/kg)													
Arsenic	--	--	--	--	--	--	--	**8.1**	--	5 U	**5.4**	5 U	20
Cadmium	--	--	--	--	--	--	--	**6.4**	1U	1 U	1 U	1 U	1.2
Chromium	--	--	--	--	--	--	--	**21**	--	**31**	**32**	**11**	120,000
Lead	**7**	**9**	5 U	**26**	**2**	**3**	**6**	**28**	--	**5.2**	**5.8**	5 U	250
Mercury	--	--	--	--	--	--	--	**0.02**	--	0.02 U	**0.03**	0.02 U	0.07
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)													
Total PCBs	--	--	--	--	--	--	--	0.1 U	--	0.1 U	0.1 U	0.1 U	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Sample was not analyzed with current EPA Methods so results should be considered estimates. Results listed for Heavy Oil are for "total oil and grease."

[3]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated Sepember 1, 2009.

[4]Gasoline cleanup level is 30 mg/kg if benzene is present.

[5]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Table 2

Summary of Historic Groundwater Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	MW-1[2]	MW-2[2]	SHL01-W1	SHL02-W1	SHL03-W1	SHL04-W1	SHL05-W1	SHL06-W1	SHL07-W1	CSM01-W1	CSM02-W1	CSM03-W1	CSM12-W1	CSM13-W1	Preliminary Groundwater Cleanup Level[3]
Study	Hart Crowser, 1987	Hart Crowser, 1987	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	Floyd Snider, 2005	
Sample Date	4/23/1987	4/23/1987	8/24/2005	8/24/2005	8/24/2005	8/24/2005	8/24/2005	8/26/2005	8/26/2005	8/24/2005	8/24/2005	8/24/2005	8/26/2005	8/26/2005	
Petroleum Hydrocarbons by NWTPH-HCID, NWTPH-G or NWTPH-Dx (µg/kg)															
Gasoline-Range	–	–	250 U	**670**	**500**	**520**	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	800/1,000[4]
Diesel-Range	–	–	250 U	**5,600**	250 U	**7,200**	250 U	250 U	250 U	**260**	**330**	**370**	**1,900**	250 U	500
Oil-Range	–	–	500 U	1,000	500 U	1,000 U	500 U	500 U	500 U	500 U	500 U	500 U	**5,000**	500 U	500
Volatile Organic Compounds (VOCs) by EPA 8260 (µg/kg)															
Benzene	3	1 U	**1.4**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	23
Ethylbenzene	–	–	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2,100
Toluene	**24**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	15,000
Xylenes	**49**	1 U	1 U	1 U	**1.6**	**1**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1,000
Metals by EPA 6000/7000 Series (µg/kg)															
Arsenic	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8
Cadmium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.8
Chromium	--	--	--	--	--	--	--	--	--	--	--	--	--	--	240,000
Lead	**40**	**100**	–	–	–	–	–	–	–	–	–	–	–	–	10
Mercury	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.2

Notes:

[1]Sample locations are shown on Figures 11 and 12.

[2]Sample was not analyzed with current EPA Methods so results should be considered estimates. Results listed for Heavy Oil are for "total oil and grease."

[3]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated Sepember 1, 2009.

[4]Gasoline cleanup level is 800 mg/kg if benzene is present.

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Table 3

Summary of Soil Investigation Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	GEI-1-5.0	GEI-1-7.5	GEI-2-5.0	GEI-2-7.5	GEI-3-2.5	GEI-3-10.0	DUP-1 (GEI-3-10.0)	GEI-3-18.0	GEI-4-5.0	GEI-4-10.0	GEI-5-2.5	GEI-5-10.0	GEI-5-17.0	Preliminary Soil Cleanup Level [2]
Sample Date	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	
Sample Depth	**5**	**7.5**	**5**	**7.5**	**2.5**	**10**	**10**	**18**	**5**	**10**	**2.5**	**10**	**17**	
Field Screening														
Sheen	NS	NS	NS	NS	NS	HS	HS	SS	SS	NS	SS	HS	SS	NE
Headspace Vapors (ppm)	<1	<1	<1	<1	<1	230	230	--	--	--	--	--	--	NE
Petroleum Hydrocarbons by NWTPH-G or NWTPH-Dx (mg/kg)														
Gasoline-Range	9.1 U	7.3 U	8.7 U	6.9 U	6.8 UJ	12 U	--	7.6 U	6.1 UJ	5.8 UJ	12 U	11 U	7.2 UJ	30/100
Diesel-Range	38 U	32 U	36 U	31 U	**53**	**4,300**	**4,500**	**200**	**740**	29 U	**7,400**	**3,200**	**32**	2,000
Oil-Range	75 U	64 U	72 U	62 U	**270**	300 U	330 U	64 U	57 U	58 U	600 U	68 U	56 U	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)														
Benzene	0.02 U	0.02 U	0.02 U	0.02 U	0.02 UJ	0.024 U	--	0.02 U	0.02 UJ	0.02 UJ	**0.16**	0.13	0.02 UJ	0.13
Ethylbenzene	0.091 U	0.073 U	0.087 U	0.069 U	0.068 UJ	0.12 U	--	0.076 U	0.061 UJ	0.058 UJ	0.60 U	0.55 U	0.072 UJ	18
Toluene	0.091 U	0.073 U	0.087 U	0.069 U	0.068 UJ	**0.3**	--	0.076 U	0.061 UJ	0.058 UJ	**3.3**	**3.3**	**0.12J**	109
Xylenes	0.091 U	0.073 U	0.087 U	0.069 U	0.068 UJ	**0.54**	--	0.076 U	0.061 UJ	0.058 UJ	**5.2**	**1.6**	0.072 UJ	9
Methyl tert-butyl ether (MTBE)	--	--	--	--	--	--	--	--	--	--	--	--	--	560
Ethylene Dibromide (EDB)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.012
ethylene dichloride (EDC)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.179
Tetrachloroethylene (PCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Trichloroethylene (TCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.044
(cis) 1,2-Dichloroethene (DCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	13,957
Vinyl Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Trichlorofluoromethane (freon)	--	--	--	--	--	--	--	--	--	--	--	--	--	24,000
Carbon tetrachloride	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)														
Naphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	140
2-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	3,200
1-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	NE
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.13
Chrysene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.14
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.43
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.43
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.137
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3
Dibenz(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.65
Total cPAHs (TEQ)[3]	--	--	--	--	--	--	--	--	--	--	--	--	--	0.137
Metals by EPA 6000/7000 Series (mg/kg)														
Cadmium	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2
Lead	--	--	--	--	--	--	--	--	--	--	--	--	--	250
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)														
Total PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated September 1, 2009.

[3]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

ppm = parts per million

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Chemical analysis performed by OnSite Environmental of Redmond, Washington. Laboratory reports are presented in Appendix C

Table 3

Summary of Soil Investigation Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	GEI-6-5.0	GEI-6-10.0	GEI-7-2.5	GEI-7-5.0	GEI-7-7.5	GEI-8-2.5	GEI-8-7.5	GEI-9-2.5	GEI-9-7.5	DUP-2 (GEI-9-7.5)	GEI-9-10.0	GEI-10-5.0	GEI-10-7.5	Preliminary Soil Cleanup Level [2]
Sample Date	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	**9/27/2011**	
Sample Depth	**5**	**10**	**2.5**	**5**	**7.5**	**2.5**	**7.5**	**2.5**	**7.5**	**7.5**	**10**	**5**	**7.5**	
Field Screening														
Sheen	NS	NS	NS	HS	NS	MS	NS	NS	HS	NS	NS	NS	NS	NE
PID	--	--	<1	450	<1	35	10	8	550	550	<1	<1	<1	NE
Petroleum Hydrocarbons by NWTPH-G or NWTPH-Dx (mg/kg)														
Gasoline-Range	5.3 U	5.2 U	6.2 UJ	13 U	7.1 U	4.8 U	5.8 U	6.7 UJ	13 U	--	6.3 U	5.6 U	6.6 U	30/100
Diesel-Range	28 U	28 U	**54**	**4,200**	32 U	**4,400**	**38**	29 U	**900**	**950**	30 U	28 U	29 U	2,000
Oil-Range	56 U	56 U	**140**	**69**	63 U	61 U	60 U	59 U	58 U	60 U	60 U	56 U	59 U	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)														
Benzene	0.02 U	0.02 U	0.02 UJ	0.025 U	0.02 U	0.02 U	0.02 U	0.02 UJ	0.025 U	--	0.02 U	0.02 U	0.02 U	0.13
Ethylbenzene	0.053 U	0.052 U	0.062 UJ	0.13 U	0.071 U	0.048 U	0.058 U	0.067 UJ	0.13 U	--	0.063 U	0.056 U	0.066 U	18
Toluene	0.053 U	0.052 U	0.062 UJ	**0.18**	0.071 U	0.048 U	0.058 U	0.067 UJ	**5.4**	--	0.063 U	0.056 U	0.066 U	109
Xylenes	0.053 U	0.052 U	0.062 UJ	**1**	0.071 U	0.048 U	0.058 U	0.067 UJ	**4.5**	--	0.063 U	0.056 U	0.066 U	9
Methyl tert-butyl ether (MTBE)	--	--	0.0011 UJ	0.065 U	0.0010 U	0.055 U	0.0011 U	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	560
Ethylene Dibromide (EDB)	--	--	0.0011 UJ	0.065 U	0.0010 U	0.055 U	0.0011 U	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	0.012
1,2-Dichloroethane (EDC)	--	--	0.0011 UJ	0.065 U	0.0010 U	0.055 U	0.0011 U	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	0.179
Tetrachloroethylene (PCE)	--	--	--	--	--	--	--	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	0.01
Trichloroethylene (TCE)	--	--	--	--	--	--	--	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	0.044
(cis) 1,2-Dichloroethene (DCE)	--	--	--	--	--	--	--	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	--
1,1,1-Trichloroethane	--	--	--	--	--	--	--	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	13,957
Vinyl Chloride	--	--	--	--	--	--	--	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	0.015
Trichlorofluoromethane (freon)	--	--	--	--	--	--	--	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	24,000
Carbon tetrachloride	--	--	--	--	--	--	--	0.0012 UJ	0.053 U	--	0.0010 U	0.00091 U	0.0011 U	0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)														
Naphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	140
2-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	3,200
1-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	NE
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.13
Chrysene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.14
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.43
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.43
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.137
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3
Dibenz(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.65
Total cPAHs (TEQ)[3]	--	--	--	--	--	--	--	--	--	--	--	--	--	0.137
Metals by EPA 6000/7000 Series (mg/kg)														
Cadmium	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2
Lead	--	--	--	--	--	--	--	--	--	--	--	--	--	250
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)														
Total PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated September 1, 2009.

[3]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

ppm = parts per million

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Chemical analysis performed by OnSite Environmental of Redmond, Washington. Laboratory reports are presented in Appendix C

Table 3

Summary of Soil Investigation Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	GEI-11-5.0	DUP-3 (GEI-11-5.0)	GEI-11-10.0	GEI-12-7.5	GEI-12-12.0	GEI-12-15.0	GEI-13-5.0	GEI-13-7.5	GEI-13-12.5	GEI-13-15.0	GEI-14-5.0	GEI-14-8.0	GEI-14-10.0	Preliminary Soil Cleanup Level [2]
Sample Date	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	
Sample Depth	**5**	**5**	**10**	**7.5**	**12**	**15**	**5**	**7.5**	**12.5**	**15**	**5**	**8**	**10**	
Field Screening														
Sheen	MS	MS	NS	NS	MS	NS	NS	MS	NS	NS	NS	SS	NS	NE
PID	280	280	35	<1	120	<1	<1	4	<1	<1	<1	250	<1	NE
Petroleum Hydrocarbons by NWTPH-G or NWTPH-Dx (mg/kg)														
Gasoline-Range	13 U	--	6 U	5.5 U	12 U	16 UJ	5.1 U	6.3 U	**56 J**	6.9 UJ	6.2 UJ	**45 J**	6.3 U	30/100
Diesel-Range	**2,200**	**2,600**	29 U	30 U	**380**	33 U	27 U	**890**	**240**	--	48 U	**700**	31 U	2,000
Oil-Range	**920**	**1,200**	59 U	60 U	**62**	66 U	54 U	**200**	63 U	--	**88**	**220**	62 U	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)														
Benzene	**0.05**	--	0.02 U	0.02 U	0.025 U	0.016 UJ	0.02 U	0.02 U	**0.65**	--	0.02 UJ	**0.025**	0.02 U	0.13
Ethylbenzene	0.13 U	--	0.060 U	0.055 U	0.12 U	0.16 UJ	0.051 U	0.063 U	0.049 U	--	0.062 UJ	0.056 U	0.063 U	18
Toluene	**2.5**	--	0.060 U	0.055 U	0.12 U	0.16 UJ	0.051 U	0.063 U	0.049 U	--	0.062 UJ	0.056 U	0.063 U	109
Xylenes	**2.1**	--	0.060 U	0.055 U	0.12 U	0.16 UJ	0.051 U	0.063 U	**0.14**	--	0.062 UJ	0.056 U	0.063 U	9
Methyl tert-butyl ether (MTBE)	0.058 U	--	0.001 U	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	560
Ethylene Dibromide (EDB)	0.058 U	--	0.001 U	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	0.012
1,2-Dichloroethane (EDC)	0.058 U	--	0.001 U	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	0.179
Tetrachloroethylene (PCE)	--	--	--	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	0.01
Trichloroethylene (TCE)	--	--	--	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	0.044
(cis) 1,2-Dichloroethene (DCE)	--	--	--	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	13,957
Vinyl Chloride	--	--	--	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	0.015
Trichlorofluoromethane (freon)	--	--	--	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	24,000
Carbon tetrachloride	--	--	--	0.001 U	0.0093 U	0.0013 UJ	--	--	--	--	--	--	--	0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)														
Naphthalene	**0.37**	--	0.0078 U	**0.026**	**0.026**	**0.14**	**0.013**	**0.12**	**0.021**	--	**0.0083**	**0.028**	0.0083 U	140
2-Methylnaphthalene	**3.1**	--	0.0078 U	**0.029**	**0.019**	0.0087 U	**0.069**	**0.18**	0.0083 U	--	**0.026**	**0.044**	0.0083 U	3,200
1-Methylnaphthalene	**2.8**	--	**0.011**	**0.027**	**0.021**	0.0087 U	**0.016**	**0.082**	0.0083 U	--	**0.0078**	**0.027**	0.0083 U	NE
Benzo(a)anthracene	0.082 U	--	0.0078 U	0.0080 U	0.0080 U	0.0087 U	0.0072 U	0.0080 U	**0.025**	--	0.0074 U	0.0075 U	0.0083 U	0.13
Chrysene	0.082 U	--	0.0078 U	0.0080 U	0.0080 U	0.0087 U	0.0072 U	0.0080 U	**0.023**	--	0.0074 U	0.0075 U	0.0083 U	0.14
Benzo(b)fluoranthene	0.082 U	--	0.0078 U	0.0080 U	0.0080 U	0.0087 U	0.0072 U	0.0080 U	**0.019**	--	0.0074 U	0.0075 U	0.0083 U	0.43
Benzo(k)fluoranthene	0.082 U	--	0.0078 U	0.0080 U	0.0080 U	0.0087 U	0.0072 U	0.0080 U	**0.023**	--	0.0074 U	0.0075 U	0.0083 U	0.43
Benzo(a)pyrene	0.082 U	--	0.0078 U	0.0080 U	0.0080 U	0.0087 U	0.0072 U	0.0080 U	**0.036**	--	0.0074 U	0.0075 U	0.0083 U	0.137
Indeno(1,2,3-cd)pyrene	0.082 U	--	0.0078 U	0.0080 U	0.0080 U	0.0087 U	0.0072 U	0.0080 U	**0.018**	--	0.0074 U	0.0075 U	0.0083 U	1.3
Dibenz(a,h)anthracene	0.082 U	--	0.0078 U	0.0080 U	0.0080 U	0.0087 U	0.0072 U	0.0080 U	0.0083 U	--	0.0074 U	0.0075 U	0.0083 U	0.65
Total cPAHs (TEQ)[3]	0.006	--	0.0059	0.006	0.006	0.0066	0.0054	0.006	0.045	--	0.0056	0.0057	0.0063	0.137
Metals by EPA 6000/7000 Series (mg/kg)														
Cadmium	--	--	--	--	--	--	**0.54**	0.6 U	0.63 U	--	0.56 U	0.56 U	0.62 U	1.2
Lead	6.2 U	--	5.8 U	6 U	6 U	6.5 U	**5.5**	6 U	6.3 U	--	5.6 U	5.6 U	6.2 U	250
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)														
Total PCBs	0.062 U	--	0.058 U	--	--	--	--	--	--	--	--	--	--	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated September 1, 2009.

[3]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

ppm = parts per million

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

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Table 3

Summary of Soil Investigation Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	GEI-15-5.0	GEI-15-10.0	GEI-15A-5.0	GEI-15A-10.0	GEI-16-5.0	DUP-4 (GEI-16-5.0)	GEI-16-10.0	GEI-17-10.0	GEI-17-14.0	GEI-17-17.5	GEI-18-5.0	GEI-18-12.5	GEI-18-15.0	Preliminary Soil Cleanup Level [2]
Sample Date	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/28/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	
Sample Depth	**5**	**10**	**5**	**10**	**5**	**5**	**10**	**10**	**14**	**17.5**	**5**	**12.5**	**15**	
Field Screening														
Sheen	NS	NS	NS	NS	SS	SS	NS	NS	HS	NS	NS	MS	NS	NE
PID	<1	<1	<1	3	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE
Petroleum Hydrocarbons by NWTPH-G or NWTPH-Dx (mg/kg)														
Gasoline-Range	--	5.7 UJ	--	5.7 U	11 U	--	5.4 U	9.9 U	**26**	14 U	7.5 U	13 U	13 U	30/100
Diesel-Range	--	--	--	--	43 U	29 U	28 U	39 U	**53**	32 U	32 U	32 U	**87**	2,000
Oil-Range	--	--	--	--	85 U	58 U	56 U	78 U	57 U	63 U	64 U	64 U	**290**	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)														
Benzene	--	0.02 UJ	--	0.02 U	0.022 U	--	0.02 U	0.02 U	0.027 U	0.027 U	0.02 U	0.026 U	0.026 U	0.13
Ethylbenzene	--	0.057 UJ	--	0.057 U	0.11 U	--	0.054 U	0.099 U	0.13 U	0.14 U	0.075 U	0.13 U	0.13 U	18
Toluene	--	0.057 UJ	--	0.057 U	0.11 U	--	0.054 U	0.099 U	0.13 U	0.14 U	0.075 U	0.13 U	0.13 U	109
Xylenes	--	0.057 UJ	--	0.057 U	0.11 U	--	0.054 U	0.099 U	0.13 U	0.14 U	0.075 U	0.13 U	0.13 U	9
Methyl tert-butyl ether (MTBE)	--	--	--	--	--	--	--	--	--	--	--	--	--	560
Ethylene Dibromide (EDB)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.012
1,2-Dichloroethane (EDC)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.179
Tetrachloroethylene (PCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Trichloroethylene (TCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.044
(cis) 1,2-Dichloroethene (DCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	13,957
Vinyl Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Trichlorofluoromethane (freon)	--	--	--	--	--	--	--	--	--	--	--	--	--	24,000
Carbon tetrachloride	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)														
Naphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	140
2-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	3,200
1-Methylnaphthalene	--	--	--	--	--	--	--	--	--	--	--	--	--	NE
Benzo(a)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.13
Chrysene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.14
Benzo(b)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.43
Benzo(k)fluoranthene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.43
Benzo(a)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.137
Indeno(1,2,3-cd)pyrene	--	--	--	--	--	--	--	--	--	--	--	--	--	1.3
Dibenz(a,h)anthracene	--	--	--	--	--	--	--	--	--	--	--	--	--	0.65
Total cPAHs (TEQ)[3]	--	--	--	--	--	--	--	--	--	--	--	--	--	0.137
Metals by EPA 6000/7000 Series (mg/kg)														
Cadmium	0.54 U	0.6 U	**0.77**	**0.9**	--	--	--	--	--	--	--	--	--	1.2
Lead	--	--	--	--	8.5 U	--	5.6 U	7.8 U	5.7 U	6.3 U	6.3 U	6.4 U	**24**	250
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)														
Total PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated September 1, 2009.

[3]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

ppm = parts per million

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

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Table 3

Summary of Soil Investigation Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	GEI-19-5.0	GEI-19-10.0	GEI-20-5.0	GEI-20-10.0	GEI-21-5.0	GEI-21-10.0	GEI-21-15.0	GEI-22-5.0	GEI-22-12.5	GEI-22-15.0	GEI-23-7.5	GEI-23-12.5	GEI-23-15.0	Preliminary Soil Cleanup Level [2]
Sample Date	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	
Sample Depth	**5**	**10**	**5**	**10**	**5**	**10**	**15**	**5**	**12.5**	**15**	**7.5**	**12.5**	**15**	
Field Screening														
Sheen	NS	NS	NS	NS	NS	SS	NS	NS	NS	NS	NS	SS	NS	NE
PID	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE
Petroleum Hydrocarbons by NWTPH-G or NWTPH-Dx (mg/kg)														
Gasoline-Range	12 U	10 U	11 U	11 U	11 U	8 U	--	7.3 U	12 U	--	12 U	21 UJ	--	30/100
Diesel-Range	**92**	39 U	41 U	42 U	41 U	**650**	--	33 U	**1,300**	--	45 U	**1,300**	32 U	2,000
Oil-Range	**330**	77 U	81 U	82 U	81 U	**1,400**	--	65 U	**1,700**	--	**160**	**2,700**	63 U	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)														
Benzene	0.024 U	0.021 U	0.022 U	0.023 U	0.021 U	0.02 U	--	0.02 U	0.024 U	--	0.024 U	**0.072 J**	--	0.13
Ethylbenzene	0.12 U	0.1 U	0.11 U	0.11 U	0.11 U	0.08 U	--	0.073 U	0.12 U	--	0.12 U	0.21 UJ	--	18
Toluene	0.12 U	0.1 U	0.11 U	0.11 U	0.11 U	0.08 U	--	0.073 U	0.12 U	--	0.12 U	0.21 UJ	--	109
Xylenes	0.12 U	0.1 U	0.11 U	0.11 U	0.11 U	0.08 U	--	0.073 U	0.12 U	--	0.12 U	0.21 UJ	--	9
Methyl tert-butyl ether (MTBE)	--	--	--	--	--	--	--	--	--	--	--	--	--	560
Ethylene Dibromide (EDB)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.012
1,2-Dichloroethane (EDC)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.179
Tetrachloroethylene (PCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Trichloroethylene (TCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.044
(cis) 1,2-Dichloroethene (DCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	13,957
Vinyl Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Trichlorofluoromethane (freon)	--	--	--	--	--	--	--	--	--	--	--	--	--	24,000
Carbon tetrachloride	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)														
Naphthalene	--	--	**0.02**	0.011 U	**0.02**	**0.59**	0.0082 UJ	0.0087 U	**1.2**	0.01 UJ	--	--	--	140
2-Methylnaphthalene	--	--	0.011 U	0.011 U	0.011 U	**0.26**	0.0082 UJ	0.0087 U	**0.98**	0.01 UJ	--	--	--	3,200
1-Methylnaphthalene	--	--	0.011 U	0.011 U	0.011 U	**0.28**	0.0082 UJ	**0.016**	**0.97**	0.01 UJ	--	--	--	NE
Benzo(a)anthracene	--	--	0.011 U	0.011 U	0.011 U	**2.5**	0.0082 UJ	0.0087 U	**0.54**	**0.011 J**	--	--	--	0.13
Chrysene	--	--	0.011 U	0.011 U	0.011 U	**2.5**	0.0082 UJ	0.0087 U	**0.53**	**0.011 J**	--	--	--	0.14
Benzo(b)fluoranthene	--	--	0.011 U	0.011 U	0.011 U	**1.4**	0.0082 UJ	0.0087 U	**0.32**	0.01 UJ	--	--	--	0.43
Benzo(k)fluoranthene	--	--	0.011 U	0.011 U	0.011 U	**1.6**	0.0082 UJ	0.0087 U	**0.36**	0.01 UJ	--	--	--	0.43
Benzo(a)pyrene	--	--	0.011 U	0.011 U	0.011 U	**2.3**	0.0082 UJ	0.0087 U	**0.51**	**0.011 J**	--	--	--	0.137
Indeno(1,2,3-cd)pyrene	--	--	0.011 U	0.011 U	0.011 U	**0.35**	0.0082 UJ	0.0087 U	**0.077**	0.01 UJ	--	--	--	1.3
Dibenz(a,h)anthracene	--	--	0.011 U	0.011 U	0.011 U	**1.2**	0.0082 UJ	0.0087 U	**0.26**	0.01 UJ	--	--	--	0.65
Total cPAHs (TEQ)[3]	--	--	0.008	0.008	0.008	**3.03**	0.006	0.007	**0.67**	0.014	--	--	--	0.137
Metals by EPA 6000/7000 Series (mg/kg)														
Cadmium	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2
Lead	**21**	7.7 U	8.1 U	8.4 U	8.1 U	**19**	--	6.5 U	32	--	9 U	**100**	--	250
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)														
Total PCBs	--	--	--	--	--	--	--	--	--	--	--	--	--	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated Sepember 1, 2009.

[3]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

ppm = parts per million

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Chemical analysis performed by OnSite Environmental of Redmond, Washington. Laboratory reports are presented in Appendix C

Table 3

Summary of Soil Investigation Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	GEI-24-5.0	GEI-24-10.0	GEI-25-5.0	GEI-25-10.0	GEI-26-5.0	GEI-26-10.0	GEI-27-7.5	GEI-27-11.0	GEI-27-13.0	GEI-28-5.0	GEI-28-10.0	GEI-29-5.0	GEI-29-10.0	Preliminary Soil Cleanup Level [2]
Sample Date	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	
Sample Depth	**5**	**10**	**5**	**10**	**5**	**10**	**7.5**	**11**	**13**	**5**	**10**	**5**	**10**	
Field Screening														
Sheen	NS	NS	NS	NS	NS	NS	NS	MS	NS	NS	NS	NS	NS	NE
PID	<1	<1	<1	<1	<1	<1	<1	10	<1	<1	<1	<1	<1	NE
Petroleum Hydrocarbons by NWTPH-G or NWTPH-Dx (mg/kg)														
Gasoline-Range	12 U	12 U	8.7 U	12 U	8.4 U	9.5 U	8.8 U	17 U	11 U	5.9 U	8.2 U	5.4 U	6.4 U	30/100
Diesel-Range	**88**	42 U	**67**	44 U	33 U	38 U	35 U	35 U	**52**	31 U	34 U	28 U	**64**	2,000
Oil-Range	**250**	85 U	**240**	**100**	66 U	76 U	97 U	**190**	**180**	**63**	69 U	56 U	**170**	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)														
Benzene	0.024 U	0.024 U	0.02 U	0.025 U	0.02 U	0.02 U	0.02 U	0.017 U	0.022 U	0.02 U	0.02 U	0.02 U	0.022 U	0.13
Ethylbenzene	0.12 U	0.12 U	0.087 U	0.12 U	0.084 U	0.095 U	0.088 U	0.17 U	0.11 U	0.059 U	0.082 U	0.054 U	0.064 U	18
Toluene	0.12 U	0.12 U	0.087 U	0.12 U	0.084 U	0.095 U	0.088 U	0.17 U	0.11 U	0.059 U	0.082 U	0.054 U	0.064 U	109
Xylenes	0.12 U	0.12 U	0.087 U	0.12 U	0.084 U	0.095 U	0.088 U	0.17 U	0.11 U	0.059 U	0.082 U	0.054 U	0.064 U	9
Methyl tert-butyl ether (MTBE)	--	--	--	--	--	--	0.0017 U	0.0016 U	0.0015 U	--	--	--	--	560
Ethylene Dibromide (EDB)	--	--	--	--	--	--	0.0017 U	0.0016 U	0.0015 U	--	--	--	--	0.012
1,2-Dichloroethane (EDC)	--	--	--	--	--	--	0.0017 U	0.0016 U	0.0015 U	--	--	--	--	0.179
Tetrachloroethylene (PCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.01
Trichloroethylene (TCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	0.044
(cis) 1,2-Dichloroethene (DCE)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--	--	13,957
Vinyl Chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Trichlorofluoromethane (freon)	--	--	--	--	--	--	--	--	--	--	--	--	--	24,000
Carbon tetrachloride	--	--	--	--	--	--	--	--	--	--	--	--	--	0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)														
Naphthalene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	**0.012**	0.0092 U	0.0075 U	0.034	140
2-Methylnaphthalene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	0.0082 U	0.0092 U	0.0075 U	ND	3,200
1-Methylnaphthalene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	0.0082 U	0.0092 U	0.0075 U	ND	NE
Benzo(a)anthracene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	0.0082 U	0.0092 U	0.0075 U	0.015	0.13
Chrysene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	0.0082 U	0.0092 U	0.0075 U	0.017	0.14
Benzo(b)fluoranthene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	0.0082 U	0.0092 U	0.0075 U	0.011	0.43
Benzo(k)fluoranthene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	0.0082 U	0.0092 U	0.0075 U	0.012	0.43
Benzo(a)pyrene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	0.0082 U	0.0092 U	0.0075 U	0.016	0.137
Indeno(1,2,3-cd)pyrene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	0.0082 U	0.0092 U	0.0075 U	ND	1.3
Dibenz(a,h)anthracene	--	--	--	--	0.0089 U	0.01 U	0.0093 U	0.0094 U	0.01 U	0.0082 U	0.0092 U	0.0075 U	**0.011**	0.65
Total cPAHs (TEQ)[3]	--	--	--	--	0.007	0.008	0.007	0.007	0.008	0.006	0.007	0.006	0.021	0.137
Metals by EPA 6000/7000 Series (mg/kg)														
Cadmium	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2
Lead	**22**	8.5 U	**22**	8.7 U	6.6 U	7.6 U	7 U	7 U	7.7 U	6.2 U	6.9 U	5.6 U	14 U	250
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)														
Total PCBs	--	--	--	--	--	--	0.07 U	0.07 U	0.077 U	--	--	--	--	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated September 1, 2009.

[3]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

ppm = parts per million

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Chemical analysis performed by OnSite Environmental of Redmond, Washington. Laboratory reports are presented in Appendix C

Table 3

Summary of Soil Investigation Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	GEI-30-7.5	GEI-31-7.5	GEI-32-5.0	GEI-33-5.0	GEI-33-10.0	GEI-33-14.0	GEI-34-12.0	GEI-34-15.0	GEI-35-15.0	GEI-MW-1-7.5	GEI-MW-1-12.5	Preliminary Soil Cleanup Level [2]
Sample Date	**9/28/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**9/29/2011**	**2/9/2012**	**2/9/2012**	
Sample Depth	**7.5**	**7.5**	**5**	**5**	**10**	**14**	**12**	**15**	**15**	**7.5**	**12.5**	
Field Screening												
Sheen	NS	NS	NS	SS	HS	NS	NS	NS	NS	NS	NS	NE
PID	<1	<1	<1	<1	200	32	<1	<1	<1	<1	<1	NE
Petroleum Hydrocarbons by NWTPH-G or NWTPH-Dx (mg/kg)												
Gasoline-Range	5.5 U	7 U	6.4 U	16 U	13 U	13 U	5.9 U	--	6.9 U	7.4 U	5.4 U	30/100
Diesel-Range	29 U	31 U	31 U	**220**	**700**	**66**	29 U	--	30 U	--	--	2,000
Oil-Range	58 U	62 U	62 U	**74**	73 U	63 U	59 U	--	61 U	--	--	2,000
Volatile Organic Compounds (VOCs) by EPA 8260 (mg/kg)												
Benzene	0.02 U	0.02 U	0.02 U	0.016 U	0.027 U	**0.026**	0.02 U	--	0.02 U	--	0.02 U	0.13
Ethylbenzene	0.055 U	0.07 U	0.064 U	0.16 U	0.13 U	0.13 U	0.059 U	--	0.069 U	--	0.054 U	18
Toluene	0.055 U	0.07 U	0.064 U	0.16 U	0.13 U	0.13 U	0.059 U	--	0.069 U	--	0.054 U	109
Xylenes	0.055 U	0.07 U	0.064 U	0.16 U	0.23	0.13 U	0.059 U	--	0.069 U	--	0.054 U	9
Methyl tert-butyl ether (MTBE)	--	--	--	--	--	--	--	--	--	--	--	560
Ethylene Dibromide (EDB)	--	--	--	--	--	--	--	--	--	--	--	0.012
1,2-Dichloroethane (EDC)	--	--	--	--	--	--	--	--	--	--	--	0.179
Tetrachloroethylene (PCE)	--	--	--	--	--	--	--	--	--	--	--	0.01
Trichloroethylene (TCE)	--	--	--	--	--	--	--	--	--	--	--	0.044
(cis) 1,2-Dichloroethene (DCE)	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	13,957
Vinyl Chloride	--	--	--	--	--	--	--	--	--	--	--	0.015
Trichlorofluoromethane (freon)	--	--	--	--	--	--	--	--	--	--	--	24,000
Carbon tetrachloride	--	--	--	--	--	--	--	--	--	--	--	0.015
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (mg/kg)												
Naphthalene	0.0078 U	0.0082 U	0.0082 U	0.0087 U	0.0082 U	0.0083 U	**0.2**	0.0074 U	--	--	**0.05**	140
2-Methylnaphthalene	0.0078 U	0.0082 U	0.0082 U	0.0087 U	0.0082 U	0.0083 U	**0.03**	0.0074 U	--	--	0.037 U	3,200
1-Methylnaphthalene	0.0078 U	0.0082 U	0.0082 U	0.0087 U	**0.015**	0.0083 U	**0.017**	0.0074 U	--	--	0.037 U	NE
Benzo(a)anthracene	**0.0095**	0.0082 U	0.0082 U	0.0087 U	0.0082 U	0.0083 U	**0.38**	0.0074 U	--	--	**0.47**	0.13
Chrysene	0.0078 U	0.0082 U	0.0082 U	0.0087 U	0.0082 U	0.0083 U	**0.37**	0.0074 U	--	--	**0.55**	0.14
Benzo(b)fluoranthene	0.0078 U	0.0082 U	0.0082 U	0.0087 U	0.0082 U	0.0083 U	**0.23**	0.0074 U	--	--	**0.47**	0.43
Benzo(k)fluoranthene	0.0078 U	0.0082 U	0.0082 U	0.0087 U	0.0082 U	0.0083 U	**0.27**	0.0074 U	--	--	**0.16**	0.43
Benzo(a)pyrene	**0.0092**	0.0082 U	0.0082 U	0.0087 U	0.0082 U	0.0083 U	**0.41**	0.0074 U	--	--	**0.48**	0.137
Indeno(1,2,3-cd)pyrene	0.0078 U	0.0082 U	0.0082 U	0.0087 U	0.0082 U	0.0083 U	**0.058**	0.0074 U	--	--	**0.073**	1.3
Dibenz(a,h)anthracene	0.0078 U	0.0082 U	0.0082 U	0.0087 U	0.0082 U	0.0083 U	**0.24**	0.0074 U	--	--	**0.37**	0.65
Total cPAHs (TEQ)[3]	0.012	0.006	0.006	0.007	0.006	0.006	**0.53**	0.006	--	--	**0.52**	0.137
Metals by EPA 6000/7000 Series (mg/kg)												
Cadmium	5.8 U	--	--	--	--	--	--	--	--	--	--	1.2
Lead	--	6.1 U	6.2 U	6.5 U	6.1 U	6.2 U	**25**	--	**6.1**	--	--	250
Polychlorinated Biphenyls (PCBs) by EPA 8280 (mg/kg)												
Total PCBs	--	--	--	--	--	--	--	--	--	--	--	0.1

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated Sepember 1, 2009.

[3]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

ppm = parts per million

mg/kg = milligrams per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Chemical analysis performed by OnSite Environmental of Redmond, Washington. Laboratory reports are presented in Appendix C

Table 4

Summary of Groundwater Investigation Chemical Analytical Data

Former Shell Oil Tank Farm

Anacortes, Washington

Sample ID[1]	GEI-MW-1	GEI-MW-2	GEI-MW-3	GEI-MW-4	GEI-MW-5	GEI-MW-6	GEI-MW-7	Dup (GEI-MW-7)	Trip Blank	Preliminary Groundwater Cleanup Level [2]
Sample Date	**3/6/2012**	**3/6/2012**	**3/6/2012**	**3/6/2012**	**3/6/2012**	**3/6/2012**	**3/6/2012**	**3/6/2012**	**3/6/2012**	
Depth to Water (feet)	**5.88**	**5.26**	**5.37**	**5.34**	**5.10**	**2.94**	**5.15**	**5.15**	**–**	
Top of Casing Elevation (feet MLLW)	**14.16**	**12.98**	**13.09**	**12.98**	**12.67**	**12.52**	**11.65**	**11.65**	**–**	
Groudwater Elevation (feet MLLW)	**8.28**	**7.72**	**7.72**	**7.64**	**7.57**	**9.58**	**6.50**	**6.50**	**–**	
Petroleum Hydrocarbons by NWTPH-G or NWTPH-Dx (µg/kg)										
Gasoline-Range	100 U	**190**	**230**	100 U	100 U	100 U	100 U	100 U	–	800/1,000[3]
Diesel-Range	260 U	260 U	260 U	260 U	260 U	270 U	250 U	260U	–	500
Oil-Range	410 U	410 U	410 U	410 U	410 U	440 U	410 U	410 U	–	500
Volatile Organic Compounds (VOCs) by EPA 8260 (µg/kg)										
Benzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	23
Ethylbenzene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	2,100
Toluene	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	15,000
Xylenes	1.0 U	**1.3**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1,000
Methyl tert-butyl ether (MTBE)	–	–	0.20 U	–	–	–	–	–	0.20 U	20
Ethylene Dibromide (EDB)	–	–	0.20 U	–	–	–	–	–	0.20 U	2.000
1,2-Dichloroethane (EDC)	–	–	0.20 U	–	–	–	–	–	0.20 U	37
Tetrachloroethylene (PCE)	–	–	0.20 U	–	–	–	–	–	0.20 U	0.39
Trichloroethylene (TCE)	–	–	0.20 U	–	–	–	–	–	0.20 U	6.7
(cis) 1,2-Dichloroethene (DCE)	–	–	0.20 U	–	–	–	–	–	0.20 U	–
1,1,1-Trichloroethane	–	–	0.20 U	–	–	–	–	–	0.20 U	420,000
Vinyl Chloride	–	–	0.20 U	–	–	–	–	–	0.20 U	2.4
Trichlorofluoromethane (freon)	–	–	0.20 U	–	–	–	–	–	0.20 U	–
Carbon tetrachloride	–	–	0.20 U	–	–	–	–	–	0.20 U	1.6
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270SIM (µg/kg)										
Naphthalene	0.095 U	**0.23**	**0.30**	0.094 U	0.095 U	0.095 U	0.094 U	0.094 U	–	4900
2-Methylnaphthalene	0.095 U	0.095 U	0.095 U	0.094 U	0.095 U	0.095 U	0.094 U	0.094 U	–	–
1-Methylnaphthalene	0.095 U	0.095 U	**1.3**	0.094 U	0.095 U	0.095 U	0.094 U	0.094 U	–	–
Benzo(a)anthracene	0.0095 U	**0.015**	**0.010**	0.0094 U	0.0095 U	**0.0095**	0.0094 U	0.0094 U	–	0.018
Chrysene	0.0095 U	**0.011**	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0094 U	–	0.018
Benzo(b)fluoranthene	0.0095 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0094 U	–	0.018
Benzo(k)fluoranthene	0.0095 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0094 U	–	0.018
Benzo(a)pyrene	0.0095 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0094 U	–	0.018
Indeno(1,2,3-cd)pyrene	0.0095 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0094 U	–	0.018
Dibenz(a,h)anthracene	0.0095 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0094 U	–	0.018
Total cPAHs (TEQ)[3]	0.0072	0.0083	0.0077	0.0071	0.0072	0.0076	0.0071	0.0071	–	0.1
Metals by EPA 6000/7000 Series (µg/kg)										
Cadmium	4.4 U	–	–	–	–	–	–	–	–	8.8
Lead	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	**1.4**	1.1 U	1.1 U	–	10

Notes:

[1]Sample locations are shown on Figures 4 Through 7.

[2]Preliminary soil cleanup levels referenced from GeoEngineers' Work Plan, Remedial Investigation/Feasibility Study, Former Shell Oil Tank Farm dated Sepember 1, 2009.

[3]Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by EPA method 8270 SIM. Total carcinogenic PAHs (cPAHs) calculated using toxic equivalent (TEQ) methodology relative to benzo(a)pyrene. cPAHs that were not detected were assigned a value of one half of the reporting limit for these calculations.

MLLW = Mean Lower Low Water

ppm = parts per million

µg/kg = micrograms per kilograms

U = Not detected above laboratory reporting limit

J = Estimated Value

Bold indicates analyte was detected.

Shading indicates analyte was detected at a concentration above the Preliminary Soil Cleanup Level.

Chemical analysis performed by OnSite Environmental of Redmond, Washington. Laboratory reports are presented in Appendix C

2,000 0 2,000

Feet

Notes:
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3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps

Projection: NAD 1983 UTM Zone 10N

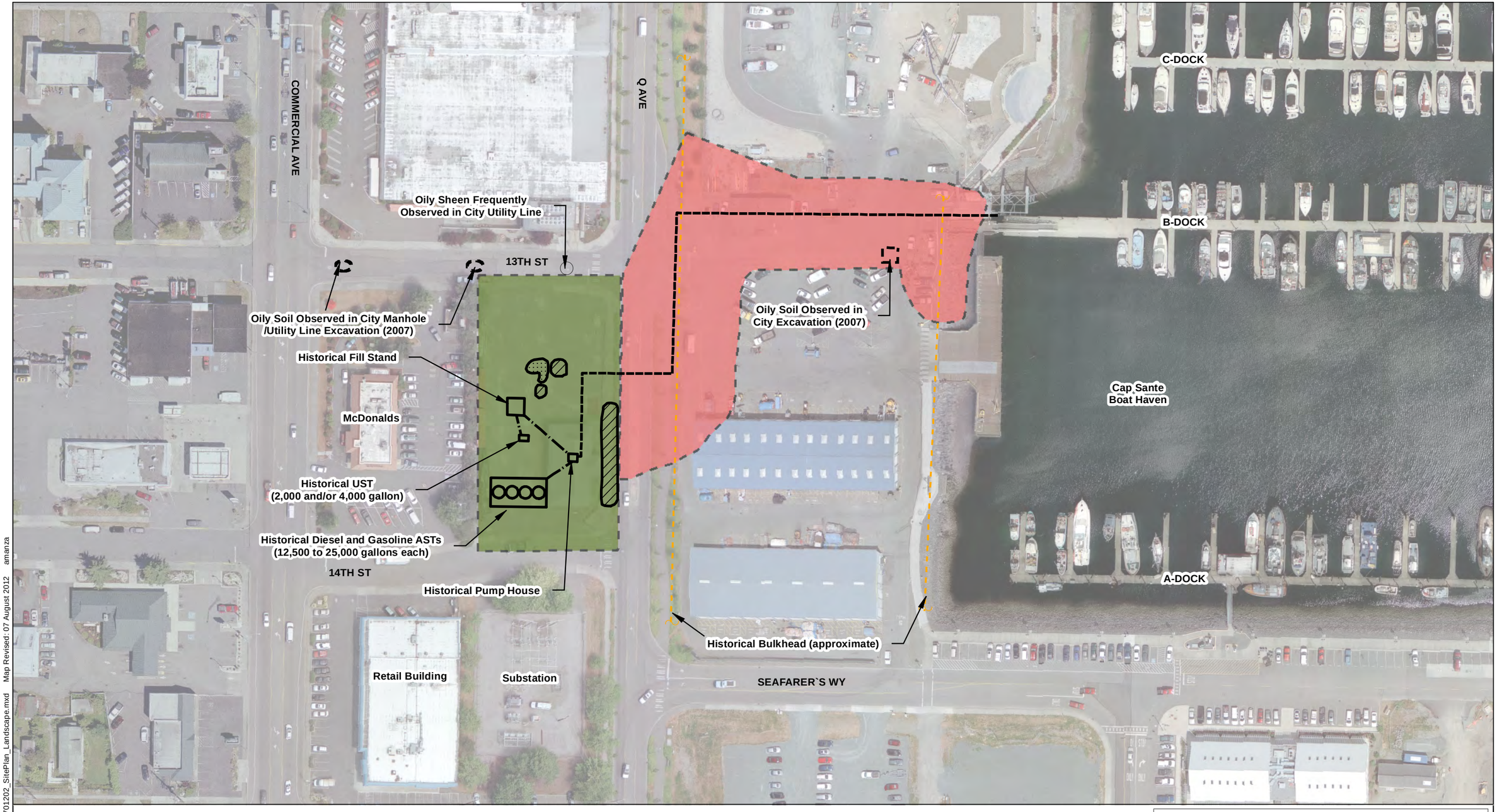
Vicinity Map

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 1

Path: \\sea\projects\5\5147012\GIS\5147012_VicinityMap.mxd Map Revised: 12 July 2012 amanza



Path: \\eal\Projects\5\5147012\GIS\5147012_SitePlan_Landscape.mxd Map Revised: 07 August 2012 amanza

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1. The locations of all features shown are approximate.
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Reference: Roads from Skagit County. Point, line and polygon features digitized from figures 5.1 and 6.1 of November 2006 and Figure 2 of September 2005 by Floyd Snider. Imagery date: 2010.

- Fuel Supply Line Area
- Tank Farm Area
- Historical Features
- Surface Oil (1987 Observation)
- White Powder (1987 Observation)
- Historical Fuel Supply Line
- Historical Product Line
- AST - Above Ground Storage Tank
- UST - Underground Storage Tank

N W E S

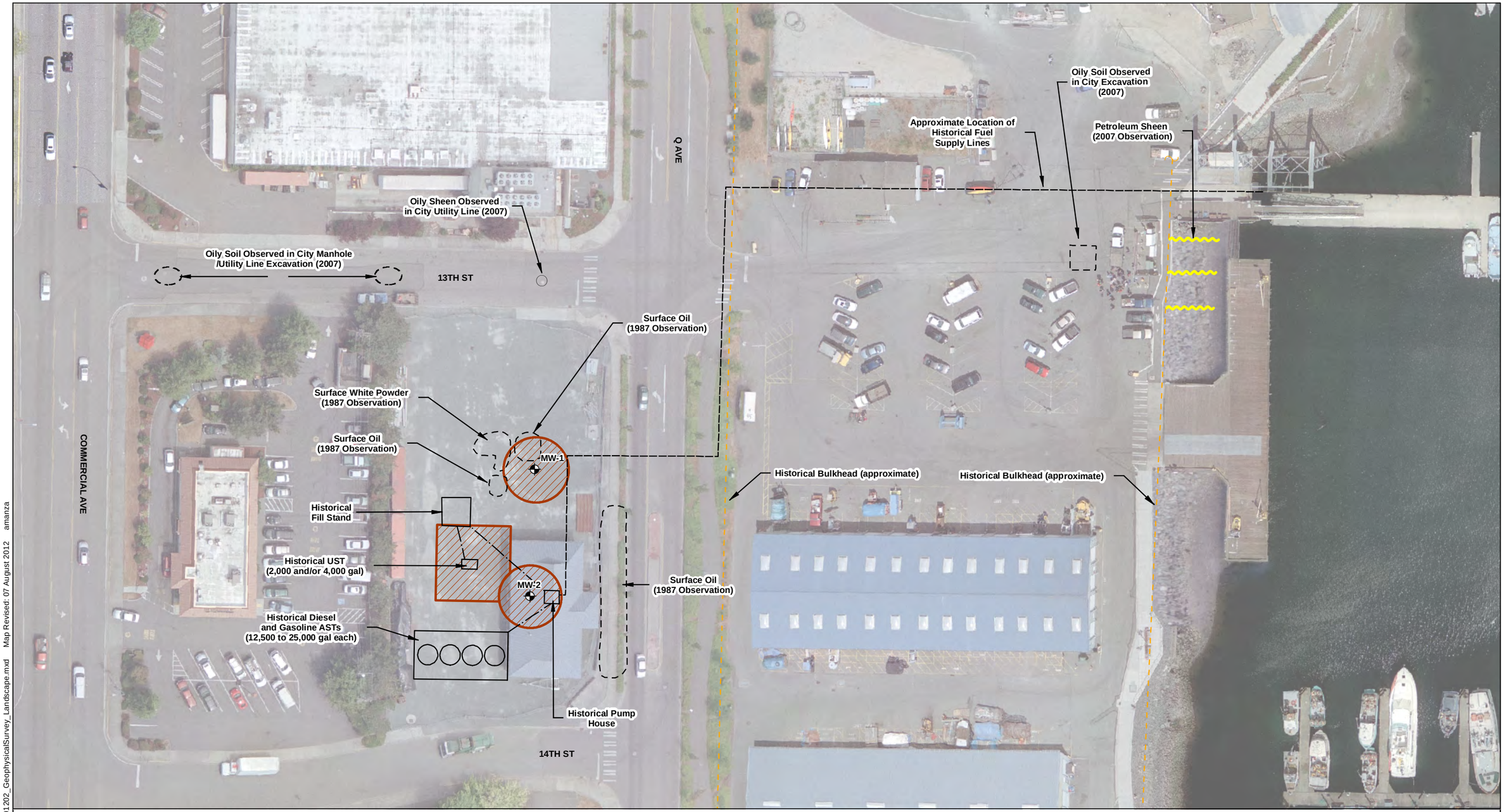
0 100 200
Feet

Site Plan

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 2



Path: \\sea\projects\5\51470\2\GIS\51470202_GeophysicalSurvey_Landscape.mxd Map Revised: 07 August 2012 amanza

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Reference: Roads from Skagit County. Point, line and polygon features digitized from figures 5.1 and 6.1 of November 2006 and Figure 2 of September 2005 by Floyd Snider. Imagery date: 2010.

- Historical Monitoring Well Location
- Historical Fuel Supply Line
- Historical Product Line
- Electromagnetic/GPR Survey Area

GPR - Ground Penetrating Radar

N W E S

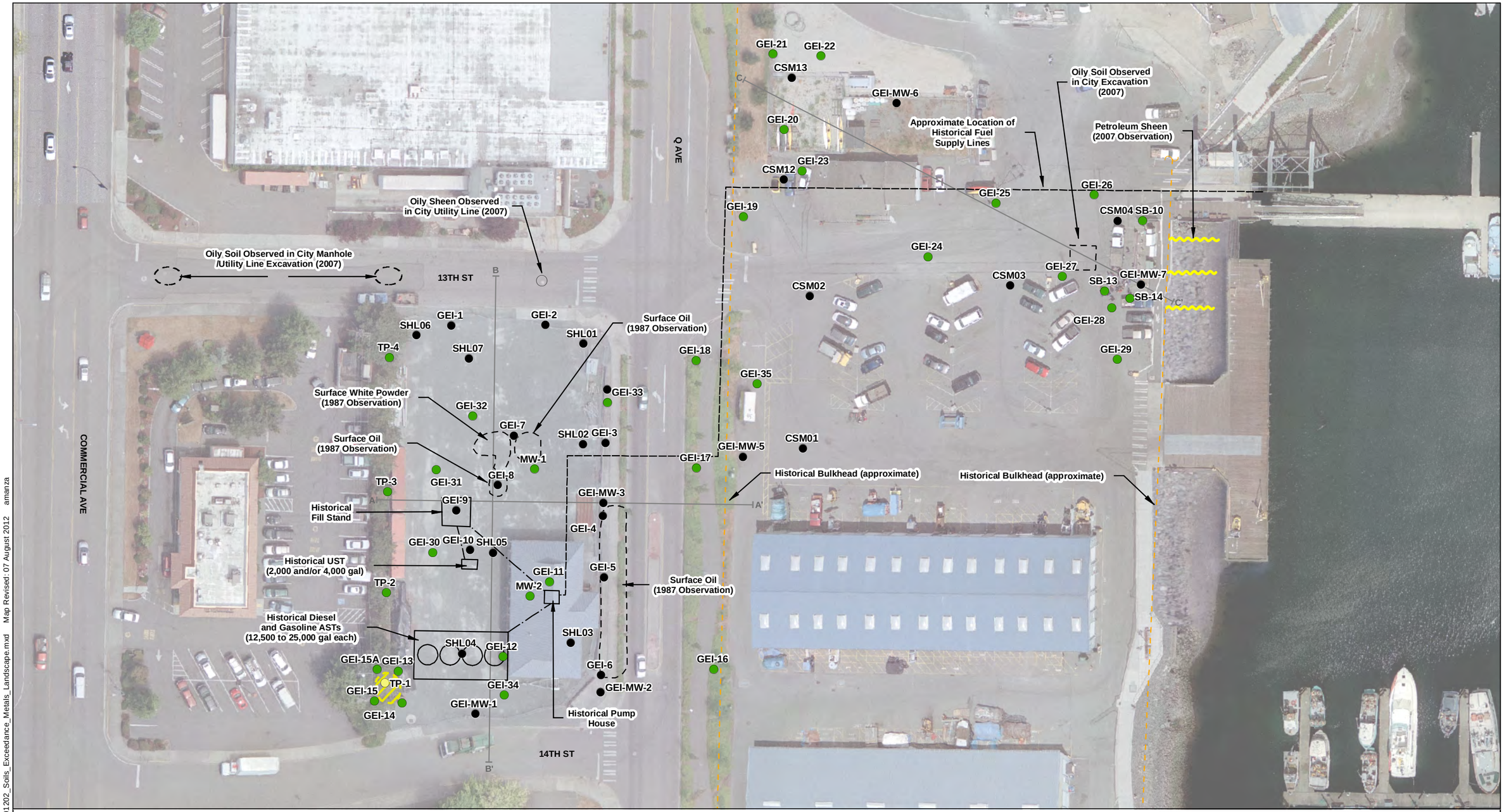
0 60 120
Feet

Geophysical Survey

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 3



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Reference: Roads from Skagit County. Point, line and polygon features digitized from figures 5.1 and 6.1 of November 2006 and Figure 2 of September 2005 by Floyd Snider. Imagery date: 2010.

- Soil Sample Location - Metals less than Preliminary Cleanup Level (see Tables 1 and 3)
- Soil Sample Location - Metals exceeds Preliminary Cleanup Level (see Tables 1 and 3)
- Soil Sample Location - No Metals Sample Data
- Cross Section
- Historical Fuel Supply Line
- Historical Product Line
- Approximate Area of Metals (Cadmium) Exceedance in Soil

N W E S

0 60 120
Feet

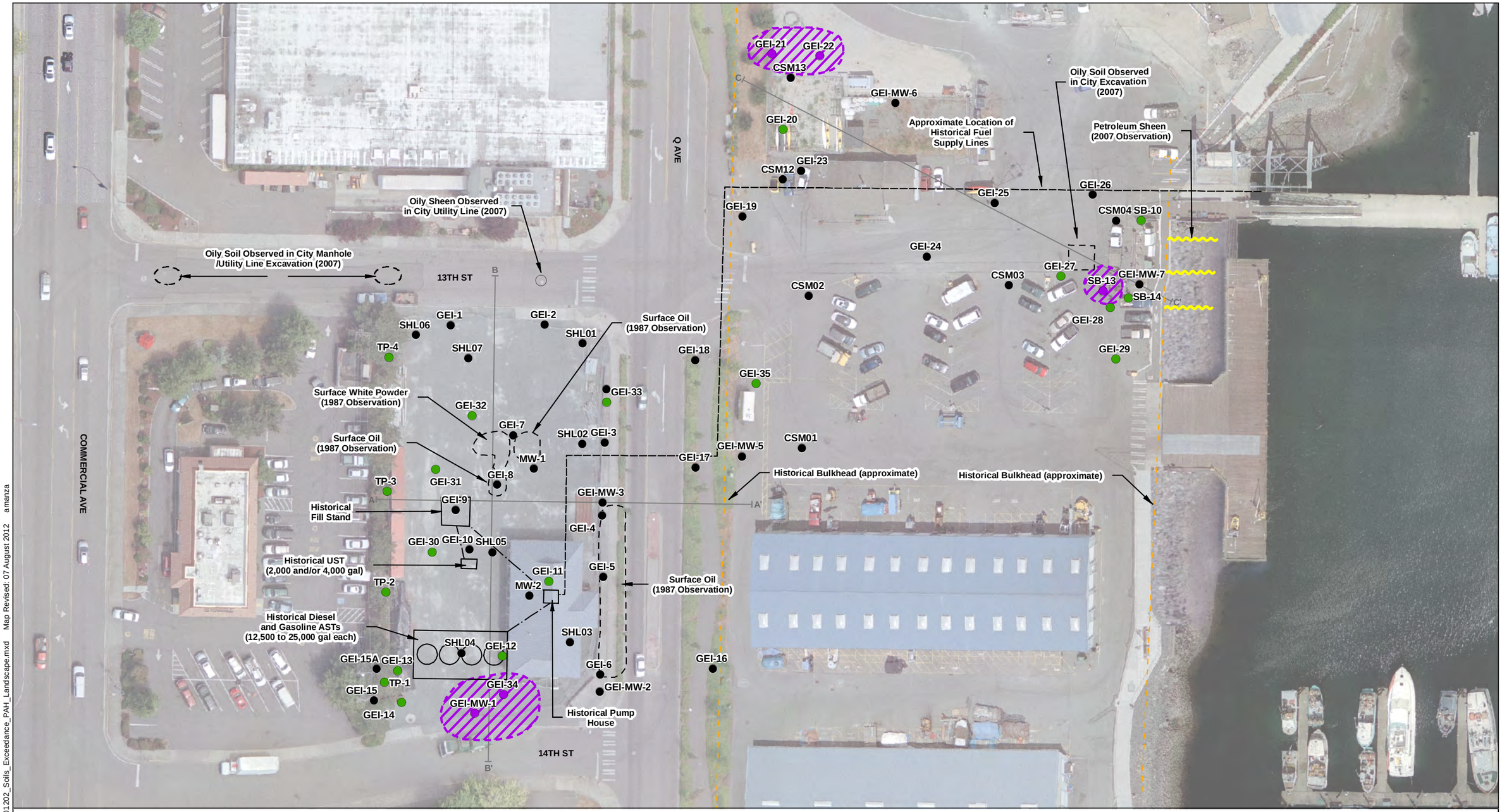
Summary of Metals Exceedances in Soil

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 4

Path: \\seaprojects\5\5147012\GIS\5147012_Soils_Exceedance_Metals_Landscape.mxd Map Revised: 07 August 2012 amanza



Path: \\sea\projects\5\5147012\GIS\5147012_Soils_Exceedance_PAH_Landscape.mxd Map Revised: 07 August 2012 amanza

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Reference: Roads from Skagit County. Point, line and polygon features digitized from figures 5.1 and 6.1 of November 2006 and Figure 2 of September 2005 by Floyd Snider. Imagery date: 2010.

- Soil Sample Location - PAHs less than Preliminary Cleanup Level (see Tables 1 and 3)
- Soil Sample Location - PAHs exceeds Preliminary Cleanup Level (see Tables 1 and 3)
- Soil Sample Location - No PAH Sample Data
- Cross Section
- Historical Fuel Supply Line
- Historical Product Line
- Approximate Area of PAH Exceedance in Soil

PAH - Polycyclic Aromatic Hydrocarbons

N W E S

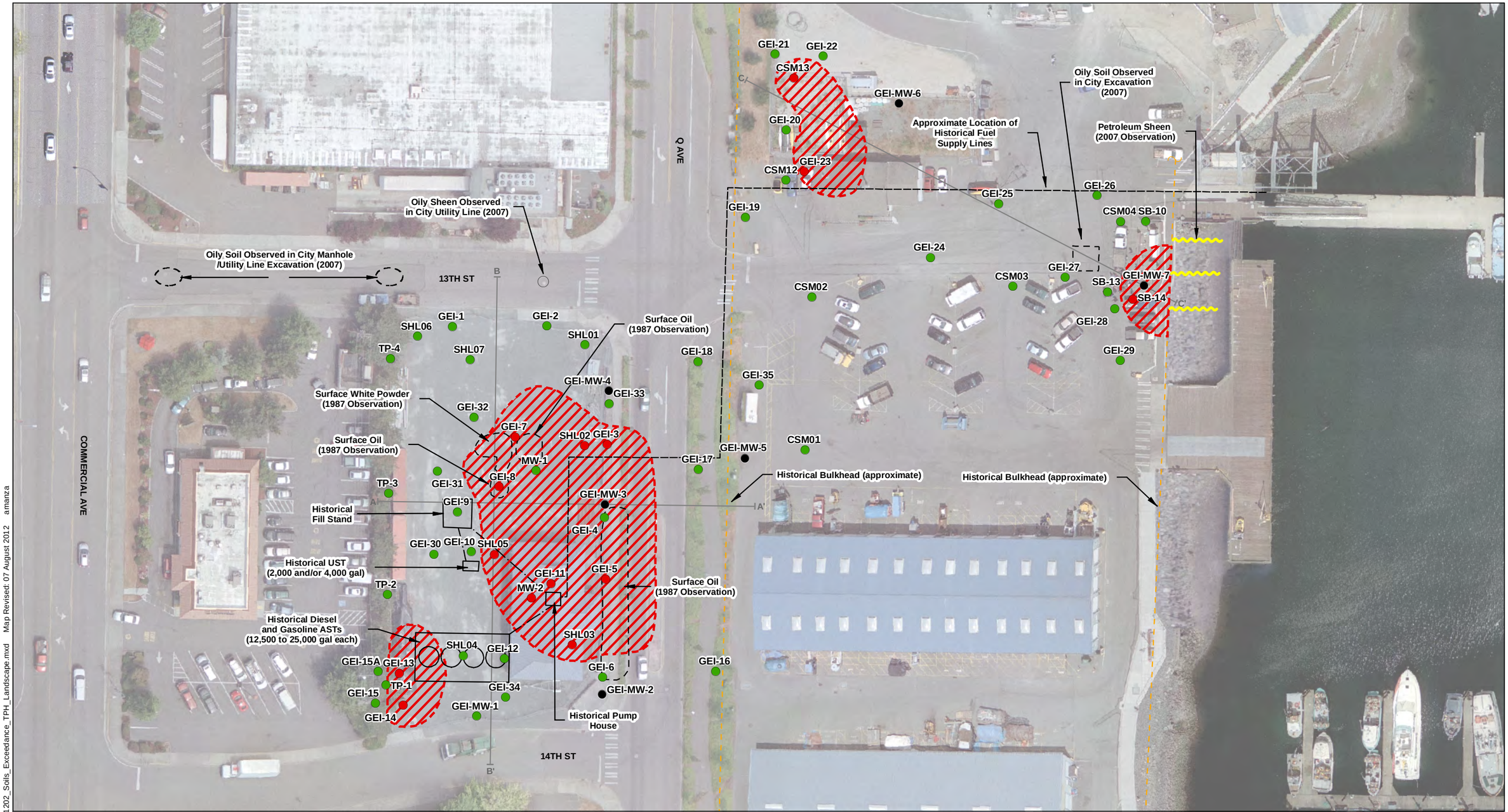
0 60 120
Feet

Summary of PAH Exceedances in Soil

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 5



Path: \\sea\projects\5\5147012\GIS\5147012_Soils_Exceedance_TPH_Landscape.mxd Map Revised: 07 August 2012 amanza

Notes:
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Reference: Roads from Skagit County. Point, line and polygon features digitized from figures 5.1 and 6.1 of November 2006 and Figure 2 of September 2005 by Floyd Snider. Imagery date: 2010.

- Soil Sample Location - TPH less than Preliminary Cleanup Level (see Tables 1 and 3)
- Soil Sample Location - TPH exceeds Preliminary Cleanup Level (see Tables 1 and 3)
- Soil Sample Location - No TPH Sample Data
- Cross Section
- Historical Fuel Supply Line
- Historical Product Line
- Approximate Area of TPH Exceedance in Soil

TPH - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil)

N W E S

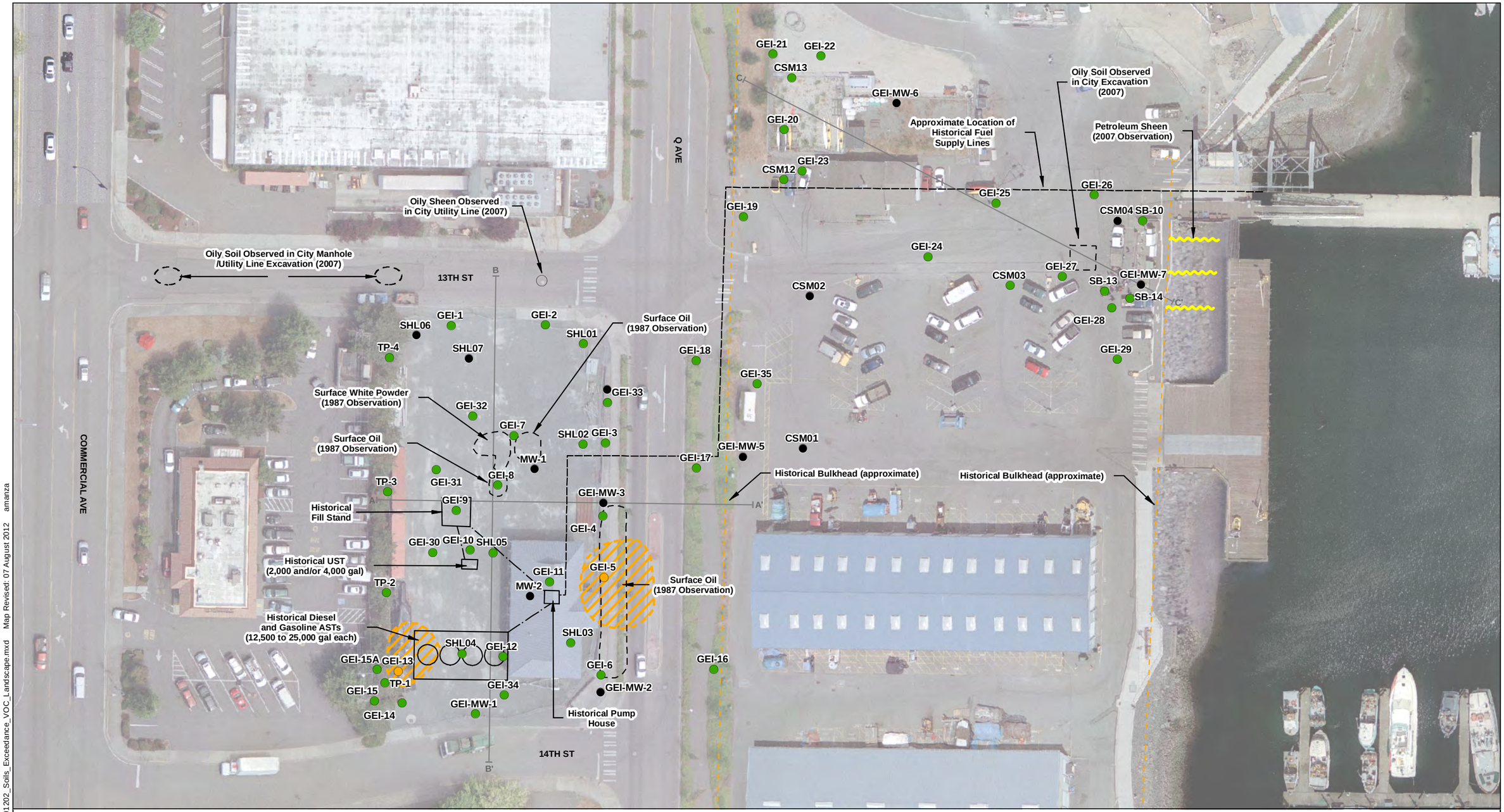
0 60 120
Feet

Summary of TPH Exceedances in Soil

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 6



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Reference: Roads from Skagit County. Point, line and polygon features digitized from figures 5.1 and 6.1 of November 2006 and Figure 2 of September 2005 by Floyd Snider. Imagery date: 2010.

- Soil Sample Location - VOC less than Preliminary Cleanup Level (see Tables 1 and 3)
- Soil Sample Location - VOC exceeds Preliminary Cleanup Level (see Tables 1 and 3)
- Soil Sample Location - No VOC Sample Data
- Cross Section
- Historical Fuel Supply Line
- Historical Product Line
- Approximate Area of VOC (BETX) Exceedance in Soil
- VOC - Voilatile Organic Compound

N W E S

0 60 120
Feet

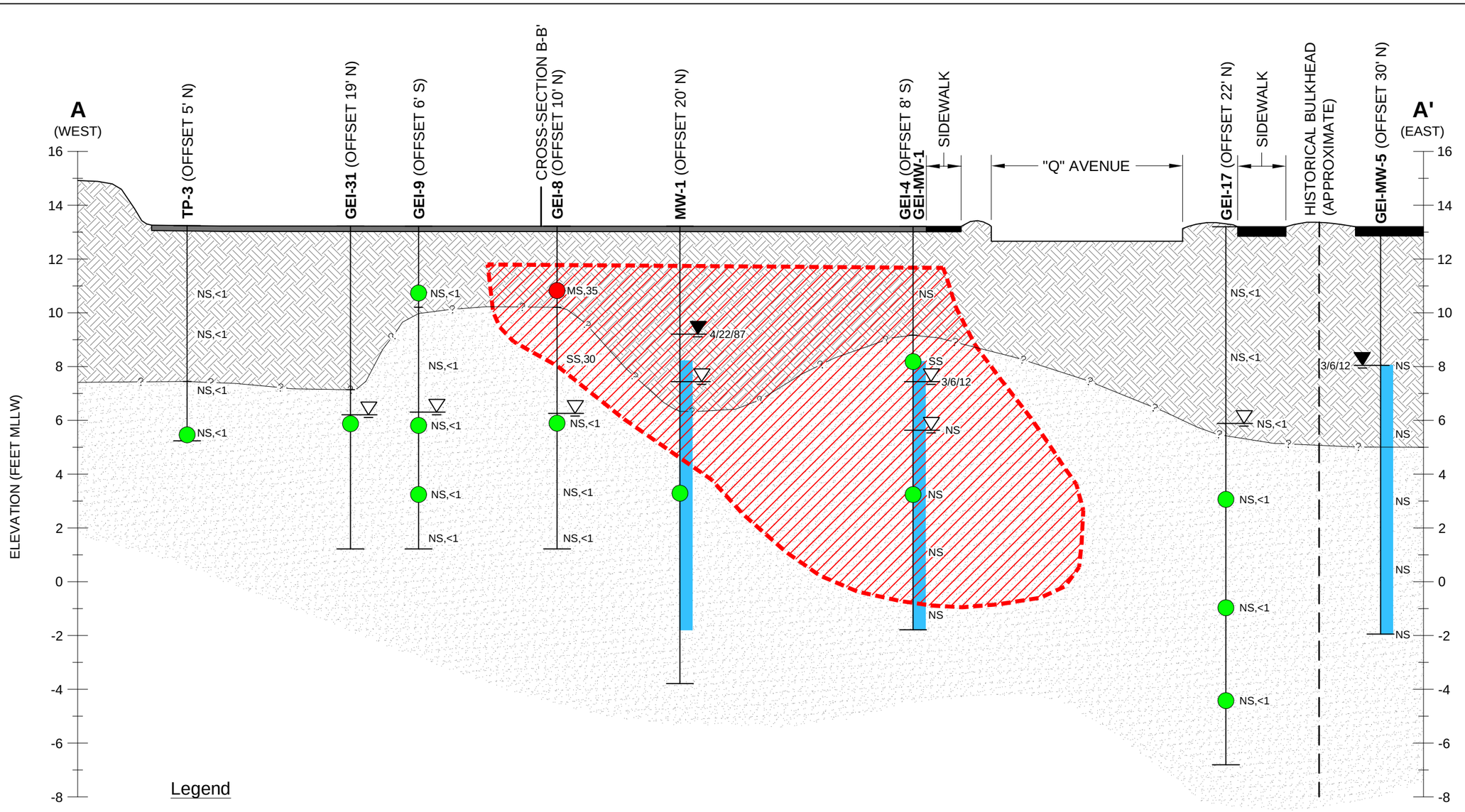
Summary of VOC Exceedances in Soil

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 7

Path: \\seaprojects\5\51470\2012\GIS\514701202_Soils_Exceedance_VOC_Landscape.mxd Map Revised: 07 August 2012 amanza



Legend

GEI-8 — Boring

? — Inferred Soil Contact

Groundwater Level Observed During Drilling

Measured Ground Water Level and Date

NS,<1 — Field Screening Results (Sheen, Headspace Vapor)

Well Screen Interval

Fill Material (Silty Sand with varying amounts of Silt and Gravel)

Native Marine Sediment (Silt and Silty Sand)

Soil Sample Location - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil) Exceed Preliminary Cleanup Levels (See Tables 1 and 3)

Soil Sample Location - Contaminants Less then Preliminary Cleanup Levels (See Tables 1 and 3)

Approximate Area of Petroleum Hydrocarbon (Gasoline, Diesel and/or Heavy Oil) Exceedance in Soil

MLLW — Mean Lower Low Water

HORIZONTAL SCALE: 1"= 20'
VERTICAL SCALE: 1"= 4'
VERTICAL EXAGGERATION: 5X

20 0 20
FEET

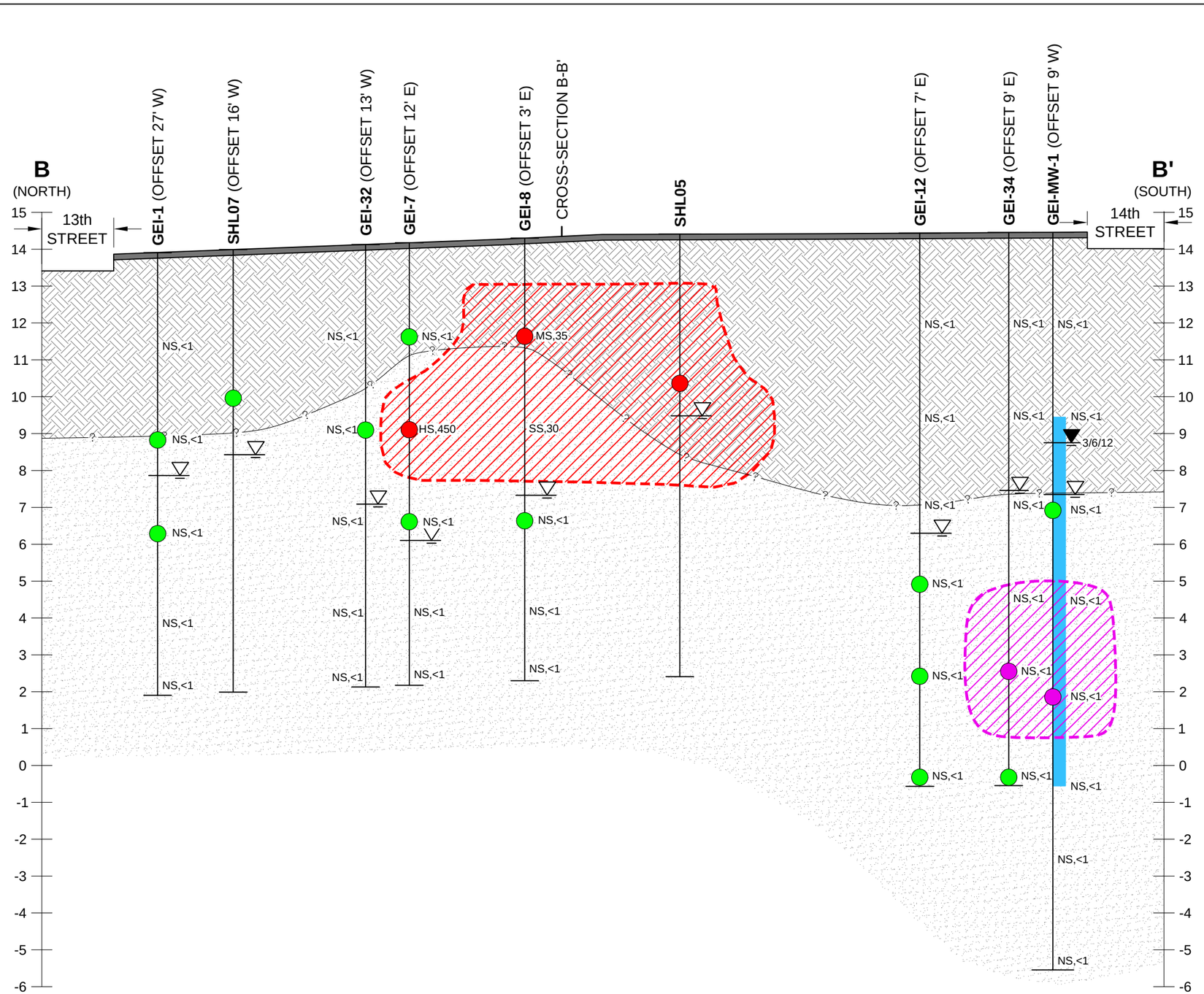
Cross-Section A-A'

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 8

P:\15\5I4701\2\CAD\5I4701\2-02 Cross-Sections.dwg\TAB:Cross-Section AA modified by THICHAUD on Apr 04, 2012 - 17:35



Legend

GEI-8 — Boring

? — Inferred Soil Contact

Groundwater Level Observed During Drilling

Measured Ground Water Level and Date

NS,<1 — Field Screening Results (Sheen, Headspace Vapor)

Well Screen Interval

Fill Material (Silty Sand with varying amounts of Silt and Gravel)

Native Marine Sediment (Silt and Silty Sand)

Soil Sample Location - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil) Exceed Preliminary Cleanup Levels (See Tables 1 and 3)

Soil Sample Location - PAHs Exceed Preliminary Cleanup Levels (See Tables 1 and 3)

Soil Sample Location - Contaminants Less then Preliminary Cleanup Levels (See Tables 1 and 3)

Approximate Area of Petroleum Hydrocarbon (Gasoline, Diesel and/or Heavy Oil) Exceedance in Soil

Approximate Area of PAH Exceedance in Soil

MLLW — Mean Lower Low Water

PAH — Polycyclic Aromatic Hydrocarbon

HORIZONTAL SCALE: 1"= 30'
VERTICAL SCALE: 1"= 3'
VERTICAL EXAGGERATION: 10X

30 0 30
FEET

Cross-Section B-B'

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers | **Figure 9**

P:\15\14701\2\CAD\15147012-02 Cross-Sections.dwg\TAB:Cross-Section BB modified by tmichaud on Apr 04, 2012 - 17:40

C (WEST)

C' (EAST)

GEI-21 (OFFSET 22' N)
CSM13 (OFFSET 14' N)
GEI-20 (OFFSET 16' S)
GEI-23 (OFFSET 34' S)
GEI-MW-6 (OFFSET 30' N)
GEI-24 (OFFSET 45' S)
GEI-25 (OFFSET 3' N)
CSM03 (OFFSET 38' S)
GEI-26 (OFFSET 36' N)
GEI-27 (OFFSET 18' S)
CSM04 (OFFSET 39 N)
SB-13 (OFFSET 14' S)
SB-14 (OFFSET 10' S)
GEI-MW-7
HISTORICAL BULKHEAD (APPROXIMATE)

RIP-RAP

MHHW (8.2')

ELEVATION (FEET MLLW)

14 13 12 11 10 9 8 7 6 5 4 3 2 1 0 -1 -2 -3 -4 -5 -6 -7 -8 -9 -10

NS,<1 SS,<1 MS,10 NS 3/6/12 ?

HORIZONTAL SCALE: 1"= 30'
VERTICAL SCALE: 1"= 3'
VERTICAL EXAGGERATION: 10X

30 0 30
FEET

Legend

GEI-8 Boring

? Inferred Soil Contact

Groundwater Level Observed During Drilling

Measured Ground Water Level and Date

NS,<1 Field Screening Results (Sheen, Headspace Vapor)

Well Screen Interval

Fill Material (Silty Sand with varying amounts of Silt and Gravel)

Native Marine Sediment (Silt and Silty Sand)

Soil Sample Location - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil) Exceed Preliminary Cleanup Levels (See Tables 1 and 3)

Soil Sample Location - PAHs Exceed Preliminary Cleanup Levels (See Tables 1 and 3)

Soil Sample Location - Contaminants Less then Preliminary Cleanup Levels (See Tables 1 and 3)

Approximate Area of Petroleum Hydrocarbon (Gasoline, Diesel and/or Heavy Oil) in Soil

Approximate Area of PAH Exceedance in Soil

MHHW Mean Higher High Water

MLLW Mean Lower Low Water

PAH Polycyclic Aromatic Hydrocarbon

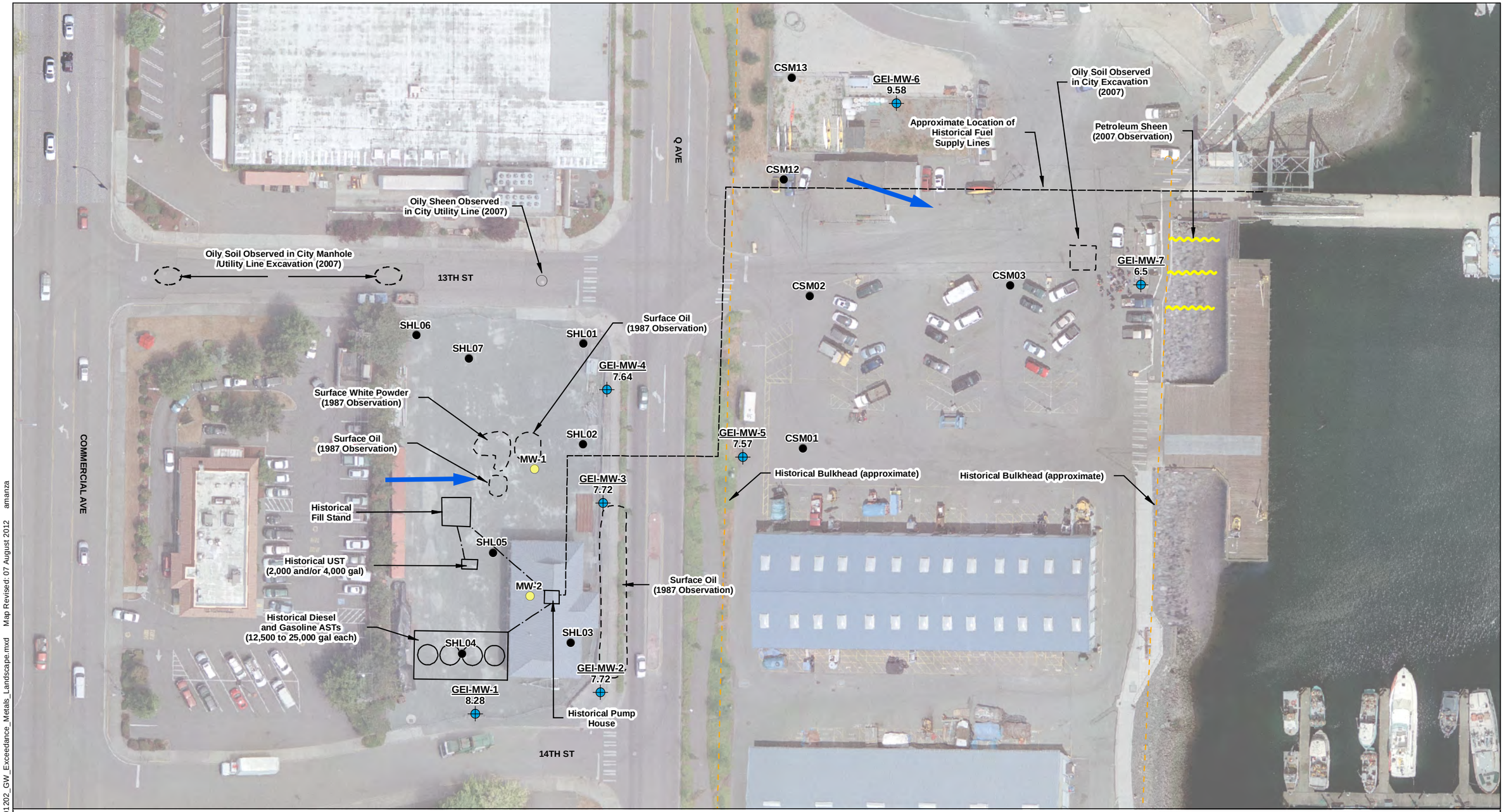
Cross-Section C-C'

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 10

P:\15\15\4701\2\CAD\15\4701\2-02 Cross-Sections.dwg\TAB:Cross-Section CC modified by TMichaud on Apr 04, 2012 - 17:33



Path: \\sea\projects\5\51470\2012\GIS\51470202_GW_Exceedance_Metals_Landscape.mxd Map Revised: 07 August 2012 amanza

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Reference: Roads from Skagit County. Point, line and polygon features digitized from figures 5.1 and 6.1 of November 2006 and Figure 2 of September 2005 by Floyd Snider. Imagery date: 2010.

- Monitoring Well Location
- GEI-MW-1 / 8.28 — Monitoring Well Identification / March 2012 Groundwater Elevation (feet, MLLW)
- Inferred Groundwater Flow Direction
- Historical Fuel Supply Line
- Historical Product Line
- Groundwater Sample Location - Metals (Lead) less than Preliminary Cleanup Levels (See Tables 2 and 4)
- Groundwater Sample Location - Metals (Lead) exceeds Preliminary Cleanup Levels (See Tables 2 and 4)
- Groundwater Sample Location - No Metals Sample Data

MLLW - Mean Lower Low Water

N W E S

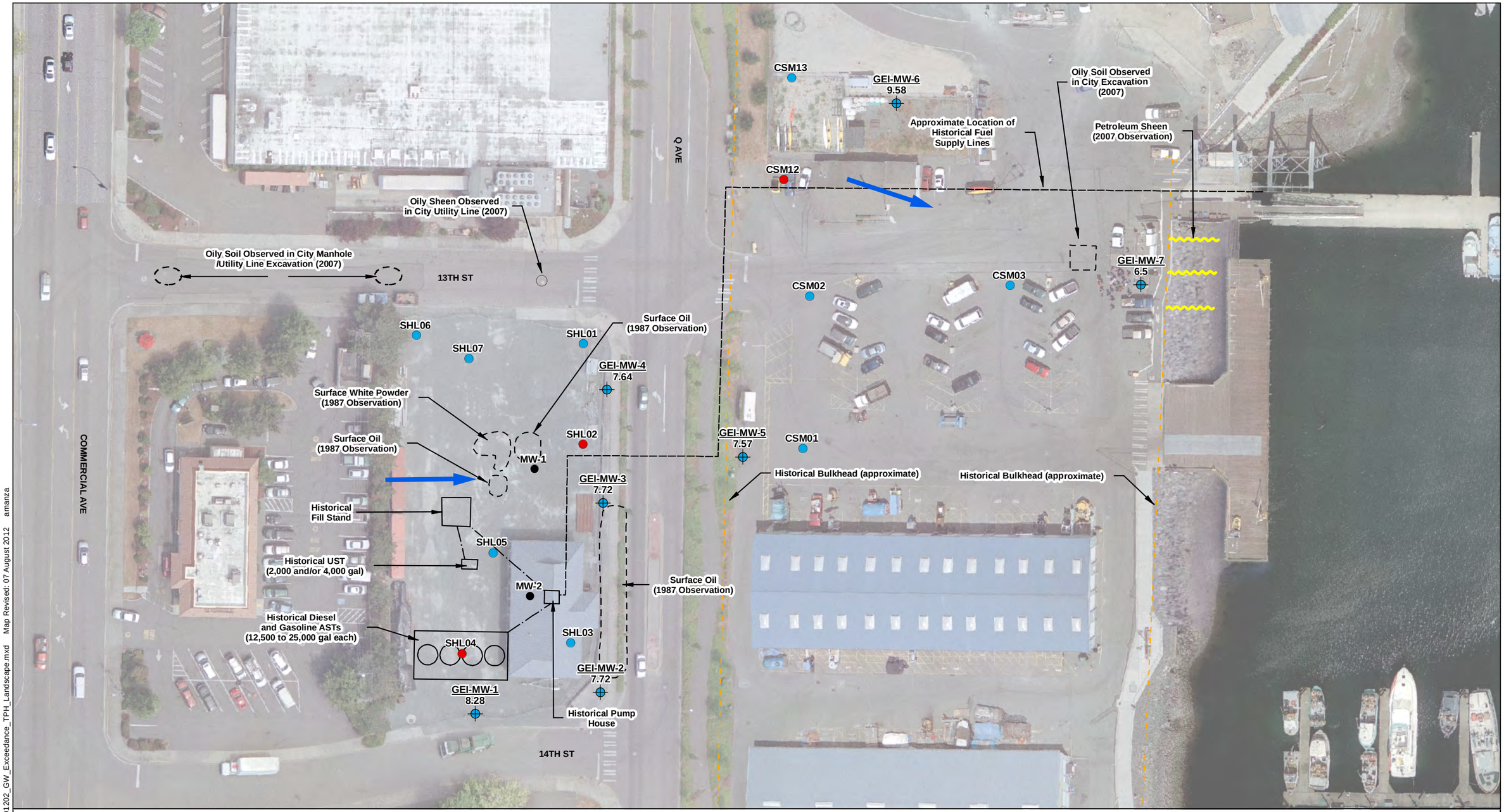
0 60 120
Feet

Summary of Metals Exceedance in Groundwater

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 11



Path: \\sea\projects\5\51470\2012\GIS\514701202_GW_Exceedance_TPH_Landscape.mxd Map Revised: 07 August 2012 amanza

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Reference: Roads from Skagit County. Point, line and polygon features digitized from figures 5.1 and 6.1 of November 2006 and Figure 2 of September 2005 by Floyd Snider. Imagery date: 2010.

- Monitoring Well Location
- GEI-MW-1 / 8.28 — Monitoring Well Identification / March 2012 Groundwater Elevation (feet, MLLW)
- Inferred Groundwater Flow Direction
- Historical Fuel Supply Line
- Historical Product Line
- Groundwater Sample Location - TPH less than Preliminary Cleanup Levels (See Tables 2 and 4)
- Groundwater Sample Location - TPH exceeds Preliminary Cleanup Levels (See Tables 2 and 4)
- Groundwater Sample Location - No TPH Sample Data

MLLW - Mean Lower Low Water
TPH - Petroleum Hydrocarbons (Gasoline, Diesel and/or Heavy Oil)

N W E S

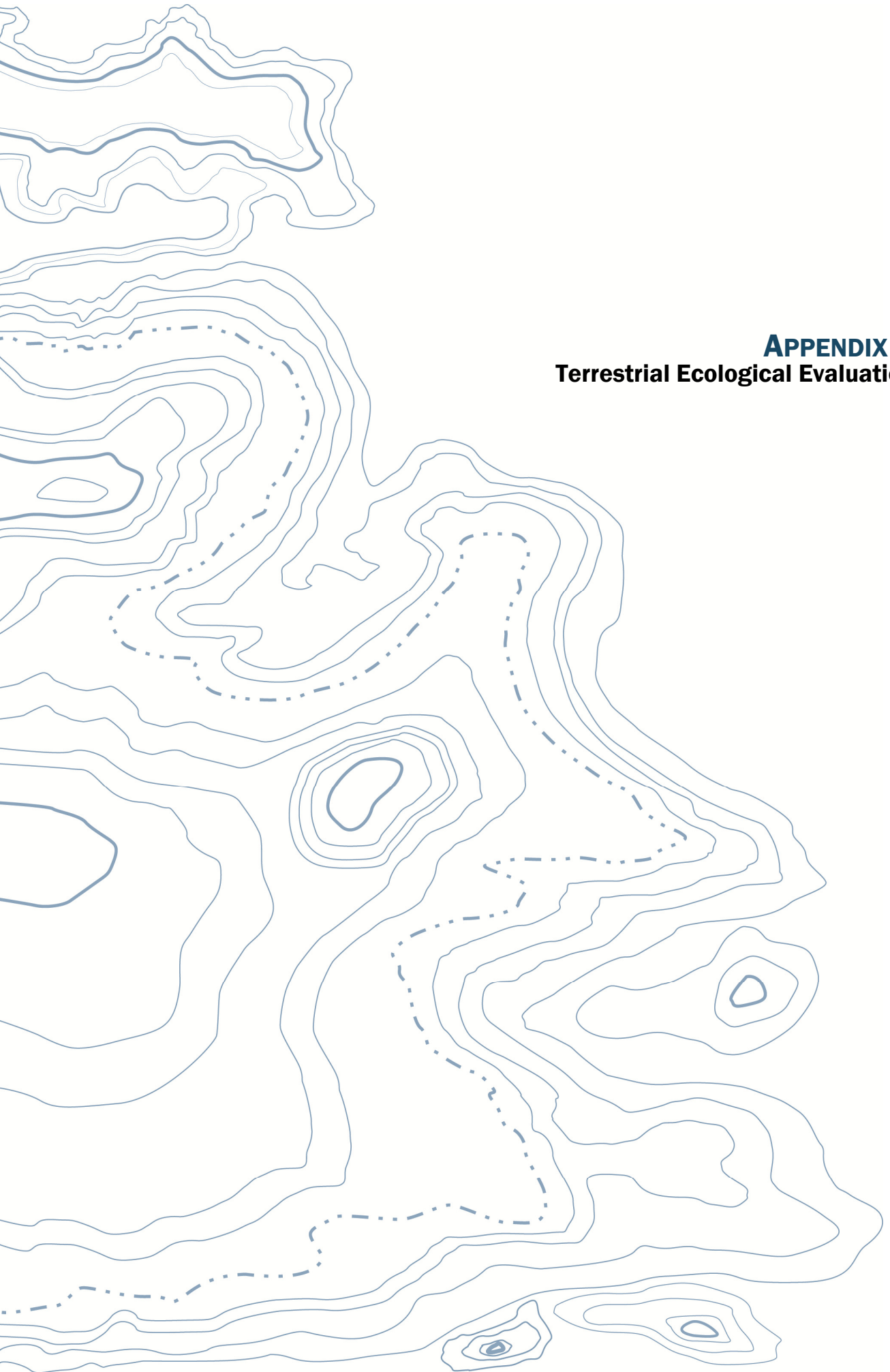
0 60 120
Feet

Summary of TPH Exceedance in Groundwater

Former Shell Oil Tank Farm
Anacortes, Washington

GeoEngineers

Figure 12



APPENDIX B
Terrestrial Ecological Evaluation

Terrestrial Ecological Evaluation Process- Simplified or Site-Specific Evaluation?

Documentation Form

	Terrestrial Concern	Response (Circle One)
*1	Is the site is located on or directly adjacent to an area where management or land use plans will maintain or restore native or semi-native vegetation?	Yes / (No)
*2a	Is the site used by a threatened or endangered species?	Yes / (No)
*2b	Is the site used by a wildlife species classified by the state department of fish and wildlife as a "priority species" or "species of concern" under Title 77 RCW?	Yes / (No)
*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.	Yes / (No)
*3	Is the site (area where the contamination is located) located on a property that contains at least ten acres of native vegetation within 500 feet of the area where the contamination is located?	Yes / (No)
4	Has the department determined that the site may present a risk to significant wildlife populations?	Yes / (No)

*1 This includes for example, green-belts, protected wetlands, forestlands, locally designated environmentally sensitive areas, open space areas managed for wildlife, and some parks or outdoor recreation areas. This does not include park areas used for intensive sport activities such as baseball or football.

*2a What are the threatened or endangered species in Washington state?

*2b Which plant species are classified as threatened, endangered, or sensitive? Where can I find out more information about this topic?

*2c For plants, "used" means that a plant species grows at the site or has been found growing at the site. For animals, "used" means that individuals of a species have been observed to live, feed or breed at the site.

*3 For this analysis, do not include native vegetation beyond the property boundary.

The following sources shall be used in making this determination: Natural Vegetation of Oregon and Washington, J.F. Franklin and C.T. Dyrness, Oregon State University Press, 1988, and L.C. Hitchcock, C.L. Hitchcock, J.W. Thompson and A. Cronquist, 1955-1969, Vascular Plants of the Pacific Northwest(5 volumes). Areas planted with native species for ornamental or landscaping purposes shall not be considered to be native vegetation. [WAC 173-340-7491(2)(c)(i)]

(Here's a link to the Seattle Public Library and the Washington State Library to borrow a copy of Natural Vegetation of Oregon and Washington, J.F. Franklin and C.T. Dyrness, Oregon State University Press, 1988, or you may purchase it through your favorite bookseller. Here's an additional link to a useful online Field Guide to Selected Rare Plants of Washington developed by the Washington State Department of Natural Resources' Natural Heritage Program (WNHP) and the Spokane District of the U.S.D.I. Bureau of Land Management (BLM) which contains fact sheets for 139 vascular plant species and one lichen species.

Here is an aid to calculating area and an aerial photo depicting a site, its 500 foot boundary and several labeled circles identifying various areas for reference in judging the area of native vegetation within the 500 foot radius.

[Exclusions Main] [TEE Definitions] [Simplified or Site-Specific?] [Simplified Ecological Evaluation] [Site-Specific Ecological Evaluation] [WAC 173-340-7493] [Index of Tables]

[TEE Home]

Washington State Department of Ecology
Toxics Cleanup Program

Terrestrial Ecological Evaluation Process- Simplified Evaluation

Documentation Form

Criteria # (Concern)	Criteria	Response (Circle One)
1 (exposure)	Is the total area of soil contamination at the site less than or equal to 350 square feet	**Yes (End TEE) / No**
2 (exposure)	Does land use at the site and surrounding area make substantial wildlife exposure unlikely based on completion of Table 749-1?	**Yes (End TEE) / No**
3 (pathway)	Is there a potential exposure pathway from soil contamination to soil biota, plants, or wildlife?	**Yes / No (End TEE)**
4 (contaminant)	Are the hazardous substances at your site listed in Table 749-2 and is (or will) their location in the soil at your site be at a depth not exceeding the point of compliance, and at concentrations that do not exceed the values provided in Table 749-2.	**Yes (End TEE) / No** **Note: You must perform bioassays for contaminants at your site if no table value is provided.**
5 (contaminant)	Will hazardous substances listed in Table 749-2 be present in the soil at your site within 6 feet of the ground surface at concentrations likely to be toxic, or with the potential to bioaccumulate, based on bioassays using methods approved by the department.	**Yes / No (End TEE)**

[Exclusions Main] [TEE Definitions] [Simplified or Site-Specific?] [Simplified Ecological Evaluation] [Site-Specific Ecological Evaluation] [WAC 173-340-7493] [Index of Tables]

[TEE Home]

Table 749-1

Simplified Terrestrial Ecological Evaluation-Exposure Analysis Procedure

Estimate the area of contiguous (connected) undeveloped land on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre).	
1) From the table below, find the number of points corresponding to the area and enter this number in the field to the right.	
Area (acres) / Points 0.25 or less / 4 0.5 / 5 1.0 / 6 1.5 / 7 2.0 / 8 2.5 / 9 3.0 / 10 3.5 / 11 4.0 or more / 12	6
2) Is this an industrial or commercial property? If yes, enter a score of 3. If no, enter a score of 1	1
3)[a] Enter a score in the box to the right for the habitat quality of the site, using the following rating system[b]. High=1, Intermediate=2, Low=3	3
4) Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2.[c]	2
5) Are there any of the following soil contaminants present: Chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.	4
6) Add the numbers in the boxes on lines 2-5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified evaluation may be ended.	10

Notes for Table 749-1

[a] It is expected that this habitat evaluation will be undertaken by an experienced field biologist. If this is not the case, enter a conservative score of (1) for questions 3 and 4.

[b] **Habitat rating system.** Rate the quality of the habitat as high, intermediate or low based on your professional judgment as a field biologist. The following are suggested factors to consider in making this evaluation:

> **Low:** Early successional vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas severely disturbed by human activity, including intensively cultivated croplands. Areas isolated from other habitat used by wildlife.

High: Area is ecologically significant for one or more of the following reasons: Late-successional native plant communities present; relatively high species diversity; used by an uncommon or rare species; priority habitat (as defined by the Washington Department of fish and Wildlife); part of a larger area of habitat where size or fragmentation may be important for the retention of some species.

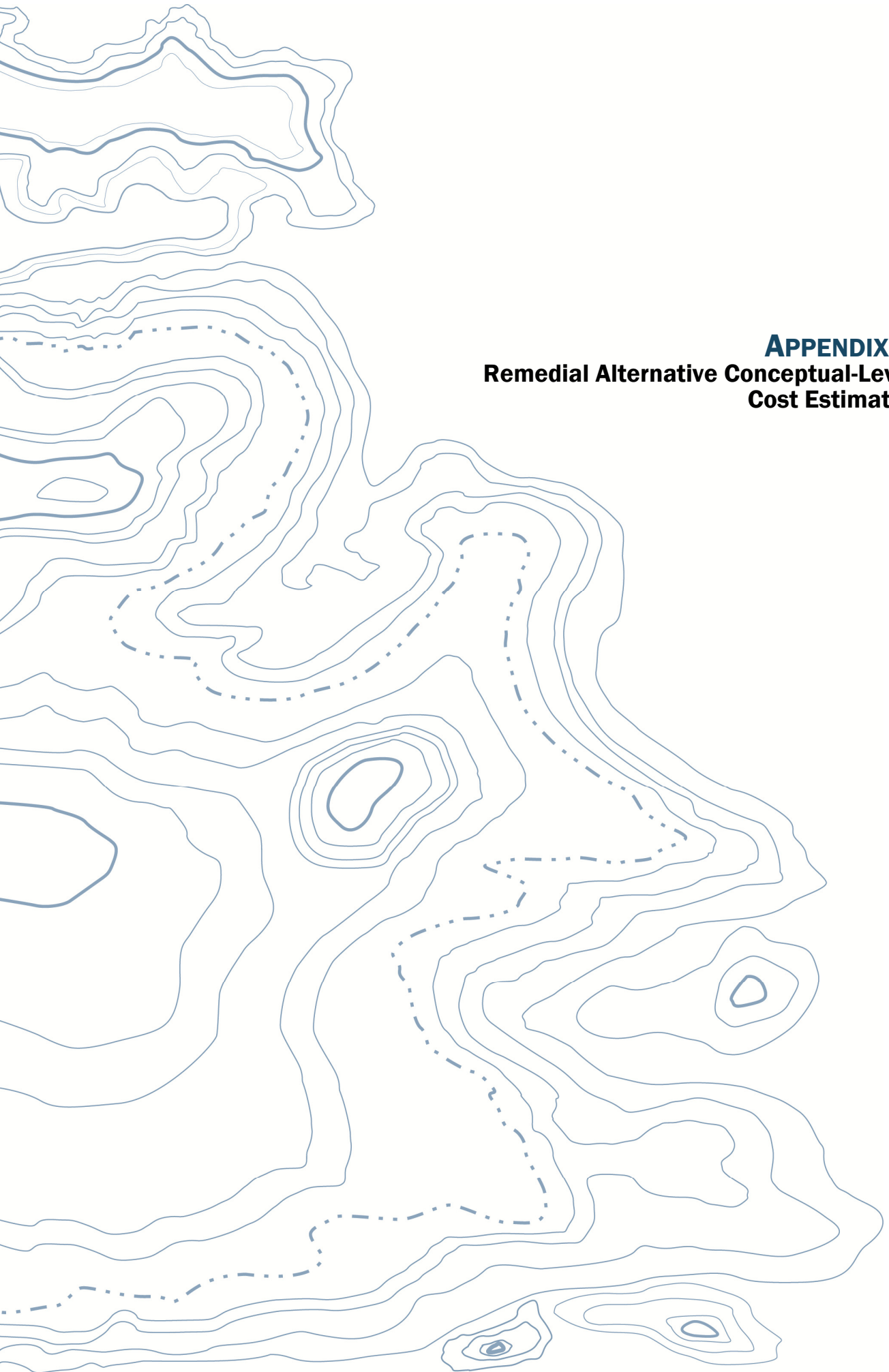
Intermediate: Area does not rate as either high or low.

[c] Indicate "yes" if the area attracts wildlife or is likely to do so. Examples: Birds frequently visit the area to feed; evidence of high use b mammals (tracks, scat, etc.); habitat "island" in an industrial area; unusual features of an area that make it important for feeding animals; heavy use during seasonal migrations.

[Area Calculation Aid] [Aerial Photo with Area Designations] [TEE Table 749-1] [Index of Tables]

[Exclusions Main] [TEE Definitions] [Simplified or Site-Specific?] [Simplified Ecological Evaluation] [Site-Specific Ecological Evaluation] [WAC 173-340-7493]

[TEE Home]



APPENDIX C
Remedial Alternative Conceptual-Level Cost Estimates

Table C-1

Cost Estimate - Proposed Cleanup Action Alternative 1

Engineering and Institutional Controls

Cap Sante Marine
Anacortes, Washington

Description	QTY	Unit	Unit Cost	Total	Notes
Capital Costs					
Institutional Controls					
Institutional Control Plan	1	LS	$25,000	$25,000	Describe controls/implementation
Groundwater Use Restriction	1	LS	$20,000	$20,000	Legal fees
Site Information Database	1	LS	$2,500	$2,500	Setup data management system
			SUBTOTAL	$47,500	
Annual Operation & Maintenance (O&M) Costs					
Site Monitoring and Reporting					
Quarterly Groundwater Sampling and Reporting	4	QTR	$5,000	$20,000	Sample 2 wells per quarter for one year - summerize quartely groundwater monitoring results in a single report
Annual Groundwater Sampling and Reporting	10	YR	$9,500	$95,000	Sample 2 wells per year for ten years - summerize annual monitoring events in separate reports (ten annual events)
Groundwater Sample Laboratory Analysis	31	EA	$350	$10,850	Chemical analysis of TPH and PAH. Includes 10% duplicate samples.
Cap Inspection	10	YR	$3,000	$30,000	
Site Information Database Update	3	EA	$1,000	$3,000	
			SUBTOTAL	$158,850	
Periodic Costs					
Off-Site Treatment/Disposal					
Wastewater Testing/Discharge	150	GAL	$1	$150	Disposal fee for purge water generated
			SUBTOTAL	$150	
Monitoring Well Abandonment/Decommissioning					
Monitoring well Decommissioning by Licensed Driller	1	LS	$2,000	$2,000	Decomission 2 wells following completion of groundwater monitoring
			SUBTOTAL	$2,000	
Cleanup Alternative Cost Summary					
Capital Costs				$47,500	
O&M Costs				$158,850	
Periodic Costs				$2,150	
			CLEANUP ALTERNATIVE SUBTOTAL	$208,500	
Contingency (30%)				$62,550	% of Cleanup Alternative Subtotal
Project Planning, Management and Support (15%)				$40,658	% of Cleanup Alternative Subtotal with Contingancy
Port Administration Cost (6%)				$16,263	% of Cleanup Alternative Subtotal with Contingancy
Total Estimated Cleanup Action Alternative Cost				**$327,971**	

Notes:

QTY = quantity
LS = lump sum
QTR = quarter
YR = year
EA = each
GAL = gallon
TPH = gasoline-, diesel- and heavy oil-range petroleum hydrocarbons
PAH = polycyclic aromatic hydrocarbons
VOC = volatile organic compounds

Table C-2

Cost Estimate - Proposed Cleanup Action Alternative 2

In-Situ Soil Treatment

Cap Sante Marine
Anacortes, Washington

Description	QTY	Unit	Unit Cost	Total	Notes
Capital Costs					
Preperation/Planning and Treatability Testing					
Project Preperation, Planning and Treatability Testing	1	LS	$25,000	$25,000	
			SUBTOTAL	$25,000	
Mobilization/Demobilization					
Mobilization/Site Controls/Demobilization	1	LS	$75,000	$75,000	Basis: Preliminary contractor quote - assumes mobilization/demobilization cost for two round of treatment
			SUBTOTAL	$75,000	
In-Situ Treatment					
Purchase of Chemical Oxidant	120,000	LB	$2	$240,000	Basis: Preliminary contractor quote for two round of treatment
Purchase of Activating Agent	40,000	LB	$1	$40,000	Basis: Preliminary contractor quote for two round of treatment
In-Situ Treatment using injection	1	LS	$100,000	$100,000	Basis: Preliminary contractor quote for two round of treatment
			SUBTOTAL	$380,000	
Verification Soil Sampling and Analyses					
Soil Sampling	1	LS	10,000	10,000	Geoprobe sampling on a 25'x25' grid over an area of 7,700 square feet for two rounds of sampling
Soil Laboratory Analysis	35	EA	$350	$12,250	Chemical analysis of TPH and PAH. Assume 25' by 25' sample grid spacing. Includes 10% duplicate samples. For two rounds of sampling.
			SUBTOTAL	$22,250	
Annual Operation & Maintenance (O&M) Costs					
Site Monitoring and Reporting					
Quarterly Groundwater Sampling and Reporting	4	QTR	$5,000	$20,000	Sample 2 wells per quarter for one year - summerize quartely groundwater monitoring results in a single report
Annual Groundwater Sampling and Reporting	10	YR	$9,500	$95,000	Sample 2 wells per year for ten years - summerize annual monitoring events in separate reports (ten annual events)
Groundwater Sample Laboratory Analysis	31	EA	$350	$10,850	Chemical analysis of TPH and PAH. Includes 10% duplicate samples.
Site Information Database Update	5	EA	$1,000	$5,000	
			SUBTOTAL	$130,850	

Description	QTY	Unit	Unit Cost	Total	Notes
Periodic Costs					
Reporting					
Cleanup Action Report	1	EA	$50,000	$50,000	
			SUBTOTAL	$50,000	
Off-Site Treatment/Disposal					
Soil cuttings from soil sampling activities	2	EA	$80	$160	Disposal fee for soil cuttings per 55-gallon drum
Wastewater Testing/Discharge	150	GAL	$1	$150	Disposal fee for purge water generated
			SUBTOTAL	$310	
Monitoring Well Abandonment/Decommissioning					
Monitoring well Decommissioning by Licensed Driller	1	LS	$2,000	$2,000	Decomission 2 wells following completion of groundwater monitoring
			SUBTOTAL	$2,000	
Cleanup Alternative Cost Summary					
Capital Costs				$502,250	
O&M Costs				$130,850	
Periodic Costs				$52,310	
			CLEANUP ALTERNATIVE SUBTOTAL	$685,410	
Construction Management and Field Monitoring (10%)				$50,225	% of Capital Cost
Contractor Overhead (20%)				$10,462	% of Capital Cost
Contingency (30%)				$205,623	% of Cleanup Alternative Subtotal
Project Planning, Management and Support (15%)				$133,655	% of Cleanup Alternative Subtotal with Contingency
Port Administration Cost (6%)				$53,462	% of Cleanup Alternative Subtotal with Contingency
Total Estimated Cleanup Action Alternative Cost				**$1,138,837**	

Notes:

QTY = quantity

CY = cubic yard

TON = tons

LS = lump sum

QTR = quarter

YR = year

EA = each

GAL = gallon

TPH = gasoline-, diesel- and heavy oil-range petroleum hydrocarbons

PAH = polycyclic aromatic hydrocarbons

Table C-3

Cost Estimate - Proposed Cleanup Action Alternative 3

Complete Source Removal

Cap Sante Marine

Anacortes, Washington

Description	QTY	Unit	Unit Cost	Total	Notes
Capital Costs					
Mobalization/Demobalization					
Mobilization/Site Controls/Demobilization	1	LS	$112,803	$112,803	Assume 10% of Overall Capital Cost
			SUBTOTAL	$112,803	
Demolition					
Asphalt Demolition and Disposal	320	SY	$12	$3,776	Assumes asphalt surfaces at ~6" thick
Concrete Demolition and Disposal	50	CY	$149	$7,450	Includes concrete foundations, and sidewalks
Relocate and Return Office Building	1	LS	$200,000	$200,000	Based on cost of relocating port building during Former Scott Mill Project
			SUBTOTAL	$211,226	
Monitoring Well Abandonment/Decommissioning					
Monitoring well Decommissioning by Licensed Driller	1	LS	$1,000	$1,000	Decomission 1 well prior to construction Excavation
			SUBTOTAL	$1,000	
Soil Removal, Backfill, and Pavement Restoration					
Shoring	250	LF	$500	$125,000	Assume temporary sheet pile along east face of Contamination Area 4 and along western face of Contamination Area 5 Average depth of 30 feet.
Excavation Dewatering	1	LS	$175,000	$175,000	Unit cost based on average of three Cap Sante Marine Interim Action bids.
Wastewater Treatment	1	LS	$16,000	$16,000	Unit cost based on average of three Cap Sante Marine Interim Action bids.
Excavate Soil (0'-14' bgs)	6,120	CY	$6	$36,720	Includes clean overburden plus contaminated soil. Assume 20% expansion above in-place volume. Cost includes excavation and stockpile. Unit cost for excavation based on average of three Cap Sante Marine Interim Action bids.
Contaminated Soil (non-haz) Transport and Disposal at Approved Off-Site Facility	3,456	TON	$60	$207,360	Assumes a total of 1,800 cy of in-place contaminated soil. Assume 20% expansion above in-place volume. Assume 1.6 ton/cy. Cost includes loading and hauling.
Purchase, Place and Compact General Backfill Material	3,456	TON	$46	$158,976	Assume 1.6 ton/cy. Cost includes purchase, filling and compaction. Unit cost based on average of three Cap Sante Marine Interim Action bids.
			SUBTOTAL	$719,056	

Description	QTY	Unit	Unit Cost	Total	Notes
Capital Costs Continued					
Surface Restoration					
Pavement and Subgrade Restoration	400	SY	$40	$16,000	Assumes pavement surfaces at ~6" thick
			SUBTOTAL	$16,000	
Utility Alteration and Replacement					
Remove, Bypass, and/or Replace utilities in project area	1	LS	$150,000	$150,000	
			SUBTOTAL	$150,000	
Monitoring Well Installation					
Monitoring well Installation by Licensed Driller	1	LS	$4,000	$3,000	Install 1 replacement well following soil removal and backfilling
			SUBTOTAL	$3,000	
Site Survey					
Post-Construction (As-Built) Surveys	1	LS	$15,000	$15,000	
			SUBTOTAL	$15,000	
Verification Soil Sampling					
Soil Laboratory Analysis	45	EA	$350	$15,750	Chemical analysis of TPH, and PAH. Assume base samples on 25' by 25' grid spacing and sidewall sample on 40 linear foot spacing. Includes 10% duplicate samples
			SUBTOTAL	$15,750	
Annual Operation & Maintenance (O&M) Costs					
Site Monitoring and Reporting					
Quarterly Groundwater Sampling and Reporting	4	QTR	$5,000	$20,000	Sample 2 wells per quarter for one year - summerize quartely groundwater monitoring results in a single report
Groundwater Sample Laboratory Analysis	9	EA	$610	$5,490	Chemical analysis of TPH and PAH. Includes 10% duplicate samples.
Site Information Database Update	2	EA	$1,000	$2,000	
			SUBTOTAL	$27,490	
Periodic Costs					
Reporting					
Cleanup Action Report	1	EA	$50,000	$50,000	
			SUBTOTAL	$50,000	
Off-Site Treatment/Disposal					
Monitoirng Well Soil Cuttings Disposal	2	EA	$80	$160	Disposal fee for soil cuttings per 55-gallon drum
Wastewater Testing/Discharge	75	GAL	$1	$75	Disposal fee for purge water generated
			SUBTOTAL	$235	
Monitoring Well Abandonment/Decommissioning					
Monitoring well Decommissioning by Licensed Driller	1	LS	$2,000	$2,000	Decomission 2 wells following completion of groundwater monitoring
			SUBTOTAL	$2,000	

Description	QTY	Unit	Unit Cost	Total	Notes
Cleanup Alternative Cost Summary					
Capital Costs				$1,243,835	
O&M Costs				$27,490	
Periodic Costs				$52,235	
CLEANUP ALTERNATIVE SUBTOTAL				$1,323,560	
Construction Management and Field Monitoring (10%)				$124,384	% of Capital Cost
Contractor Overhead (20%)				$248,767	% of Capital Cost
Contingency (30%)				$397,068	% of Cleanup Alternative Subtotal
Project Planning, Management and Support (15%)				$258,094	% of Cleanup Alternative Subtotal with Contingency
Port Administration Cost (6%)				$103,238	% of Cleanup Alternative Subtotal with Contingency
Total Estimated Cleanup Action Alternative Cost				**$2,455,111**	

Notes:

QTY = quantity

CY = cubic yard

TON = tons

LS = lump sum

QTR = quarter

YR = year

EA = each

GAL = gallon

TPH = gasoline-, diesel- and heavy oil-range petroleum hydrocarbons

PAH = polycyclic aromatic hydrocarbons

ATTACHMENT 1
September 2007 Shallow Soil Characterization Study

GeoEngineers

October 10, 2007

Port of Anacortes
First and Commercial Avenue
P.O. Box 297
Anacortes, Washington 98221

Attention: Bob Elsner

Subject: Shallow Soil Characterization Results
Cap Sante Marina
Anacortes, Washington
File No. 5147-005-02

INTRODUCTION

This letter presents the results of the supplemental shallow soil characterization study at the Port of Anacortes Cap Santa Marine Site (Site), located at the Cap Sante Boat Haven in Anacortes, Washington. The general site layout is shown in Figure 1.

The purpose of this supplemental soil characterization study is to further delineate the extent of contamination within the shallow soils at the Site. These data supplement the Ecology-required Remedial Investigation/Feasibility Study (RI/FS) investigation of the Site and will also be utilized to support excavation, segregation and disposal of the non-contaminated Site soils at the Anacortes Airport during remediation construction.

Interim remedial actions are being completed at the Site to address historical petroleum hydrocarbon contamination resulting from underground storage tank releases. The soil samples collected at the Site were field screened for petroleum hydrocarbons and submitted for chemical analysis to further characterize the shallow soil and delineate the contact between clean soil and underlying contaminated soil.

SUPPLEMENTAL SITE CHARACTERIZATION ACTIVITIES

EXPLORATION PROGRAM

GeoEngineers conducted Site reconnaissance and exploration activities at the site on September 11, 2007. Explorations were completed in the proposed remedial excavation area as shown on Figure 1. Sampling locations and target sample intervals were identified using the existing RI/FS soil characterization data. A total of eleven borings (GEI-1 through GEI-11) were completed using a truck-mounted direct push drilling rig. Borings were completed to depths ranging from approximately 4 feet to 8 feet below ground surface (bgs).

SURFACE AND SUBSURFACE CONDITIONS

Based on the field observations made during this study and during the RI/FS investigation, near-surface soils at the site generally consist of fine to coarse sand with varying silt and gravel content to a depth of approximately 8 feet bgs. Groundwater was typically encountered at a depth of 4 feet bgs in the borings.

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FIELD SCREENING OBSERVATIONS

Field screening was conducted to evaluate the presence of petroleum hydrocarbons in soil samples. Field screening consisted of visual/odor observations, water sheen testing and headspace organic vapor measurements with a photoionization detector (PID). Field screening evidence of petroleum hydrocarbons was observed in borings GEI-4, GEI-5 and GEI-7 through GEI-11 at depths similar to those identified in the RI/FS field investigation. Field screening evidence of petroleum hydrocarbons was not observed in borings GEI-1 through GEI-3 and GEI-6 within the depth interval of the completed boring.

CHEMICAL ANALYTICAL RESULTS

Based on field observations, eleven soil samples were submitted to CCI laboratories of Everett, Washington for chemical testing to confirm soil quality conditions. Each of the submitted samples were analyzed for benzene, ethylbenzene, toluene and xylenes (BETX) by EPA Method 8021B; gasoline-range hydrocarbons by Ecology Method NWTPH-Gx; diesel- and oil-range hydrocarbons by Ecology Method NWTPH-Dx, polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270 SIM and lead by EPA Method 6010. Chemical analytical results are presented in Table 1, 2 and 3.

BETX, gasoline-, diesel-, and oil-range hydrocarbons, PAHs and lead either were not detected or were detected at concentrations less than MTCA Method A and B cleanup levels with one exception. Gasoline-range hydrocarbons were detected at a concentration that exceeded the MTCA Method A cleanup level in sample GEI-7-2.0 to 3.0.

CONCLUSIONS

Field observations, field screening, and chemical analytical data obtained during the September 2007 drilling program at the Site show that shallow soils of varying thickness are not contaminated relative to MTCA Method A and B cleanup levels. In our opinion, the non-contaminated soils meeting MTCA Method A and B cleanup levels are acceptable for unrestricted land uses including placement as fill material at the Anacortes Airport.

The approximate vertical extent of non-contaminated soils is presented in Figure 1. The actual limits of the non-contaminated material will be confirmed during construction based on field screening observation during excavation. The non-contaminated shallow soils will be carefully segregated from the underlying contaminated soil during construction to ensure that cross-contamination does not occur during soil excavation and handling.

LIMITATIONS

This letter report has been prepared for the exclusive use of Port of Anacortes, their authorized agents and regulatory agencies. This report is not intended for use by others and the information contained herein is not applicable to other sites. No other party may rely on the product of our services unless we agree in advance, and in writing, to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

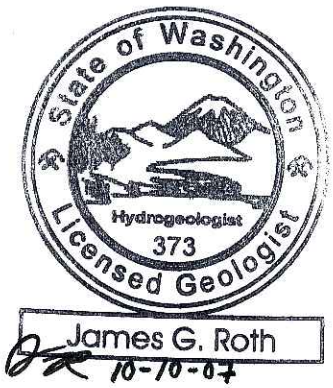
Interpretation of soil conditions for this study is based on site observations, field screening results and chemical analysis of a limited number of widely spaced soil samples. It is always possible that contamination not identified by our study exists in portions of the site that were not sampled or analyzed.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with our general agreement with the Port of Anacortes (Contract No. 72-00-07) and generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form of this document (email, text, table, and/or figure), if provided, and any attachments are only a copy of a master document. The master hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

We appreciate the opportunity to provide these services to the Port of Anacortes. Please contact us if you have questions regarding this study.

Yours very truly,
GeoEngineers, Inc.



James G. Roth, LG, LHG
Senior Hydrogeologist

FOR John M. Herzog Ph.D.
Principal

RST:JGR:JMH:bmw
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Attachments: Table 1. Summary of Field Screening and Soil Chemical Analytical Data – Petroleum Hydrocarbons, BETX and Lead
Table 2. Summary of Soil Chemical Analytical Data – Non-Carcinogenic Polycyclic Aromatic Hydrocarbons
Table 3. Summary of Soil Chemical Analytical Data – Carcinogenic Polycyclic Aromatic Hydrocarbons
Figure 1. Estimated Vertical Extent of Clean Soil in Remedial Excavation
Laboratory Chemical Data Report

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TABLE 1
SUMMARY OF FIELD SCREENING AND SOIL CHEMICAL ANALYTICAL DATA
PETROLEUM HYDROCARBONS, BETX AND LEAD
CAP SANTE MARINE
ANACORTES, WASHINGTON

Sample Number[1]	Sample Depth (feet bgs)	Date Sampled	Field Screening Results		Petroleum Hydrocarbons[2] (mg/kg)			BETX[3] (mg/kg)				Total Lead[4] (mg/kg)
			Headspace Vapors (ppm)	Sheen	Gasoline-Range	Diesel-Range	Oil-Range	Benzene	Ethlybenzene	Toluene	Xylenes	
GEI-1	3.0 to 4.0	9/11/2007	<1	NS	<3	<26	<53	<0.03	<0.05	<0.05	<0.2	<5
GEI-2	5.0 to 6.0	9/11/2007	<1	NS	<3	<25	**88**	<0.03	<0.05	<0.05	<0.2	**18**
GEI-3	3.0 to 4.0	9/11/2007	<1	NS	<3	<25	<50	<0.03	<0.05	<0.05	<0.2	<5
GEI-4	3.0 to 4.0	9/11/2007	<1	NS	<3	<25	<50	<0.03	<0.05	<0.05	<0.2	<5
GEI-5	1.0 to 2.0	9/11/2007	<1	NS	**7**	<25	<50	<0.03	<0.05	<0.05	<0.2	<5
GEI-6	5.0 to 6.0	9/11/2007	<1	NS	<3	<25	<50	<0.03	<0.05	<0.05	<0.2	<5
GEI-7	2.0 to 3.0	9/11/2007	7	NS	**38**	<25	<50	<0.03	**0.12**	<0.05	<0.2	<5
GEI-8	3.0 to 4.0	9/11/2007	<1	NS	<3	<25	**87**	<0.03	<0.05	<0.05	<0.2	**12**
GEI-9	3.0 to 4.0	9/11/2007	9	NS	<3	<28	<57	<0.03	<0.05	<0.05	<0.2	<5
GEI-10	3.0 to 4.0	9/11/2007	<1	NS	<3	<25	<50	<0.03	<0.05	<0.05	<0.2	<5
GEI-11	3.0 to 4.0	9/11/2007	<1	NS	<4	<25	<50	<0.04	<0.07	<0.07	<0.2	<5
MTCA Method A Cleanup Levels for Unrestricted Land Use					30	2,000	2,000	0.03	6	7	9	250

Notes:

[1]The approximate exploration locations are shown in Figure 1.

[2]Analyzed by Ecology Methods NWTPH-Gx and NWTPH-Dx with silica gel cleanup.

[3]BETX analyzed by EPA Method 8021.

[4]Total lead analyzed by EPA Method 6010.

NS=no sheen

bgs = below ground surface

ppm = parts per million

mg/kg = milligrams per kilogram

Bolding indicates analyte was detected. Shading indicates analyte detected at a concentration exceeding the MTCA Method A cleanup level.

Chemical analyses conducted by CCI Analytical Laboratory of Everett, Washington.

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TABLE 2
SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA
NON-CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS
CAP SANTE MARINE
ANACORTES, WASHINGTON

Sample Number[1]	Sample Depth (feet bgs)	Date Sampled	Non-Carcinogenic Polycyclic Aromatic Hydrocarbons[2] (mg/kg)								
			Naph-thalenes	Acenaph-thylene	Acenaph-thene	Fluorene	Phenan-threne	Anthra-cene	Fluoran-thene	Pyrene	Benzo(g,h,i)-perylene
GEI-1	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.03**	**0.04**	<0.02
GEI-2	5.0 to 6.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-3	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-4	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-5	1.0 to 2.0	9/11/2007	**0.02**	<0.02	**0.06**	**0.02**	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-6	5.0 to 6.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-7	2.0 to 3.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-8	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	**0.02**	<0.02	**0.04**	**0.07**	**0.03**
GEI-9	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-10	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-11	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.02**	<0.02
MTCA Method B Cleanup level			5[3]	NE	4,800	3,200	NE	24,000	3,200	2,400	NE

Notes:

[1]The approximate sample locations are shown in Figure 1.

[2]Analyzed by EPA Method 8270 SIM.

[3]MTCA Method A cleanup level.

bgs = below ground surface

mg/kg = milligrams per kilogram

NE = not established

Bolding indicates analyte was detected.

Chemical analyses conducted by CCI Analytical Laboratory of Everett, Washington.

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TABLE 3
SUMMARY OF SOIL CHEMICAL ANALYTICAL DATA
CARCINOGENIC POLYCYCLIC AROMATIC HYDROCARBONS
CAP SANTE MARINE
ANACORTES, WASHINGTON

Sample Number[1]	Sample Depth (feet bgs)	Date Sampled	Carcinogenic Polycyclic Aromatic Hydrocarbons[2] (mg/kg)							
			Benzo(a)-anthracene	Chrysene	Benzo(b)-fluoranthene	Benzo(k)-fluoranthene	Benzo(a)-pyrene	Indeno(1,2,3--cd)Pyrene	Dibenz(a,h)-anthracene	Total cPAHs (TEQ)[3]
GEI-1	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-2	5.0 to 6.0	9/11/2007	**0.02**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	**0.02**
GEI-3	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-4	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-5	1.0 to 2.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-6	5.0 to 6.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-7	2.0 to 3.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-8	3.0 to 4.0	9/11/2007	**0.02**	**0.03**	**0.03**	**0.02**	**0.03**	**0.02**	<0.02	**0.04**
GEI-9	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-10	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
GEI-11	3.0 to 4.0	9/11/2007	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
MTCA Method B Cleanup level			0.137	0.137	0.137	0.137	0.137	0.137	0.137	0.1[4]

Notes:

[1]The approximate sample locations are shown in Figure 1.

[2]Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) analyzed by EPA Method 8270 SIM.

[3]Calculated using the toxicity equivalency (TEQ) methodology specified in WAC 173-340-780(8). cPAHs that were not detected were assigned a value of one-half the detection limit for these calculations.

[4]MTCA Method A cleanup level.

bgs = below ground surface

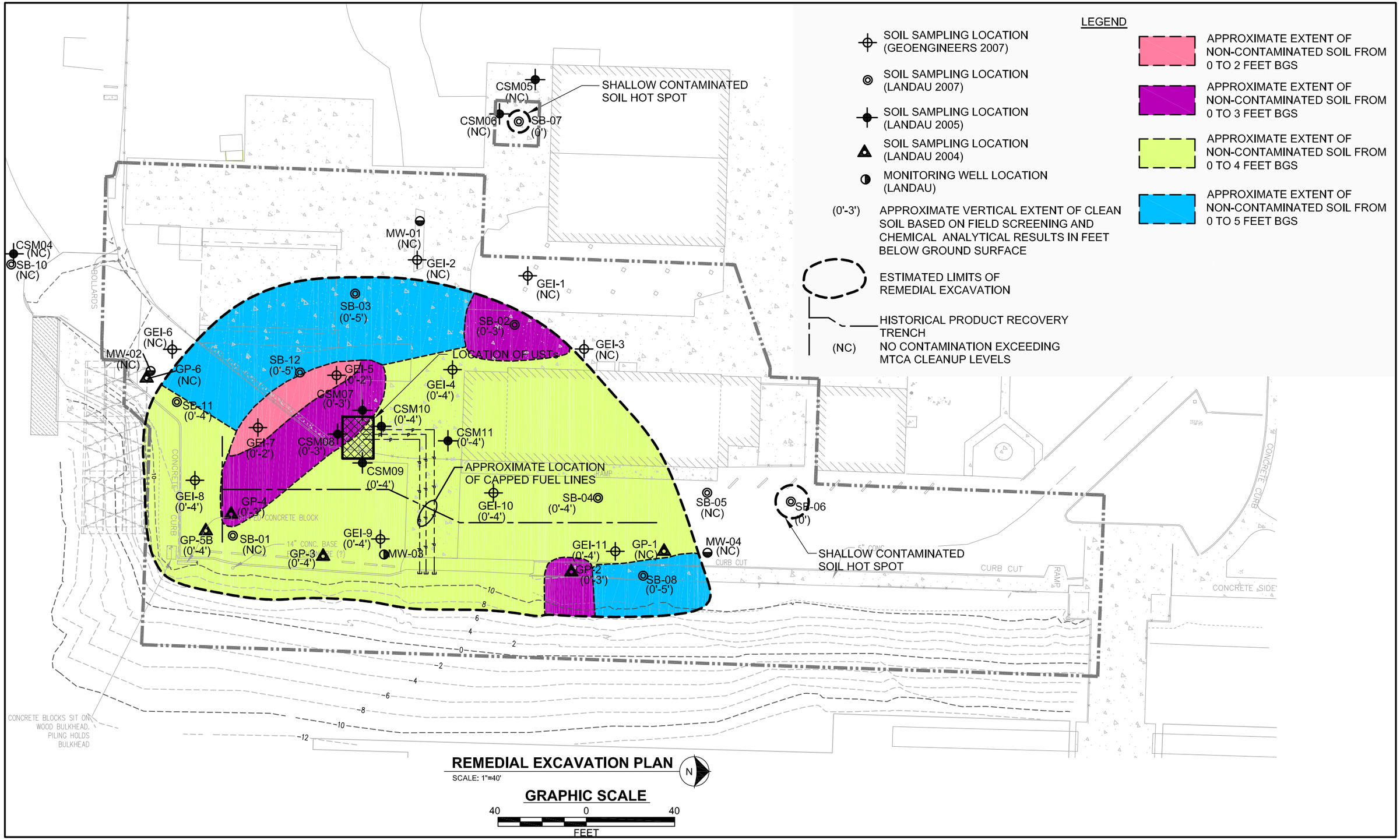
mg/kg = milligrams per kilogram

NE = not established

Bolding indicates analyte was detected.

Chemical analyses conducted by CCI Analytical Laboratory of Everett, Washington.

SEAT:\5\5147005\02\Finals\514700502tables.xls



REMEDIAL EXCAVATION PLAN

SCALE: 1"=40'

N

GRAPHIC SCALE

40 0 40

FEET

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Cap Sante Marine Interim Remedial Action Project

PORT OF ANACORTES
PROJECT CSBH-13

ESTIMATED VERTICAL EXTENT OF CLEAN SOIL IN REMEDIAL EXCAVATION

DRAWN:	SES	PROJECT NO.	514700500
DESIGN:	RST	SCALE:	NONE
CHECKED:	JMH	DATE:	09/28/07
SHEET NO.			

Figure 1

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