

ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES (ABCA)
WEST PROPERTY
PORTLAND, OREGON

by
Haley & Aldrich, Inc.
Portland, Oregon

for
Portland Bureau of Environmental Services
Portland, Oregon

File No. 0209772
October 2024

DRAFT



SIGNATURE PAGE FOR

**REPORT ON
ANALYSIS OF BROWNFIELDS CLEANUP ALTERNATIVES (ABCA)
WEST PROPERTY
PORTLAND, OREGON**

**PREPARED FOR
PORTLAND BUREAU OF ENVIRONMENTAL SERVICES
PORTLAND, OREGON**

PREPARED BY:

Anna Murphy
Project Engineer
Haley & Aldrich, Inc.

REVIEWED AND APPROVED BY:

Jennifer A. Casler, RG
Senior Associate Geologist
Haley & Aldrich, Inc.

Table of Contents

Figures	iv
1. Introduction and Background	1
1.1 SITE LOCATION AND DESCRIPTION	1
1.2 FORECASTED CLIMATE CONDITIONS	1
1.3 PREVIOUS SITE USES AND ANY PREVIOUS REMEDIATION ACTIVITIES	1
1.4 SITE ASSESSMENT FINDINGS	2
1.5 RISK ASSESSMENT CONCLUSIONS	3
1.5.1 Soil	3
1.5.2 Groundwater	4
1.5.3 Soil Vapor	4
1.6 PROJECT GOAL	4
2. Applicable Regulations and Cleanup Standards	5
2.1 CLEANUP OVERSIGHT RESPONSIBILITY	5
2.2 CLEANUP STANDARDS FOR MAJOR CONTAMINANTS	5
2.3 LAWS & REGULATIONS APPLICABLE TO THE CLEANUP	5
3. Analysis of Brownfield Cleanup Alternatives	6
3.1 EVALUATION OF CLEANUP ALTERNATIVES	6
3.2 ALTERNATIVE 1: NO ACTION	7
3.3 ALTERNATIVE 2: FABRIC AND GRAVEL CAP	7
3.4 ALTERNATIVE 3: ASPHALT CAP	7
3.5 RECOMMENDED CLEANUP ALTERNATIVE	8

List of Figures

Figure No.	Title
1	RA Overview Map
2	West Property Sampling Locations

DRAFT

1. Introduction and Background

1.1 SITE LOCATION AND DESCRIPTION

The subject site is a 4.25-acre portion of a larger 22.5-acre property identified as the West Property at 10505 North Portland Road, in Portland, Oregon. The subject site is the 4.25 acres of the West Property that are not already addressed by corrective actions taken by the City of Portland (City) that consist of a 2-acre cap over an area formerly used for storage by Columbia steel storage, or the 6-acre Temporary Alternative Shelter Site 2 (TASS 2) site on which the City completed a Risk Assessment. The remaining 10.25 acres of the West Property is covered by a vegetated riparian zone along the Columbia Slough. The 4.25-acre subject site is shown on Figure 1. Previous sampling locations on the entire West Property are shown on Figure 2.

The West Property is planned for a mix of paving, habitat restoration and walking/biking trail.

The 4.25-acre subject site is bordered by the former Columbia Steel site to the west, Truck Repair Enterprise to the south, The TASS 2 site to the east (also a part of the West Property), and the Columbia Slough to the north. The subject site is undeveloped with gravel and grass vegetation cover. A riparian zone covers the site's northern border with Columbia Slough. The riparian zone consists mainly of mature trees with herbaceous ground cover and covers the slope from the upland areas of the site down to the water line of the slough.

1.2 FORECASTED CLIMATE CONDITIONS

According to the Oregon Watershed Enhancement Board's Observed and Projected Changes in Climate for the Willamette Valley, climate trends for the region include increases in average temperature and increasing extreme heat, increased intensity of atmospheric rivers, increased frequency and duration of drought, increased number of high fire danger days and increased fire activity and frequency.¹

Part of the site is in Zone AE special flood hazard area with base flood elevation of approximately 31 feet. An additional portion of the site is also located in Zone X with a 0.2% annual chance flood hazard zone. With increased intensity of rainfall and atmospheric rivers due to climate change, the potential for flooding on the site increases.²

Based on the nature of the site and its reuse, changing temperature, rising sea levels, and wildfire are not expected to significantly affect the site.

1.3 PREVIOUS SITE USES AND ANY PREVIOUS REMEDIATION ACTIVITIES

The subject site was part of the larger West Property occupied by a lumber mill that ceased operations prior to 1948. By 1961, a truck washing facility operated on the eastern portion of the West Property and discharged wastewater to ponds located in the subject site. The ponds were later developed into retention ponds; however, usage ceased in 1980 due to phenols, phthalates, and heavy metals detected

¹ Oregon Watershed Enhancement Board (OWEB). 2024. Water and Climate Resources: Observed and Projected Changes in Climate, Habitat, and Species by Region.

<https://www.oregon.gov/oweb/resources/pages/water%20and%20climate.aspx>.

² FEMA. 2024. FEMA Flood Map Service Center: Search By Address. Map Panel 4101830080F eff. 10/19/2004

<https://msc.fema.gov/portal/search?AddressQuery=10505%20north%20portland%20road%20portland%20oregon>

in pond sediment and pond water samples. Concentrations of these constituents were below Resource Conservation and Recovery Act (RCRA) hazardous waste levels, and the Oregon Department of Environmental Quality (DEQ) allowed the pond sediment to be left in place and the pond backfilled with high-clay content fill.

Truck washing operations continued at the subject site under various owners until 1997 when the owner at that time (Arrow Transportation) filed for bankruptcy. The City purchased the West Property, including the subject site, in July 2001. The West Property remained vacant until construction of TASS 2 east of the subject site in 2024.

Operations from the truck washing facility on the parcel to the south of the West Property (known as the South Larsen Property) resulted in a release of chlorinated solvents to soil and groundwater that resulted in the South Larsen Property being listed on the DEQ Environmental Cleanup Site Information (ECSI) database (ECSI No. 3337). The groundwater plume from the South Larsen Property extended beneath a small portion of the West Property along the southern border, which included the subject site. A remedial action was performed on the chlorinated solvent plume that involved in-situ bioremediation injections to treat the plume. The remedial action was completed in 2011.

In 2007, Columbia Steel entered into a lease agreement with the City to use the property to the west of the subject site as a storage area for soil stockpiles generated from Columbia Steel's operations. Soil was placed in stockpiles and stored until 2020. The soils contained elevated concentrations of metals. In 2020, Columbia Steel began removing the soil stockpiles for disposal. Columbia Steel removed the stockpiles before filing for bankruptcy, at which point they ceased all activities at the lease area and removed the soils stockpiles. This area will be capped with geotextile fabric and 14-inches crushed gravel with funding provided by Columbia Steel.

Surface contamination on the TASS 2 portion of the West Property, east of the subject site was capped by asphalt in 2024 to prevent human contact with surface impacts to soil.

1.4 SITE ASSESSMENT FINDINGS

Due to past operations at the West Property, numerous environmental investigations have been conducted since 1997. These investigations were conducted across the West Property, including the subject site. Previous environmental investigations consisted of the following:

- UST Decommissioning by Enviro-Comp Services, Inc. (ECS) in July 1997 (AMEC, 2000);
- Phase II ESA conducted by PNG in December 1998 (PNG, 1999a);
- Phase II Investigation conducted by PNG in May 1999 (PNG, 1999b);
- Phase II ESA conducted by Kleinfelder in May 2000 (Kleinfelder, 2000);
- Geotechnical Investigation by Fujitani Hilts & Associates, Inc. (Fujitani) in May 2000 (Fujitani, 2000);
- Monitoring well installation conducted by AMEC in September 2009 (AMEC, 2009);
- South Larsen Groundwater Remediation conducted by Ash Creek Associates, Inc. (Ash Creek) in January 2011 (Ash Creek, 2011a);
- Groundwater monitoring event conducted by GeoEngineers in July 2011 (GeoEngineers, 2011);

- Columbia Steel soil stockpile removal confirmation sampling conducted by the BES in May and September 2020;
- Columbia Steel soil stockpile removal soil evaluation conducted by the SLR International Corporation (SLR) in June 2020 (SLR, 2024);
- Test Pit Investigation conducted by BES in October 2023; Soil Boring Investigation conducted by BES in November 2023; and
- Soil Vapor Investigation conducted by Haley & Aldrich in April 2024 (Haley & Aldrich, 2024b)
- Risk Assessment for the West Property TASS 2 Site conducted by Haley & Aldrich in August 2024 (Haley & Aldrich, 2024c)

Based on results of the investigations, exceedances to DEQ risk-based screening criteria were identified resulting in potential risk from:

- Metals in shallow and deep soil for residential, occupational, and construction worker receptors;
- VOCs in groundwater for residential and construction worker receptors.
- Polynuclear aromatic hydrocarbons (PAHs) in shallow and deep (greater than 3 feet deep) soil for residential receptors; and
- Total petroleum hydrocarbons in shallow (less than or equal to 3 feet deep) soil for residential and construction worker receptors.

1.5 RISK ASSESSMENT CONCLUSIONS

Using analytical data for the entire West Property (including the subject site), the following conclusions regarding the extent and nature of contamination on TASS 2 property based on the 2024 RA, are anticipated to also be true for the subject site. An RA for the entire West Property, including the subject site, currently is being completed.

1.5.1 Soil

Multiple sample locations in the subject site contain PAHs in shallow and deep soil above DEQ Soil Ingestion, Dermal Contact, and Inhalation Risk-Based Concentrations (RBCs) for residential receptors. Shallow soil also contains arsenic at concentrations that exceed the DEQ Soil Ingestion, Dermal Contact, and Inhalation RBCs for residential and occupational receptors. Only two shallow soil samples exceed the background value of 8.8 mg/kg. None of the exceedances are greater than the DEQ Soil Ingestion, Dermal Contact, and Inhalation RBCs for construction or excavation worker receptors.

1.5.2 Groundwater

Vinyl chloride was detected in one groundwater sample at a concentration above the DEQ Volatilization to Outdoor Air RBC for residential receptors and Direct Contact for Construction and Excavation worker receptors. All other contaminants were not detected at concentrations greater than DEQ Volatilization to Outdoor Air RBCs for residential and occupational receptors in groundwater samples collected from the subject site. Except for the single vinyl chloride exceedance, groundwater data evaluated did not indicate that contaminants were present at concentrations that pose a risk to construction and excavation workers.

1.5.3 Soil Vapor

Although soil vapor data is only available for the TASS 2 site and not the subject site, the nature of the contamination sources did not indicate that soil vapor conditions would be different across the West Property. Soil vapor data evaluated did not indicate the presence of contaminants at concentrations that pose a risk to occupational or residential receptors at the TASS 2 site. The results of subsurface biogas measurements indicate that elevated concentrations of subsurface methane will aerobically biodegrade as methane diffuses towards the ground surface, and there is little risk of accumulation of ignitable concentrations.

A remedial action for the TASS 2 portion of the site was completed as part of TASS 2 construction and incorporated a soil cap as part of the TASS 2 design.

1.6 PROJECT GOAL

The planned future use of the subject site is planned for a mix of paving, habitat restoration and walking/biking trail. This project will not occur until after TASS 2 operations have terminated. Due to the RBC exceedances, there is exposure risk to human health receptors at the subject site, which will require capping until future development.

2. Applicable Regulations and Cleanup Standards

2.1 CLEANUP OVERSIGHT RESPONSIBILITY

The subject site is part of the state-listed cleanup of the West Property, and cleanup will be overseen by DEQ. All documents prepared for the West Property, including the subject site, are submitted to DEQ for review and comment.

2.2 CLEANUP STANDARDS FOR MAJOR CONTAMINANTS

Risk to human health from contact with soil was evaluated on 13 August 2024 for the adjoining TASS 2 site, using the DEQ Soil Ingestion, Dermal Contact, and Inhalation RBCs for the residential, occupational, construction worker, and excavation worker receptors. For chemicals that did not have an RBC established, the US Environmental Protection Agency (EPA) Soil Ingestion, Dermal Contact, and Inhalation Regional Screening Levels for residential and industrial receptors using a target hazard quotient of 0.1 were used. Hazard quotient of 0.1 were selected as conservative screening values as there are multiple constituents screened at the site.

Risk to human health from groundwater ingestion or contact at the site was evaluated using the DEQ Groundwater In Excavation RBCs for the construction/excavation worker receptor and Volatilization to Outdoor Air RBCs for residential and occupational receptors.

Risk to human health from soil vapor was evaluated using site-specific Volatilization to Outdoor RBCs developed by DEQ for residential and occupational receptors.

2.3 LAWS & REGULATIONS APPLICABLE TO THE CLEANUP

Laws and regulations that are applicable to the cleanup at the West Property site include the Federal Small Business Liability Relief and Brownfields Revitalization Act, the Federal Davis-Bacon Act, and Oregon Administrative Rules (OAR) Chapter 340 Division 122: Hazardous Substance Remedial Action Rules. Laws and regulations followed will include Federal, state, and local laws regarding procurement of contractors to conduct the cleanup. In addition, all appropriate permits will be obtained prior to the work commencing.

3. Analysis of Brownfield Cleanup Alternatives

To address residual soil contamination at the 4.25-acre subject site, three cleanup alternatives were considered:

- **Alternative #1 – No Action**
This alternative would result in no active management of residual contamination at the subject site but would rely on levees along the Columbia Slough to the north to protect against surface water runoff from entering the Columbia Slough.
- **Alternative #2 - Fabric and Gravel Cap**
This alternative would involve placing geotextile fabric across the 4.25- acre subject site and then covering the area with gravel. This alternative would be a measure while awaiting future site development and would allow significant vegetated areas to remain on the subject site and along the Columbia Slough. This alternative would also allow direct infiltration of stormwater.
- **Alternative #3 – Asphalt Cap**
This alternative would involve capping the entire 4.25-acre subject site with asphalt, including paving areas currently covered by vegetation. This alternative would include engineered management of stormwater.

3.1 EVALUATION OF CLEANUP ALTERNATIVES

Three remedial alternatives were evaluated for effectiveness, implementability, and reasonableness of cost, while also considering climate change concerns. The factors are defined below, based on EPA brownfield guidance.

- **Effectiveness** – Effectiveness measures the performance of the technology in achieving protectiveness up to the time when Response Action Outcomes (RAOs) are achieved, and remedy implementation is complete.
- **Implementability** – Implementability measures whether it is easy or difficult to implement a remedy considering practical, technical, or legal difficulties that may be associated with construction and implementation, including scheduling delays. Implementability also depends on the ability to measure the effectiveness of the remedy and its consistency with regulatory requirements.
- **Reasonableness of cost** – A remedy’s reasonableness of cost is based on the following, as appropriate:
 - Cost of remedial action, including capital cost, and annual operation and maintenance (O&M) cost.
 - The degree to which the costs are proportionate to the benefits to human health and the environment created by risk reduction.
 - The degree of sensitivity and uncertainty of the costs

For each of the three remedial alternatives, consideration was given to how each activity could be affected by the changing climate and whether the activities themselves could be performed in an environmentally friendly manner. Climate considerations are included in each of the three tables in the following subsections.

3.2 ALTERNATIVE 1: NO ACTION

Remedial Alternative: No Action	
Effectiveness	Less effective. Does not cap residual surface contamination and does not address potential surface water runoff during storm events.
Implementability	Easy to implement as no implementation action is necessary.
Cost	Low cost to maintain. Maintenance would include monitoring the subject site.
Climate Consideration	Considering climate change, this alternative would have the beneficial effect of keeping vegetated, riparian areas along the Columbia Slough intact, and would also keep vegetated areas throughout the subject site.

3.3 ALTERNATIVE 2: FABRIC AND GRAVEL CAP

Remedial Alternative: Fabric and Gravel Cap	
Effectiveness	More effective. Fabric and gravel capping is an effective way to prevent access to residual soil contamination by human and ecological receptors, it covers residual surface contamination while still allowing groundwater infiltration.
Implementability	Straightforward easy implementation that would include minimal grading before covering with porous geotextile fabric and a 14-inch layer of crushed rock. This remedial alternative was approved by DEQ on another portion of the West Property.
Cost	Costs are estimated to be approximately \$129,000 per acre for the fabric and gravel cap. This would mean a total of \$550,000 for the 4.25-acre subject site. Maintenance would include monitoring the subject site for fabric cap exposure.
Climate Consideration	Considering climate change, this alternative would have the beneficial effect of keeping vegetated, riparian areas along the Columbia Slough intact, and would also keep vegetated areas throughout the subject site.

3.4 ALTERNATIVE 3: ASPHALT CAP

Remedial Alternative: Asphalt Cap	
Effectiveness	More effective. An asphalt cap is an effective way to prevent access to residual soil contamination by human and ecological receptors.
Implementability	Straightforward implementation but would require increased site preparation activities including engineered grading with gravel base and engineered stormwater collection system.
Cost	Costs are estimated to be approximately \$5/square foot. This would mean a total of \$2,613,600 for the 12-acre subject site. Maintenance would include monitoring the subject site.
Climate Consideration	Considering climate change, this alternative would have the least beneficial effect because this alternative would include replacing pervious surface with an impervious surface, which would act as a heat sink and would not allow direct infiltration of stormwater into the ground surface. Additionally, this alternative will disturb important riparian habitat along the Columbia Slough and would contribute to increased stormwater runoff.

3.5 RECOMMENDED CLEANUP ALTERNATIVE

The recommended cleanup alternative is Alternative #2, Fabric and Gravel Cap. This remedial alternative has been determined to be an effective solution to protect human and ecological receptors from residual surface soil contamination.

The Fabric and Gravel Cap alternative also works well with the existing Contaminated Media Management Plan (CMMP) that was prepared for the TASS 2 site and was approved by DEQ as an effective plan in managing human health risks at the TASS 2 site.

To make the selected alternative more sustainable, several techniques are planned. The most recent Best Management Practices (BMPs) issued under ASTM Standard E-2893: Standard Guide for Greener Cleanups will be used as a reference in this effort. The City will require the fabric and gravel contractor to follow an idle-reduction policy and use heavy equipment with advanced emissions controls operated on ultra-low sulfur diesel. The excavation work would be conducted during the dry-weather months (summertime) to minimize groundwater infiltration during fabric and gravel placement. The number of mobilizations to the Site would be minimized and erosion control measures would be used to minimize runoff into environmentally sensitive areas along the Columbia Slough. In addition, the City plans to ask bidding cleanup contractors to propose additional green remediation techniques in their response to the Request for Proposals for the cleanup contract.

DRAFT

FIGURES