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Feasibility Study

"1913 Marine View Drive Site"
Tacoma, Washington

Facility No.: 1213
Cleanup Site ID: 3671

Prepared for

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Project Number TR0837J1

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TABLE OF CONTENTS

1.	Introduction.....	1
1.1	Site Information	1
1.2	Purpose	1
1.3	Background	1
1.4	Report Organization	2
2.	Conceptual Site Model	3
2.1	Site Description	3
2.1.1	Site Setting	3
2.1.2	Neighborhood Setting	3
2.1.3	Past and Current Property Uses and Facilities	4
2.2	Geology and Hydrology.....	4
2.2.1	General Geology.....	4
2.2.2	Site Geologic Conditions	4
2.2.3	Site Hydrogeologic Conditions	5
2.3	Nature and Extent of Impacts	6
2.3.1	Potential Contaminant Sources	6
2.3.2	Media of Potential Concern	7
2.3.3	Contaminants of Concern.....	7
2.3.4	Contaminant Occurrence in Media	8
2.4	Contaminant Fate and Transport	8
2.5	Future Site Uses	9
2.6	Exposure Pathway Assessment	9
3.	Identify Cleanup Goals	10
3.1	Cleanup Goals	10
3.2	Proposed Preliminary Cleanup Levels.....	10
3.2.1	Soil Cleanup Levels.....	10
3.2.2	Sediment Cleanup Levels.....	11
3.2.3	Groundwater Cleanup Levels	12
3.2.4	Surface Water Cleanup Levels.....	13
3.3	Cleanup Actions	13
3.4	Potential Applicable Local, State, and Federal laws.....	14
4.	Identify Alternatives	14
5.	Screen Alternatives and Components.....	17
6.	Evaluate Remaining Alternatives	18
6.1	Reasonable Restoration Time Frame	18
6.2	Determining Whether a Cleanup Action Uses Permanent Solutions to the Maximum Extent Practicable	18
6.2.1	Step 1—Determine the Benefits and Costs of Each Cleanup Action Alternative	19
6.2.2	Step 2—Rank the Cleanup Action Alternatives by Degree of Permanence.....	27
6.2.3	Step 3—Identify the Initial Baseline Alternative.....	27
6.2.4	Step 4—Conduct a Disproportionate Cost Analysis.....	27
7.	Select Preferred Alternative	29
8.	References	30

LIST OF TABLES

Table 1	Proposed Preliminary Cleanup Levels for Soil
Table 4	Proposed Preliminary Cleanup Levels for Sediment
Table 3	Proposed Preliminary Cleanup Levels for Groundwater
Table 4	Proposed Preliminary Cleanup Levels for Surface Water
Table 5	Proposed Cleanup Actions
Table 6	Potential Applicable Local, State, and Federal Laws and Relevant and Appropriate Requirements
Table 7	Summary of Alternative Costs
Table 8	Disproportional Cost Analysis (DCA) Summary

LIST OF FIGURES

Figure 1	Site Location
Figure 2	Site Plan
Figure 3	Stratigraphic Cross-Section Locations
Figure 4	Stratigraphic Cross-Section A-A'
Figure 5	Stratigraphic Cross-Section B-B'
Figure 6	Human Health Conceptual Site Model
Figure 7	Cost Effectiveness (\$/B) vs. Permanence for Cleanup Alternatives

LIST OF APPENDICES

Appendix A	Cost Estimates for Cleanup Alternatives
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ACRONYMS AND ABBREVIATIONS

Alt. A	Alternative A
Alt. B1	Alternative B1
Alt. B2	Alternative B2
Alt. C	Alternative C
Alt. D1	Alternative D1
Alt. D2	Alternative D2
Alt. E	Alternative E
AMSL	above mean sea level
AO	Agreed Order
bgs	below ground surface
Bluffs	Puget Sound Bluffs
CAP	Cleanup Action Plan
CGs	cleanup goals
CMP	Compliance Monitoring Plan
COC	contaminants of concern
CrVI	hexavalent chromium
CrIII	trivalent chromium
CSM	Conceptual Site Model
DCA	disproportionate cost analysis
Ecology	Washington State Department of Ecology
FS	Feasibility Study
ft	feet
ft/ft	foot/foot
General Metals	General Metals of Tacoma
Geosyntec	Geosyntec Consultants, Inc.
ICs	institutional controls
\$MM	millions of dollars
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
MTCA	Model Toxics Control Act
OCC	Occidental Chemical Corporation
O&M/P	operation and maintenance/periodic
PCE	tetrachloroethylene
PLP	potentially liable person
PMI	Port Maritime and Industrial
the Property	1905 Marine View Drive
RI	Remedial Investigation
SCSL(s)	Sediment Cleanup Screening Level(s)
Site	the fill area within the southern portion of the Property and referred to as "1913 Marine View Drive Site"
SMP	Soil Management Plan
SOW	Scope of Work
SRS Properties	Leslie P. Sussman, Paula Rose, and Alan Sussman, a partnership, d/b/a Sussman, Rose and Sussman
TCE	trichloroethylene
VOCs	volatile organic compounds
WAC	Washington Administrative Code
WQC	Water Quality Criteria

1. Introduction

1.1 Site Information

Site Name:	"1913 Marine View Drive Site"
Property Address:	1905 Marine View Drive, Tacoma, Washington
Project Consultant:	Geosyntec Consultants, Inc. (Geosyntec)
Project Consultant Contact Information:	Rick Bieber 801 5th Ave., Suite 2200 Seattle, WA 98104 Cell: 253.993.0190
Current Owner/Operator:	SRS Properties

1.2 Purpose

The Washington State Department of Ecology (Ecology) has determined that Leslie P. Sussman, Paula Rose, and Alan Sussman, a partnership, d/b/a Sussman, Rose and Sussman (referred to as SRS Properties), Occidental Chemical Corporation (OCC), General Metals of Tacoma (General Metals), and Don Oline are potentially liable persons (PLPs) for fill materials historically placed in the southern portion of a property located at 1905 Marine View Drive in Tacoma, Washington (the Property) and referred to as the "1913 Marine View Drive Site" (Site). **Figure 1** depicts the location of the Site and **Figure 2** depicts the layout of the Site.

Ecology and the PLPs entered into Agreed Order (AO) No. DE 1679, effective date of July 6, 2007 (Ecology, 2007a), that requires the PLPs to complete a Remedial Investigation (RI) at the Site (the fill area within the southern portion of the Property), conduct a Feasibility Study (FS) to determine a preferred cleanup action, and develop a draft Cleanup Action Plan (CAP). The RI was complete and approved. This report presents the FS. A draft CAP will be developed after Ecology approval of the FS.

Per Washington Administrative Code (WAC) Chapter 173-340-351 of the Model Toxics Control Act (MTCA) Cleanup Regulation, as amended January 2024 (MTCA Regulations) (Ecology, 2024a):

"The purpose of the feasibility study is to develop and evaluate cleanup action alternatives to enable the selection of a cleanup action that meets the requirements in WAC 173-340-360 and conforms, as appropriate, to the expectations in WAC 173-340-370."

1.3 Background

An RI Report prepared by GHD on behalf of the PLPs, was submitted to Ecology in 2015 that presented the results of the data collected during investigations completed at the Site through 2014. Ecology provided comments on the 2015 RI Report, and a revised RI Report was submitted to Ecology in November 2016.

In 2023, Ecology requested the PLPs to collect additional data to supplement the 2016 RI Report. In 2024, Geosyntec collected additional groundwater and surface water samples in accordance with an Ecology approved Scope of Work¹ (SOW) on behalf of the PLPs. A Supplemental Environmental Data Report presenting the 2024 data was submitted to Ecology in October 2024. Ecology provided comments on the Supplemental Environmental Data Report and requested that Site data be combined into one RI report. A Consolidated RI Report was submitted to Ecology in January 2025. Ecology provided comments on the Consolidated RI Report in March 2025. A revised Consolidated RI Report (Geosyntec, 2025) was submitted to Ecology on June 16, 2025, which was approved by Ecology on June 24, 2025.

In May 2025, OCC and Ecology met to discuss the next steps for developing an FS for the Site. Subsequently, an initial screening of cleanup actions sorted by media was developed and submitted to Ecology on June 10, 2025, and accepted by Ecology on June 24, 2025. A draft disproportionate cost analysis (DCA) summary based on the initial screening of cleanup actions was developed and submitted to Ecology on July 3, 2025. Additionally, virtual meetings between OCC and Ecology were also held in July and August to discuss these submissions.

The approved June 16, 2025, Consolidated RI Report, the initial screening of cleanup actions, and the DCA summary form the basis for development of this FS.

1.4 Report Organization

This FS presents the evaluation of cleanup action alternatives to address impacts at the Site. The evaluation was conducted in accordance with WAC 173-340-351. This FS also selects a preferred alternative based on the evaluation presented.

This FS is organized as follows:

- i) Section 1 Introduction. Provides a summary of Site information, purpose of the report, background, and report organization.
- ii) Section 2 Conceptual Site Model (CSM). Provides a summary of the Site characterization including the physical setting, nature and extent of impacts, contaminant fate and transport, exposure pathways assessment, and likely future uses.
- iii) Section 3 Identify cleanup goals (CGs), including proposed preliminary cleanup levels for protecting human health and the environment based on the contaminants of concern (COC), and potential receptors and exposure pathways, and potential future uses. It also identifies and describes cleanup actions (technologies) that—alone or in combination—satisfy the CGs for each medium of potential concern and potential applicable local, state, and federal laws.
- iv) Section 4 Identify alternatives. Identifies and describes a reasonable number and type of cleanup action alternatives developed from technologies identified in **Section 3**—including at least one permanent cleanup action alternative.
- v) Section 5 Screen alternatives and components. Evaluates the identified alternatives to potentially reduce the number for detailed evaluation by eliminating alternatives

¹ Bieber, Richard. "Re: Marine View Drive - Tasks." Received by Misuraca, Tia (Ecology), 2 Nov. 2023.

that do not meet the minimum WAC requirements, for which costs are clearly disproportionate, or that are technically not implementable.

- vi) Section 6 Evaluate remaining alternatives. Evaluates the remaining alternatives with respect to compliance with requirements in WAC 173-340-360 and conformance to the expectations in WAC 173-340-370, including conducting a DCA.
- vii) Section 7 Select preferred alternative. Selects a preferred cleanup action alternative based on the detailed evaluation in **Section 6**.
- viii) Section 8 References: lists the documents referenced in this FS.

2. Conceptual Site Model

The following subsections summarize key information presented in the approved RI Report.

2.1 Site Description

2.1.1 Site Setting

The Site (the fill area within the southern portion of the Property—**Figure 2**) is an area of approximately 2.62 acres containing historically placed fill materials that are within the southern portion of the 6.25-acre Property (1905 Marine View Drive—**Figure 1**).

The Site is vacant without structures and is located on the north side of Marine View Drive. In general, the Property surface cover varies from sparse grass to densely vegetated—thick brush and trees—on the majority of the Property. The southwest portion of the Property is sparsely covered with grass and/or small standing brush. A significant portion of the Site is covered with the invasive noxious weed—phragmites australis, known as the common reed. A soil/gravel access road runs south to north through the Site from Marine View Drive.

The Property is vacant industrial land and currently recorded by the Pierce County Assessors' office as Parcel #0321362051 and is zoned 9167 (Vacant Land Major Problem). The City of Tacoma identifies the portion of the Property where the Site is located as zoned M-2 Heavy Industrial District.

2.1.2 Neighborhood Setting

The Property is bound along its entire southern boundary by a thin parcel owned by Manke Lumber Company Inc., running east to west between the Site/Property and Marine View Drive. The northern and northeastern flanks of the Property are steep bluffs. These hillsides make up much of the portion of the Property north of the fill area.

Adjacent properties to the north, west, east, and northeast are all at higher elevations than the Site—see **Figure 2**. Adjacent properties to the southeast and south are zoned 9180 or Port Maritime and Industrial (PMI). The adjacent property to the west is zoned 9180 or M-2. The properties to the north, east, and northeast that are at a higher elevation are zoned 9100 (Vacant Land Undeveloped – Residential), 1101 (Single Family Dwelling – Residential), and 7600 (Parks –

Residential) or R-2. These residential-zoned properties are physically separated from the Property by steep inclines and are up-gradient of the Site.

2.1.3 Past and Current Property Uses and Facilities

An area in the southern portion of the Property was used for the placement of fill materials, comprised of lime waste, shredder residue, sand, cobbles, dredged material, and construction/demolition debris. The lime waste fill is a by-product of the production of chlorinated solvents such as trichloroethylene (TCE) and tetrachloroethylene (PCE). Shredder residue consists of by-products of scrap metal and automobile recycling—such as rubber, plastic, foam, glass, textile materials, unrecovered metal, and wire (also known as auto fluff). The Site was also used for the storage of automobile scrap parts and other metal items.

The former Property owner Don Oline indicated at a July 8, 2004, Site meeting with Ecology that, during the 1960s or 1970s, approximately 20,000–30,000 cubic yards of material dredged from the Hylebos Waterway at the General Metals "graving dock" was placed at the Site in a 6-foot-thick layer on top of the lime waste fill and auto fluff².

The Property is currently vacant and covered with vegetation.

2.2 Geology and Hydrology

2.2.1 General Geology

Regionally, the Site and Property, Puyallup River Valley, and surrounding area are part of the Puget Sound Lowlands, which are surrounded by the Puget Sound Bluffs (Bluffs). The Bluffs extend along the sides of the Puyallup River Valley and correspond to the north side of the Property. The slope of the southern half of the Site rises from an approximate elevation of 11 feet (ft) above mean sea level (AMSL) along Marine View Drive to an approximate elevation of 27 ft AMSL at the northern portion of the Site. The northern half of the Property—north of the Site—rises more steeply to a bluff. The properties to the east and west of the Site are at higher elevations. The property to the east is approximately 160 ft AMSL and the property to the west is approximately 120 ft AMSL (Figure 2).

2.2.2 Site Geologic Conditions

The shallow subsurface geology of the Site has been defined using data collected during the RI. The Site consists primarily of sand with varying amounts of silt, gravel, lime waste fill, shredder residue, and other refuse. The shallow soils at the Site are divided into three stratigraphic units including

- topsoil;
- fill materials (dredged material, sand and shredder residue, construction/demolition debris, and lime waste); and
- native sediments.

² Statement attributed to Don Oline on July 8, 2004, recounted by one of the meeting participants.

The alignments of stratigraphic cross-sections through the Site are depicted on **Figure 3**. Stratigraphic cross-sections are presented on **Figure 4** (north to south) and **Figure 5** (west to east).

The topsoil unit is brown, clayey silt, having low plasticity. The thickness of the topsoil ranges from 0 to 0.7 ft but generally is not more than 0.5 ft thick.

Below the topsoil, the Site consists of imported fill materials made up primarily of sand and shredder residue fill with varying amounts of silt, gravel, cobbles, lime waste fill, and construction debris. The imported fill materials cover approximately 40 percent of the Property and extend from land surface to a depth as great as 20 ft below ground surface (ft bgs). At some locations along the flanks of the Property in close proximity to the eastern drainage swale and former western drainage swale, the shredder residue is observed at or just below the surface. The lime waste fill, as encountered during the investigations, is a gray to beige fine-grained material with medium to high plasticity and is typically present as a defined single layer at depth within the sand and shredder residue fill in the southern portion of the Site. A portion of the lime waste fill to the east, between GM-B-6A and TP-34 (**Figure 3**), is overlain by the sand and shredder residue fill and underlain by native sand, silty sand with peat. The thickness of the lime waste fill ranges from approximately 1.0 to 5.0 ft and is typically greater than 7.5 ft below the ground surface. There is a small area on the west side of the Site where some lime waste fill was left at the surface following completion of a test pit in 2014. The estimated areal limits of sand and shredder residue fill and lime waste fill are depicted on **Figure 3**.

The upper native sediments below the imported fill materials are brown, intermixed, silty sands, clayey silts, and peat, with plasticity ranging from low to high.

2.2.3 Site Hydrogeologic Conditions

2.2.3.1 Groundwater

Hydrographs from a 1998 hydraulic monitoring program indicate that there is no response in the monitoring wells to the tidal fluctuations in the Hylebos Waterway—indicating a lack of hydraulic connection.

Groundwater from springs emerging from the base of the hill slope at the north side of the Property flow overland to the south (**Subsection 2.2.3.2**).

Water levels measured during groundwater sampling programs indicate that the groundwater flow direction within and below the imported fill materials is from northeast to southwest—the same direction that the ground surface slopes. The horizontal flow gradient of the shallow groundwater ranged from 0.03 foot/foot (ft/ft) to 0.04 ft/ft. Horizontal flow gradients of the groundwater beneath the depth of the imported fill materials ranged from 0.02 ft/ft to 0.05 ft/ft.

Water level data between the shallow and deeper well pairs indicate upward vertical gradients that ranged from 0.18 ft/ft to 0.86 ft/ft. The average vertical gradient was calculated as 0.45 ft/ft upward. Well GM-B-6A (**Figure 3**) was observed to be artesian during the preparation for sampling in June 2024.

2.2.3.2 Surface Water

Groundwater springs—emerging from the base of the hill slope at the north side of the Property—fed two small drainage swales that traversed the Property along the eastern and western flanks of the Property. In June 2024, it was observed that water was flowing within the eastern drainage swale. The former western drainage swale was blocked by a small landslide near up-gradient groundwater monitoring well GM-B-3R (**Figure 3**) and water was not flowing within this former drainage swale. The eastern drainage swale traverses the Property to the south to a small wet area between the Site/Property and Marine View Drive further to the south. This surface water eventually flows to the Hylebos Waterway as described below.

Two small wet areas are present along the southern boundary of the Site—one to the east and one to the west as indicated on Figure 2. A majority of the wet areas are located on the Manke Lumber Company Inc. parcel between the Site/Property and Marine View Drive. A drainage swale enters the wet areas from the east, off the southeastern corner of the Site. All of the surface water discharges through a culvert off the southwestern edge of the Property, ultimately discharging to the Hylebos Waterway further to the southwest.

2.3 Nature and Extent of Impacts

Investigations have been conducted at the Site to define the nature and extent of impacts. The chemical characterization of soil, sediment, groundwater, and surface water is based upon the analytical data obtained during the various investigations summarized in the approved Consolidated RI Report (Geosyntec, 2025). This subsection summarizes the potential contaminant sources, media of potential concern, and COC in relation to the Site.

2.3.1 Potential Contaminant Sources

On-Site

The Site (the fill area within the southern portion of the Property—Figure 2) was used for the placement of fill materials, comprised of lime waste, shredder residue, sand, cobbles, dredged material, and construction/demolition debris. The lime waste fill is a by-product of the production of chlorinated solvents such as TCE and PCE. Shredder residue consists of by-products of scrap metal and automobile recycling, such as rubber, plastic, foam, glass, textile materials, unrecovered metal, and wire (also known as auto fluff).

The Site was also used for the storage of automobile scrap parts and other metal items. The Site is not currently in use, and nearly all scrap materials and other surface debris have been removed as was observed in June 2024. The estimated volume of fill at the site is upwards of approximately 66,000 cubic yards. The volume was calculated based on the areal extent of the fill (**Figure 3**) and the cross-sections (**Figures 4 and 5**).

Off-Site

There are several properties identified as "Facilities" and/or "Sites" in Ecology's Facility/Site Database (Ecology, 2024b). The properties identified are located down- to cross-gradient or at a distance greater than 0.25 mile except the Oline Storage Yard. The Oline Storage Yard is the closest property to the Site and is located to the west/northwest at the 1915 Marine View Drive property. This property is cross-gradient/up-gradient to the Site based on the flow direction (south)

of Site groundwater and is at a significantly higher elevation (**Figure 2**). The Oline Storage Yard site status is listed as No Further Action having complied with an AO.

Surface water from a drainage swale to the east enters the wet area that is south of the Site. The surface water and sediment quality from this drainage swale, which could impact the wet areas south of the Site, have not been assessed. Therefore, there appears to be potential for future contaminant migration in surface water (including water and suspended sediment), if present, to the wet areas south of the Site from neighboring properties.

Potential contribution to Site impacts from surface water coming from the bluffs located north, west, and east of the Site has not been assessed.

2.3.2 Media of Potential Concern

The media of potential concern based on the findings of the RI include

- soil—specifically the fill within the Site;
- sediment—specifically in the Site eastern drainage swale and former western drainage swale and the drainage swale south of the Site;
- groundwater—specifically with respect to potential impacts to surface water as groundwater is non-potable under the Site; and
- surface water—specifically south of the Site.

Air/soil vapor is not considered a medium of potential concern based on current use of the Property. The vapor intrusion pathway is incomplete because there are no occupants and therefore no vapor intrusion receptors are on the Property.

2.3.3 Contaminants of Concern

The COC based on the findings of the RI include

- lead and mercury in sand and shredder residue fill and other types of fill materials —these contaminants that were identified in the RI are present in the fill materials at concentrations above MTCA Method A industrial soil cleanup levels (no MTCA Method C values are available for these metals);
- arsenic and chromium in other types of fill materials —these contaminants that were identified in the RI are present in the fill materials at concentrations above MTCA Method C industrial soil cleanup levels;
- arsenic, mercury, and zinc in sediments —these contaminants that were identified in the RI are present in sediment at concentrations above sediment cleanup objectives;
- benzene, PCE, TCE, vinyl chloride, bis(2-ethylhexyl)phthalate, hexachlorobenzene, hexachlorobutadiene, arsenic, chromium, copper, lead, manganese, mercury, nickel, silver, zinc, total cyanide, and aroclor 1254 in groundwater —these contaminants that were identified in the RI are present in groundwater at dissolved concentrations above MTCA Method B cleanup levels for surface water impacting marine

receptors. (Note that the comparisons to surface water criteria do not take into account attenuation related to the groundwater to surface water pathway); and

- arsenic, copper, manganese, thallium, bis(2-ethylhexyl)phthalate, hexachlorobenzene, and aroclor 1254 in surface water
—these contaminants that were identified in the RI are present in surface water at dissolved concentrations above MTCA Method B cleanup levels for surface water impacting marine receptors. (Note that the comparisons to surface water criteria do not take into account attenuation related surface water discharging to the Hylebos Waterway.)

2.3.4 Contaminant Occurrence in Media

The RI presented contaminant occurrence in media at the Site. The key findings are as follows:

- Soil—investigations indicate soils/fill materials with metals (arsenic and chromium) concentrations exceeding MTCA Method C industrial cleanup levels are present at shallow depths in fill materials from surface to 3.5 ft bgs. The proposed preliminary chromium cleanup level is based on hexavalent chromium (CrVI). Chromium concentrations in soils/fill materials are below the MTCA Method C industrial cleanup level for trivalent chromium (CrIII);
- Sediment—metals (arsenic, mercury, and zinc) were detected above marine sediment cleanup objectives ("no adverse effects" level) in the sediment samples collected from the east and southern drainage swales. The arsenic and zinc concentrations are below the marine sediment cleanup screening levels (SCSLs) ("minor adverse effects" level). The mercury concentrations down-drainage are below both criteria. Therefore, there does not appear to be significant migration of contaminants in sediment from the Site;
- Groundwater—comparison of the 2024 with the 2014 groundwater and 2024 surface water data appears to indicate attenuation of organic contaminants in groundwater and there does not appear to be significant migration of contaminants in groundwater from the Site; and
- Surface Water—2024 sampling indicated that surface water exhibited elevated levels of metals (copper, manganese, and thallium) exceeding cleanup standards. These dissolved concentrations are generally just above the cleanup standards. Comparison of 2024 data with historical surface water data appears to indicate attenuation of contaminants in surface water and there does not appear to be significant migration of contaminants in surface water from the Site.

2.4 Contaminant Fate and Transport

Site investigations have confirmed that there are impacts in sediment, groundwater, and surface water likely related to the fill materials placed at the Site. The mechanisms for potential migration of contaminants are by surface water runoff over and groundwater flowing through the fill materials, and surface water leaving the Site, which are discussed below.

Surface Water Runoff

Precipitation at the Site comes into contact with surficial soil and carries soil particles with the surface water runoff, especially during heavy rainfall events. The surface water at the Site is conveyed by overland flow to adjacent surface water drainage swales. Contaminants sorbed to the

soil particles could impact sediments if particles settle in the drainage swales and/or could desorb and dissolve into surface water.

Migration in Groundwater

Infiltrating water that comes into contact with fill containing contaminants may dissolve some of the contaminants, carrying them to the water table and into groundwater. Up-gradient groundwater that flows through the fill may also dissolve some of the contaminants. Once in groundwater, the contaminants may be transported along with groundwater flow southward to surface water in the drainage swale south of the Site.

Migration in Surface Water

Contaminants may be transported with surface water flow westward from the drainage swale south of the Site and eventually discharge to the Hylebos Waterway.

2.5 Future Site Uses

The Property is industrial and zoned 9167 (Vacant Land Major Problem) per Pierce County and the City of Tacoma identifies the portion of the Property where the Site (the fill area within the southern portion of the Property) is located as zoned M-2 Heavy Industrial District. Because the historical land use and zoning of the Site has been and is industrial, potential future land uses will likely be as an industrial site or vacant land.

2.6 Exposure Pathway Assessment

In accordance with MTCA, potential exposure pathways for human and environmental receptors that may need to be addressed include the following:

- Human health protection from soil to groundwater (drinking water);
- Human health protection from direct soil contact and fugitive dust;
- Human health protection from groundwater (direct contact);
- Human health protection from soil and groundwater vapor inhalation;
- Human health protection from soil to sediment/surface water;
- Human health protection from groundwater to surface water; and
- Terrestrial/aquatic ecological protection.

Based on information acquired during the RI and based on the current and potential future land uses identified, the following conclusions were made:

- soil and groundwater vapor inhalation are incomplete human health exposure pathways due to a lack of receptors based on the current and potential future Site uses and the lack of concentrations of volatile organic compounds (VOCs) in surface soils; and
- soil to groundwater (drinking water) and groundwater direct contact are incomplete human health exposure pathways due to a current lack of receptors and future expected non-use of groundwater based on the determination by Ecology that groundwater at this Site is non-potable.

Per MTCA, potential exposure pathways requiring additional evaluation and management include the following:

- Human health protection from direct soil contact;
- Human health protection from soil to sediment/surface water;
- Human health protection from groundwater to surface water; and
- Terrestrial³/aquatic ecological protection.

Figure 6 presents the human health conceptual site model for potential exposure pathways. Proposed preliminary cleanup levels addressing the aforementioned pathways are presented in **Section 3**.

3. Identify Cleanup Goals

Step 1 in the FS process involves identifying CGs. This includes proposed preliminary cleanup levels for protecting human health and the environment based on the COC, and potential receptors and exposure pathways, and potential future land uses. It also identifies and describes cleanup actions (technologies) that—alone or in combination—satisfy the CGs for each medium of potential concern and potential applicable local, state, and federal laws.

3.1 Cleanup Goals

The CGs for the Site to address residual contaminants in media, potential exposure pathways, and potential receptors include the following:

- prevent direct contact with fill materials by potential human and terrestrial receptors;
- mitigate potential migration of contaminants from impacted fills to sediment;
- mitigate potential migration of contaminants from impacted groundwater to surface water; and
- protect potential terrestrial and aquatic receptors.

3.2 Proposed Preliminary Cleanup Levels

Proposed preliminary cleanup levels were presented in the RI Report, and the information is summarized below.

3.2.1 Soil Cleanup Levels

As stated above, groundwater at the Property is not used as a drinking water source and was determined by Ecology to be non-potable. Therefore, the soil to groundwater (drinking water) pathway is incomplete and will likely remain incomplete. While there is currently no physical barrier covering the fill materials, exposure to the terrestrial ecological receptors pathway can be considered incomplete if a physical barrier were to be placed within a time frame acceptable to Ecology per WAC 173-340-7492(2)(b). This would also eliminate the surficial soil to surface water

³ Pathway analysis indicated that no physical barrier covering the imported sand and shredder residue fill is currently present on Site and therefore the terrestrial ecological protection pathway is currently complete.

pathway. The cleanup actions presented in **Subsection 3.3** for soil include a cover system. As described in **Subsection 2.6**, potential future land uses will likely be as an industrial site or vacant land. Therefore, the proposed preliminary cleanup levels for soil at the Site are MTCA Method C industrial soil cleanup levels for direct contact. The table below presents these values for the COC in soils/fill materials listed in **Subsection 2.3.3**.

Table 1: Proposed Preliminary Cleanup Levels for Soil

Parameter	MTCA Method C Industrial Soil Cleanup Levels for Direct Contact (mg/kg)
arsenic	20 ¹
chromium	820 ²
lead	NV ³
mercury	NV ⁴

Table Notes:

Values are from Ecology Cleanup Levels and Risk Calculation (CLARC) data tables (Ecology, 2025).

mg/kg - milligrams per kilogram.

¹ MTCA Table 745-1, Method A Soil Cleanup Levels for Industrial Properties (Ecology, 2007b) value is 20 mg/kg (cleanup level based on protection of groundwater for drinking water use, using the procedures in WAC 173-340-747(4), adjusted for natural background for soil.) Unadjusted calculated MTCA Method C Direct Contact value for arsenic is 4.1 mg/kg.

² Calculated value for Chromium VI. The value for Chromium III is 5,300,000 (5.30E+06) mg/kg.

³ No value for lead. MTCA Method A (default) industrial properties value is 1,000 mg/kg.

⁴ No value for mercury. MTCA Method A (default) industrial properties value is 2 mg/kg.

3.2.2 Sediment Cleanup Levels

According to WAC 173-204-562(2), two chemical criteria are established for sediments: sediment cleanup objectives, which establish a no adverse effects level; and SCSLs, which establish a minor adverse effects level. To ensure Site sediment quality results in no adverse effects to the benthic community in the Hylebos Waterway, marine sediment cleanup objectives could be used as sediment cleanup levels for the Site. Alternatively, if it can be demonstrated that the marine SCSLs would not cause an adverse effect in the Hylebos Waterway, these values may be used as sediment cleanup levels. Accordingly, the proposed preliminary cleanup levels for sediment at the Site are sediment cleanup objectives and SCSLs. The table below presents these values for the COC in sediment listed in **Subsection 2.3.3**.

Table 2: Proposed Preliminary Cleanup Levels for Sediment

Parameter	Sediment Cleanup Objectives (mg/kg)	Sediment Cleanup Screening Levels (mg/kg)
arsenic	57	93
mercury	0.41	0.59
zinc	410	960

Table Notes:

Values are from Table III, Marine Sediment, Sediment Cleanup Objectives and Cleanup Screening Levels, Chemical Criteria—WAC 173-204-562 (Ecology, 2013).

Note that the comparisons to sediment criteria do not take into account potential attenuation related sediments discharging to the Hylebos Waterway and therefore the proposed preliminary cleanup levels for sediment are conservative.

3.2.3 Groundwater Cleanup Levels

Ecology has designated groundwater at the Site as non-potable. Therefore, the groundwater is not expected to be used as a drinking water source and groundwater cleanup levels will be driven by the next stringent pathway, which is the groundwater to surface water pathway. The groundwater at the Site that discharges to surface water in drainage swales eventually discharges into the Hylebos Waterway, which is marine water. As such, groundwater cleanup levels are based on the protection of applicable marine surface water beneficial uses. Accordingly, the proposed preliminary cleanup levels for groundwater at the Site are MTCA Method B surface water cleanup levels for marine receptors. The table below presents these values for the COC in groundwater listed in Subsection 2.3.3.

Table 3: Proposed Preliminary Cleanup Levels for Groundwater

Parameter	MTCA Method B surface water cleanup level for marine receptors (µg/L)
benzene	1.6
tetrachloroethylene (PCE)	2.9
trichloroethylene (TCE)	0.7
vinyl chloride	0.18
bis(2-ethylhexyl)phthalate	0.046
hexachlorobenzene	0.000005
hexachlorobutadiene	0.01
arsenic	5
chromium	4.13 ¹
copper	3.1
lead	8.1
manganese	100 ²
mercury	0.025
nickel	8.2
silver	0.91
zinc	81
total cyanide	1
aroclor 1254	0.000104

Table Note:

Values are from Ecology CLARC data tables, updated February 2025.

µg/L - micrograms per liter.

¹ Value for Chromium VI. Water Quality Criteria (WQC) adjusted to a lower concentration so that the excess cancer risk is one in one hundred thousand (1×10^{-5}). See WAC 173-340-730(5)(b). The value for Chromium III is 243,056 (2.43E+05) µg/L.

² (Diet - e.g., fish consumption)

Note that the comparisons to surface water criteria do not take into account attenuation related to the groundwater to surface water pathway and therefore the proposed preliminary cleanup levels for groundwater are conservative.

3.2.4 Surface Water Cleanup Levels

Surface water from the Site eventually discharges into the Hylebos Waterway, which is marine water. Accordingly, the proposed preliminary cleanup levels for surface water at the Site are MTCA Method B surface water cleanup levels for marine receptors. The table below presents these values for the COC in surface water listed in **Subsection 2.3.3**.

Table 4: Proposed Preliminary Cleanup Levels for Surface Water

Parameter	MTCA Method B surface water cleanup level for marine receptors (µg/L)
bis(2-ethylhexyl)phthalate	0.046
hexachlorobenzene	0.000005
arsenic	5
copper	3.1
manganese	100 ¹
thallium	0.223
aroclor 1254	0.000104

Table Note:

Values are from Ecology CLARC data tables, updated February 2025.

¹ (Diet - e.g., fish consumption)

Note that the comparisons to surface water criteria do not take into account attenuation related to surface water discharging to the Hylebos Waterway and therefore the proposed preliminary cleanup levels for surface water are conservative.

3.3 Cleanup Actions

The proposed cleanup actions were discussed with Ecology during a series of in-person and virtual meetings between OCC and Ecology. Based on OCC and Ecology collaboration, OCC formally presented a list of proposed cleanup actions for the Site to Ecology for comment on June 10, 2025, via email correspondence. Subsequently, Ecology agreed with the list on June 24, 2025, via email correspondence.

The proposed cleanup actions for the Site based on the above are presented in **Table 5** attached to this report. The cleanup actions are arranged by potential exposure pathway and each medium of potential concern—soil, sediment, and groundwater/surface water (groundwater to surface water pathway). **Table 5** also includes the soil vapor exposure pathway that is presently incomplete but could become complete in the future without control of future Site uses (i.e., deed restrictions). No Action is listed in **Table 5** for comparison with the cleanup actions.

As listed in **Table 5**, institutional controls (ICs) are common for all exposure pathways and media of potential concern. The remaining cleanup actions are specific to the exposure pathways and media of potential concern. These cleanup actions form the basis for development of the cleanup alternatives presented in **Section 4**.

3.4 Potential Applicable Local, State, and Federal laws

WAC 173-340-710 discusses requirements for identifying applicable local, state, and federal laws. The requirements in WAC 173-340-710 "...are similar to the "ARAR" (applicable, relevant and appropriate requirements) approach of the federal superfund law. Sites that are cleaned up under an order or decree may be exempt from obtaining a permit under certain other laws but they must still meet the substantive requirements of these other laws. (See WAC 173-340-710(9).)" [(WAC 173-340-700(6)(a))].

In accordance with WAC 173-340-710(2), this section identifies potential applicable local, state, and federal laws that may be considered legally applicable or relevant and appropriate requirements for the Site. "The department shall make the final interpretation on whether these requirements have been correctly identified and are legally applicable or relevant and appropriate." [WAC 173-340-710(2)].

"Legally applicable requirements include those cleanup standards, standards of control, and other environmental protection requirements, criteria, or limitations adopted under state or federal law that specifically address a hazardous substance, cleanup action, location or other circumstances at the site." [WAC 173-340-710(3)].

"Relevant and appropriate requirements include those cleanup standards, standards of control, and other environmental requirements, criteria, or limitations established under state or federal law that, while not legally applicable to the hazardous substance, cleanup action, location, or other circumstance at a site, address problems or situations sufficiently similar to those encountered at the site that their use is well suited to the particular site." [WAC 173-340-710(4)].

Table 6 attached to this report presents the potential applicable local, state, and federal laws and relevant and appropriate requirements identified for the Site.

4. Identify Alternatives

Step 2 in the FS process identifies cleanup action alternatives for evaluation in the study. This section identifies and describes a reasonable number and type of cleanup action alternatives developed from cleanup actions identified in **Section 3**, including at least one permanent cleanup action alternative.

OCC formally presented a draft preliminary DCA summary—that included a list of seven proposed remedial alternatives developed from the list of cleanup actions (see **Subsection 3.3**)—to Ecology for comment on July 3, 2025, via email correspondence. The list of alternatives and the DCA were subsequently discussed with Ecology during conference calls between OCC and Ecology.

The proposed cleanup action alternatives for the Site based on the draft preliminary DCA are presented below.

Alternative A (Alt. A)—Natural Attenuation

This alternative includes

- ICs (deed restrictions, entrance fencing) to restrict access and use of the Site;

- a Soil Management Plan (SMP) to manage potentially impacted materials that may be disturbed at the Site in the future; and
- a Compliance Monitoring Plan (CMP) to describe monitoring of groundwater at selected wells and surface water at selected locations to assess natural attenuation of COC.

All remedial alternatives, except the No Action alternative, will incorporate ICs. ICs are measures undertaken to limit or prohibit activities that interfere with the integrity of a remedy or that might result in exposure to hazardous substances at a site. In most cases, ICs are recorded as part of the property deed to restrict activities or uses of the property that could result in exposure to hazardous substances.

In the event that disturbance of potentially impacted soils/fill materials or sediments on the Site is necessary in the future, an SMP will provide procedure to manage the materials to protect human health and the environment in accordance with applicable local, state, and federal laws.

Groundwater and surface water sampling over time will provide data to assess whether dissolved concentrations of COC are reducing towards meeting Site cleanup levels and eventually are below Site cleanup levels.

Alternative B1 (Alt. B1)—Consolidate and Common Soil Cover (soil and sediment)

This alternative includes the cleanup actions in Alt. A plus

- consolidation of potentially impacted soils/fill materials and sediments on the Site; and
- regrading the fill area and installation of a common soil cover to prevent direct contact and promote surface water drainage off of the cover.

This alternative adds a layer of protection over potentially impacted soils/fill materials and sediments to prevent direct contact.

Alternative B2 (Alt. B2)—Consolidate and Direct Contact Barrier with Reduced Infiltration (soil and sediment)

This alternative includes the cleanup actions in Alt. B1 plus

- installation of a horizontal barrier below the common soil cover to reduce infiltration and promote drainage away from potentially impacted materials.

The system would include a permeable soil (e.g., sand) layer immediately above the horizontal barrier to drain infiltrating water away from the cover and fill materials.

This alternative reduces infiltrating water that could come in contact with impacted materials and potentially transport contaminants to groundwater, which should reduce groundwater flux and the time for natural attenuation to meet cleanup levels in surface water—assuming no contributions from potential off-Site sources.

Alternative C (Alt. C)—Consolidate and Direct Contact Barrier with Reduced Infiltration (soil and sediment) and Up-Gradient Groundwater Diversion

This alternative includes the cleanup actions in Alt. B2 plus

- installation of a vertical barrier up-gradient of the fill materials to divert up-gradient groundwater from flowing through potentially impacted materials.

The up-gradient vertical barrier would divert up-gradient groundwater to either side of the fill materials so that it flows through the natural uncompacted soils, eventually discharging to surface water down-gradient. If the natural soils are not sufficiently permeable to accommodate the increased flow, then groundwater mounding could occur and possibly discharge to surface. The design would need to take this into consideration to divert additional surface water around the cover and fill materials. The potential mounding could also impact drainage away from the cover above the horizontal barrier. Contaminant dissolved concentrations in groundwater on the Site may increase temporarily because of less water available to dilute dissolved contaminants.

The addition of the vertical barrier will decrease groundwater flux through the fill materials, likely further reducing potential transport of COC in groundwater to surface water. The reduced groundwater flux should further reduce the time for natural attenuation to meet cleanup levels in surface water—assuming no contributions from potential off-Site sources.

Alternative D1 (Alt. D1)—Consolidate and Direct Contact Barrier with Reduced Infiltration (soil and sediment), Up-Gradient Groundwater Diversion, and Down-gradient Funnel and Gate System

This alternative includes the cleanup actions in Alt. C plus

- installation of a vertical barrier down-gradient of the fill materials (funnel) on either side of a vertical reactive barrier treatment zone (gate) for treatment of potentially impacted groundwater.

The down-gradient vertical barrier would divert groundwater to flow from the fill materials through the vertical treatment zone before discharging to surface water down-gradient. The vertical treatment zone would need to be sufficiently permeable to accommodate the groundwater flow to prevent groundwater mounding, which could impact the cover and potentially reduce the capture of groundwater. The vertical treatment zone would need to be sufficiently sized with appropriate reactive materials to reduce dissolved concentrations of COC to below cleanup levels.

The addition of the funnel and gate system will mitigate potential transport of COC in groundwater to surface water at dissolved concentrations greater than cleanup levels. The time for natural attenuation up-gradient of the system to meet cleanup levels in groundwater may be affected because of a reduced groundwater flux. Reductions in dissolved concentrations of COC in surface water will occur sooner assuming no contributions from potential off-Site sources.

Alternative D2 (Alt. D2)—Consolidate and Direct Contact Barrier with Reduced Infiltration (soil and sediment), Up-Gradient Groundwater Diversion, and Down-gradient Reactive Barrier System

This alternative includes the cleanup actions in Alt. C plus

- installation of a vertical reactive barrier down-gradient of the fill materials for treatment of potentially impacted groundwater.

The down-gradient vertical reactive barrier would treat groundwater flow from the fill materials through a vertical treatment zone before discharging to surface water down-gradient. The vertical treatment zone would need to be sufficiently permeable to accommodate the groundwater flow to prevent groundwater mounding, which could impact the cover and potentially reduce the capture of groundwater. The risk of groundwater mounding is reduced as compared to the funnel and gate

system (Alt. D1); however, more reactive materials would be needed to treat groundwater along the entire flow path from the fill materials. The vertical treatment zone would need to be sufficiently sized with appropriate reactive materials to reduce dissolved concentrations of COC to below cleanup levels.

The addition of the vertical reactive barrier will mitigate potential transport of COC in groundwater to surface water at dissolved concentrations greater than cleanup levels. The time for natural attenuation up-gradient of the system to meet cleanup levels in groundwater may be affected because of a reduced groundwater flux. Reductions in dissolved concentrations of COC in surface water will occur sooner assuming no contributions from potential off-Site sources.

Alternative E (Alt. E)—Excavation of Potentially Impacted Soils and Sediment and Off-Site Disposal

This alternative includes

- excavating fill materials and potentially impacted sediment from the Site;
- disposing of all excavated materials off-Site;
- backfilling of the excavation with imported clean fill and grading;
- entrance fencing to control future access to the Site; and
- monitoring of groundwater at selected wells and surface water at selected locations for a limited time to confirm the Site is no longer impacting groundwater and contributing to impacts in surface water.

This alternative satisfies the requirement for at least one permanent cleanup action alternative. By removing the fill materials and potentially impacted sediments from the Site, potential sources at the Site will be eliminated and the restoration time frame for groundwater and surface water impacted from the Site will be the shortest compared to the other alternatives. Excavation of the fill will be difficult due to shallow water levels. Dewatering may be necessary that would require treatment of the extracted water either on Site or off Site. Excavation under wet conditions may not be practicable because of artesian conditions at the Site that could be exacerbated during excavation.

5. Screen Alternatives and Components

Step 3 in the FS process involves evaluating the alternatives to potentially reduce the number for detailed evaluation by eliminating alternatives identified in Step 2 that

- *clearly do not meet the requirements for a cleanup action in WAC 173-340-360, including alternatives for which costs are clearly disproportionate to benefits under WAC 173-340-360(5); and*
- *are not technically possible at the site.*

The applicable requirements of WAC 173-340-360 for screening include

- protecting human health and the environment;
- complying with cleanup standards and applicable local, state, and federal laws;

- minimizing present and future releases and migration of hazardous substances in the environment;
- providing resilience to climate change to protect long-term effectiveness;
- providing compliance monitoring; and
- conforming, as appropriate, to the expectations in WAC 173-340-370.

None of the alternatives presented in Step 2 are candidates for elimination based on the above criteria and therefore will be carried forward for detailed evaluation.

6. Evaluate Remaining Alternatives

Step 4 in the FS process involves conducting *a detailed evaluation of each remaining cleanup action alternative to determine whether it meets the requirements in WAC 173-340-360 and conforms to the expectations in WAC 173-340-370.*

This evaluation includes determining whether the proposed cleanup actions provide for a reasonable restoration time frames and which cleanup action uses permanent solutions to the maximum extent practicable using a DCA.

6.1 Reasonable Restoration Time Frame

The Site currently does not pose significant potential risks to human health and the environment. The Site is not currently in use and because the historical land use and zoning of the Site has been and remains industrial, potential future land uses will likely be as an industrial site or vacant land. The Site is privately owned and therefore access can be controlled. As stated in **Subsection 2.3**, evaluation of the RI data indicates that concentrations of COC in groundwater and surface water are

- detected both below and above the proposed cleanup levels;
- attenuating, which is expected to continue with or without remediation resulting in restoration of the groundwater and surface water; and
- not significantly migrating from the Site.

Based on the current conditions noted above, any of the proposed cleanup alternatives, except Alt. A, should reduce the time frame for restoration of groundwater and surface water.

6.2 Determining Whether a Cleanup Action Uses Permanent Solutions to the Maximum Extent Practicable

Determining whether a cleanup action uses permanent solutions to the maximum extent practicable in accordance with WAC 173-340-360(5) has four steps that include

- Step 1: determine the benefits and costs of each cleanup action alternative using the criteria in WAC 173-340-360(5)(d);
- Step 2: rank the cleanup action alternatives by degree of permanence;
- Step 3: identify the initial baseline alternative for use in the DCA; and

- Step 4: conduct a DCA of the ranked list of cleanup action alternatives identified.

Evaluation of the proposed alternatives under each step is discussed in the following subsections.

6.2.1 Step 1—Determine the Benefits and Costs of Each Cleanup Action Alternative

The first step (Step 1) is to determine the benefits and costs of each cleanup action alternative. Benefits are assessed under five criteria that include

- protectiveness;
- permanence;
- effectiveness over the long term;
- management of implementation risks; and
- technical and administrative implementability.

The assessment includes assigning a weighted benefit score from 10 (highest benefit) to 1 (lowest benefit) for each criterion to each proposed alternative.

The following subsections present an evaluation of the alternative under each criterion and weighted benefit scores based on the evaluation, followed by costs for each alternative.

6.2.1.1 Protectiveness

Protectiveness relates to the degree to which the alternative protects human health and the environment including the degree to which the alternative reduces existing risks, time required for the alternative to reduce risks at the site and attain cleanup standards, on-site and off-site risks remaining after implementing the alternative, and improvement of the overall environmental quality.

Alternative E. The required protection for human health and the environment would be met through complete removal of the source (fill materials) and ICs (deed restrictions, entrance fencing) to prevent access to and restrict use of the Site, and limited monitoring to confirm the Site is no longer potentially contributing to impacts in surface water. This alternative

- will protect human health and the environment to the highest degree. It will eliminate existing soil direct contact risks and reduce and then eliminate potential risks of exposure to impacted surface water in the short term;
- will attain soil and sediment cleanup standards on the Site and will likely attain groundwater and surface water cleanup standards in the shortest time frame;
- will eliminate on-Site risks to potential direct contact after implementation; and
- will improve overall environmental quality to the highest degree.

Alternative E is the most protective of the proposed alternatives and is assigned the highest possible weighted benefit score of 10.

Alternative D2. Protectiveness would be met by containing the source in place using a proven and reliable technology (cover), treating potentially impacted groundwater prior to discharge to surface

water using a proven and reliable technology (reactive barrier), preventing access to and restricting use of the Site, and monitoring—to confirm the cleanup action is preventing impacted groundwater from contributing to impacts in surface water and concentrations of contaminants related to the Site in surface water are attenuating. This alternative

- will protect human health and the environment to a high degree. It will eliminate existing soil direct contact risks and reduce and then eliminate potential risks of exposure to impacted surface water in the short term;
- will not attain soil and sediment cleanup standards on the Site but will contain these media and will likely attain groundwater and surface water cleanup standards in a short time frame;
- will eliminate on-Site risks to potential direct contact after implementation; and
- will improve overall environmental quality to a high degree.

Since the source will be contained on Site, Alternative D2 is less protective than Alternative E and therefore is assigned a weighted benefit score of 9.

Alternative D1. This alternative is the same as Alternative D2 except that a different proven and reliable technology (funnel and gate) is used to treat groundwater. Alternative D1 is equally as protective as Alternative D2 and therefore is assigned a weighted benefit score of 9.

Alternative C. This alternative includes the components of Alternatives D1 and D2 except that it uses natural attenuation to reduce concentrations in groundwater and surface water over time, eliminating the need for a groundwater treatment component. The cover and up-gradient groundwater diversion components from Alternatives D1 and D2 are retained to decrease groundwater flux through the fill materials, likely reducing potential transport of COC in groundwater to surface water. This alternative

- will protect human health and the environment to a medium to high degree. It will eliminate existing soil direct contact risks and reduce and then eliminate potential risks of exposure to impacted surface water in the medium term;
- will not attain soil and sediment cleanup standards on the Site but will contain these media and will likely attain groundwater and surface water cleanup standards in a medium time frame;
- will eliminate on-Site risks to potential direct contact after implementation; and
- will improve overall environmental quality to a medium to high degree.

Since this alternative is less protective than Alternatives D1 and D2, it is assigned a weighted benefit score of 7.5.

Alternative B2. This alternative includes the components of Alternative C except that it removes the up-gradient groundwater diversion component. It includes a cover with reduced infiltration of surface water such that groundwater flux through the fill materials is decreased but to a lesser extent when compared to Alternative C. This alternative

- will protect human health and the environment to a medium to high degree. It will eliminate existing soil direct contact risks and reduce and then eliminate potential risks of exposure to impacted surface water in the medium to long term;
- will not attain soil and sediment cleanup standards on the Site but will contain these media and will likely attain groundwater and surface water cleanup standards in a medium to long time frame;
- will eliminate on-Site risks to potential direct contact after implementation; and
- will improve overall environmental quality to a medium to high degree.

Since this alternative is slightly less protective than Alternative C, it is assigned a weighted benefit score of 7.

Alternative B1. This alternative is the same as Alternative B2 except that the cover does not reduce infiltration of surface water to the same degree and groundwater flux is not expected to be significantly reduced. Consequently, Alternative B1 has a medium degree of protectiveness and is less protective than Alternative B2. Therefore, Alternative B1 is assigned a weighted benefit score of 5.5.

Alternative A. This alternative restricts access to the Site with entrance fencing to prevent potential exposure to potentially impacted soils/fill materials but does not have a cover and includes natural attenuation to reduce concentrations in groundwater and surface water over time. This alternative

- will protect human health and the environment to a medium degree. It will reduce existing soil direct contact risks and reduce and then eliminate potential risks of exposure to impacted surface water in the long term;
- will not attain soil and sediment cleanup standards on the Site and will likely attain groundwater and surface water cleanup standards in a long time frame;
- will reduce on-Site risks to potential direct contact after implementation; and
- will improve overall environmental quality to a medium degree.

Since this alternative is significantly less protective than Alternative B1, it is assigned a weighted benefit score of 4.

6.2.1.2 Permanence

Permanence relates to the degree to which the alternative permanently reduces the toxicity, mobility, or mass of hazardous substances including adequacy of destroying hazardous substances, reduction or elimination of hazardous substance releases and sources of releases, degree of irreversibility of waste treatment process, and characteristics and quantity of treatment residuals generated.

Alternative E. This alternative is a permanent cleanup action and

- will permanently reduce the toxicity, mobility, and mass of hazardous substances to the highest degree;
- will permanently eliminate the source of releases at the Site; and

- will not produce treatment residuals.

Alternative E is the most permanent of the proposed alternatives and is assigned the highest possible weighted benefit score of 10.

Alternative D2. This alternative is not a permanent cleanup action since the fill materials will stay at the Site. This alternative

- will reduce the mobility of hazardous substances to a high degree and the mass to moderate degree over time;
- will adequately and irreversibly destroy organic contaminants in groundwater that pass through the treatment zone at the Site and eliminate releases from leaving the Site; and
- will not produce treatment residuals.

Alternative D2 is less permanent than Alternative E because the source is not removed from the Site and ongoing treatment is necessary. Therefore, it is assigned a weighted benefit score of 8.

Alternative D1. Alternative D1 is slightly less permanent than Alternative D2 because there is a greater chance for impacted groundwater to circumvent the smaller treatment zone. Therefore, it is assigned a weighted benefit score of 7.5.

Alternative C. This is not a permanent cleanup action since the fill materials will stay at the Site. This alternative

- will reduce the mobility of hazardous substances to a medium to high degree and the mass to lower degree over time;
- will not treat contaminants in groundwater other than through natural processes at the Site. Releases leaving the Site will be eliminated over time; and
- will not produce treatment residuals.

Alternative C is less permanent than Alternative D1 because there is no ongoing treatment other than through natural processes. Therefore, it is assigned a weighted benefit score of 7.

Alternative B2. This is not a permanent cleanup action since the fill materials will stay at the Site. This alternative

- will reduce the mobility of hazardous substances to a medium to high degree and the mass to a lower degree over time;
- will not treat contaminants in groundwater other than through natural processes at the Site. Releases leaving the Site will be eliminated over time; and
- will not produce treatment residuals.

Alternative B2 is less permanent than Alternative C because it permits a higher groundwater flux through the fill materials. Therefore, it is assigned a weighted benefit score of 6.5.

Alternative B1. Alternative B1 is slightly less permanent than Alternative B2 because it permits a high groundwater flux through the fill materials. Therefore, it is assigned a weighted benefit score of 5.5.

Alternative A. Alternative A is not permanent to the maximum extent practicable since it does not reduce groundwater flux through the fill materials and does not have a protective cover over the fill materials. ICs do provide a low degree of permanence to protect exposure; however, it is assigned the lowest possible weighted benefit score of 1.

6.2.1.3 Long-Term Effectiveness

Long-term effectiveness relates to the degree to which the alternative is likely to be effective over the long term including certainty to be successful, reliability over time, resilience to climate change impacts, magnitude of residual risk, and effectiveness of controls. The location of the Site is not expected to be significantly impacted by climate change and therefore this consideration is not discussed further.

Alternative E. This alternative

- uses proven technologies that have been used at other remediation sites successfully and reliably;
- will permanently eliminate residual risks of the source; and
- will effectively control access to the Site.

Alternative E is the most effective of the proposed alternatives and will be highly effective in the long term. Therefore, it is assigned the highest possible weighted benefit score of 10.

Alternative D2. This alternative

- uses proven technologies that have been used at other remediation sites successfully and reliably;
- will not permanently eliminate residual risks of the source; and
- will effectively control the risks associated with the source and access to the Site.

Alternative D2 will be highly effective over the long term but is less effective than Alternative E. Therefore, it is assigned a weighted benefit score of 9.

Alternative D1. This alternative will be as highly effective over the long term as Alternative D2. Therefore, it is assigned a weighted benefit score of 9.

Alternative C. This alternative

- uses proven technologies that have been used at other remediation sites successfully and reliably;
- will not permanently eliminate residual risks of the source; and
- will effectively control the risks associated with the source and access to the Site.

Alternative C will have medium to high effectiveness over the long term but is less effective than Alternative D1. Therefore, it is assigned a weighted benefit score of 8.

Alternative B2. This alternative

- uses proven technologies that have been used at other remediation sites successfully and reliably;
- will not permanently eliminate residual risks of the source; and
- will effectively control the risks associated with the source and access to the Site.

Alternative B2 will have medium to high effectiveness over the long term but is less effective than Alternative C at reducing groundwater flux through the fill materials. Therefore, it is assigned a weighted benefit score of 7.5.

Alternative B1. This alternative will have medium effectiveness over the long term because, although it eliminates direct contact like Alternative B2, it does not effectively reduce ground flux through the fill compared to Alternative B2. Therefore, it is assigned a weighted benefit score of 5.5.

Alternative A. This alternative

- uses proven technologies that have been used at other remediation sites successfully and reliably;
- will not permanently eliminate residual risks of the source;
- will effectively control the risks of direct contact associated with the source and access to the Site; and
- will not effectively control the risks of contaminant migration in groundwater associated with the source.

Alternative A will have low effectiveness over the long term. Therefore, it is assigned a weighted benefit score of 3.

6.2.1.4 Management of Implementation Risk

Management of implementation risk relates to the risks to human health and the environment during construction and implementation, and the effectiveness of the alternative to manage such risks.

Alternative E. This alternative

- will have a medium to high degree of risk associated with excavation of impacted materials below the water table;
- will have a medium to high degree of risk associated with managing excessive impacted groundwater;
- will have a medium to high degree of risk associated with transporting impacted materials to a designated facility for treatment and/or disposal;
- will have a medium degree of risk associated with transporting clean fill to the Site to backfill the excavation; and
- will have a medium degree of risk associated with backfilling and compacting clean fill below the water table.

These risks can be managed with moderate to hard difficulty. Therefore, Alternative E is assigned a weighted benefit score of 4.

Alternative D2. This alternative

- will have a medium degree of risk associated with installation of the up-gradient groundwater diversion barrier and cover;
- will have a medium to high degree of risk associated with installation of the down-gradient reactive barrier that involves excavation and potential handling of impacted materials;
- will have a medium to high degree of risk associated with managing excessive impacted groundwater; and
- will have a medium degree of risk associated with transporting construction materials and cover materials to the Site to construct the cover.

These risks can be managed with moderate difficulty. Therefore, Alternative E is assigned a weighted benefit score of 5.

Alternative D1. The management risks of implementation for this alternative are similar to Alternative D2 and therefore, Alternative D1 is assigned a weighted benefit score of 5.

Alternative C. This alternative

- will have a medium degree of risk associated with installation of the up-gradient groundwater diversion barrier and cover; and
- will have a medium degree of risk associated with transporting construction materials and cover materials to the Site to construct the cover.

The management of implementation risks for this alternative is slightly easier than Alternative D1 and therefore, Alternative C is assigned a weighted benefit score of 5.5.

Alternative B2. This alternative

- will have a medium degree of risk associated with installation of the cover; and
- will have a medium degree of risk associated with transporting cover materials to the Site to construct the cover.

Management of implementation risks for this alternative is moderate to easier and therefore, is assigned a weighted benefit score of 7.5.

Alternative B1. The management of implementation risks for this alternative are similar to Alternative B2 and therefore, Alternative B1 is assigned a weighted benefit score of 7.5.

Alternative A. Management of implementation risks for this is alternative is very easy as it does not involve any construction activities and requires periodic site visits. Therefore, Alternative A is assigned the maximum weighted benefit score of 10.

6.2.1.5 Implementability

Technical and administrative implementability relates to the ability to implement the alternative including consideration of technical difficulty of designing, constructing, and otherwise implementing the alternative in a reliable and effective manner; availability of necessary off-site facilities, services, and materials; administrative and regulatory requirements; scheduling, size, and complexity; monitoring requirements; access for construction operations and monitoring; and integration with existing facility operations and other current or potential remedial actions. The common items from above include availability of necessary off-site facilities, services, and materials; scheduling and size; monitoring requirements; and access, which are not discussed further. Integration with existing facility operations or remedial actions is not applicable to the Site and therefore not discussed further.

Alternative E. This alternative

- will be moderately difficult to design and implement because of the small size of the Site and the need to manage traffic in and out of the Site;
- will be moderate to difficult to comply with administrative and regulatory requirements; and
- will have medium to high complexity for managing equipment, impacted groundwater, and traffic.

The implementability for this alternative is moderate to hard. Therefore, Alternative E is assigned a weighted benefit score of 4.

Alternatives D2 and D1. These alternatives will have similar difficulty for implementation compared to Alternative E. Therefore, Alternatives D2 and D1 are assigned a weighted benefit score of 4.

Alternative C. This alternative

- will be moderately difficult to design and implement because of the small size of the Site and the need to manage traffic in and out of the Site;
- will be moderate to difficult to comply with administrative and regulatory requirements; and
- will have medium complexity for managing equipment and traffic.

The implementability of this alternative is moderate and less difficult than Alternatives D1, D2, and E. Therefore, alternative C is assigned a weighted benefit score of 6.

Alternative B2 and B1. These alternatives

- will be moderately difficult to design and implement because of the size of the Site and the need to manage traffic in and out of the Site;
- will be easy to comply with administrative and regulatory requirements; and
- will have low to medium complexity for managing equipment and traffic.

The implementability of these alternatives is much easier than Alternatives C, D1, D2, and E. Therefore, alternatives B2 and B1 are assigned a weighted benefit score of 8.

Alternative A. Implementability of this alternative is very easy as it involves administrative activities (e.g., deed restrictions), constructing an entrance fence to secure the Site, and groundwater monitoring at existing wells. Therefore, Alternative A is assigned the maximum weighted benefit score of 10.

6.2.1.6 Costs

FS-level (-30 percent to +50 percent) costs for the above alternatives have been developed and are presented in **Appendix A**. A summary of the alternative costs is presented below in **Table 7**.

Table 7: Summary of Alternative Costs

Category	Alt. E	Alt. D2	Alt. D1	Alt. C	Alt. B2	Alt. B1	Alt. A
Capital	24.1	7.7	6.2	3.6	2.2	1.7	0.2
O&M/P	0.6	1.8	1.8	1.8	1.8	1.8	0.8
Total	24.7	9.5	8.0	5.4	4.0	3.5	1.0

Table Notes:

Costs are in millions of dollars (\$MM)

O&M/P – operation and maintenance/periodic.

O&M/P costs based on 30 years of operation and maintenance.

6.2.2 Step 2—Rank the Cleanup Action Alternatives by Degree of Permanence

The second step (Step 2) is to rank the cleanup action alternatives by degree of permanence. Based on the discussion in **Subsection 6.2.1**, the alternatives rank as follows:

- Rank 1. Alternative E
- Rank 2. Alternative D2
- Rank 3. Alternative D1
- Rank 4. Alternative C
- Rank 5. Alternative B2
- Rank 6. Alternative B1
- Rank 7. Alternative A

6.2.3 Step 3—Identify the Initial Baseline Alternative

The third step (Step 3) is to identify the initial baseline alternative. The initial baseline alternative is Alternative E since it is the only permanent cleanup action alternative.

6.2.4 Step 4—Conduct a Disproportionate Cost Analysis

The fourth step (Step 4) is to conduct a DCA of the ranked list of cleanup action alternatives identified in Step 2 starting with the initial baseline alternative identified in Step 3.

The DCA analysis is conducted as follows in accordance with WAC 173-340-360(5)(c)(iv)(A)

(I) First, compare the costs and benefits of the baseline alternative with the costs and benefits of only the next most permanent alternative (not any of the other alternatives); and

(II) Second, determine whether the incremental costs of the baseline alternative over the next most permanent alternative are disproportionate to the incremental degree of benefits of the baseline alternative over the next most permanent alternative.

Table 8, attached to this report, lists the alternatives by rank (1 through 7) determined in **Subsection 6.2.2**, lists the weighted benefits scores presented in **Subsection 6.2.1** for each alternative, calculates a total weighted benefit score (B) for each alternative based on the default weights for each comparison criterion (**Subsection 6.2.1**), lists the costs (**Subsection 6.2.1**), and calculates the cost effectiveness (cost divided by total weighted benefit score) for each alternative. **Figure 7** illustrates a comparison of the cost effectiveness of each alternative to its weighted benefit score for performance. As illustrated on **Figure 7**, Alt. E is the most protective but the least cost effective and Alt. A is the least protective and the most cost effective. **Figure 7** illustrates that Alt. B1 and Alt. B2 are similarly cost effective but Alt. B2 is more protective. The calculated total weighted benefit scores and cost effectiveness in **Table 8** are used in the following discussion to compare the alternatives.

Comparison of Alt. E with Alt. D2

The costs for Alt. E (initial baseline alternative) are significantly higher (approximately 162 percent) than the costs for Alt. D2, whereas the benefit of Alt. E is higher than Alt. D2 by a smaller margin (approximately 8–9 percent). This is reflected in the cost effectiveness values (Alt. E=3.25; Alt. D2=1.36)—the higher the value the less cost effective the alternative is—and illustrated on **Figure 7**, which indicate the incremental costs of Alt. E over Alt. D2 are disproportionate to the incremental degree of benefits of Alt. E over Alt. D2, which makes Alt. E impracticable.

Since the incremental costs are disproportionate to the incremental degree of benefits for Alt. E, making it impracticable, it is eliminated from further analysis and Alt. D2 becomes the baseline for further analysis.

Comparison of Alt. D2 with Alt. D1

The costs for Alt. D2 (new baseline alternative) are higher (approximately 18 percent) than the costs for Alt. D1, whereas the benefit of Alt. D2 is similar to Alt. D1 (approximately 1–2 percent difference). This is reflected in the cost effectiveness values (Alt. D2=1.36; Alt. D1=1.16) and illustrated on **Figure 7**, which indicate the incremental costs of Alt. D2 over Alt. D1 are disproportionate to the incremental degree of benefits of Alt. D2 over Alt. D1 which makes Alt. D2 impracticable.

Since the incremental costs are disproportionate to the incremental degree of benefits for Alt. D2, making it impracticable, it is eliminated from further analysis and Alt. D1 becomes the baseline for further analysis.

Comparison of Alt. D1 with Alt. C

The costs for Alt. D1 (new baseline alternative) are significantly higher (approximately 49 percent) than the costs for Alt. C, whereas the benefit of Alt. D1 is similar to Alt. C (approximately 1–2 percent difference). This is reflected in the cost effectiveness values (Alt. D1=1.16; Alt. C=0.79) and illustrated on **Figure 7**, which indicate the incremental costs of Alt. D1 over Alt. C are disproportionate to the incremental degree of benefits of Alt. D1 over Alt. C which makes Alt. D1 impracticable.

Since the incremental costs are disproportionate to the incremental degree of benefits for Alt. D1, making it impracticable, it is eliminated from further analysis and Alt. C becomes the baseline for further analysis.

Comparison of Alt. C with Alt. B2

The costs for Alt. C (new baseline alternative) are higher (approximately 36 percent) than the costs for Alt. B2, whereas the benefit of Alt. C is lower than Alt. B2 (approximately 6–7 percent). This is reflected in the cost effectiveness values (Alt. C=0.79; Alt. B2=0.55) and illustrated on **Figure 7**, which indicate the incremental costs of Alt. C over Alt. B2 are disproportionate to the incremental degree of benefits of Alt. C over Alt. B2, which makes Alt. C impracticable.

Since the incremental costs are disproportionate to the incremental degree of benefits for Alt. C, making it impracticable, it is eliminated from further analysis and Alt. B2 becomes the baseline for further analysis.

Comparison of Alt. B2 with Alt. B1

The costs for Alt. B2 (new baseline alternative) are higher (approximately 14 percent) than the costs for Alt. B1 and the benefit of Alt. B2 is higher than Alt. B1 by a similar margin (approximately 14 percent). This is reflected in the cost effectiveness values (Alt. B2=0.55; Alt. B1=0.55) that are the same and illustrated on **Figure 7**, which indicate the incremental costs of Alt. B2 over Alt. B1 are not disproportionate to the incremental degree of benefits of Alt. B2 over Alt. B1, which makes Alt. B2 practicable.

Since the incremental costs are not disproportionate to the incremental degree of benefits for Alt. B2, it uses a permanent solution to the maximum extent practicable, and the analysis is complete.

7. Select Preferred Alternative

Step 5 in the FS process involves selecting a *preferred cleanup action alternative that meets the requirements in WAC 173-340-360 and conforms, as appropriate, to the expectations in WAC 173-340-370. Selects a preferred cleanup action alternative based on the detailed evaluation in Step 4.*

Based on the evaluation presented in **Section 6**, the preferred cleanup action alternative is Alternative B2, which has the highest total weighted benefit score (B) of any alternative other than Alternative E. The cost effectiveness of Alternatives B1 and B2 are the same; however, Alternative B2 offers more protectiveness, permanence, and long-term effectiveness.

Alternative B2 includes the following components:

- ICs (deed restrictions, entrance fencing) to restrict access and use of the Site;
- an SMP to manage potentially impacted materials that may be disturbed at the Site in the future;
- a CMP to describe monitoring of groundwater at selected wells and surface water at selected locations to assess natural attenuation of COC;

- consolidation of potentially impacted soils/fill materials and sediments on the Site;
- regrading the fill area and installation of a common soil cover to prevent direct contact; and
- installation of a horizontal barrier below the common soil cover to reduce infiltration and promote drainage away from potentially impacted materials.

Alternative B2 will

- protect human health and the environment;
- comply with cleanup standards and applicable local, state, and federal laws;
- minimize present and future releases and migration of hazardous substances in the environment;
- provide resilience to climate change to protect long-term effectiveness;
- provide compliance monitoring;
- eliminate future potential Site-related effects in a reasonable time frame;
- use a permanent solution to the maximum extent practicable based on the DCA—most cost-effective alternative;
- meet the requirements in WAC 173-340-360; and
- conform, as appropriate, to the expectations in WAC 173-340-370.

8. References

Ecology, 2025. Ecology Cleanup Levels and Risk Calculation (CLARC) data tables, updated February 2025.

Ecology, 2024a. Washington State Department of Ecology, Model Toxics Control Act, Chapter 173-340 Washington Administrative Code (MTCA Regulations), Publication No. 94-06, amended January 2024.

Ecology, 2024b. Facility Site Database Search, Washington State Department of Ecology. Accessed on December 16, 2024.

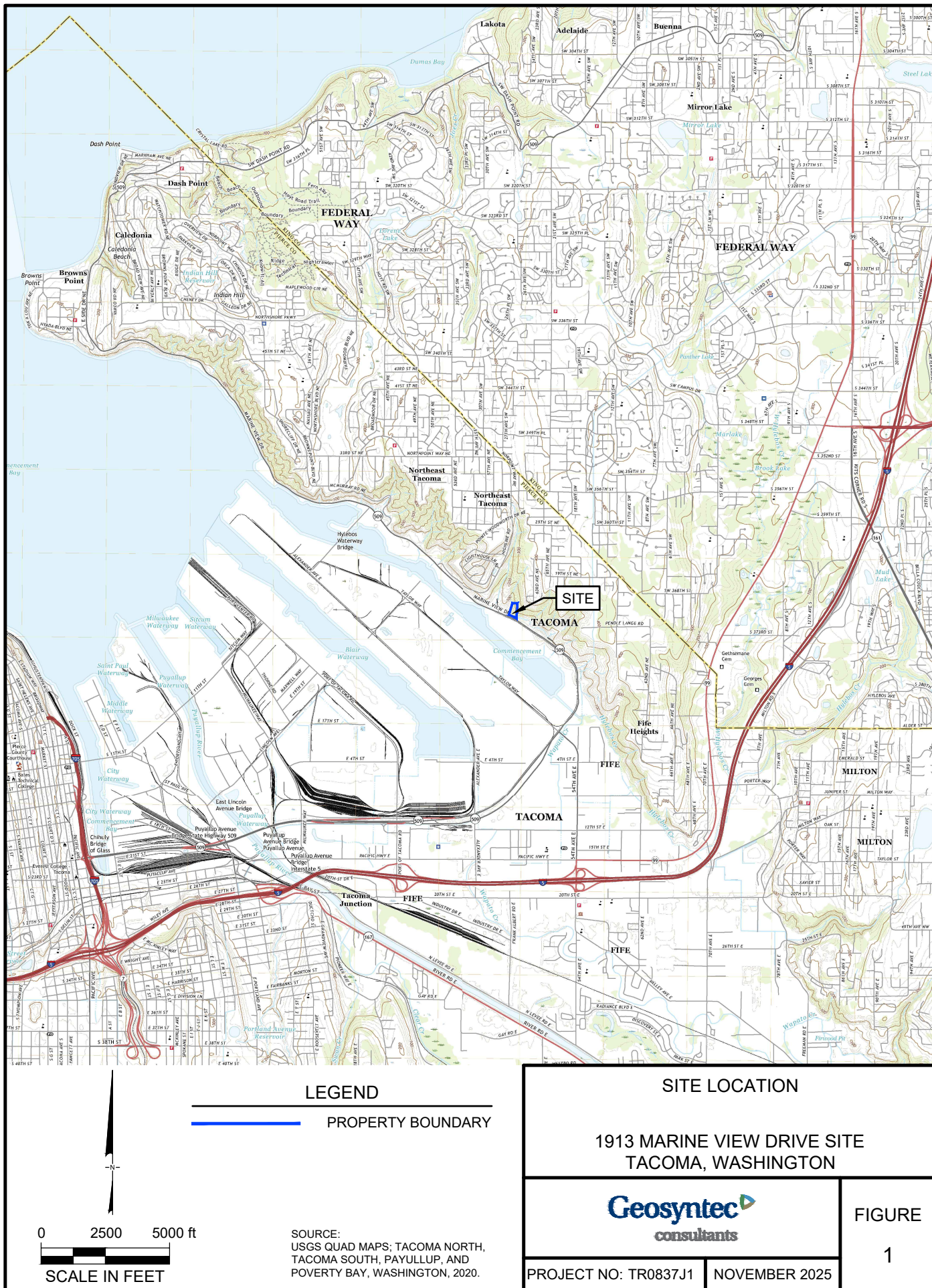
Ecology, 2013. Section 173-204-562 Washington Administrative Code, amended September 2013.

Ecology, 2007a. Agreed Order No. DE 1679. In the Matter of Remedial Action by: Occidental Chemical Corporation, General Metals of Tacoma, SRS Properties, Don Oline. Effective date of July 6, 2007.

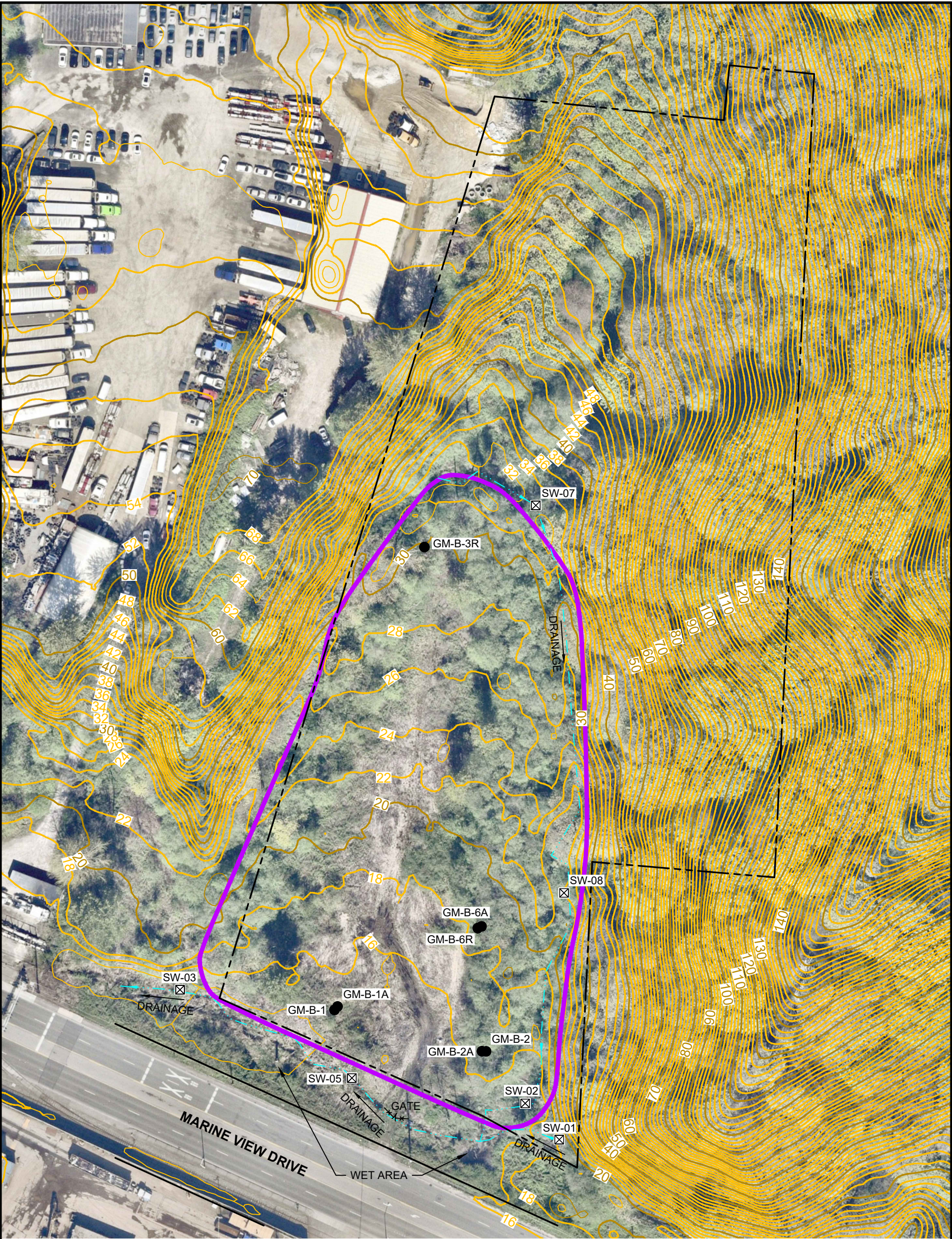
Ecology, 2007b. Table 745-1, Method A Soil Cleanup Levels for Industrial Properties, Section 173-340-900 Washington Administrative Code, November 2007.

Geosyntec, 2025. Consolidated Remedial Investigation Report, June 16, 2025.

FIGURES



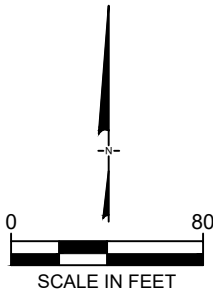
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LEGEND

- PROPERTY LINE
- .-.- APPROXIMATE DRAINAGE SWALE
- ESTIMATED LIMIT OF FILL MATERIALS
- 20 MAJOR GROUND CONTOUR (10' INTERVAL)
- 18 MINOR GROUND CONTOUR (2' INTERVAL)
- MONITORING WELL LOCATION
- ☒ SURFACE WATER SAMPLE LOCATION

NOTE:
EXISTING GROUND TOPO CREATED FROM 2020 LIDAR: PIERCE COUNTY, WA, NAVD88
OCM Partners, 2023: 2020 LIDAR: PIERCE COUNTY, WA.



IMAGERY SOURCE:
NEARMAP, DATE OF PHOTOGRAPHY
APRIL 15, 2025.

SITE PLAN

1913 MARINE VIEW DRIVE SITE
TACOMA, WASHINGTON

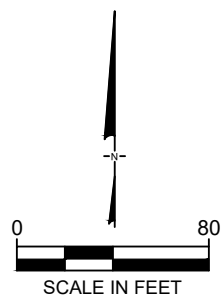


FIGURE

2

PROJECT NO: TR0837J1 NOVEMBER 2025

---	PROPERTY LINE
- . . . - . . . -	DRAINAGE SWALE
— · — · —	FORMER DRAINAGE SWALE
●	MONITORING WELL LOCATION
■	TEST PIT LOCATION
▣	BOREHOLE LOCATION
☒	SURFACE SEDIMENT SAMPLE LOCATION
☒	SURFACE WATER SAMPLE LOCATION
◻	HAND AUGER LOCATION
▲	SHALLOW SOIL SAMPLE LOCATION
— — — — —	CROSS-SECTION LOCATION
— — — — —	ESTIMATED LIMIT OF FILL MATERIALS
— — — — —	ESTIMATED LIMIT OF LIME WASTE FILL

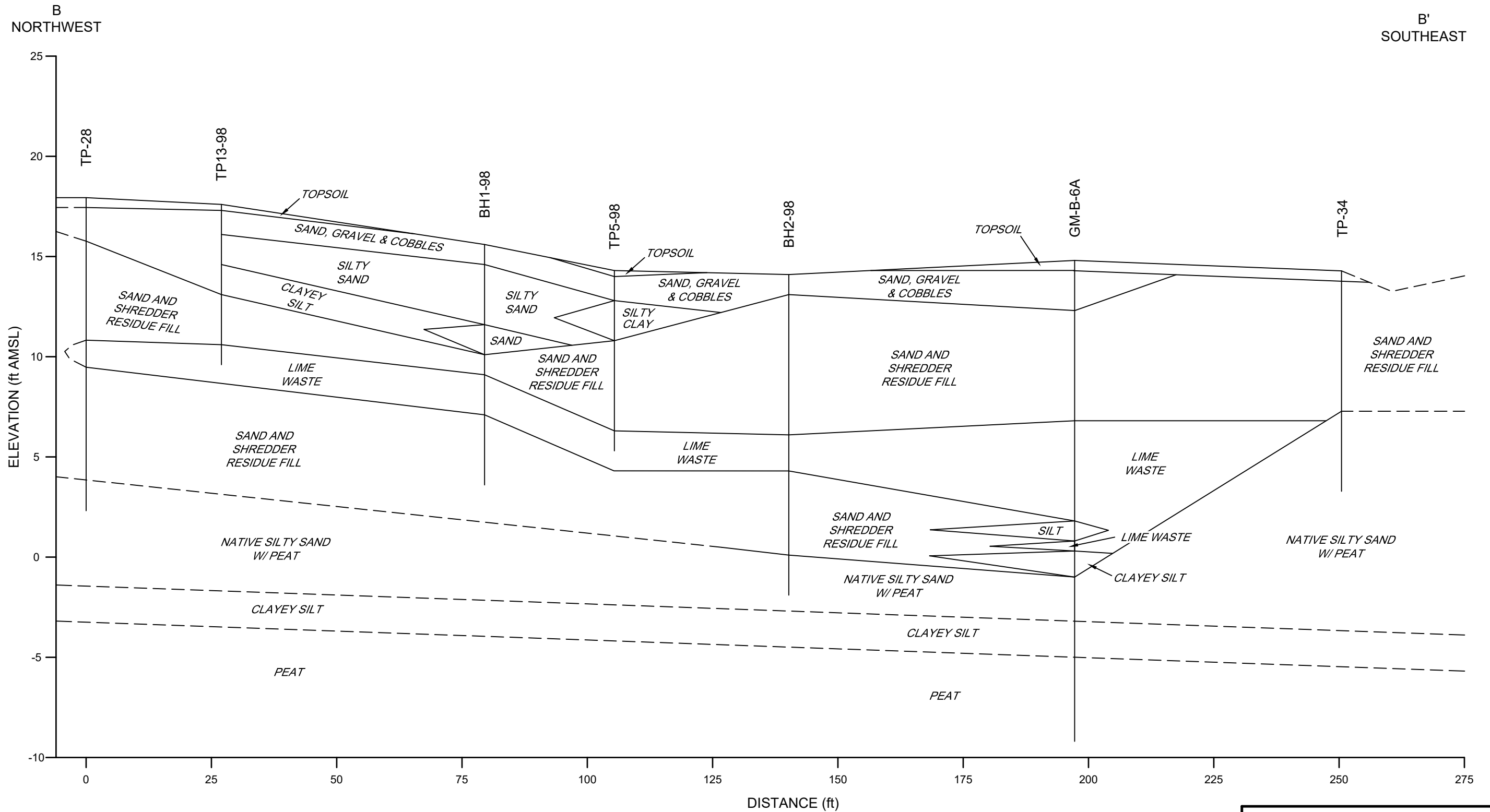


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consultants

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SCALES

HORIZONTAL 1"=20'
VERTICAL 1"= 5'

STRATIGRAPHIC CROSS-SECTION B-B'

1913 MARINE VIEW DRIVE SITE
TACOMA, WASHINGTON



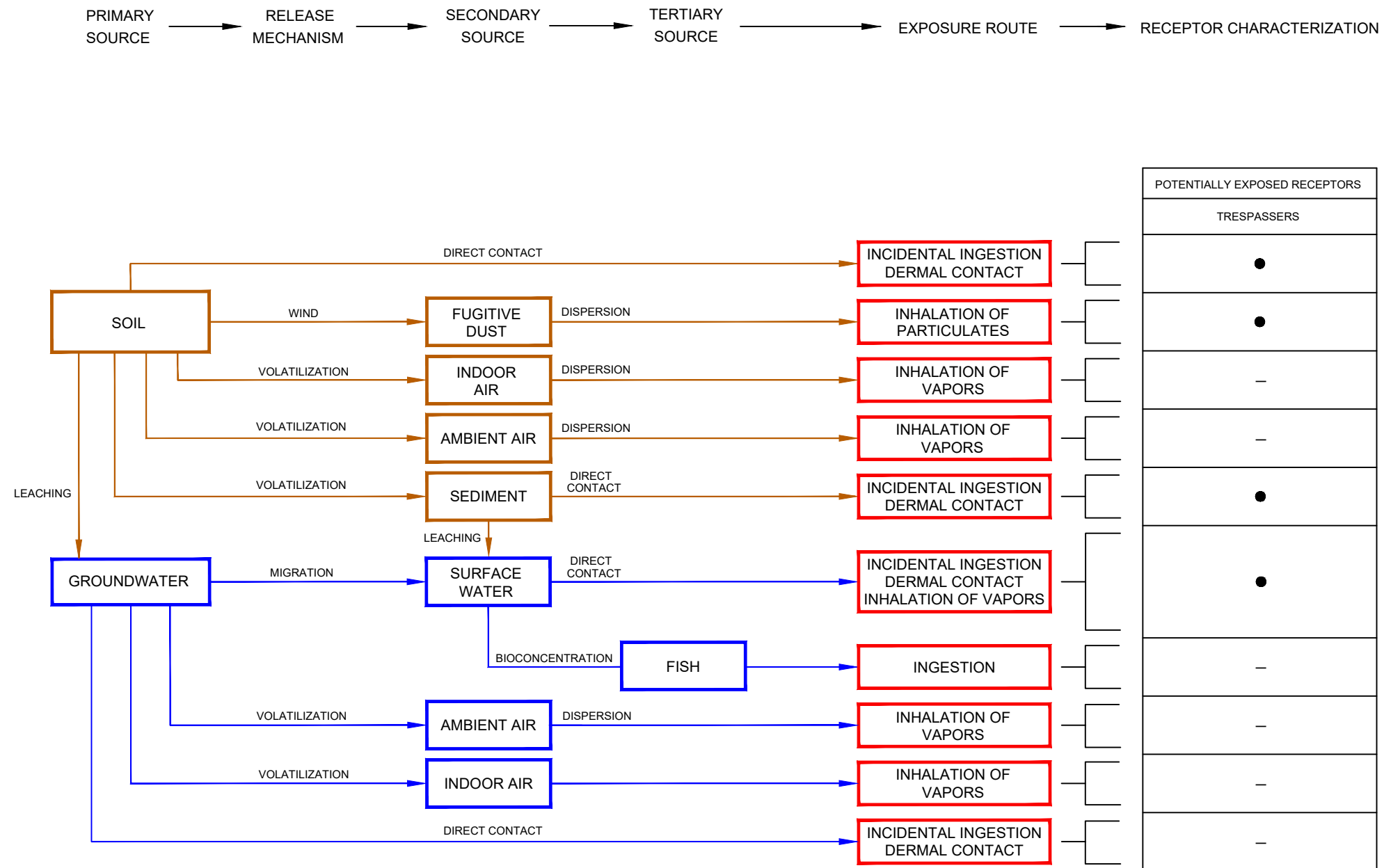
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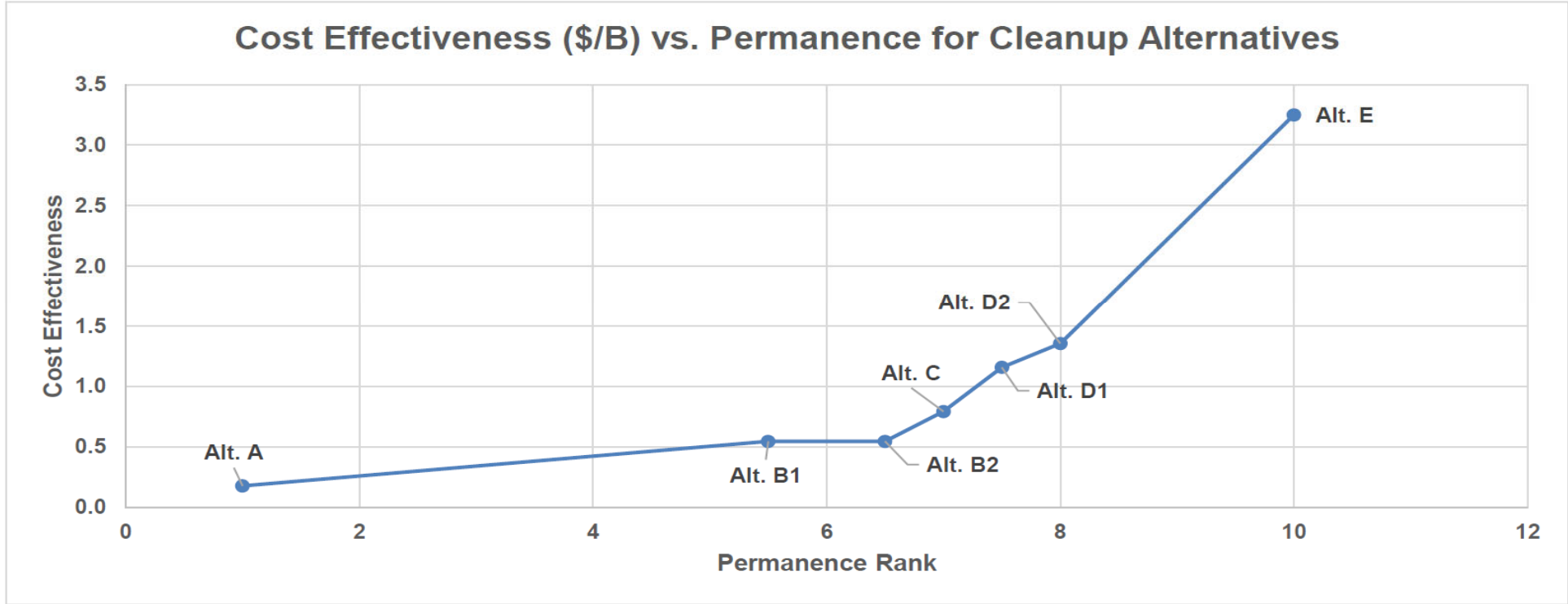
FIGURE

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- LEGEND**
- POTENTIALLY COMPLETE EXPOSURE PATHWAY
 - INCOMPLETE EXPOSURE PATHWAY
 - ➡ POTENTIAL EXPOSURE PATHWAY



TABLES

Table 5
Proposed Cleanup Actions
1913 Marine View Drive Site, Tacoma, Washington

Step 1: Cleanup Action Goals

Prevent direct contact of fill materials to potential human and terrestrial receptors
Mitigate potential migration of contaminants from impacted fill to sediment
Mitigate potential migration of contaminants from impacted groundwater to surface water
Protect potential terrestrial and aquatic receptors

Future Use:

No planned future use for site, no habitat restoration or resource recovery goals for the site
Site does not have future use, to remain vacant industrial land

Exposure Pathway	Cleanup Action	Ease of Implementability	Relative Cost	Effectiveness (Health/Environment Protection)	Comments
Soil Direct Contact (human health and ecological receptors)	No Action	Easy	None	None	-no prevention measures for direct contact of fill materials
	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Easy	Low-Medium - site controls, soil management	Medium	- prevent site access and SMP to prevent incidental direct contact of fill materials (institutional controls)
	Consolidate and Cover	Moderate	Medium - full site cover	High	- prevent direct contact of fill materials (consolidation, cover)
	Excavation	Hard	High - Excavation of impacts, backfill, grade, off-site treatment/disposal	High	- prevent direct contact of fill materials (excavation of source) - excavation is difficult due to shallow water levels, excavation under wet conditions is not practicable, artesian issues if the confining unit is breached
Sediment Direct Contact (human health and ecological receptors)	No Action	Easy	None	None	- no prevention for potential migration of contaminants from impacted fill to sediment
	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Easy	Low-Medium - site controls, soil management	Medium	- prevent site access and SMP to prevent incidental direct contact of sediment materials on the Site (institutional controls) - potential migration of contaminants from impacted fill to sediment (may be met over time via attenuation)
	Excavation and Consolidation—remove sediment as part of soil consolidation and cover, and create lined ditches with armoring	Moderate	Medium - excavation of sediment, engineered drainage	High	- prevent direct contact of sediment on the Site (consolidate and cover, regrading to engineering drainage channel) - excavation above water table
	Excavation	Moderate	High - Excavation of impacts, backfill, grade, off-site treatment/disposal	High	- prevent direct contact of sediment on the Site (excavation of source) - excavation above water table
Groundwater (GW) to Surface Water (SW) (human health and ecological receptors)	No Action	Easy	None	None	- no prevention measures for potential migration of contaminants from impacted groundwater to surface water
	Institutional Controls (deed restrictions, entrance fencing) and Monitoring—retain selected wells for monitoring	Moderate	Low-Medium - site controls, monitoring only	Low-Medium	- potential migration of contaminants from impacted groundwater to surface water (may be met over time via attenuation)
	Upgradient GW Diversion to SW	Moderate-Hard	Medium-High	Medium	- reduce/mitigate groundwater flow through fill material via installation of an in situ diversion wall upgradient of the fill material—may increase concentrations in groundwater) - reduce/mitigate potentially impacted groundwater flux to surface water—may benefit attenuation
	Downgradient In Situ Reactive Barrier: 1) Funnel and Gate	Moderate-Hard	Medium-High - barrier wall and reactive gate install	Medium-High	- mitigate potential migration of contaminants from impacted groundwater to surface water - barrier wall/reactive gate system to treat groundwater
	2) Reactive Wall	Moderate-Hard	Medium-High - reactive wall install	Medium-High	- mitigate potential migration of contaminants from impacted groundwater to surface water - reactive wall to treat groundwater
Soil Vapor (potential future human health receptors)	No action	Easy	None	None	- no prevention measures for potential future human health receptors
	Institutional Controls (deed restrictions)	Easy	Low - site controls	Low	- prevent exposure to soil vapor (institutional controls) - require engineering controls for any future construction

Table 6

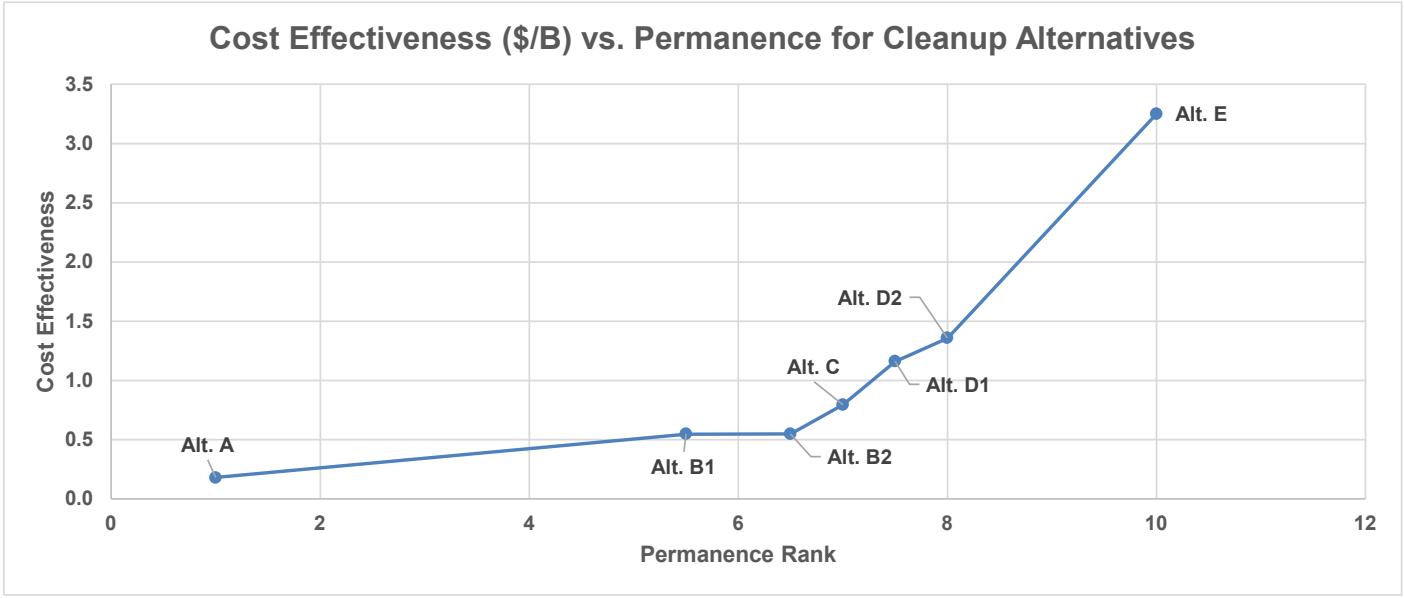
**Potential Applicable Local, State, and Federal Laws and Relevant and Appropriate Requirements
1913 Marine View Drive Site
Tacoma, Washington**

Topic	Standard or Requirement	Regulatory Citation		Project-Specific Comments
		Federal	State and Local	
Hazardous Substance Cleanup	Washington State Cleanup Standards; Cleanup Screening Levels (CSL)		Model Toxics Control Act (MTCA) (RCW 70.105D; WAC 173-340)	Applicable to determining cleanup of hazardous waste sites to protect human health and the environment.
Surface Water Quality	Surface water quality standards. National Recommended Water Quality Criteria (WQC); National Toxics Rule (NTR); State Water Quality Standards (WQS); Clean Water Act Model Toxics Control Act (MTCA)	WQC per Clean Water Act Section 304(a) (33 USC § 1314) NTR at 40 CFR 131.36(b)(1) as applied to Washington, 40 CFR 131.36(d)(14) 40 CFR 122-125	Water Pollution Control Act (RCW 90.46); WQS (WAC 173-201A); Aquatic Life Criteria (ALC) numerical criteria (WAC 173-201A-240)	Relevant to remedial actions impacting contaminant migration to surface water and groundwater.
Solid Waste Disposal	Requirements for solid waste handling management and disposal	Solid Waste Disposal Act (42 U.S.C 6901-6992K; 40 CFR 257-258)	Solid Waste Management (RCW 70.95; WAC 173-350)	Substantive requirements for non-dangerous or non-hazardous waste generated during remedial activities unless wastes meet recycling or other exemptions will be complied with.
Waste Treatment, Storage, and Disposal	Dangerous or Hazardous Waste Management Ecology Dangerous Waste Regulations	Resource Conservation and Recovery Act, Hazardous Waste (42 U.S.C §§ 6901-6992K, 40 CFR 260-279)	Dangerous Waste Management (RCW 70.105; WAC 173-303)	Applicable if remedial activities include land disposal of RCRA hazardous waste, such as that generated from excavation of waste that is characterized as hazardous.
	Transportation of Hazardous Waste	49 CFR 170-189		Applicable to remedial activities that involve the off-Site transportation of hazardous waste
Land Disposal of Waste	Hazardous Waste Land Disposal Restrictions	Resource Conservation and Recovery Act Land Disposal Restrictions (42 U.S.C §§ 6901-6992K; 40 CFR 268)	Dangerous Waste Management (RCW 70.105; WAC 173-303- 140, 141)	Any dangerous or hazardous waste land disposal shall meet substantive land disposal requirements.
Air Emissions	Ambient air quality standards; fugitive emission/fugitive dust	Clean Air Act (42 U.S.C. §§ 7401-7671q; 40 CFR 50)	Washington Clean Air Act (RCW 70.94; WAC 173-400)	Some treatment alternatives may impact ambient air quality. Substantive requirements will be applicable if alternative results in emission from treatment processes.
	National Ambient Air Quality Standards (NAAQS)	40 CFR Part 50		Applicable to treatment alternatives that may emit pollutants to the air, establishes standards to protect health and welfare.
	National Emission Standards for Hazardous Air Pollutants (NESHAPs)	40 CFR Part 261		Applicable to treatment alternatives that may emit toxic pollutants to the air.
	State Environmental Policy Act (SEPA)		WAC 192-11	SEPA checklist may be required prior to construction.
Noise	Permissible noise levels		Noise Control Act (RCW 70.107; WAC 173-60-040-050)	Maximum levels at specified times for specified durations are WAC 173-60-040, subject to exemptions in WAC 173-60-050, including 050(3) (a) (sounds originating from temporary construction sites as a result of construction activity) and (3)(f) (sounds created by emergency equipment and work necessary in the interests of law enforcement or for health, safety or welfare of the community).
Construction	City of Tacoma requirements			Establishes criteria for review and analysis of all development, including grading, erosion control, and property development. Requires permits for excavation of soil in excess of 50 cubic yards and construction and demolition activities. SEPA checklist required if soil excavation is greater than 500 cubic yards.

Table 8
Disproportional Cost Analysis (DCA) Summary
1913 Marine View Drive Site, Tacoma, Washington

		Alternative Alt. E	Alternative Alt. D2	Alternative Alt. D1	Alternative Alt. C	Alternative Alt. B2	Alternative Alt. B1	Alternative Alt. A
		Excavation (soil and sediment)	Consolidate and Common Soil Cover with Reduced Infiltration (soil and sediment)	Consolidate and Common Soil Cover with Reduced Infiltration (soil and sediment)	Consolidate and Common Soil Cover with Reduced Infiltration (soil and sediment)	Consolidate and Common Soil Cover with Reduced Infiltration (soil and sediment)	Consolidate and Common Soil Cover (soil and sediment)	Natural Attenuation
		Institutional Controls (entrance fencing)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)
		Monitoring—replace selected existing wells and retain selected surface water locations for monitoring over defined time	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—retain selected existing wells and selected surface water locations for monitoring
			Upgradient Groundwater (GW) Diversion Barrier to Surface Water (SW)	Upgradient GW Diversion Barrier to SW	Upgradient GW Diversion Barrier to SW			
			Downgradient In Situ Reactive Barrier	Downgradient In Situ Funnel and Gate (Reactive)				
Permanence Rank		1	2	3	4	5	6	7
Weighted Benefits Rankings/Scores for DCA (1 [lowest] to 10 [highest])								
Criteria Weights (default)								
20%	Protectiveness	10	9	9	7.5	7	5.5	4
20%	Permanence	10	8	7.5	7	6.5	5.5	1
20%	Long-Term Effectiveness	10	9	9	8	7.5	5.5	3
20%	Management of Implementation Risk	4	5	5	5.5	7.5	7.5	10
20%	Implementability	4	4	4	6	8	8	10
Total weighted benefit score (B)		7.60	7.00	6.90	6.80	7.30	6.40	5.60
Alternatives Costs								
Preliminary Estimated Costs \$MM (-30% to +50%; 30-years at 4.89% discount rate)								
Capital		24.1	7.7	6.2	3.6	2.2	1.7	0.2
Operation and Maintenance/Periodic		0.6	1.8	1.8	1.8	1.8	1.8	0.8
Total Estimated Alternative Cost		24.7	9.5	8.0	5.4	4.0	3.5	1.0
Cost Effectiveness (\$/B) - \$ in millions		3.25	1.36	1.16	0.79	0.55	0.55	0.18 ¹

Notes:
¹ This alternative is not permanent to the maximum extent practicable (PMEP)



APPENDIX A

Cost Estimates for Cleanup Alternatives

COMPARISON OF TOTAL COST OF ALTERNATIVES

Site: "1913 Marine View Drive Site"
Location: 1905 Marine View Drive, Tacoma, Washington
Phase: Feasibility Study (-30% to +50%)

Base Year: 2025
Date: November 2025

	<u>Alternative A</u>	<u>Alternative B1</u>	<u>Alternative B2</u>	<u>Alternative C</u>	<u>Alternative D1</u>	<u>Alternative D2</u>	<u>Alternative E</u>
	Natural Attenuation	<u>Alt. A + Consolidate and Cover</u>	<u>Alt. A + Consolidate and Cover (Reduced Infiltration)</u>	<u>Alt. B2 + Groundwater Diversion Barrier</u>	<u>Alt. C + Downgradient Groundwater Treatment</u>	<u>Alt. C + Downgradient Groundwater Treatment</u>	<u>Source Removal and Limited Post-Remedy Monitoring</u>
DESCRIPTION	No Active Remedial Technology Implemented	Consolidate and Common Soil Cover (soil and sediment)	Consolidate and Common Soil Cover with Reduced Infiltration (soil and sediment)	Consolidate and Common Soil Cover with Reduced Infiltration (soil and sediment)	Consolidate and Common Soil Cover with Reduced Infiltration (soil and sediment)	Consolidate and Common Soil Cover with Reduced Infiltration (soil and sediment)	Excavation (soil and sediment)
	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (deed restrictions, entrance fencing) and Soil Management Plan (SMP)	Institutional Controls (entrance fencing)
	Monitoring—retain selected existing wells and selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring	Monitoring—replace selected existing wells and retain selected surface water locations for monitoring over defined time
				Upgradient Groundwater (GW) Diversion Barrier to Surface Water (SW)	Upgradient GW Diversion Barrier to SW	Upgradient GW Diversion Barrier to SW	
					Downgradient In Situ Funnel and Gate (Reactive)	Downgradient In Situ Reactive Barrier	
Total Project Duration (Years)	30	30	30	30	30	30	30
Capital Cost	\$158,200	\$1,693,900	\$2,184,100	\$3,589,900	\$6,210,100	\$7,676,800	\$24,127,700
Annual O&M Cost	\$25,000	\$84,500	\$84,500	\$84,500	\$84,500	\$84,500	\$25,400
Total Periodic Cost	\$756,000	\$756,000	\$756,000	\$756,000	\$756,000	\$756,000	\$252,000
Total PV of Alternative (4.89%)	\$994,900	\$3,456,900	\$3,947,100	\$5,352,900	\$7,973,100	\$9,439,800	\$24,744,800

Alternative A (Alt. A) NATURAL ATTENUATION			COST ESTIMATE SUMMARY ALT. A			
Site:	"1913 Marine View Drive Site"	Description:	Institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) with Soil Management Plan (SMP); monitoring—retain selected existing wells and selected surface water locations for monitoring.			
Location:	1905 Marine View Drive, Tacoma, Washington					
Phase:	Feasibility Study (-30% to +50%)					
Base Year:	2025					
Date:	November 2025					
CAPITAL COSTS						
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES	
Institutional Controls						
Institutional Controls Plan	1	LS	\$ 40,400	\$ 40,400	Deed restrictions, entrance fencing, SMP	
Groundwater Use Restrictions	1	LS	\$ 16,300	\$ 16,300	Legal fees	
Deed Restrictions	1	LS	\$ 16,300	\$ 16,300	Legal fees	
Documentation	1	LS	\$ 20,200	\$ 20,200	Other plans and documents	
Entrance fence	550	FOOT	\$ 45	\$ 24,800	6-foot chain link fence with barbed wire and locked access gate	
SUBTOTAL				\$ 118,000		
Contingency		25%		\$ 29,500		
SUBTOTAL				\$ 147,500		
Project Management		5%		\$ 7,400		
Construction Management		13%		\$ 3,300	Fence subcontractor	
TOTAL CAPITAL COSTS				\$ 158,200		
ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS:						
DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES	
Inspections						
Mobilization and Inspection	1	LS	\$ 2,300	\$ 2,300	One day	
Reporting	1	LS	\$ 1,800	\$ 1,800	Inspection documentation	
SUBTOTAL				\$ 4,100		
Fence Repair and Vegetation Clearing						
Annual maintenance	1	LS	\$ 12,100	\$ 12,100	Allowance (5 percent fence + 10k for clearing/grubbing)	
SUBTOTAL				\$ 16,200		
Contingency		30%		\$ 4,900	10% scope + 20% bid	
SUBTOTAL				\$ 21,100		
Project Management		5%		\$ 1,100		
Construction Management		13%		\$ 2,800		
TOTAL ANNUAL O&M COSTS				\$ 25,000		
PERIODIC COSTS:						
DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Monitoring (groundwater sampling)						
Quarterly	1	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	1	1	EA	\$ 35,000	\$ 35,000	Reporting
Quarterly	2	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	2	1	EA	\$ 35,000	\$ 35,000	Reporting
Annually	3	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	4	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	5	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	7	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	9	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	11	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	13	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	15	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	17	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	19	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	21	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	23	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	25	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	27	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	29	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
TOTAL PERIODIC COSTS					\$ 756,000	

Alternative A (Alt. A) NATURAL ATTENUATION			COST ESTIMATE SUMMARY ALT. A			
Site:	"1913 Marine View Drive Site"	Description:	Institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) with Soil Management Plan (SMP); monitoring—retain selected existing wells and selected surface water locations for monitoring.			
Location:	1905 Marine View Drive, Tacoma, Washington					
Phase:	Feasibility Study (-30% to +50%)					
Base Year:	2025					
Date:	November 2025					
PRESENT VALUE ANALYSIS:						
COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (4.89%)	PRESENT VALUE	NOTES
Capital Cost	0	\$ 158,200	\$ 158,200	1	\$ 158,200	
Annual O&M Cost	1-30	\$ 750,000	\$ 25,000	15.57	\$ 389,200	30 years
Periodic Cost	1	\$ 63,000	\$ 63,000	0.953	\$ 60,100	Quarterly monitoring + reporting
Periodic Cost	2	\$ 63,000	\$ 63,000	0.909	\$ 57,300	Quarterly monitoring + reporting
Periodic Cost	3	\$ 42,000	\$ 42,000	0.867	\$ 36,400	Annual monitoring + reporting
Periodic Cost	4	\$ 42,000	\$ 42,000	0.826	\$ 34,700	Annual monitoring + reporting
Periodic Cost	5	\$ 42,000	\$ 42,000	0.788	\$ 33,100	Annual monitoring + reporting
Periodic Cost	6	\$ -	\$ -	0.751	\$ -	
Periodic Cost	7	\$ 42,000	\$ 42,000	0.716	\$ 30,100	Biennial monitoring + reporting
Periodic Cost	8	\$ -	\$ -	0.683	\$ -	
Periodic Cost	9	\$ 42,000	\$ 42,000	0.651	\$ 27,400	Biennial monitoring + reporting
Periodic Cost	10	\$ -	\$ -	0.620	\$ -	
Periodic Cost	11	\$ 42,000	\$ 42,000	0.591	\$ 24,900	Biennial monitoring + reporting
Periodic Cost	12	\$ -	\$ -	0.564	\$ -	
Periodic Cost	13	\$ 42,000	\$ 42,000	0.538	\$ 22,600	Biennial monitoring + reporting
Periodic Cost	14	\$ -	\$ -	0.513	\$ -	
Periodic Cost	15	\$ 42,000	\$ 42,000	0.489	\$ 20,600	Biennial monitoring + reporting
Periodic Cost	16	\$ -	\$ -	0.466	\$ -	
Periodic Cost	17	\$ 42,000	\$ 42,000	0.444	\$ 18,700	Biennial monitoring + reporting
Periodic Cost	18	\$ -	\$ -	0.423	\$ -	
Periodic Cost	19	\$ 42,000	\$ 42,000	0.404	\$ 17,000	Biennial monitoring + reporting
Periodic Cost	20	\$ -	\$ -	0.385	\$ -	
Periodic Cost	21	\$ 42,000	\$ 42,000	0.367	\$ 15,500	Biennial monitoring + reporting
Periodic Cost	22	\$ -	\$ -	0.350	\$ -	
Periodic Cost	23	\$ 42,000	\$ 42,000	0.334	\$ 14,100	Biennial monitoring + reporting
Periodic Cost	24	\$ -	\$ -	0.318	\$ -	
Periodic Cost	25	\$ 42,000	\$ 42,000	0.303	\$ 12,800	Biennial monitoring + reporting
Periodic Cost	26	\$ -	\$ -	0.289	\$ -	
Periodic Cost	27	\$ 42,000	\$ 42,000	0.276	\$ 11,600	Biennial monitoring + reporting
Periodic Cost	28	\$ -	\$ -	0.263	\$ -	
Periodic Cost	29	\$ 42,000	\$ 42,000	0.250	\$ 10,600	Biennial monitoring + reporting
Periodic Cost	30	\$ -	\$ -	0.239	\$ -	
		\$ 1,664,200			\$ 994,900	
TOTAL PRESENT VALUE OF ALTERNATIVE				\$	994,900	

Alternative B1 (Alt. B1)**ALT. A + CONSOLIDATE AND COVER****COST ESTIMATE SUMMARY ALT. B1**

Site: "1913 Marine View Drive Site" **Description:** Consolidate potentially impacted soil and sediment under common soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring.

Location: 1905 Marine View Drive, Tacoma, Washington

Phase: Feasibility Study (-30% to +50%)

Base Year: 2025

Date: November 2025

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mobilization/Demobilization					
Construction Equipment & Facilities	1	LS	\$ 25,000	\$ 25,000	Excavators, Loaders, etc.
Temporary facilities and Utilities	1	LS	\$ 50,000	\$ 50,000	Construction fence, roads, signs, trailers, etc.
H&S Plans and Submittals	1	LS	\$ 25,000	\$ 25,000	HASP, quality control, etc.
Design, Work Plans, Permits	1	LS	\$ 75,000	\$ 75,000	Common soil cover
Post-construction Submittals	1	LS	\$ 25,000	\$ 25,000	Report completed work
SUBTOTAL				\$ 200,000	
Clearing Vegetation					
Bushes/trees	3.0	ACRE	\$ 16,900	\$ 50,700	Based on heavily treed site
Common Soil Cover Construction					
Preparation/consolidation	4800	CY	\$ 28	\$ 134,400	Remove debris/prepare surface/consolidate perimeter material
Common soil material	9600	CY	\$ 35	\$ 336,000	2 feet
Common soil placement and compaction	57600	SY	\$ 5	\$ 288,000	6 inch layers
Disposal of debris (non-hazardous)	400	TN	\$ 80	\$ 32,000	Allowance (20 truck loads)
SUBTOTAL				\$ 790,400	
SUBTOTAL				\$ 1,041,100	
Contingency		25%		\$ 260,300	10% scope + 15% bid
SUBTOTAL				\$ 1,301,400	
Project Management		5%		\$ 65,100	
Construction Management		13%		\$ 169,200	
Alt. A (Natural Attenuation)					
Capital+contingency+management	1	LS	\$ 158,200	\$ 158,200	See cost estimate Summary Alt. A
TOTAL CAPITAL COSTS				\$ 1,693,900	

ANNUAL O&M COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Common Soil Cover Maintenance					
Annual maintenance	1	LS	\$ 39,700	\$ 39,700	Allowance (5 percent of material/handling/oversight)
Contingency		30%		\$ 12,000	10% scope + 20% bid
SUBTOTAL				\$ 51,700	
Project Management		5%		\$ 2,600	
Technical Support		10%		\$ 5,200	
Alt. A (Natural Attenuation)					
Inspections/maintenance/clearing	1	LS	\$ 25,000	\$ 25,000	See cost estimate Summary Alt. A
TOTAL ANNUAL O&M COSTS				\$ 84,500	

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Alternative A (Natural Attenuation)						
Quarterly	1	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	1	1	EA	\$ 35,000	\$ 35,000	Reporting
Quarterly	2	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	2	1	EA	\$ 35,000	\$ 35,000	Reporting
Annually	3	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	4	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	5	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	7	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	9	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	11	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	13	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	15	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	17	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	19	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	21	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	23	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	25	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	27	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	29	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
TOTAL PERIODIC COSTS					\$ 756,000	

Alternative B1 (Alt. B1)
ALT. A + CONSOLIDATE AND COVER
COST ESTIMATE SUMMARY ALT. B1

Site: "1913 Marine View Drive Site" **Description:** Consolidate potentially impacted soil and sediment under common soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring.
Location: 1905 Marine View Drive, Tacoma, Washington
Phase: Feasibility Study (-30% to +50%)
Base Year: 2025
Date: November 2025

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (4.89%)	PRESENT VALUE	NOTES
Capital Cost	0	\$ 1,693,900	\$ 1,693,900	1	\$ 1,693,900	
Annual O&M Cost	1-30	\$ 2,535,000	\$ 84,500	15.567	\$ 1,315,500	30 years
Periodic Cost	1	\$ 63,000	\$ 63,000	0.953	\$ 60,100	Quarterly monitoring + reporting
Periodic Cost	2	\$ 63,000	\$ 63,000	0.909	\$ 57,300	Quarterly monitoring + reporting
Periodic Cost	3	\$ 42,000	\$ 42,000	0.867	\$ 36,400	Annual monitoring + reporting
Periodic Cost	4	\$ 42,000	\$ 42,000	0.826	\$ 34,700	Annual monitoring + reporting
Periodic Cost	5	\$ 42,000	\$ 42,000	0.788	\$ 33,100	Annual monitoring + reporting
Periodic Cost	6	\$ -	\$ -	0.751	\$ -	
Periodic Cost	7	\$ 42,000	\$ 42,000	0.716	\$ 30,100	Biennial monitoring + reporting
Periodic Cost	8	\$ -	\$ -	0.683	\$ -	
Periodic Cost	9	\$ 42,000	\$ 42,000	0.651	\$ 27,400	Biennial monitoring + reporting
Periodic Cost	10	\$ -	\$ -	0.620	\$ -	
Periodic Cost	11	\$ 42,000	\$ 42,000	0.591	\$ 24,900	Biennial monitoring + reporting
Periodic Cost	12	\$ -	\$ -	0.564	\$ -	
Periodic Cost	13	\$ 42,000	\$ 42,000	0.538	\$ 22,600	Biennial monitoring + reporting
Periodic Cost	14	\$ -	\$ -	0.513	\$ -	
Periodic Cost	15	\$ 42,000	\$ 42,000	0.489	\$ 20,600	Biennial monitoring + reporting
Periodic Cost	16	\$ -	\$ -	0.466	\$ -	
Periodic Cost	17	\$ 42,000	\$ 42,000	0.444	\$ 18,700	Biennial monitoring + reporting
Periodic Cost	18	\$ -	\$ -	0.423	\$ -	
Periodic Cost	19	\$ 42,000	\$ 42,000	0.404	\$ 17,000	Biennial monitoring + reporting
Periodic Cost	20	\$ -	\$ -	0.385	\$ -	
Periodic Cost	21	\$ 42,000	\$ 42,000	0.367	\$ 15,500	Biennial monitoring + reporting
Periodic Cost	22	\$ -	\$ -	0.350	\$ -	
Periodic Cost	23	\$ 42,000	\$ 42,000	0.334	\$ 14,100	Biennial monitoring + reporting
Periodic Cost	24	\$ -	\$ -	0.318	\$ -	
Periodic Cost	25	\$ 42,000	\$ 42,000	0.303	\$ 12,800	Biennial monitoring + reporting
Periodic Cost	26	\$ -	\$ -	0.289	\$ -	
Periodic Cost	27	\$ 42,000	\$ 42,000	0.276	\$ 11,600	Biennial monitoring + reporting
Periodic Cost	28	\$ -	\$ -	0.263	\$ -	
Periodic Cost	29	\$ 42,000	\$ 42,000	0.250	\$ 10,600	Biennial monitoring + reporting
Periodic Cost	30	\$ -	\$ -	0.239	\$ -	
		\$ 4,984,900			\$ 3,456,900	

TOTAL PRESENT VALUE OF ALTERNATIVE
\$ 3,456,900

Alternative B2 (Alt. B2)				COST ESTIMATE SUMMARY ALT. B2			
ALT. A + CONSOLIDATE AND COVER (REDUCED INFILTRATION)							
Site:	"1913 Marine View Drive Site"	Description:			Consolidate potentially impacted soil and sediment under reduced infiltration soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring.		
Location:	1905 Marine View Drive, Tacoma, Washington						
Phase:	Feasibility Study (-30% to +50%)						
Base Year:	2025						
Date:	November 2025						
CAPITAL COSTS							
DESCRIPTION		QTY	UNIT	UNIT COST	TOTAL	NOTES	
Reduced Infiltration Layer Construction							
Sand layer		2400	CY	\$ 35	\$ 84,000	6 inches	
Sand layer placement		14400	SY	\$ 5	\$ 72,000		
Low-permeability liner		129600	SF	\$ 1.5	\$ 194,400		
Installation		129600	SF	\$ 0.9	\$ 116,700		
SUBTOTAL					\$ 311,100		
Contingency			25%		\$ 77,800	10% scope + 15% bid	
SUBTOTAL					\$ 388,900		
Project Management			5%		\$ 19,500		
Remedial Design (reduced infiltration)			8%		\$ 31,200		
Construction Management			13%		\$ 50,600		
Alt. B1 (Alt. A + Consolidate and Cover)							
Capital+contingency+management		1	LS	\$ 1,693,900	\$ 1,693,900	See cost estimate Summary Alt. B1	
TOTAL CAPITAL COSTS				\$ 2,184,100			
ANNUAL O&M COSTS:							
DESCRIPTION		QTY	UNIT	UNIT COST	TOTAL	NOTES	
Alt. B1 (Alt. A + Consolidate and Cover)							
Inspections/maintenance/clearing		1	LS	\$ 84,500	\$ 84,500	See cost estimate Summary Alt. B1	
TOTAL ANNUAL O&M COSTS				\$ 84,500			
PERIODIC COSTS:							
DESCRIPTION		YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Alternative A (Natural Attenuation)							
Quarterly		1	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report		1	1	EA	\$ 35,000	\$ 35,000	Reporting
Quarterly		2	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report		2	1	EA	\$ 35,000	\$ 35,000	Reporting
Annually		3	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually		4	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually		5	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		7	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		9	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		11	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		13	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		15	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		17	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		19	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		21	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		23	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		25	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		27	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		29	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
TOTAL PERIODIC COSTS				\$ 756,000			

Alternative B2 (Alt. B2)
ALT. A + CONSOLIDATE AND COVER (REDUCED INFILTRATION)
COST ESTIMATE SUMMARY ALT. B2

Site: "1913 Marine View Drive Site" **Description:** Consolidate potentially impacted soil and sediment under reduced infiltration soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring.

Location: 1905 Marine View Drive, Tacoma, Washington

Phase: Feasibility Study (-30% to +50%)

Base Year: 2025

Date: November 2025

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (4.89%)	PRESENT VALUE	NOTES
Capital Cost	0	\$ 2,184,100	\$ 2,184,100	1	\$ 2,184,100	
Annual O&M Cost	1-30	\$ 2,535,000	\$ 84,500	15.567	\$ 1,315,500	30 years
Periodic Cost	1	\$ 63,000	\$ 63,000	0.953	\$ 60,100	Quarterly monitoring + reporting
Periodic Cost	2	\$ 63,000	\$ 63,000	0.909	\$ 57,300	Quarterly monitoring + reporting
Periodic Cost	3	\$ 42,000	\$ 42,000	0.867	\$ 36,400	Annual monitoring + reporting
Periodic Cost	4	\$ 42,000	\$ 42,000	0.826	\$ 34,700	Annual monitoring + reporting
Periodic Cost	5	\$ 42,000	\$ 42,000	0.788	\$ 33,100	Annual monitoring + reporting
Periodic Cost	6	\$ -	\$ -	0.751	\$ -	
Periodic Cost	7	\$ 42,000	\$ 42,000	0.716	\$ 30,100	Biennial monitoring + reporting
Periodic Cost	8	\$ -	\$ -	0.683	\$ -	
Periodic Cost	9	\$ 42,000	\$ 42,000	0.651	\$ 27,400	Biennial monitoring + reporting
Periodic Cost	10	\$ -	\$ -	0.620	\$ -	
Periodic Cost	11	\$ 42,000	\$ 42,000	0.591	\$ 24,900	Biennial monitoring + reporting
Periodic Cost	12	\$ -	\$ -	0.564	\$ -	
Periodic Cost	13	\$ 42,000	\$ 42,000	0.538	\$ 22,600	Biennial monitoring + reporting
Periodic Cost	14	\$ -	\$ -	0.513	\$ -	
Periodic Cost	15	\$ 42,000	\$ 42,000	0.489	\$ 20,600	Biennial monitoring + reporting
Periodic Cost	16	\$ -	\$ -	0.466	\$ -	
Periodic Cost	17	\$ 42,000	\$ 42,000	0.444	\$ 18,700	Biennial monitoring + reporting
Periodic Cost	18	\$ -	\$ -	0.423	\$ -	
Periodic Cost	19	\$ 42,000	\$ 42,000	0.404	\$ 17,000	Biennial monitoring + reporting
Periodic Cost	20	\$ -	\$ -	0.385	\$ -	
Periodic Cost	21	\$ 42,000	\$ 42,000	0.367	\$ 15,500	Biennial monitoring + reporting
Periodic Cost	22	\$ -	\$ -	0.350	\$ -	
Periodic Cost	23	\$ 42,000	\$ 42,000	0.334	\$ 14,100	Biennial monitoring + reporting
Periodic Cost	24	\$ -	\$ -	0.318	\$ -	
Periodic Cost	25	\$ 42,000	\$ 42,000	0.303	\$ 12,800	Biennial monitoring + reporting
Periodic Cost	26	\$ -	\$ -	0.289	\$ -	
Periodic Cost	27	\$ 42,000	\$ 42,000	0.276	\$ 11,600	Biennial monitoring + reporting
Periodic Cost	28	\$ -	\$ -	0.263	\$ -	
Periodic Cost	29	\$ 42,000	\$ 42,000	0.250	\$ 10,600	Biennial monitoring + reporting
Periodic Cost	30	\$ -	\$ -	0.239	\$ -	
		\$ 5,475,100			\$ 3,947,100	

TOTAL PRESENT VALUE OF ALTERNATIVE
\$ 3,947,100

Alternative C (Alt. C)**ALT. B2 + GROUNDWATER DIVERSION BARRIER****COST ESTIMATE SUMMARY ALT. C**

Site: "1913 Marine View Drive Site" **Description:** Consolidate potentially impacted soil and sediment under reduced infiltration soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring, upgradient groundwater diversion barrier—assume separate subcontractor.

Location: 1905 Marine View Drive, Tacoma, Washington

Phase: Feasibility Study (-30% to +50%)

Base Year: 2025

Date: November 2025

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mobilization/Demobilization					
Construction Equipment & Facilities	1	LS	\$ 50,000	\$ 50,000	Crane, equipment, etc.
Temporary facilities and Utilities	1	LS	\$ -	\$ -	Part of Alt. B1
H&S Plans and Submittals	1	LS	\$ 50,000	\$ 50,000	HASP, quality control, etc.
Design, Work Plans, Permits	1	LS	\$ 100,000	\$ 100,000	Groundwater diversion barrier
Post-construction Submittals	1	LS	\$ 25,000	\$ 25,000	Report completed work
SUBTOTAL				\$ 225,000	
Sheet Pile Wall Installation					
Sheet Pile	12250	SF	\$ 32	\$ 392,000	rate for 20 feet long x 1 foot wide
Load and Unload Sheet Pile	350	Sheet	\$ 50	\$ 17,500	20 minutes per sheet at \$150/hour
Install Perimeter SP Wall	12250	SF	\$ 26	\$ 318,500	
SUBTOTAL				\$ 728,000	
SUBTOTAL				\$ 953,000	
Contingency		25%		\$ 238,300	10% scope + 15% bid
SUBTOTAL				\$ 1,191,300	
Project Management		5%		\$ 59,600	
Construction Management		13%		\$ 154,900	
Alt. B2 (Alt. A + Consolidate and Cover—reduced infiltration)					
Capital+contingency+management	1	LS	\$ 2,184,100	\$ 2,184,100	See cost estimate Summary Alt. B2

TOTAL CAPITAL COSTS**\$ 3,589,900****ANNUAL O&M COSTS:**

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Alt. B1 (Alt. A + Consolidate and Cover)					
Inspections/maintenance/clearing	1	LS	\$ 84,500	\$ 84,500	See cost estimate Summary Alt. B1

TOTAL ANNUAL O&M COSTS**\$ 84,500****PERIODIC COSTS:**

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Alternative A (Natural Attenuation)						
Quarterly	1	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	1	1	EA	\$ 35,000	\$ 35,000	Reporting
Quarterly	2	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	2	1	EA	\$ 35,000	\$ 35,000	Reporting
Annually	3	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	4	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	5	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	7	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	9	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	11	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	13	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	15	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	17	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	19	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	21	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	23	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	25	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	27	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	29	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting

TOTAL PERIODIC COSTS**\$ 756,000**

Alternative C (Alt. C)
ALT. B2 + GROUNDWATER DIVERSION BARRIER
COST ESTIMATE SUMMARY ALT. C

Site: "1913 Marine View Drive Site" **Description:** Consolidate potentially impacted soil and sediment under reduced infiltration soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring, upgradient groundwater diversion barrier—assume separate subcontractor.
Location: 1905 Marine View Drive, Tacoma, Washington
Phase: Feasibility Study (-30% to +50%)
Base Year: 2025
Date: November 2025

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (4.89%)	PRESENT VALUE	NOTES
Capital Cost	0	\$ 3,589,900	\$ 3,589,900	1	\$ 3,589,900	
Annual O&M Cost	1-30	\$ 2,535,000	\$ 84,500	15.567	\$ 1,315,500	30 years
Periodic Cost	1	\$ 63,000	\$ 63,000	0.953	\$ 60,100	Quarterly monitoring + reporting
Periodic Cost	2	\$ 63,000	\$ 63,000	0.909	\$ 57,300	Quarterly monitoring + reporting
Periodic Cost	3	\$ 42,000	\$ 42,000	0.867	\$ 36,400	Annual monitoring + reporting
Periodic Cost	4	\$ 42,000	\$ 42,000	0.826	\$ 34,700	Annual monitoring + reporting
Periodic Cost	5	\$ 42,000	\$ 42,000	0.788	\$ 33,100	Annual monitoring + reporting
Periodic Cost	6	\$ -	\$ -	0.751	\$ -	
Periodic Cost	7	\$ 42,000	\$ 42,000	0.716	\$ 30,100	Biennial monitoring + reporting
Periodic Cost	8	\$ -	\$ -	0.683	\$ -	
Periodic Cost	9	\$ 42,000	\$ 42,000	0.651	\$ 27,400	Biennial monitoring + reporting
Periodic Cost	10	\$ -	\$ -	0.620	\$ -	
Periodic Cost	11	\$ 42,000	\$ 42,000	0.591	\$ 24,900	Biennial monitoring + reporting
Periodic Cost	12	\$ -	\$ -	0.564	\$ -	
Periodic Cost	13	\$ 42,000	\$ 42,000	0.538	\$ 22,600	Biennial monitoring + reporting
Periodic Cost	14	\$ -	\$ -	0.513	\$ -	
Periodic Cost	15	\$ 42,000	\$ 42,000	0.489	\$ 20,600	Biennial monitoring + reporting
Periodic Cost	16	\$ -	\$ -	0.466	\$ -	
Periodic Cost	17	\$ 42,000	\$ 42,000	0.444	\$ 18,700	Biennial monitoring + reporting
Periodic Cost	18	\$ -	\$ -	0.423	\$ -	
Periodic Cost	19	\$ 42,000	\$ 42,000	0.404	\$ 17,000	Biennial monitoring + reporting
Periodic Cost	20	\$ -	\$ -	0.385	\$ -	
Periodic Cost	21	\$ 42,000	\$ 42,000	0.367	\$ 15,500	Biennial monitoring + reporting
Periodic Cost	22	\$ -	\$ -	0.350	\$ -	
Periodic Cost	23	\$ 42,000	\$ 42,000	0.334	\$ 14,100	Biennial monitoring + reporting
Periodic Cost	24	\$ -	\$ -	0.318	\$ -	
Periodic Cost	25	\$ 42,000	\$ 42,000	0.303	\$ 12,800	Biennial monitoring + reporting
Periodic Cost	26	\$ -	\$ -	0.289	\$ -	
Periodic Cost	27	\$ 42,000	\$ 42,000	0.276	\$ 11,600	Biennial monitoring + reporting
Periodic Cost	28	\$ -	\$ -	0.263	\$ -	
Periodic Cost	29	\$ 42,000	\$ 42,000	0.250	\$ 10,600	Biennial monitoring + reporting
Periodic Cost	30	\$ -	\$ -	0.239	\$ -	
		\$ 6,880,900			\$ 5,352,900	

TOTAL PRESENT VALUE OF ALTERNATIVE
\$ 5,352,900

Alternative D1 (Alt. D1)				COST ESTIMATE SUMMARY ALT. D1			
ALT. C + GROUNDWATER FUNNEL AND GATE (REACTIVE)							
Site:	"1913 Marine View Drive Site"	Description: Consolidate potentially impacted soil and sediment under reduced infiltration soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring, upgradient groundwater diversion barrier—assume separate subcontractor, downgradient in situ funnel and gate (reactive)—assume same subcontractor.					
Location:	1905 Marine View Drive, Tacoma, Washington						
Phase:	Feasibility Study (-30% to +50%)						
Base Year:	2025						
Date:	November 2025						
CAPITAL COSTS							
DESCRIPTION		QTY	UNIT	UNIT COST	TOTAL	NOTES	
Mobilization/Demobilization							
Construction Equipment & Facilities		1	LS	\$ -	\$ -	Part of Alt. C	
Temporary facilities and Utilities		1	LS	\$ -	\$ -	Part of Alt. B1	
H&S Plans and Submittals		1	LS	\$ -	\$ -	Part of Alt. C	
Design, Work Plans, Permits		1	LS	\$ 150,000	\$ 150,000	In situ funnel and gate, treatability study	
Post-construction Submittals		1	LS	\$ 25,000	\$ 25,000	Report completed work	
SUBTOTAL					\$ 175,000		
In Situ Funnel and Gate Installation							
Sheet Pile		21000	SF	\$ 32	\$ 672,000	rate for 20 feet long x 1 foot wide	
Load and Unload Sheet Pile		600	Sheet	\$ 50	\$ 30,000	20 minutes per sheet at \$150/hour	
Install Perimeter SP Wall		21000	SF	\$ 26	\$ 546,000		
PRB (ZVI) installed		1	LS	\$ 353,400	\$ 353,400		
Soil Transport		320	ton	\$ 40	\$ 12,800		
Soil Disposal					\$ -		
Non-Haz (Sand and Shredder)		320	ton	\$ 50	\$ 16,000		
Haz (Lime Sludge)		0	ton	\$ 200	\$ -		
SUBTOTAL					\$ 1,601,400		
SUBTOTAL					\$ 1,776,400		
Contingency			25%		\$ 444,100	10% scope + 15% bid	
SUBTOTAL					\$ 2,220,500		
Project Management			5%		\$ 111,000		
Construction Management			13%		\$ 288,700		
Alt. C (Alt. A + Consolidate and Cover—reduced infiltration + Upgradient groundwater diversion barrier)							
Capital+contingency+management		1	LS	\$ 3,589,900	\$ 3,589,900	See cost estimate Summary Alt. C	
TOTAL CAPITAL COSTS					\$ 6,210,100		
ANNUAL O&M COSTS:							
DESCRIPTION		QTY	UNIT	UNIT COST	TOTAL	NOTES	
Alt. B1 (Alt. A + Consolidate and Cover)							
Inspections/maintenance/clearing		1	LS	\$ 84,500	\$ 84,500	See cost estimate Summary Alt. B1	
TOTAL ANNUAL O&M COSTS					\$ 84,500		
PERIODIC COSTS:							
DESCRIPTION		YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Alternative A (Natural Attenuation)							
Quarterly		1	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report		1	1	EA	\$ 35,000	\$ 35,000	Reporting
Quarterly		2	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report		2	1	EA	\$ 35,000	\$ 35,000	Reporting
Annually		3	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually		4	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually		5	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		7	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		9	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		11	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		13	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		15	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		17	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		19	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		21	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		23	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		25	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		27	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually		29	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
TOTAL PERIODIC COSTS					\$ 756,000		

Alternative D1 (Alt. D1)
ALT. C + GROUNDWATER FUNNEL AND GATE (REACTIVE)
COST ESTIMATE SUMMARY ALT. D1

Site: "1913 Marine View Drive Site" Description: Consolidate potentially impacted soil and sediment under reduced infiltration soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring, upgradient groundwater diversion barrier—assume separate subcontractor, downgradient in situ funnel and gate (reactive)—assume same subcontractor.
Location: 1905 Marine View Drive, Tacoma, Washington
Phase: Feasibility Study (-30% to +50%)
Base Year: 2025
Date: November 2025

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (4.89%)	PRESENT VALUE	NOTES
Capital Cost	0	\$ 6,210,100	\$ 6,210,100	1	\$ 6,210,100	
Annual O&M Cost	1-30	\$ 2,535,000	\$ 84,500	15.567	\$ 1,315,500	30 years
Periodic Cost	1	\$ 63,000	\$ 63,000	0.953	\$ 60,100	Quarterly monitoring + reporting
Periodic Cost	2	\$ 63,000	\$ 63,000	0.909	\$ 57,300	Quarterly monitoring + reporting
Periodic Cost	3	\$ 42,000	\$ 42,000	0.867	\$ 36,400	Annual monitoring + reporting
Periodic Cost	4	\$ 42,000	\$ 42,000	0.826	\$ 34,700	Annual monitoring + reporting
Periodic Cost	5	\$ 42,000	\$ 42,000	0.788	\$ 33,100	Annual monitoring + reporting
Periodic Cost	6	\$ -	\$ -	0.751	\$ -	
Periodic Cost	7	\$ 42,000	\$ 42,000	0.716	\$ 30,100	Biennial monitoring + reporting
Periodic Cost	8	\$ -	\$ -	0.683	\$ -	
Periodic Cost	9	\$ 42,000	\$ 42,000	0.651	\$ 27,400	Biennial monitoring + reporting
Periodic Cost	10	\$ -	\$ -	0.620	\$ -	
Periodic Cost	11	\$ 42,000	\$ 42,000	0.591	\$ 24,900	Biennial monitoring + reporting
Periodic Cost	12	\$ -	\$ -	0.564	\$ -	
Periodic Cost	13	\$ 42,000	\$ 42,000	0.538	\$ 22,600	Biennial monitoring + reporting
Periodic Cost	14	\$ -	\$ -	0.513	\$ -	
Periodic Cost	15	\$ 42,000	\$ 42,000	0.489	\$ 20,600	Biennial monitoring + reporting
Periodic Cost	16	\$ -	\$ -	0.466	\$ -	
Periodic Cost	17	\$ 42,000	\$ 42,000	0.444	\$ 18,700	Biennial monitoring + reporting
Periodic Cost	18	\$ -	\$ -	0.423	\$ -	
Periodic Cost	19	\$ 42,000	\$ 42,000	0.404	\$ 17,000	Biennial monitoring + reporting
Periodic Cost	20	\$ -	\$ -	0.385	\$ -	
Periodic Cost	21	\$ 42,000	\$ 42,000	0.367	\$ 15,500	Biennial monitoring + reporting
Periodic Cost	22	\$ -	\$ -	0.350	\$ -	
Periodic Cost	23	\$ 42,000	\$ 42,000	0.334	\$ 14,100	Biennial monitoring + reporting
Periodic Cost	24	\$ -	\$ -	0.318	\$ -	
Periodic Cost	25	\$ 42,000	\$ 42,000	0.303	\$ 12,800	Biennial monitoring + reporting
Periodic Cost	26	\$ -	\$ -	0.289	\$ -	
Periodic Cost	27	\$ 42,000	\$ 42,000	0.276	\$ 11,600	Biennial monitoring + reporting
Periodic Cost	28	\$ -	\$ -	0.263	\$ -	
Periodic Cost	29	\$ 42,000	\$ 42,000	0.250	\$ 10,600	Biennial monitoring + reporting
Periodic Cost	30	\$ -	\$ -	0.239	\$ -	
		\$ 9,501,100			\$ 7,973,100	

TOTAL PRESENT VALUE OF ALTERNATIVE
\$ 7,973,100

Alternative D2 (Alt. D2)**ALT. C + GROUNDWATER REACTIVE BARRIER****COST ESTIMATE SUMMARY ALT. D2**

Site: "1913 Marine View Drive Site" **Description:** Consolidate potentially impacted soil and sediment under reduced infiltration soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring, upgradient groundwater diversion barrier—assume separate subcontractor, downgradient in situ reactive barrier—assume separate subcontractor.

Location: 1905 Marine View Drive, Tacoma, Washington

Phase: Feasibility Study (-30% to +50%)

Base Year: 2025

Date: November 2025

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mobilization/Demobilization					
Construction Equipment & Facilities	1	LS	\$ -	\$ -	Part of Alt. C
Temporary facilities and Utilities	1	LS	\$ -	\$ -	Part of Alt. B1
H&S Plans and Submittals	1	LS	\$ -	\$ -	Part of Alt. C
Design, Work Plans, Permits	1	LS	\$ 323,000	\$ 323,000	In situ reactive barrier, treatability study
Post-construction Submittals	1	LS	\$ 50,000	\$ 50,000	Report completed work
SUBTOTAL				\$ 373,000	
Groundwater Reactive Barrier Installation					
PRB (ZVI) installed	1	LS	\$ 2,196,100	\$ 2,196,100	700 feet and 30 feet deep
Soil Transport	2240	ton	\$ 40	\$ 89,600	
Soil Disposal				\$ -	
Non-Haz (Sand and Shredder)	2240	ton	\$ 50	\$ 112,000	
Haz (Lime Sludge)	0	ton	\$ 200	\$ -	
SUBTOTAL				\$ 2,770,700	
Contingency		25%		\$ 692,700	10% scope + 15% bid
SUBTOTAL				\$ 3,463,400	
Project Management		5%		\$ 173,200	
Construction Management		13%		\$ 450,300	
Alt. C (Alt. A + Consolidate and Cover—reduced infiltration + Upgradient groundwater diversion barrier)					
Capital+contingency+management	1	LS	\$ 3,589,900	\$ 3,589,900	See cost estimate Summary Alt. C
TOTAL CAPITAL COSTS				\$ 7,676,800	

ANNUAL O&M COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Alt. B1 (Alt. A + Consolidate and Cover)					
Inspections/maintenance/clearing	1	LS	\$ 84,500	\$ 84,500	See cost estimate Summary Alt. B1
TOTAL ANNUAL O&M COSTS				\$ 84,500	

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Alternative A (Natural Attenuation)						
Quarterly	1	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	1	1	EA	\$ 35,000	\$ 35,000	Reporting
Quarterly	2	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	2	1	EA	\$ 35,000	\$ 35,000	Reporting
Annually	3	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	4	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	5	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	7	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	9	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	11	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	13	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	15	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	17	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	19	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	21	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	23	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	25	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	27	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Biannually	29	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
TOTAL PERIODIC COSTS					\$ 756,000	

Alternative D2 (Alt. D2)
ALT. C + GROUNDWATER REACTIVE BARRIER
COST ESTIMATE SUMMARY ALT. D2

Site: "1913 Marine View Drive Site" **Description:** Consolidate potentially impacted soil and sediment under reduced infiltration soil cover, institutional controls (deed restrictions, entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]) and Soil Management Plan (SMP), monitoring—replace selected existing wells and retain selected surface water locations for monitoring, upgradient groundwater diversion barrier—assume separate subcontractor, downgradient in situ reactive barrier—assume separate subcontractor.
Location: 1905 Marine View Drive, Tacoma, Washington
Phase: Feasibility Study (-30% to +50%)
Base Year: 2025
Date: November 2025

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (4.89%)	PRESENT VALUE	NOTES
Capital Cost	0	\$ 7,676,800	\$ 7,676,800	1	\$ 7,676,800	
Annual O&M Cost	1-30	\$ 2,535,000	\$ 84,500	15.567	\$ 1,315,500	30 years
Periodic Cost	1	\$ 63,000	\$ 63,000	0.953	\$ 60,100	Quarterly monitoring + reporting
Periodic Cost	2	\$ 63,000	\$ 63,000	0.909	\$ 57,300	Quarterly monitoring + reporting
Periodic Cost	3	\$ 42,000	\$ 42,000	0.867	\$ 36,400	Annual monitoring + reporting
Periodic Cost	4	\$ 42,000	\$ 42,000	0.826	\$ 34,700	Annual monitoring + reporting
Periodic Cost	5	\$ 42,000	\$ 42,000	0.788	\$ 33,100	Annual monitoring + reporting
Periodic Cost	6	\$ -	\$ -	0.751	\$ -	
Periodic Cost	7	\$ 42,000	\$ 42,000	0.716	\$ 30,100	Biennial monitoring + reporting
Periodic Cost	8	\$ -	\$ -	0.683	\$ -	
Periodic Cost	9	\$ 42,000	\$ 42,000	0.651	\$ 27,400	Biennial monitoring + reporting
Periodic Cost	10	\$ -	\$ -	0.620	\$ -	
Periodic Cost	11	\$ 42,000	\$ 42,000	0.591	\$ 24,900	Biennial monitoring + reporting
Periodic Cost	12	\$ -	\$ -	0.564	\$ -	
Periodic Cost	13	\$ 42,000	\$ 42,000	0.538	\$ 22,600	Biennial monitoring + reporting
Periodic Cost	14	\$ -	\$ -	0.513	\$ -	
Periodic Cost	15	\$ 42,000	\$ 42,000	0.489	\$ 20,600	Biennial monitoring + reporting
Periodic Cost	16	\$ -	\$ -	0.466	\$ -	
Periodic Cost	17	\$ 42,000	\$ 42,000	0.444	\$ 18,700	Biennial monitoring + reporting
Periodic Cost	18	\$ -	\$ -	0.423	\$ -	
Periodic Cost	19	\$ 42,000	\$ 42,000	0.404	\$ 17,000	Biennial monitoring + reporting
Periodic Cost	20	\$ -	\$ -	0.385	\$ -	
Periodic Cost	21	\$ 42,000	\$ 42,000	0.367	\$ 15,500	Biennial monitoring + reporting
Periodic Cost	22	\$ -	\$ -	0.350	\$ -	
Periodic Cost	23	\$ 42,000	\$ 42,000	0.334	\$ 14,100	Biennial monitoring + reporting
Periodic Cost	24	\$ -	\$ -	0.318	\$ -	
Periodic Cost	25	\$ 42,000	\$ 42,000	0.303	\$ 12,800	Biennial monitoring + reporting
Periodic Cost	26	\$ -	\$ -	0.289	\$ -	
Periodic Cost	27	\$ 42,000	\$ 42,000	0.276	\$ 11,600	Biennial monitoring + reporting
Periodic Cost	28	\$ -	\$ -	0.263	\$ -	
Periodic Cost	29	\$ 42,000	\$ 42,000	0.250	\$ 10,600	Biennial monitoring + reporting
Periodic Cost	30	\$ -	\$ -	0.239	\$ -	
		\$ 10,967,800			\$ 9,439,800	

TOTAL PRESENT VALUE OF ALTERNATIVE
\$ 9,439,800

Alternative E (Alt. E)

EXCAVATION, INSTITUTIONAL CONTROLS, MONITORING

COST ESTIMATE SUMMARY ALT. E

Site: "1913 Marine View Drive Site" **Description:** Excavation (impacted soil and sediment), institutional controls (entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]),
Location: 1905 Marine View Drive, Tacoma, Washington
Phase: Feasibility Study (-30% to +50%) monitoring—replace selected existing wells and retain selected surface water locations for monitoring over defined time.
Base Year: 2025
Date: November 2025

CAPITAL COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Mobilization/Demobilization					
Construction Equipment & Facilities	1	LS	\$ 25,000	\$ 25,000	Excavators, Loaders, etc.
Temporary facilities and Utilities	1	LS	\$ 50,000	\$ 50,000	Construction fence, roads, signs, trailers, etc.
H&S Plans and Submittals	1	LS	\$ 25,000	\$ 25,000	HASP, quality control, etc.
Design, Work Plans, Permits	1	LS	\$ 100,000	\$ 100,000	Excavation/dewatering
Post-construction Submittals	1	LS	\$ 25,000	\$ 25,000	Report completed work
SUBTOTAL				\$ 225,000	
Clearing Vegetation					
Bushes/trees	3	ACRE	\$ 16,900	\$ 50,700	Based on heavily treed site
Excavation					
Soil Excavation (Lime Sludge Waste)	3200	CY	\$ 5	\$ 16,000	
Soil Excavation (Auto Fluff)	62900	CY	\$ 5	\$ 314,500	
Soil Transport	99150	ton	\$ 40	\$ 3,966,000	
Soil Disposal				\$ -	
Non-Haz (Sand and Shredder)	94350	ton	\$ 50	\$ 4,717,500	
Haz (Lime Sludge)	4800	ton	\$ 200	\$ 960,000	
Common soil material	66100	CY	\$ 35	\$ 2,313,500	
Common soil placement and compaction	66100	CY	\$ 30	\$ 1,983,000	
				\$ 14,270,500	
SUBTOTAL				\$ 14,546,200	
Contingency		40%		\$ 5,818,500	25% scope + 15% bid
SUBTOTAL				\$ 20,364,700	
Project Management		5%		\$ 1,018,300	
Construction Management		13%		\$ 2,647,500	
Institutional Controls					
Institutional Controls Plan	1	LS	\$ 20,200	\$ 25,300	Deed restriction and entrance fencing
Deed Restrictions	1	LS	\$ 16,300	\$ 20,400	Legal fees
Documentation	1	LS	\$ 10,100	\$ 12,700	Other plans and documents
Entrance fence	550	FOOT	\$ 45	\$ 31,000	6-foot chain link fence with barbed wire and locked access gate
Project Management	1	LS	\$ 4,500	\$ 4,500	
Construction Management	1	LS	\$ 3,300	\$ 3,300	Fence subcontractor
SUBTOTAL				\$ 97,200	
TOTAL CAPITAL COSTS				\$ 24,127,700	

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES
Inspections					
Mobilization and Inspection	1	LS	\$ 2,300	\$ 2,300	One day
Reporting	1	LS	\$ 1,800	\$ 1,800	Inspection documentation
SUBTOTAL				\$ 4,100	
Fence Repair and Vegetation Clearing					
Annual maintenance	1	LS	\$ 12,400	\$ 12,400	Allowance (5 percent fence + 10k for clearing/grubbing)
SUBTOTAL				\$ 16,500	
Contingency		30%		\$ 5,000	10% scope + 20% bid
SUBTOTAL				\$ 21,500	
Project Management		5%		\$ 1,100	
Construction Management		13%		\$ 2,800	
TOTAL ANNUAL O&M COSTS				\$ 25,400	

PERIODIC COSTS:

DESCRIPTION	YEAR	QTY	UNIT	UNIT COST	TOTAL	NOTES
Monitoring (groundwater sampling)						
Quarterly	1	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	1	1	EA	\$ 35,000	\$ 35,000	Reporting
Quarterly	2	4	EA	\$ 7,000	\$ 28,000	Event: 2 staff, 10 hours each + management + interim reporting
Annual Review Report	2	1	EA	\$ 35,000	\$ 35,000	Reporting
Annually	3	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	4	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
Annually	5	1	EA	\$ 42,000	\$ 42,000	Event: 2 staff, 10 hours each + management + reporting
TOTAL PERIODIC COSTS					\$ 252,000	

Alternative E (Alt. E)

EXCAVATION, INSTITUTIONAL CONTROLS, MONITORING

COST ESTIMATE SUMMARY ALT. E

Site: "1913 Marine View Drive Site" **Description:** Excavation (impacted soil and sediment), institutional controls (entrance fencing [6-foot chain link fence with barbed wire located on south side of property boundary and keyed into the east and west property boundaries and locked access gate]),
Location: 1905 Marine View Drive, Tacoma, Washington
Phase: Feasibility Study (-30% to +50%) monitoring—replace selected existing wells and retain selected surface water locations for monitoring over defined time.
Base Year: 2025
Date: November 2025

PRESENT VALUE ANALYSIS:

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR (4.89%)	PRESENT VALUE	NOTES
Capital Cost	0	\$ 24,127,700	\$ 24,127,700	1	\$ 24,127,700	
Annual O&M Cost	1-5	\$ 126,500	\$ 25,400	15.567	\$ 395,500	5 years
Periodic Cost	1	\$ 63,000	\$ 63,000	0.953	\$ 60,100	Quarterly monitoring + reporting
Periodic Cost	2	\$ 63,000	\$ 63,000	0.909	\$ 57,300	Quarterly monitoring + reporting
Periodic Cost	3	\$ 42,000	\$ 42,000	0.867	\$ 36,400	Annual monitoring + reporting
Periodic Cost	4	\$ 42,000	\$ 42,000	0.826	\$ 34,700	Annual monitoring + reporting
Periodic Cost	5	\$ 42,000	\$ 42,000	0.788	\$ 33,100	Annual monitoring + reporting
Periodic Cost	6	\$ -	\$ -	0.751	\$ -	
Periodic Cost	7	\$ -	\$ -	0.716	\$ -	
Periodic Cost	8	\$ -	\$ -	0.683	\$ -	
Periodic Cost	9	\$ -	\$ -	0.651	\$ -	
Periodic Cost	10	\$ -	\$ -	0.620	\$ -	
Periodic Cost	11	\$ -	\$ -	0.591	\$ -	
Periodic Cost	12	\$ -	\$ -	0.564	\$ -	
Periodic Cost	13	\$ -	\$ -	0.538	\$ -	
Periodic Cost	14	\$ -	\$ -	0.513	\$ -	
Periodic Cost	15	\$ -	\$ -	0.489	\$ -	
Periodic Cost	16	\$ -	\$ -	0.466	\$ -	
Periodic Cost	17	\$ -	\$ -	0.444	\$ -	
Periodic Cost	18	\$ -	\$ -	0.423	\$ -	
Periodic Cost	19	\$ -	\$ -	0.404	\$ -	
Periodic Cost	20	\$ -	\$ -	0.385	\$ -	
Periodic Cost	21	\$ -	\$ -	0.367	\$ -	
Periodic Cost	22	\$ -	\$ -	0.350	\$ -	
Periodic Cost	23	\$ -	\$ -	0.334	\$ -	
Periodic Cost	24	\$ -	\$ -	0.318	\$ -	
Periodic Cost	25	\$ -	\$ -	0.303	\$ -	
Periodic Cost	26	\$ -	\$ -	0.289	\$ -	
Periodic Cost	27	\$ -	\$ -	0.276	\$ -	
Periodic Cost	28	\$ -	\$ -	0.263	\$ -	
Periodic Cost	29	\$ -	\$ -	0.250	\$ -	
Periodic Cost	30	\$ -	\$ -	0.239	\$ -	
		\$ 24,506,200			\$ 24,744,800	

TOTAL PRESENT VALUE OF ALTERNATIVE

\$ 24,744,800