

ATTACHMENT - 1

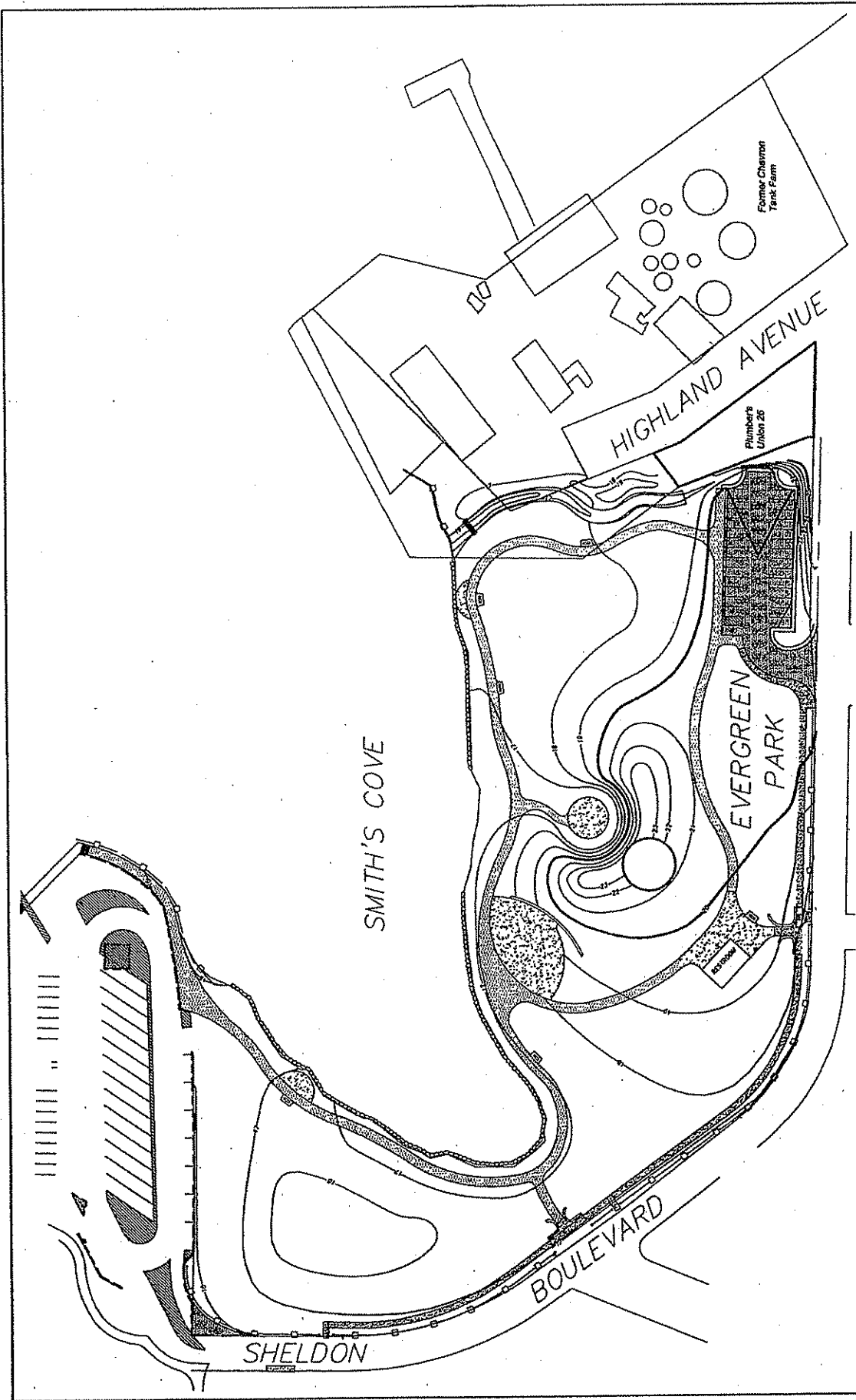
Chevron Property Environmental Conditions Assessment

Prepared for

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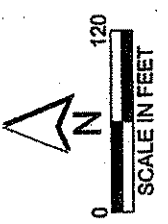
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Figure 3-1
Plumber's Union
Project Location Map



5. CURRENT SITE ENVIRONMENTAL CONDITIONS

This section presents a summary of current site environmental conditions based on a review of documentation provided by the City. With the exception of three sediment samples collected, no investigations were performed in support of this report. The information related to soil, groundwater, sediment and phase-separated hydrocarbons presented below is collected from previous investigations. The most recent data reported was collected in 2003 and would not meet the standard for ASTM-1527 or prospective purchaser under EPA 40CFR Part 312.

5.1 SOIL

Very little is known about current soil conditions at the site. No soil investigations were performed following the remediation actions taken in the early nineties. Prior to remediation activities, gasoline and diesel were detected in the soil at 100-200 times MTCA Method A regulations and BTEX concentrations were detected in the soil at up to 40 times MTCA Method A regulations (Ecology 1991). The vapor extraction system installed in 1991 and operated until 1994 is reported to have removed 195,000 pounds of hydrocarbons from the site. It is anticipated that concentrations in the soil today would be reduced in comparison to the results of initial sampling.

5.2 GROUNDWATER

The most recent groundwater data was collected by Chevron in March 2003. Groundwater samples were collected from six wells, the results of these analyses are presented in Table 5-1.

Table 5-1. March 2003 Groundwater Sampling Results^a

Contaminant	Diesel (ug/L)	Oil (ug/L)	Gasoline (ug/L)	Benzene (ug/L)
MTCA Method A:	500	500	800	5
MW-6	4,400	4,100	1,200	39
MW-9	6,300	2,400	8,200	550
MW-18	80,000	<10,000	810	ND
MW-21	970	ND	6,500	ND
MW-22	1,500	500	100	0.89
MW-23	270	ND	ND	ND

^a (Gettler-Ryan, 2003)

5.3 SEDIMENT

6. DATA GAPS

Based on information reviewed, several data gaps were identified that may affect a prospective purchaser's future cleanup liability. This means that Ecology could require additional sampling prior to negotiating cleanup criteria and extent or the City may elect to perform some additional sampling to better understand conditions prior to deciding on a regulatory approach. While we believe that sufficient data exists to prepare cost estimates of potential property liability, these factors do create some level of uncertainty.

Data gaps include:

- **No data since 2003:** Two year old data does not meet the standard for AAI under 40 CFR, Part 312 or the guidelines set forth under ASTM 1527-00 that may affect a prospective purchaser's future cleanup liability. It is not known if site conditions have changed since 2003.
- **Absence of fate and transport information:** No data exists to establish trends in natural attenuation processes. While considerable chemical data is present, no determination of natural degradation processes (methagenesis, sulfate/iron reduction, etc.) and no mobility modeling has been performed.
- **No Site Conceptual Model Exists:** No site conceptual model has been developed for this site. A site conceptual model may be recommended or required to develop risk-based cleanup criteria
- **Limited coverage for monitoring points:** Several of the wells located along the edge of the property have been damaged or lost and no data is available for these locations. Without adequate coverage for sentinel wells, the levels of contaminants that may be migrating off the property is not known.
- **Unknown soil conditions:** Site soil data were collected prior to the implementation of any remedial actions. Current soil conditions are not known and the volume of continuing source material that may remain at levels exceeding MTCA regulations cannot be evaluated.
- **Sediment data is indicative rather than definitive:** Sediment data is sparse, limited in quantity with no off-shore data collected. Three samples were collected as part of this assessment and indicated that no hydrocarbon contamination was present. Ecology of the Washington Department of Natural Resources may require additional characterization to demonstrate that impacts are not present in the off-shore environment.
- **Impacts to adjacent properties are unknown:** Contaminants from this site may have migrated off-site to an adjacent property. Potentially-impacted properties are owned by the City of Bremerton, Washington Department of Natural Resources and privately-owned parcels to the north. Consideration of the terms of the purchase and sale agreement should include a discussion of the potential liability from these adjacent properties.

The lack of information regarding current soil conditions, sediment conditions, and lack of recent groundwater data or adequate coverage for monitoring wells present the most significant unknowns for this site. Additionally, the lack of a site conceptual model may make it difficult for the City to negotiate less restrictive cleanup criteria. Future actions to address these unknowns are impacted by the stakeholder responsibilities and regulatory scenario selected for this property as discussed below:

- Under any scenario Ecology may mandate or the City may elect to install additional monitoring wells to evaluate groundwater conditions at the property and to collect a baseline set of groundwater data from selected wells. This would mitigate the data gaps related to a lack of recent data and limited coverage for monitoring points.
- Under an Agreed Order, the level and extent of any cleanup would be negotiated and defined and Ecology would identify any additional investigation requirements. This would help to mitigate the liability associated with impacts to DNR properties and the possibility of a future enforcement order from Ecology. In addition, collection of fate and transport information or the development of site conceptual model would likely not be required. This may also eliminate the need to collect additional soil or sediment data.
- Through the VCP the City would likely be required to collect additional soil, and sediment data to develop a cleanup action plan. This would resolve the data gaps related to unknown soil and sediment conditions.
- Under a "no action" or Independent Cleanup scenario the City may additionally elect to install borings to evaluate current site soil conditions and to consider future liability as unidentified source areas may exist. This would resolve the data gap related to unknown soil conditions.
- Under an Agreed Order or the VCP, additional sampling of soil, groundwater and sediment data would provide a basis for the City to negotiate risk-based cleanup criteria which may be less restrictive. This would resolve the data gaps related to unknown soil and sediment conditions.

7. CONCEPTUAL REMEDIAL ACTION ALTERNATIVES

Several remedial alternatives were developed to assess potential cleanup costs for the site. The remedial alternatives evaluated range from no action with monitoring (low cost, low effectiveness) to significant excavation (high cost, high effectiveness).

A list of remediation options was considered in developing the remedial alternatives. These options are listed below.

Groundwater

The following remedial options were used in developing alternatives for groundwater remediation:

- **Monitoring/Natural Attenuation (20 year duration)** - Monitor six wells semi-annually for 10 years, annually for 10 additional years.
- **Dewatering** - Maintain groundwater levees below the existing hydrocarbon "smear" zone to aid removal of residual free product, reduce potential for migration of contaminants in soil, and possibly enhance natural attenuation processes.

Soil

The following remedial options were used in developing alternatives for soil remediation:

- **Cap and Cover** - Install cap consisting of a geocomposite clay liner and clean soil cover layer.
- **Cutoff Wall** - Contain site groundwater with an oil-resistant geomembrane or sheet pile wall.
- **Soil Excavation** - Excavation and offsite disposal of contaminated soil. This option is included for completeness to provide an upper bound remediation cost.

An in-situ remedial alternative, Oxygen Releasing Compound, was considered but it was determined that this site is not a good candidate for this type of remediation due to the presence of free product in some wells and soil conditions.

Sediment

The following remedial options were used in developing alternatives for sediment remediation:

- **Sediment Removal** - Excavation of a 3-foot layer of sediment located between the toe of the shoreline bank and the mean lower low water (MLLW) line. Sediment would be excavated in the dry during low tides and disposed of off-site in a Subtitle D landfill. This estimate is based on an assumed volume of 3,000 cubic yards.
- **Sediment Capping** - Placement of an oil-resistant geomembrane and 3 feet of cobbly pit run fill over sediment located between the toe of the shoreline bank and the extreme low water line. Exact dimensions are unknown, and a 50x100 foot impacted area was estimated for purposes of estimated costs.

The remedial alternatives presented below were developed from these options. Details and estimated line item costs associated with these alternatives are provided in Appendix D.

- (1) Monitoring with no active remediation or institutional controls such as deed restrictions.

- (2) Point of contact compliant soil capping system with monitoring and institutional controls such as deed restrictions.
- (3) Point of contact compliant soil capping system and cutoff wall with monitoring and institutional controls such as deed restrictions.
- (4) Cutoff wall and dewatering with monitoring and institutional controls such as deed restrictions.
- (5) Point of contact compliant soil capping system, cutoff wall and dewatering with monitoring and institutional controls such as deed restrictions.
- (6) Cutoff wall and soil excavation with limited monitoring.

Each of the upland alternatives were evaluated for effectiveness/risk reduction, implementability, and cost. The scoring analysis used to evaluate the alternatives is presented in Table 8-1. The alternatives which presented the highest value based on these evaluation criteria are summarized below.

- **Alternative 2: Cap and Cover with Monitoring** – The cap and cover alternative provides a barrier to receptors for the upland portion of the site but does not provide containment for groundwater or soil contaminants to migrate off-site along the shoreline. Institutional controls would be required to protect against exposure to subsurface contaminants. This alternative is unlikely to substantially reduce petroleum hydrocarbon or lead concentrations in soil or groundwater to below regulatory limits. The preliminary estimate for implementing the cap and cover alternative is \$680,000 which includes 20 years of groundwater monitoring. This alternative offers a lower cost with a lower level of containment than Alternative 3.
- **Alternative 3: Cap, Cover and Cutoff Wall with Monitoring** – The cap/cover plus cutoff wall alternative would provide a higher degree of containment than the cap and cover alternative as it includes additional containment of the upland material along the shoreline. Institutional controls would be required to protect against exposure to subsurface contaminants. This alternative is unlikely to substantially reduce petroleum hydrocarbon or lead concentrations in soil or groundwater to below regulatory limits. The preliminary estimate for implementing the cap/cover plus cutoff wall alternative is \$1,100,000, which includes 20 years of groundwater monitoring. This alternative offers a higher level of containment with a higher cost than Alternative 2.

Sediment remediation, if required, is estimated to cost an additional \$300,000. Please note these cost estimates are based on the limited site data currently available. Actual remedial action construction costs can be anticipated to be within -30 percent to +50 percent of the costs indicated in Appendix D.