DRAFT CLEANUP ACTION PLAN (DCAP)

CAP SANTE MARINE SITE
ANACORTES, WASHINGTON

WASHINGTON STATE DEPARTMENT OF ECOLOGY

TOXICS CLEANUP PROGRAM

LACEY, WASHINGTON

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ARAR	Applicable or relevant and appropriate requirement
bgs	Below ground surface
CFR	Code of Federal Regulations
COCs	Chemicals of concern
cPAHs	Carcinogenic polycyclic aromatic hydrocarbons
CSM	Conceptual Site Model
CWA	Clean Water Act
DCA	Disproportionate cost analysis
DCAP	Draft Cleanup Action Plan
DMMP	Dredged Material Management Program
Ecology	Washington State Department of Ecology
FS	Feasibility Study
ft	Feet
GeoEngineers	GeoEngineers Inc.
HPA	Hydraulic Project Approval
mg/kg	Milligram per kilogram
mg/L	Milligrams per liter
MLLW	Mean lower low water
MTCA	Model Toxics Control Act
NWP	Nationwide Permit
PAHs	Polycyclic aromatic hydrocarbons
PLP	Potentially liable parties
Port	Port of Anacortes
RCW	Revised Code of Washington
RI	Remedial Investigation
RI/FS	Remedial investigation/feasibility study
SEPA	State Environmental Policy Act
TCLP	Toxicity characteristic leaching procedure
TEE	Terrestrial Ecological Evaluation
TEQ	Toxicity equivalent
TPH	Total petroleum hydrocarbons
USACE	U.S. Army Corps of Engineers
UST	Underground Storage Tank
WAC	Washington Administrative Code

EXECUTIVE SUMMARY

This document presents the Draft Cleanup Action Plan (DCAP) for upland properties at the Cap Sante Marine Site (Site) located between 11th and 13th Streets east of Q Avenue in Anacortes, Washington. This DCAP was prepared as a collaborative effort by the Washington State Department of Ecology (Ecology) and the Port of Anacortes (Port; entity responsible for cleanup) pursuant to an Agreed Order meeting the requirements of the Model Toxics Control Cleanup Act (MTCA) administered by Ecology under Chapter 173-340 of the Washington Administrative Code (WAC). This DCAP describes Ecology's proposed cleanup action for the Site and sets forth functional requirements that the cleanup must meet, including follow-up monitoring.

Site Background

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 that were supplied by the former Underground Storage Tanks (USTs) located within the former Cap Sante Marine Lease Area. The southern portion of the Site, referred to as the Fisherman's Work and Parking Area, is generally flat, paved with asphalt, and has been used as a work/parking area since around the late 1980s.

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. In 1984, the Port installed and operated a petroleum recovery system to control the observed fuel seepage and after approximately six months of operation, petroleum seepage into the harbor was no longer observed and product recovery operations ceased.

In 2007, the Port completed an interim action to address petroleum contamination associated with the historical USTs and supply lines located within the former Cap Sante

Marine Lease Area. Currently, a tenant to the Port leases a portion of the property at which the Site is located to operate a restaurant. Other areas of the property are used for pedestrian access (esplanade), boat launching and general parking.

Study Background

In 2013, a detailed Remedial Investigation (RI) and Feasibility Study (FS) were prepared by the Port under Ecology's direction. The RI utilized information about the history and environmental conditions of the Site gathered during prior investigations and the interim action, supplemented with additional environmental investigations, to characterize the nature and extent of contamination. The RI identified residual petroleum hydrocarbons (gasoline and diesel) and carcinogenic polycyclic aromatic hydrocarbons (cPAHs) in soil at concentrations above preliminary cleanup levels. The RI did not identify contaminants exceeding preliminary cleanup levels in Site groundwater or sediments adjacent to the Site.

The follow-on FS developed and evaluated cleanup action alternatives for addressing contamination identified at the Site.

Cleanup Action Plan Overview

Based on the findings of the RI/FS Ecology and the Port prepared this DCAP, which provides the following:

- Identifies cleanup levels for soil and groundwater;
- Recommends cleanup actions to achieve these cleanup levels from the options identified in the RI/FS, and describes these actions;
- Presents a schedule to carry out the cleanup, and;
- Identifies monitoring activities to demonstrate the effectiveness of the cleanup action.

The following actions are proposed to address soil contamination at the Site:

- Utilize existing engineering controls such as (protective concrete, asphalt and/or topsoil caps) combined with implementation of institutional controls (environmental covenants, signage, and/or other notification measures) to contain contamination and mitigate risk of direct human/terrestrial wildlife contact with contaminated soil;

- Monitor groundwater to confirm that the concentrations of gasoline- and diesel-range petroleum hydrocarbons and cPAHs do not increase above the groundwater cleanup levels, current plume stability and natural attenuation performance, and;
- Establish environmental covenants as necessary to restrict future development and control any future soil disturbance where contamination may remain at the Site.

1.0 INTRODUCTION

This document presents the Draft Cleanup Action Plan (DCAP) for the Cap Sante Marine Site (Site), located in Anacortes, Washington (Figure 1). 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 2). This DCAP was prepared as a collaborative effort by Ecology and the Port (entity responsible for cleanup) pursuant to the requirements of the Model Toxics Control Cleanup Act (MTCA) administered by Ecology under Chapter 173-340-360 of the Washington Administrative Code (WAC). Ecology is managing the Site as part of the Fidalgo and Padilla Bay component to the Puget Sound Initiative.

This DCAP provides a general description of the Site history and environmental conditions as well as the proposed site-wide cleanup action and sets forth functional requirements that the cleanup must meet to achieve the cleanup action objectives for the Site.

1.1 Regulatory Framework

In 2007, the Port entered into Agreed Order No. DE-07TCPHQ-4197 (Agreed Order; Ecology, 2007) with Ecology. Under the Agreed Order, the Port performed the scope of environmental investigation activities outlined in the Ecology-approved Cap Sante Work Plan (Work Plan; Landau, 2007a) in 2007. Between 2007 and 2009, interim action activities followed by post-construction confirmation groundwater monitoring as outlined in the Ecology-approved Work Plan Supplement (GeoEngineers, 2007) were completed by the Port to remove underground storage tanks (USTs) and associated product piping from the Site and to address identified petroleum-related contamination in the vicinity of the USTs and product lines. Supplemental environmental investigations were completed in 2012 and 2013 to evaluate residual contamination not addressed by the interim action.

Pursuant to the Agreed Order, the Port completed a Remedial Investigation and Feasibility Study (RI/FS) to address residual contamination in Site media following the completion of the interim action. The RI/FS, when approved by Ecology and this DCAP will complete the Scope of Work requirements described in the Agreed Order.

1.2 Purpose

The purpose of this DCAP is to:

- Describe the Site, including a summary of its history and extent of contamination;
- Identify site-specific cleanup levels and points of compliance for each hazardous substance and medium of concern;
- Identify applicable state and federal laws for the proposed cleanup action;
- Identify and describe the selected cleanup action alternative for the Site;
- Summarize the other cleanup action alternatives evaluated in the RI/FS;
- Discuss environmental covenants and Site use restrictions;
- Discuss compliance monitoring requirements, and;
- Present the schedule for implementing the cleanup action plan.

2.0 SUMMARY OF SITE CONDITIONS

Several environmental investigations have been conducted at the Site, beginning with an initial soil investigation in 1983 (Hart Crowser, 1983), and culminating in the RI/FS completed in 2013 (GeoEngineers, 2013). 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, 2007b);
- Shallow Soil Characterization in 2007 (GeoEngineers, 2007), and;
- Soil and groundwater investigation related to the former Shell Oil Tank Farm Site in 2011 and 2012 (GeoEngineers, 2012).

The results of these environmental investigations are presented in the RI/FS Report (GeoEngineers, 2013) and provided sufficient information for the development and selection of an appropriate cleanup action for the Site. Because the Site is located adjacent to the Cap Sante Boat Haven, as shown in Figure 2, the media investigated included soil, groundwater, and sediment. Environmental sampling locations for soil, groundwater, and sediment are shown on Figures 3, 4, and 5, respectively.

The following sections summarize pertinent environmental conditions at the Site (i.e., nature and extent of contamination) and an overview of the Conceptual Site Model (CSM) for contamination of the Site. More detailed descriptions of Site conditions are provided in the Work Plan and RI/FS report.

2.1 Site History

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 that were supplied by the former USTs that were 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 recovery trench system coupled with a recovery well. The recovery trench extended to a depth of about 8 to 10 feet below ground surface (bgs) at the approximate location shown in Figure 3. 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.

The approximate locations of the historical buildings, USTs, product supply lines, and petroleum recovery trench are shown relative to the Site on Figures 3 and 4.

2.2 Area Redevelopment

Area redevelopment was completed in conjunction with the 2007 interim action (further discussed below) and included shoreline habitat restoration, construction of an engineered retaining block wall (MSE block wall), public access walkway (esplanade), and new restaurant within the former Cap Sante Marine Lease area. Habitat restoration at the Site involved grading to habitat-specific elevations, placement of habitat substrate material (sand and gravel), planting with native plants and installation of logs in the upper intertidal and backshore area. The MSE wall extends from the boat launch (southwest corner of the interim action area) to the Central Pier (north of the interim action area) and separates the upland portion of the Site from the shoreline/habitat restoration area. The esplanade was constructed to provide public access along the waterfront at the Site. The esplanade parallels the upland side of the MSE block wall. In 2010, a new restaurant with surface parking was constructed west of the esplanade. Current Site conditions including recent area redevelopment is shown on Figure 6.

2.3 Prior Environmental Investigations and Cleanup Actions

Investigation activities were first completed at the Site in 1983 to evaluate the potential source of the observed petroleum sheen along the former Cap Sante Marine Lease Area shoreline (Hart Crowser, 1983). The findings of this study were used to design and construct the product recovery system (described above) to address the observed seepage. Following approximately six months of operation, petroleum seepage was no longer observed along the shoreline and operation of the recovery system was discontinued. During the course of operation, approximately 1,250 gallons of fuel were recovered from the interceptor trench.

Between February 1999 and January 2000, sediments adjacent to the Site were evaluated in conjunction with maintenance dredging of the marina (Hart Crowser, 2000). Sediments adjacent to the Site were subject to the chemical quality evaluations required by the Dredge 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.

Several phases of environmental due diligence investigation were completed by Floyd|Snider on behalf of the Port in 2004 and 2005 to evaluate the extent of soil and groundwater contamination in the vicinity of the historical USTs and product supply lines (Floyd Snider McCarthy, 2004 and Floyd|Snider, 2005, respectively). Subsequent

RI activities were completed by the Port in 2007 under the Ecology Agreed Order to delineate the nature and extent of contamination at the Site (Landau, 2007b).

Based on the results of the RI study, an interim action was completed by the Port to address petroleum and metals contaminated soil in the vicinity of the historical USTs (Figures 3 and 4). Results of confirmation soil samples obtained during the interim action remedial excavation activities (GeoEngineers, 2008) as well as, the post-interim action confirmational groundwater monitoring results (GeoEngineers, 2009a; GeoEngineers, 2009b) demonstrated that the interim action was successful in addressing contamination in part of the Site.

2.4 Summary of Environmental Conditions

This section summarizes environmental conditions at the Site for soil, groundwater, and sediment media, based on the previous environmental studies completed at the Site. Further details and sources of the information presented in this section are provided in the RI/FS report.

2.4.1 Soils

Soil at the Site generally 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 extends from the ground surface to depths of approximately 5 to 12 feet bgs. The fill material is typically about 8 feet thick in most areas of the Site. Within the Interim Action area (Figure 6), imported sand and gravel used to backfill the excavation extends to depths ranging from 2 to 18 feet bgs.

Based on the result of previous RI studies (Landau, 2007b and GeoEngineers, 2012) gasoline- and/or diesel-range petroleum hydrocarbons and PAHs are present in soil at the southwest portion of the former Cap Sante Marine Lease Area and the northeast portion of the Fisherman's Work and Parking Area. COCs in the southwest portion of the former Cap Sante Marine Lease Area include gasoline- and diesel-range petroleum hydrocarbon and PAHs in soil at depths ranging from 8 to 14 feet bgs. COCs in the northeast portion of the

Fisherman's Work and Parking Area include gasoline-range petroleum hydrocarbon and PAHs in soil at depths ranging from 3 to 10 feet bgs.

The approximate extent of COCs in soil is shown relative to the Site on Figure 6 and in cross-section on Figure 7.

2.4.2 Groundwater

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 Cap Sante Boat Haven Marina. 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.

As described in Section 2.3, groundwater contamination at the Site associated with the historical USTs and product supply lines was successfully addressed by the Interim Action, as documented by the results of soil samples obtained at the final limits of remedial excavation (GeoEngineers, 2008) and groundwater samples obtained during post-interim action monitoring (GeoEngineers, 2009a; GeoEngineers, 2009b). Additionally, groundwater samples obtained during the 2012 RI (GeoEngineers, 2012) indicated that COCs in soil are not adversely impacting groundwater at the Site.

2.4.3 Sediments

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

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. Concentrations of gasoline-, diesel- and/or motor oil-range petroleum hydrocarbons either were not detected or were found to be low in all sediment samples that were analyzed. At the direction of Ecology, no bioassay testing was required because total petroleum hydrocarbon (TPH) concentrations were low in the sediment samples analyzed. The results of sampling and analysis confirmed that there is no evidence of petroleum contamination in the sediment areas located downgradient of the Site.

2.5 Conceptual Site Model (CSM)

This section summarizes the conceptual model for the fate and transport of contamination at the Site as described in the RI/FS (GeoEngineers, 2013). The CSM also describes the contaminant exposure pathways identified for the Site and the potential risks posed to human health and the environment by hazardous and/or deleterious substances in soil, groundwater, and/or sediment.

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 and uses. An interim action completed by the Port has removed contamination related to historical USTs and associated piping (discussed in Section 2.3). The approximate location interim action area and soil contamination remaining at the Site are shown on Figure 6.

Vertical and horizontal transport of COPCs in soil may have been facilitated by groundwater flow and water level fluctuations at the Site however, groundwater within and downgradient of the currently petroleum and PAH contaminated soil is not adversely impacted based on the results of recent groundwater samples obtained from the Site. Additionally, sediments located east (downgradient) of the Site are not adversely impacted by the transport of contamination as confirmed by the results of sediment sampling and analysis conducted as part of the RI (discussed in Section 2.3).

Potential exposure pathways and receptors are summarized in the following sections (Sections 2.5.1 through 2.5.3).

2.5.1 Soil

Potential upland soil exposure pathways at the Site include:

- Contact (dermal, incidental ingestion, or inhalation) by visitors, workers (including excavation workers), and potential future residents or other Site users with hazardous substances in soil;
- Contact (dermal, incidental ingestion, or inhalation) by terrestrial wildlife with hazardous substances in soil, and;
- Contact by terrestrial plants and soil biota and/or food-web exposure to hazardous substances in soil.

Site areas where contaminants of potential concern (COPCs) were detected in soils at concentrations above preliminary cleanup levels are shown on Figure 6. Soil exceedances occur between 4 and 9 ft bgs at the northeast portion of the Fisherman's Work and Parking Area and between 9 and 14 ft bgs at the southwest portion of the former Cap Sante Marine Lease Area.

2.5.2 Groundwater

Contaminants of concern were not detected in monitoring wells at concentrations above levels protective of marine surface water.

Human ingestion of hazardous substances in groundwater is not a potential exposure pathway because groundwater at the Site or potentially affected by the Site is not a current or reasonable future source of drinking water. The MTCA regulation (WAC 173-340-720[2][d]) states that even if 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, the groundwater may still be classified as non-potable due to its proximity to marine surface water. To be classified as non-potable on the basis of its proximity to marine surface water, the following conditions must also be met:

- The groundwater does not serve as a current source of drinking water;
- Contaminated groundwater will not migrate to groundwater that is a current or potential future source of drinking water;
- There are known points of entry of the groundwater into surface water;
- The surface water is not classified as a suitable domestic water supply source, and;
- The groundwater is sufficiently hydraulically connected the surface water that the groundwater is not practicable to use as a drinking water source.

The shallow groundwater at the Site meets at least four, and likely all five, of these conditions. First, groundwater at the Site is not a current source of drinking water. Second, the groundwater migrates toward marine surface water and discharges at seeps in the intertidal and/or subtidal zone. Third, the marine surface water offshore of the Site is not classified as a suitable domestic water supply. Fourth, the Site groundwater is hydraulically connected to marine surface water, as evidenced by the tidal influence on groundwater levels in wells near the shoreline. Finally, migration of shallow groundwater to a lower aquifer that is a current or potential future source of drinking water is unlikely, due to the presence of a confining native silt/clay unit at the base of the shallow water-bearing unit at the Site (see the RI/FS report for further information regarding Site hydrogeology). Consequently, the Site groundwater qualifies as a non-potable water source.

2.5.3 Sediments

As discussed above, sampling results confirmed that there is no evidence of petroleum contamination in the sediment areas located downgradient of the Site. Therefore, sediments are not a potential exposure pathway for receptors.

3.0 CLEANUP REQUIREMENTS

The MTCA cleanup regulations provide that a cleanup action must comply with cleanup levels for identified COPCs, points of compliance, and applicable or relevant and appropriate requirements (ARARs) based on federal and state laws (WAC 173-340-710). The Site cleanup levels, points of compliance, and ARARs for the selected cleanup remedy are briefly summarized in the following sections.

3.1 Human Health and Environmental Concerns

Because Site groundwater is not a current or reasonably likely future source of drinking water, cleanup levels for Site soil need not be protective of groundwater as drinking water. Additionally, an empirical demonstration presented in the RI/FS verified that existing chemical concentrations in Site soils are protective of groundwater and marine surface water receptors.

3.1.1 Future Land Use Considerations

Soil cleanup levels for unrestricted land use were developed in accordance with WAC 173-340-740. The Site currently zoned Commercial (C), which provides for a mix of commercial and recreational uses. Currently there are no plans to change the uses of the Site in the foreseeable future. Because the Site is not zoned for industrial use, soil cleanup levels were developed based on unrestricted land use, including the more stringent MTCA Method B cleanup levels that assume ground floor residential land use (WAC 173 340 740[3]).

3.1.2 Ecological Risk Considerations

A terrestrial ecological evaluation (TEE) was performed for Site and is presented in the RI/FS. Based on the current and future land use, the Site qualifies for exclusion under WAC 173-340-7491(1) because there is less than 1.5 acres of contiguous undeveloped land on the site are within 500 ft of any area of the site and because all contaminated soil is covered by buildings, pavement, or other physical barriers that will prevent plants or wildlife from being exposed to the soil contamination.

3.1.3 Shoreline Stability Considerations

The shoreline at the Site is protected from northerly wind and waves by the Cap Sante Boat Haven and its breakwater. Additionally, the shoreline in the vicinity of the area in which residual contamination remains is reinforced with large rock (rip rap) to minimize erosion.

3.2 Indicator Hazardous Substances

Under MTCA, "indicator hazardous substances" means the subset of hazardous substances present at a Site for monitoring and analysis during any phase of remedial action for the purpose of characterizing the Site or establishing cleanup requirements for that Site. Consistent with WAC 173-340-703, when defining cleanup requirements at a Site that is contaminated with a relatively large number of COPCs, Ecology may eliminate from consideration those hazardous substances that contribute a small percentage of the overall threat to human health and the environment. The remaining COPCs can then serve as indicator hazardous substances for purposes of defining Site cleanup requirements.

As outlined in Section 2.5, the list of COPCs (hazardous and/or deleterious substances) identified at the Site includes:

- Gasoline-range petroleum hydrocarbons;
- Diesel- and heavy oil-range petroleum hydrocarbons, and;
- PAHs.

Indicator hazardous substances selected by Ecology for the Site include all of the above COPCs.

3.3 Cleanup Levels

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. Preliminary site-specific cleanup standards were developed in the RI/FS and detailed information regarding the derivation of cleanup levels can be found in the RI/FS report (GeoEngineers, 2013). Final media-specific cleanup levels and points of compliance are summarized below.

Site-specific cleanup levels for soil that are protective of human health and cleanup levels for groundwater that are protective of marine surface water were developed in accordance with MTCA requirements.

Because Site groundwater is not a current or reasonably likely future source of drinking water, cleanup levels for Site soil need not be protective of groundwater as drinking water. Additionally, an empirical demonstration was used in the RI/FS and showed that existing chemical concentrations in Site soil are protective of groundwater as marine surface water at the proposed conditional point of compliance for groundwater.

Media-specific cleanup levels are discussed in the sections below.

3.3.1 Soil

Cleanup levels for soil indicator hazardous substances used in this DCAP are presented in Table 1. These cleanup levels were developed as part of the Ecology-approved Cap Sante Work Plan (Landau, 2007a) 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 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;
- Concentrations protective of groundwater, and;
- Concentrations protective of marine surface water.

Details regarding the sources/derivation of each of the regulatory criteria are provided in the Work Plan. Because Site is exempt from a TEE as described in Section 3.1.2, cleanup levels protective of ecological receptors were not considered when developing soil cleanup levels. Additionally, as discussed in the Investigation Data Report (Data Report; Landau, 2007b), 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).

3.3.2 Groundwater

Cleanup levels for groundwater indicator hazardous substances used in this DCAP are presented in Table 2. As discussed in Section 2.5.2, human ingestion of hazardous substances in groundwater is not a potential exposure pathway because groundwater at the Site or potentially affected by the Site is not a current or reasonable future source of drinking water. Consequently, the Site groundwater qualifies as a non-potable water source. 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 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).

3.3.3 Sediment

As discussed in Section 2.4, sampling results adjacent to the Site confirmed that sediment has not been adversely impacted by Site contaminants. Therefore, sediment is not a medial of concern for the Site.

3.4 Points 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 points of compliance for soil, groundwater, and sediment.

3.4.1 Soil

The standard point of compliance for the soil cleanup levels shown in Table 1 will be throughout the soil column from the ground surface to 15 ft bgs, in accordance with WAC 173-340-740(6)(d) and WAC 173-340-7490(4)(b).

3.4.2 Groundwater

Because groundwater cleanup levels are based on protection of marine surface water and not protection of groundwater as drinking water, the conditional point of compliance for the groundwater cleanup levels is the point of groundwater discharge to the Cap Sante Waterway and Fidalgo Bay. This corresponds to the groundwater/surface water interface at the Site. At the Site, shoreline wells will be used to evaluate compliance.

3.4.3 Sediment

As discussed in Section 2.4, sampling results adjacent to the Site confirmed that sediment has not been adversely impacted by Site contaminants. Therefore, sediment is not a medial of concern for the Site.

3.5 Applicable Regulatory Requirements

In addition to the cleanup standards developed through the MTCA process and presented in Section 3.1, other regulatory requirements must be considered in the selection and implementation of the cleanup action. MTCA requires the cleanup standards to be "at least as stringent as all applicable state and federal laws" (WAC 173-340-700[6][a]). Besides establishing minimum requirements for cleanup standards, applicable state and federal laws may also impose certain technical and procedural requirements for performing cleanup actions. These requirements are described in WAC 173-340-710. Applicable state and federal laws are discussed below.

The cleanup action at the Site will be completed pursuant to MTCA under the terms of a Consent Decree between Ecology and the implementing Potentially Liable Parties (PLPs). Accordingly, the selected cleanup action meets the permit exemption provisions of MTCA, obviating the need to follow most procedural requirements of the various local and state regulations that would otherwise apply to the action. Ecology will determine the substantive provisions of state and local laws and regulations that are applicable to this project, following consultation with appropriate state and local regulators.

3.6.2 Solid and Hazardous Waste Management

The Washington Hazardous Waste Management Act and the implementing regulations, the Dangerous Waste Regulations (Chapter 173-303 WAC), would apply if dangerous wastes are generated during the cleanup action. There is no indication of listed wastes being generated or disposed of at the Site. The Dangerous Waste Regulations would be applicable only if excavation were to occur as part of the cleanup action and sampling of excavated material (e.g., toxicity characteristic leaching procedure [TCLP] sampling, if required by the receiving landfill) or confirmation soil sampling indicated contaminant concentrations exceeding levels associated with dangerous waste characteristics or criteria. Related regulations include state and federal requirements for solid waste handling and disposal facilities (40 Code of Federal Regulations [CFR] 241, 257; Chapter 173-350 and -351 WAC) and land disposal restrictions (40 CFR 268; WAC 173-303-340).

3.6.3 State Environmental Policy Act

The State Environmental Policy Act (SEPA) (Revised Code of Washington [RCW] 43.21C; WAC 197-11) and the SEPA procedures (WAC 173-802) are intended to ensure that state and local government officials consider environmental values when making decisions. The SEPA process begins when an application for a permit is submitted to an agency, or an agency proposes to take some official action such as implementing a MTCA cleanup action. Prior to taking any action on a proposal, agencies must follow specific procedures to ensure that appropriate consideration has been given to the environment. The severity of potential environmental impacts associated with a project determines whether an Environmental Impact Statement is required. If excavation were to occur as part of the cleanup action, a SEPA checklist would be required prior remedial construction activities. Because the Site cleanup action will be performed under a Consent Decree, SEPA and MTCA requirements will be coordinated, if possible. The Port is the lead SEPA agency for this action.

3.6.4 Shoreline Management Act

The Shoreline Management Act (RCW 90.58) and its implementing regulations establish requirements for substantial developments occurring within water areas of the state or within 200 feet of the shoreline. The City of Anacortes has set forth requirements based on local considerations such as shoreline use, economic development, public access, circulation, recreation, conservation, and historical and cultural features. Local shoreline management plans are adopted under state regulations, creating an enforceable state law. Because the Site cleanup action will be performed under a Consent Decree, compliance with substantive requirements would be necessary, but a shoreline permit would not be required.

3.6.5 Washington Hydraulics Code

The Washington Hydraulics Code establishes regulations for the construction of any hydraulic project or the performance of any work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh water of the state. The code also creates a program requiring Hydraulic Project Approval (HPA) permits for any activities that could adversely affect fisheries and water resources. Timing restrictions and technical requirements under the hydraulics code are applicable to dredging and placement of cover sediments if necessary. Exact closure periods will be determined through agency consultation. The Washington Hydraulics Code would apply if the cleanup actions involved excavation offshore of the upland areas.

3.6.6 Water Quality Management

The Clean Water Act (CWA) is the primary federal law for protecting water quality from pollution. In addition to federal law, water quality is regulated by Ecology under the state water quality act, RCW 90.48. The CWA regulations prescribe requirements for point source and non-point source discharges. Section 401 of the CWA requires the state to certify that federal permits are consistent with state water quality standards. Because applicable provisions of state water quality standards are reflected in the Section 401 certification, the certification generally stands in the stead of a stand-alone determination by Ecology of state water quality provisions applicable to the cleanup action. The substantive requirements of a certification determination are applicable. State and federal standards for marine waters will be applicable if there are any discharges to surface water during implementation of the cleanup action.

If excavation were to occur as part of the cleanup action, construction activities that disturb 1 acre or more of land need to comply with the provisions of state construction stormwater regulations, and a stormwater permit will be required for the cleanup action (RCW 90.48.260; 40 CFR 122.26; Chapter 173-226 WAC).

3.6.7 Health and Safety

Site cleanup-related activities would need to be performed in accordance with the requirements of the Washington Industrial Safety and Health Act (RCW 49.17) and the federal Occupational Safety and Health Act (29 CFR 1910, 1926). These applicable regulations include requirements that workers are to be protected from exposure to contaminants and that excavations are to be properly shored.

3.6.8 Other Potentially Applicable Regulatory Requirements

The following is a list of other potentially applicable regulations for the cleanup action:

- Potential location-specific ARARs if excavation and/or in-water activities were to occur as part of the cleanup action:
    - Endangered Species Act, 16 USC 1531-1543, 50 CFR 402, 50 CFR 17;
    - Fish and Wildlife Conservation Act, 16 USC 2901; 50 CFR 83 Federal Coastal Zone Management Act (CZMA), 16 USC 1451-1464; RCW 90.58; WAC 173-27-060, 15 CFR 923-930;
    - Archaeological and Historic Preservation Act, 16 USC 469, and;
    - Archaeological Resources Protection Act, 16 USC 470aa; 43 CFR 7.

- Potential action-specific ARARs if excavation and/or in-water activities were to occur as part of the cleanup action:
    - Temporary Modification of Water Quality Criteria and Other Requirements to Modify Water Quality Criteria, RCW 90.48; WAC 173- 201A-410 through –450. Chapters 173-201A-400 through -450;
    - Regulation and Licensing of Well Contractors and Operators, Chapter 18.104 RCW; WAC 173-162-020, -030;
    - General Regulations for Air Contaminant Source, Chapter 70.94 RCW, WAC 173-400-040(8), and;
    - Puget Sound Clean Air Agency (PSCAA) Regulation 1, Section 9.15.

- Potential Local Requirements if excavation and/or in-water activities were to occur as part of the cleanup action:
  - City of Anacortes land disturbance/grading permit;
  - City of Anacortes noise ordinance;
  - City of Anacortes Publicly Owned Treatment Water (POTW) discharge authorization;
  - City of Anacortes traffic codes, and;
  - City of Anacortes stormwater management program.

4.0 SELECTED SITE CLEANUP ACTION

The cleanup action selected by Ecology for the Site relies on the existing empirical data that groundwater located downgradient of the impacted soils is not adversely impacted by the presence of the identified contamination. The selected alternative (Alternative 1) uses engineering controls (currently present) combined with institutional controls to prevent human exposure to soil in which concentrations of COCs exceed cleanup levels and groundwater monitoring to confirm plume stability and natural attenuation performance. Alternative 1 meets the cleanup action objective of human health and environmental protection (Section 3.1) by:

- Mitigating risk of direct human/terrestrial wildlife contact with contaminated soil utilizing existing engineering controls such as protective concrete, asphalt and/or topsoil caps combined with implementation of institutional controls such as environmental covenants, signage, and/or other notification measures;
- Confirming current plume stability and natural attenuation performance of Site COCs through groundwater monitoring to confirm that the concentrations of Site COCs do not increase above the groundwater cleanup levels, and;
- Causing minimal disturbance to property infrastructure, and Site use and operations as compared to other alternatives considered.

4.1 Contamination Remaining On-Site Following Remedy

The selected cleanup action for the Site is expected to contain soil in place at two locations across the Site with hazardous substance concentrations exceeding soil cleanup levels listed in Table 1.

As described above, the cleanup strategy relies on utilizing existing engineering controls for the purpose of removing exposure pathways. These areas of residual contaminated soil will continue to be addressed through the use of confirmation monitoring and environmental covenants implemented at the Site, as described in Sections 4.2 and 4.5 below. The areas where contaminated soil will be contained in place include the following:

- Fisherman's Work and Parking Area – Soil contaminated with petroleum hydrocarbons and cPAHs is expected to underlie existing utility infrastructure including above ground electrical transformer and buried power, phone and water lines as well as concrete and asphalt paved surfaces. The contaminated soil at this location is between approximately 3 and 10 feet bgs based on data collected from previous environmental studies.

- Former Cap Sante Marine Lease Area – Soil contaminated with petroleum hydrocarbons and cPAHs is expected to underlie an existing office building, asphalt and/or concrete pavement and topsoil. The contaminated soil at this location is between approximately 8 and 14 feet bgs based on data collected from previous environmental studies.

Section 4.5 below discusses environmental covenants required for the portions of the Site where complete soil exceeding cleanup levels (Table 1) remains in place.

4.2 Confirmational Groundwater Monitoring

To verify that the proposed cleanup action is protective of groundwater, existing Site monitoring wells will be sampled for Site indicator hazardous substances. Groundwater will be sampled on a quarterly basis at each monitoring well for a minimum of four consecutive quarters. Groundwater samples will be analyzed for each of the soil indicator hazardous substances including gasoline-, diesel- and heavy oil-range petroleum hydrocarbons and PAHs. Following completion of four consecutive quarters of groundwater sampling that indicate cleanup levels are being met, the quarterly groundwater sampling schedule will be discontinued. Additional groundwater monitoring may be necessary if initial confirmational groundwater sample results indicate the potential for contaminant transfer from remaining contaminated soil to groundwater over time.

4.3 Contingency Actions

Groundwater monitoring will ensure that contaminated soils left in place do not pose a hazard to marine surface water via soil to groundwater migration. Environmental investigations completed during the RI/FS demonstrated that groundwater within and/or downgradient of the contaminant plumes complies with the proposed groundwater cleanup levels (Table 2), indicating that leaching of soil contaminants to groundwater is not an exposure pathway of concern. However, if contaminants exceed the cleanup levels in groundwater samples after four quarters of confirmational monitoring, additional groundwater monitoring will be conducted on a semi-annual basis for two years. If groundwater sample results continue to exceed the groundwater cleanup levels after two years without abating, additional actions will be considered.

4.4 Future Site Use

The selected cleanup action is compatible with future expected land use for by the Port and causes minimal disturbance to existing property infrastructure, and Site use and operations. The future expected land use of the property is an active marina with facilities for boat launching and moorage, a public access walkway (esplanade) along the shoreline and restaurant. The selected cleanup action allows for this expected future Site use.

4.5 Environmental Covenants

The proposed cleanup action will leave soil exceeding soil cleanup levels (Table 1) in place below in portions of the former Cap Sante Marine Lease Area and Fisherman's Work and Parking Area. While the contaminated soil in isolated and does not pose direct threat for exposure to human health and terrestrial ecological receptors, future development within areas of the contaminated soil could potentially generate conditions requiring appropriate safe handling procedures, stormwater controls, and consideration of disposal options for the specific indicator hazardous substances and concentrations encountered.

Environmental covenants will be required for the portions of the Site where soil exceeding cleanup levels (Table 1) remain in place. The covenants will identify specific contaminated soil locations and depths that will require special management if disturbed, unless the soil contamination is removed at a later time. Soil management plans will be required that instruct property owners on Ecology's requirements for performing invasive work in areas of remaining contaminated soil. The environmental covenants will be recorded following completion of excavation activities described in the CAP.

4.6 Potential Habitat Restoration Opportunities

Under the Puget Sound Initiative, MTCA cleanup actions are expected, where appropriate, to coincidentally enhance and/or restore habitat. Although there are no additional opportunities for habitat restoration as part of the final cleanup action, habitat restoration was completed conjunction with the 2007 interim action.

Habitat restoration as part of the 2007 interim action 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.

5.0 ALTERNATIVES CONSIDERED AND BASIS FOR REMEDY SELECTION

A range of potential cleanup action alternatives were evaluated in the RI/FS report (GeoEngineers, 2013). This section summarizes the cleanup technologies and alternatives considered, and the basis for selection of the cleanup remedy.

5.1 Cleanup Technologies

The RI/FS report presents a detailed screening evaluation of potentially applicable general response actions and remediation technologies. The screening evaluation was carried out for each of the environmental media requiring cleanup action evaluation. During the development of the RI/FS, cleanup action alternatives were developed by assembling the technologies that were carried forward from this screening evaluation.

5.2 Feasibility Study Alternatives

The RI/FS presents a detailed evaluation of a range of potential cleanup action alternatives (Alternatives 1 through 3) for the Site which are summarized in Table 3. The RI/FS also presents detailed evaluations of each alternative, which are summarized in Section 5.3 below.

5.3 MTCA Disproportionate Cost Analysis

The MTCA disproportionate cost analysis (DCA) is used to evaluate which of the alternatives that meet MTCA threshold requirements are permanent to the maximum extent practicable. This analysis compares the relative benefits and costs of cleanup alternatives in selecting the alternative whose incremental cost is not disproportionate to the incremental benefits. Seven criteria are used in the disproportionate cost analysis as specified in WAC 173-340-360(2) and (3):

- Protectiveness
- Permanence
- Cost
- Long-Term Effectiveness
- Management of Short-Term Risks
- Implementability
- Consideration of Public Concerns

The comparison of benefits relative to costs may be quantitative, but will often be qualitative. Costs are disproportionate to the benefits if the incremental costs of a more permanent alternative exceed the incremental degree of benefits achieved by a lower-cost alternative (WAC 173-340-360[3][e][i]). When two or more alternatives are equal in benefits, Ecology shall select the less costly alternative (WAC 173-340-360[3][e][ii][C]).

The comparison of benefits relative to costs may be quantitative or qualitative based on the availability of quantitative data, such as mass of contaminants removed, estimated areas that will be contained, and volume of contaminated soils remaining on the Site. However, the benefits for some of the categories will be qualitative. For this reason, Ecology's analysis of which alternative is permanent to the maximum extent practicable is largely qualitative. The MTCA regulation allows Ecology to use best professional judgment to assess benefits qualitatively, and use its discretion to favor or disfavor qualitative benefits and use that information in selecting a cleanup action (WAC 173-340-360 [3][e][ii][C]). In order to document Ecology's qualitative analysis for the Site, Ecology assigned weighing factors to each of the six non-cost benefits criteria. The weighting factors represent Ecology's opinion on the importance of each benefit criterion at the Site, relative to protection of human health and the environment. The factors weighed for each of the criteria are briefly discussed in the following section and presented in Tables 4 and 5.

5.3.1 Protectiveness

The overall protectiveness of a cleanup action alternative is evaluated based on several factors, including the extent to which human health and the environment are protected and the degree to which overall risk at a site is reduced (WAC 173-340-360[3][f][i]). Both on-site and off-site reductions in risk resulting from implementing the alternative are considered. Protectiveness is determined by evaluating the degree of improvement in overall environmental quality. At this Site, Ecology believes a weighting factor of 30 percent is appropriate for protectiveness. This represents the greatest value of all categories and is necessary based on the overall importance of protection of human health and the environment, especially in relation to Ecology's goal of restoring the health of Puget Sound.

5.3.2 Permanence

Under MTCA, the permanence of an alternative is evaluated based on the degree to which the remedy permanently reduces the toxicity, mobility, or mass of hazardous substances, including the effectiveness of the alternative in destroying 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 (WAC 173-340-360[3][f][ii]). Based on the importance of the restoration of Puget Sound, Ecology believes this factor to be second only to protectiveness in importance and used a weighting factor of 20 percent for this evaluation criterion.

5.3.3 Cost

The analysis of cleanup action alternative costs under MTCA includes consideration of all costs associated with implementing an alternative, including design, construction, confirmational monitoring, and environmental covenants (WAC 173-340-360[3][f][iii]). Costs are intended to be comparable among different alternatives to assist in the overall analysis of relative costs and benefits of the alternatives. Costs are compared against benefits to assess cost-effectiveness and practicability of the cleanup action alternatives. No weighting factor is applied to this quantitative category, as costs are compared against the numeric analysis.

5.3.4 Long-Term Effectiveness

Long-term effectiveness expresses the degree of certainty that the alternative will be successful in maintaining compliance with cleanup standards over the long-term (WAC 173-340-360[3][f][iv]). The MTCA regulations contain a specific preference ranking for different types of technologies that is to be considered as part of the comparative analysis. The ranking places the highest preference on technologies such as reuse/recycling, treatment, immobilization/solidification, and disposal in an engineered, lined, and monitored facility. Lower preference rankings are applied to technologies such as on-site isolation/containment with attendant engineered controls, and environmental covenants and monitoring. The regulations recognize that, in most cases, the selected cleanup remedy will combine multiple technologies. The MTCA preference ranking must be considered along with other site-specific factors in the evaluation of long-term effectiveness. Ecology considers a weighting for this factor of 20 percent to be appropriate at this Site.

5.3.5 Management of Short-term Risks

This criterion is a measure of the relative magnitude and complexity of actions required to maintain protection of human health and the environment during implementation of the cleanup action (WAC 173-340-360[3][f][v]). Cleanup actions carry short-term risks, such as potential mobilization of contaminants during construction, or safety risks typical of large construction projects. Excavation of contaminated soils along the shoreline carries a risk of temporary water quality degradation and potential sediment recontamination. Some short-term risks can be managed through the use of best management practices during the project design and construction, while other risks are inherent to certain project alternatives. A weighting factor of 10 percent is being used for this Site. This lower rating is based on the limited timeframe associated with the risks and the general ability to modify any alternative to reduce short-term risks during construction without significant effect on human health and the environment.

5.3.6 Implementability

Implementability is the ability to implement the selected remedy. It measures the overall relative difficulty and uncertainty of implementing the cleanup action. It includes technical factors such as the availability of proven technologies and experienced contractors to accomplish the cleanup work (WAC 173-340-360[3][f][vi]). It also includes administrative factors associated with permitting and completing the cleanup. The weighting factor Ecology used for implementability is 10 percent. Implementability is less associated with the primary goal of the cleanup action, protection of human health and the environment, and therefore has a lower weighting factor. In addition, the issues associated with the implementability of a remedy are often duplicated in the remedy costs. Engineering design considerations are often of primary importance in this category and often refined during the development of the engineering design report.

5.3.7 Consideration of Public Concerns

The public involvement process under MTCA is used to identify potential public concerns regarding cleanup action alternatives (WAC 173-340-360[3][f][vi]). The extent to which an alternative addresses those concerns is considered as part of the remedy selection 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. A weighting factor of 10 percent is being used for the evaluation of this category. The public concerns voiced during the public involvement process can also be included in the other categories identified above such as protectiveness and long-term effectiveness. Public concerns that can be incorporated into alternative categories are more appropriately considered in the scoring of those other categories. 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.

5.4 Evaluation and Comparison of the Alternatives

This section provides a comparative analysis of the remedial alternatives considered for the Site. The MTCA evaluation criteria discussed in Section 5.3 were used to evaluate the each remedial alternative, with the alternatives then ranked based on their expected performance under each criterion. Table 3 presents the details about the remedial alternatives. The details of evaluation and their results are presented in Tables 4 and 5, respectively.

5.4.1 Threshold Requirements

Based on the review of RI/FS report (GeoEngineers, 2013), Ecology determined that each of the cleanup alternatives (Alternatives 1 through 3) meet MTCA threshold requirements, because they provide for the protection of human health and the environment, comply with the cleanup standards and applicable state and federal regulations and have provisions for compliance monitoring. Alternative details and costs are presented in Table 3.

5.4.2 Comparison of the Alternatives by Criteria

The evaluation of disproportionate cost is based on a comparative analysis of costs against the remaining six MTCA evaluation criteria. Relative rankings of each alternative for these six criteria are summarized in Table 4. These rankings are briefly discussed below:

5.4.2.1 Protectiveness

Alternatives 1 and 2 are less protective than Alternative 3. Alternative 3 is the most protective because it removes all contaminated soils to the maximum extent practicable. 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 because contamination would remain in place at the Site following implementation.

5.4.2.2 Permanence

Alternative 3 achieves the highest level of performance relative to other two alternatives, since it includes the removal of soil contamination to the maximum extent practicable. 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 permanent of each of the alternatives evaluated because contamination would remain in place at the Site following implementation.

5.4.2.3 Long-Term Effectiveness

Alternative 3 achieves a higher degree of long-term effectiveness than the other two alternatives as a result of the greater amount of contaminated removed under that alternative. 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 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.

5.4.2.4 Management of Short Term-Risks

Alternative 1 receives the highest ranking due to the lack of construction activities involved in completing the components of the alternative (i.e., capping components are already in place). Alternative 2 has a lower ranking than Alternative 1 due to the uncertainty associated with in-situ treatment technologies. Alternative 3 has a moderate to high risk as a result of the level of Site disturbance that would be required (i.e., elective structure modification of the surface roads and buried utilities to access contaminated soil) and would require off-site transport of contaminated soil.

5.4.2.5 Implementability

The lowest score for implementability was assigned to Alternative 3. This is as a result of the high degree of Site disturbance that would be required to implement this alternative. Alternative 2 receives a slightly higher ranking due to the lesser degree of Site disturbance. Alternative 1 receives the highest ranking due to the lack of construction activities involved in completing the components of the alternative (i.e., capping components are already in place).

5.4.2.6 Consideration of Public Comments

Alternative 3 may result in concerns by the public and nearby property owners resulting 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. Because Alternative 3 removes all contaminated soils to the maximum extent practicable, this alternative is ranked higher than Alternatives 1 and 2.

5.4.3 Reasonable Restoration Time Frame

The restoration time pertains to the time required to meet cleanup levels. The restoration time for all three alternatives is in the order of 1 to 3 years. This includes project design, permitting, construction, and closure activities. Alternative 1 and potentially, Alternative 2 would leave residual contamination in place requiring confirmational monitoring and consequently could extend the duration of time for monitoring to confirm that cleanup levels are being maintained.

5.4.4 Overall Comparison of Remedy Costs and Benefits

Table 5 and Figure 8 summarize costs and remedy benefits for each alternative. The estimated costs of the alternatives range from $330,000 to 2.5 million. The RI/FS report (GeoEngineers, 2013) presents detailed cost estimates for the alternatives. These costs are expressed in 2012 dollars without adjustment to future cost inflation and without present value discount of future costs. The probable remedy costs are expected to vary with a range of +50 percent to -30 percent.

Using the MTCA DCA methodology, the alternatives were evaluated to determine which cleanup action provided the greatest benefits relative to cost. The calculated benefits integrate the rankings for each evaluation criterion discussed above, multiplied by the weighting within that category and summed to reach the benefits total. The calculated benefits using the categorical weighting factors are presented in Table 5 and summarized below:

- Alternative 1: The benefit ranking for Alternative 1 is 6.2 (out of 10) and has an estimated cleanup cost of $330,000.
- Alternative 2: The benefit ranking for Alternative 2 is 6.6 (out of 10) and has an estimated cleanup cost of $1,140,000.
- Alternative 3: The benefit ranking for Alternative 3 is 8.2 (out of 10) and has an estimated cleanup cost of $2,500,000.

The relatively high ranking of Alternative 3, in comparison to 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 relatively 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 involves the lowest degree of removal or treatment and so is scored lower relative to the other alternatives evaluated given the potential 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 were 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 considered to be the alternative with highest overall ranking.

5.3.1 Conclusions

Based on the above DCA evaluation per MTCA requirements, Alternative 1 is identified as the preferred alternative for the Cap Sante Marine Site. This alternative minimizes disturbances to infrastructure and operations while providing a high level of calculated ranking and high degree of environmental benefits for the unit of incremental cost while still remaining practical.

6.0 IMPLEMENTATION OF THE CLEANUP ACTION

Preliminary design of the cleanup remedy and the selected cleanup action described in this DCAP was initiated in April 2012 under Agreed Order DE-07TCPHQ-4197 between Ecology and the Port. Remedial actions are currently targeted to begin in summer/fall 2013, subject to issuing of a Consent Decree. When completed, the Consent Decree will contain an outline of the schedule to complete selected cleanup action. The Consent Decree will be entered in Skagit County Superior Court, and will become effective once entered.

Consistent with Chapter 70.105D RCW, as implemented by Chapter 173-340 WAC (MTCA Cleanup Regulation), Ecology has determined that the selected Site cleanup action described in Section 4.0 of this DCAP is protective of human health and the environment, will attain federal and state requirements that are applicable or relevant and appropriate, complies with cleanup standards, and provides for compliance monitoring. The selected cleanup action satisfies the preference expressed in WAC 173-340-360 for the use of permanent solutions to the maximum extent practicable, and provides for a reasonable restoration timeframe.

7.0 COMPLIANCE MONITORING

Compliance monitoring and contingency responses (as needed) will be implemented in accordance with WAC 173-340-410, Compliance Monitoring Requirements. Detailed requirements will be described in the Compliance Monitoring Plan (CMP) to be prepared as a part of cleanup action. Compliance monitoring of the interim action has been completed and Ecology has determined that no further monitoring of the interim action is required (See Section 2.3). The objective of this plan is to confirm that cleanup standards have been achieved, and also to confirm the long-term effectiveness of cleanup actions at the Site. The plan will contain discussions on duration and frequency of monitoring, the trigger for contingency response actions, and the rationale for terminating monitoring. The three types of compliance monitoring to be conducted include:

- **Protection Monitoring** to confirm that human health and the environment are adequately protected during the implementation of the cleanup action;
- **Performance Monitoring** to confirm that the cleanup action has attained cleanup standards and other performance standards, and;
- **Confirmation Monitoring** to confirm the long-term effectiveness of the cleanup action once performance standards have been attained.

Cleanup levels and associated points of compliance for the cleanup action are described above in Section 3.

7.1 Monitoring Objectives and Rationale

The cleanup action incorporates monitoring to determine whether cleanup standards have been achieved during and after the cleanup action. As discussed in Section 4.2, groundwater will be sampled on a quarterly basis at each of the existing downgradient wells for a minimum of four consecutive quarters. If at the completion of four consecutive quarters of groundwater monitoring confirmational sample results indicate that groundwater cleanup levels are being met, the quarterly confirmation groundwater sampling schedule will be discontinued. If contaminants exceed the cleanup levels in groundwater samples after four quarters of confirmational monitoring, groundwater monitoring may be conducted on a semi-annual basis for an additional two years. If the groundwater samples continue to exceed the groundwater cleanup levels after two years without abating, additional actions will be considered.

8.0 FIVE-YEAR REVIEW

Because the cleanup action described in Section 4.0 will result in hazardous substances remaining at the Site at concentrations exceeding cleanup levels, and because environmental covenants are included as part of the remedy, Ecology will review the selected cleanup action described in this DCAP every 5 years to ensure protection of human health and the environment. Consistent with the requirements of WAC 173-340-420, the 5-year review shall include the following:

- A review of the title of the real property subject to the environmental covenant to verify that the covenant is properly recorded;
- A review of available monitoring data to verify the effectiveness of completed cleanup actions, including engineered and institutional controls, in limiting exposure to hazardous substances remaining at the Site;
- A review of new scientific information for individual hazardous substances or mixtures present at the Site;
- A review of new applicable state and federal laws for hazardous substances present at the Site;
- A review of current and projected future land and resource uses at the Site;
- A review of the availability and practicability of more permanent remedies, and;
- A review of the availability of improved analytical techniques to evaluate compliance with cleanup levels.

Ecology will publish a notice of all periodic reviews in the Site Register and will provide an opportunity for review and comment by the potentially liable persons and the public. If Ecology determines that substantial changes in the cleanup action are necessary to protect human health and the environment at the Site, a revised CAP will be prepared and provided for public review and comment in accordance with WAC 173-340-380 and 173-340-600.

9.0 REFERENCES

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Table 1

Soil Cleanup Levels for Indicator Hazardous Substances

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 2

Groundwater Cleanup Levels for Indicator Hazardous Substances

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 3
Description of Cleanup Action Alternatives
Cap Sante Marine Site
Anacortes, Washington

Contaminants of Concern	Matrix	Objective	Cleanup Action Alternatives		
			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. Empirical data shows that down gradient groundwater is not adversely 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. Empirical data shows that down gradient groundwater is not adversely 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 over a period of approximately ten years to evaluate contaminant concentrations, plume stability and natural 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.

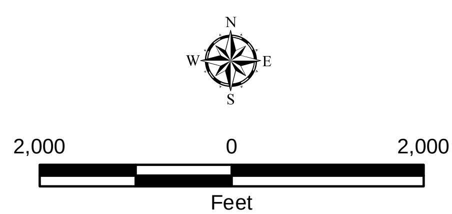
Table 4
Evaluation of Cleanup Action Alternatives
Cap Sante Marine
Anacortes, Washington

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 long-term 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, long-term 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 long-term 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 long-term 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 5
Summary of MTCA Evaluation and Ranking of Cleanup Action Alternatives
Cap Sante Marine
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



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 Site
Anacortes, Washington

Figure 1

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.
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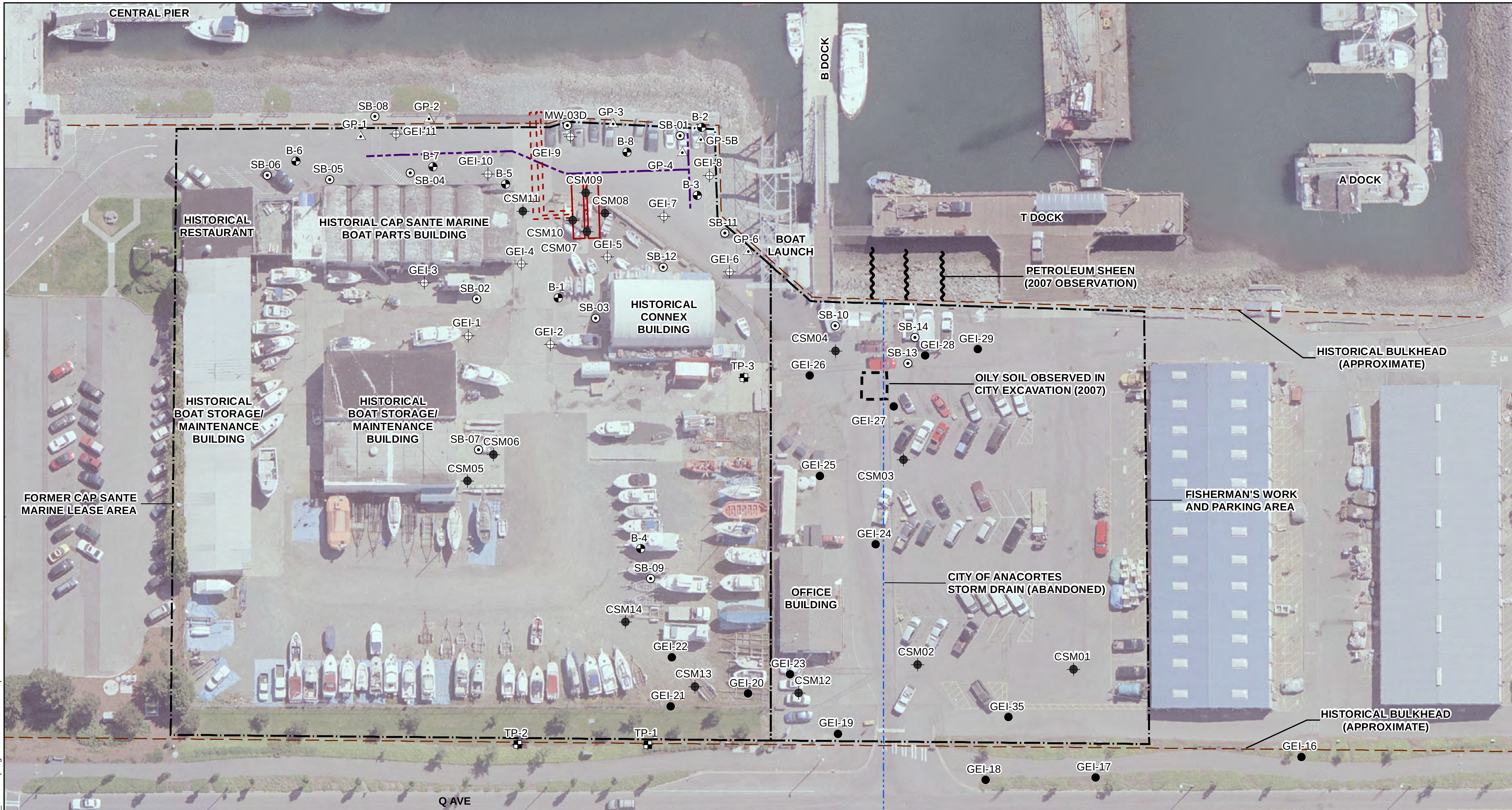
Path: \\seat\Projects\5\5147005\GIS\5147005\09_SitePlan.mxd Map Revised: 12 March 2013 amanza

Site Plan

Cap Sante Marine Site
Anacortes, Washington

Figure 2



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)

60 0 60
Feet

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

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes:
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Soil Investigation Sample Locations

Cap Sante Marine Site
Anacortes, Washington

Figure 3

Path: \\seat\Projects\5\5147005\GIS\514700509_SoilSamplingLocations.mxd Map Revised: 12 March 2013 amanza

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

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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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 Site
Anacortes, Washington

Figure 4

Path: \seat\Projects\5\5147005\GIS\514700509_GroundwaterSamplingLocations.mxd Map Revised: 12 March 2013 amanza

Path: \\sea\Projects\5\5147005\GIS\5147000509_SedimentSamplingLocations.mxd Map Revised: 12 March 2013 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.
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Legend

⊕ Landau Associates (2007)

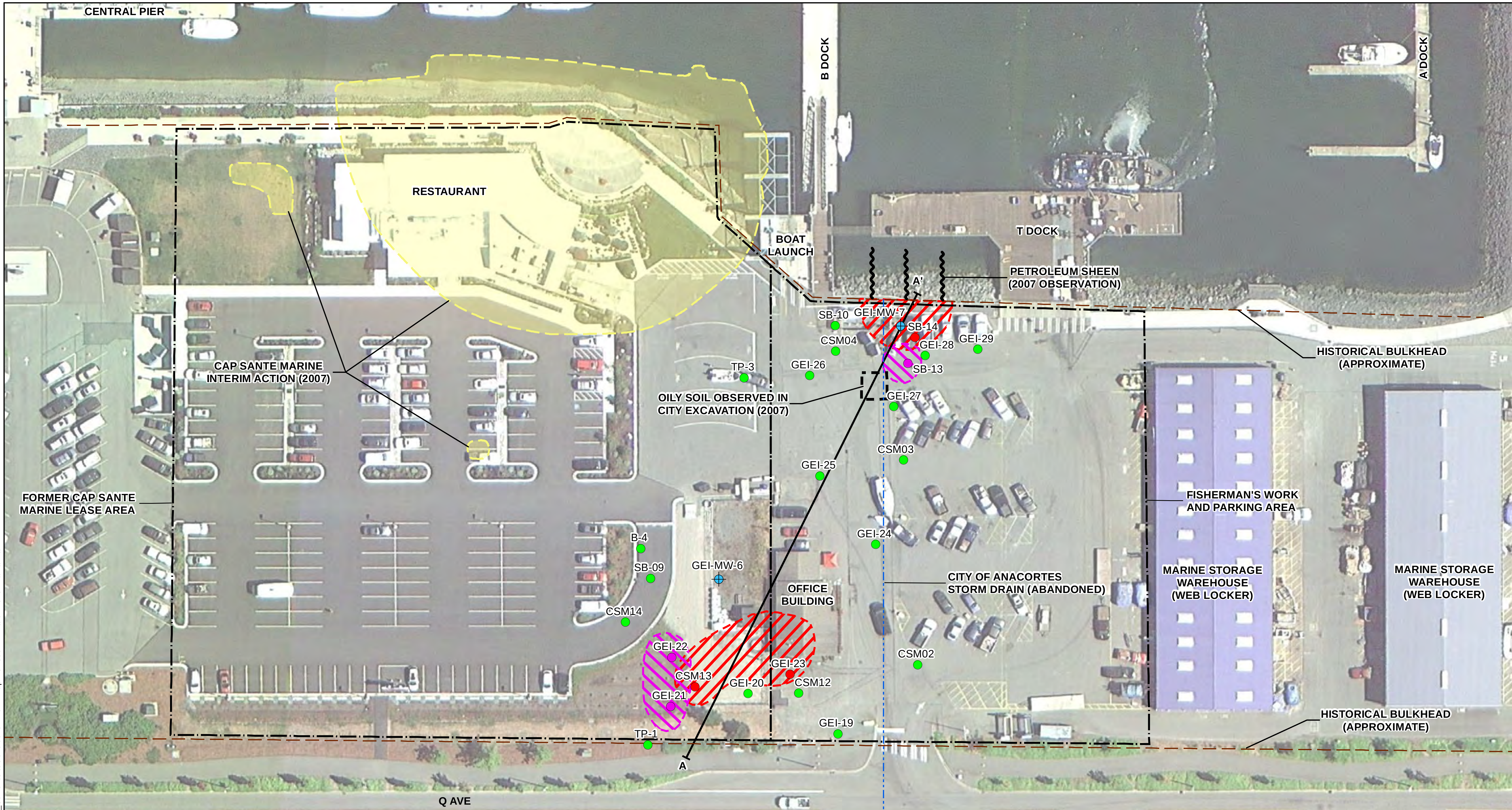
N E S W

200 0 200
Feet

Sediment Investigation Sample Locations

Cap Sante Marine Site
Anacortes, Washington

Figure 5



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

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Notes:
1. Sampling locations in the vicinity of the areas identified to contain COCs exceeding site cleanup levels are shown on this figure.
2. The locations of all features shown are approximate.
3. 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
- TPH Exceed Soil Cleanup Level
- PAHs Exceed Soil Cleanup Level
- COCs (TPH and/or PAHs) Less Than Soil Cleanup Level
- COCs (TPH and/or PAHs) Less Than Groundwater Cleanup Level
- Cross Section A-A'

Areas With Contaminant of Concern (COCs) Exceeding Soil Cleanup Level

- Approximate Area of TPH Exceedance in Soil
- Approximate Area of PAH Exceedance in Soil

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

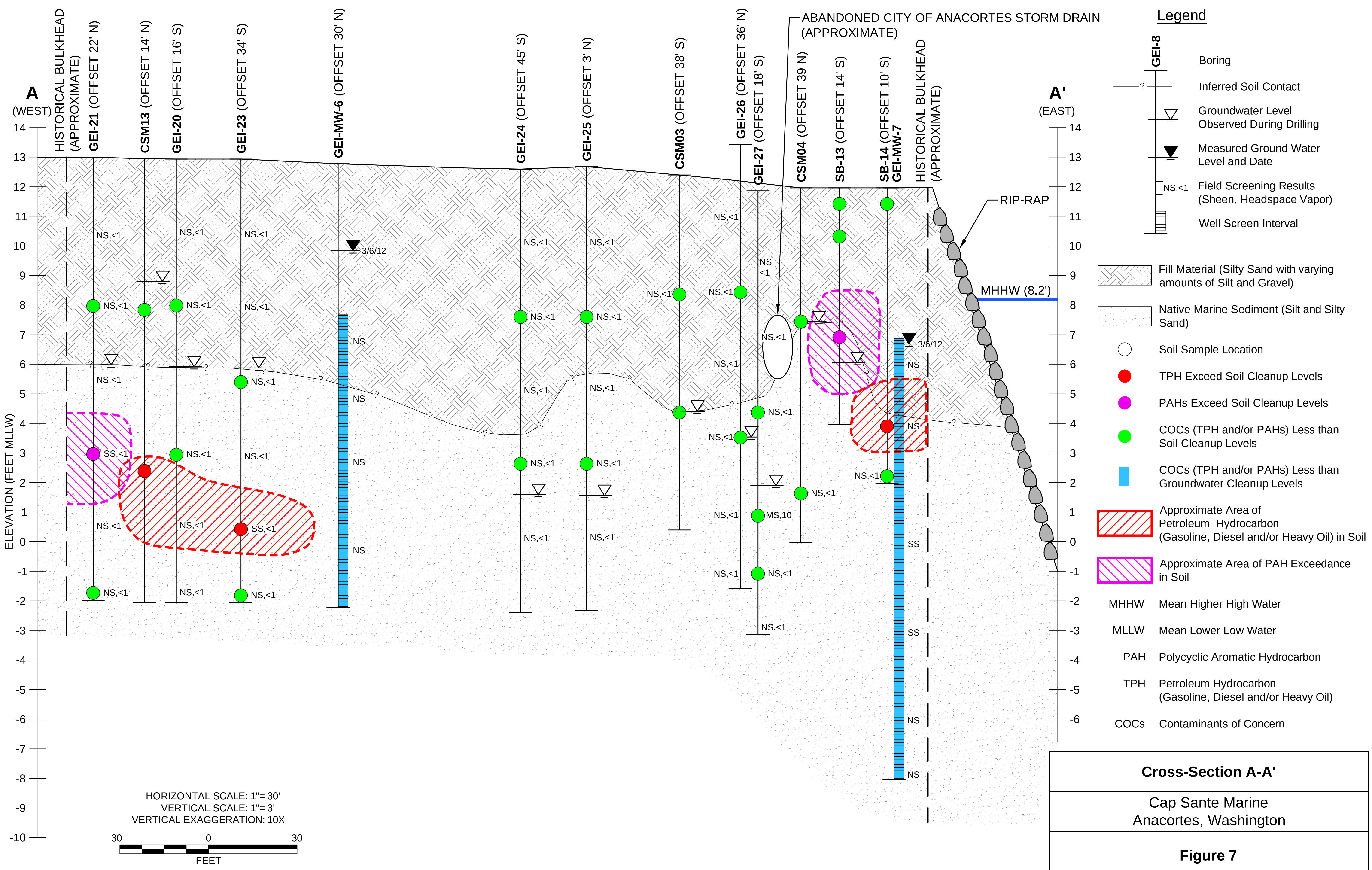
60 0 60
Feet

Current Site Conditions

Cap Sante Marine Site
Anacortes, Washington

Figure 6

Path: \\seal\Projects\5\5147005\GIS\514700509_CurrentSiteConditions.mxd Map Revised: 12 March 2013 amanza



Cross-Section A-A'

Cap Sante Marine
Anacortes, Washington

Figure 7

P:\5\5147005\09\CAD\5147005-09 Fig 7 CrossSection AA.dwg\TAB:Cross-Section AA modified by tmichaud on Mar 12, 2013 - 14:01

Disproportionate Cost Analysis

Cap Sante Marine
Anacortes, Washington

Figure 8

P:\5\5147005\09\5147005-09 Fig 8 DCA.dwg\TAB:Portrait modified by tmichaud on Mar 12, 2013 - 13:59