RECORD OF DECISION

SELECTED REMEDIAL ACTION

For

WILLAMETTE COVE UPLAND SITE
PORTLAND, OREGON

Prepared By

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
Northwest Region Office

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1. INTRODUCTION

1.1. INTRODUCTION

This document presents the Oregon Department of Environmental Quality (DEQ) selected remedial action for the Willamette Cove Upland Site (Site) located along the northeast bank of the Willamette River in the St. Johns area of Portland, Oregon. The remedial action has been developed in accordance with Oregon Revised Statutes (ORS) 465.200 et. seq. and Oregon Administrative Rules (OAR) Chapter 340, Division 122, Sections 010 through 115.

The selected remedial action is based on DEQ's *Staff Report Recommended Remedial Action for the Willamette Cove Upland Site* and dated March 2020, and the administrative record for this Site. A copy of the Administrative Record Index is attached as Appendix A. This report summarizes the more detailed information contained in the site remedial investigation, risk assessment, removal action, feasibility study, and source control evaluation documents completed under a DEQ Voluntary Cleanup Agreement (ECVC-NWR-00-26) signed November 2000 by the Port of Portland (Port), Metro, and DEQ. Metro is the current property owner and the Port is participating as a former owner of a portion of the Site.

DEQ conducted a six-month public comment period on the recommended remedial action (Alternative 4c) presented in the Staff Report and received comments from members of the public, community groups, and the Five Tribes.[1] A responsive summary is presented in Section 9 and the approximately two-hundred comments submitted are provided in Appendix B. Acknowledging public input and to provide additional flexibility as Metro finalizes their vision for future use of the Site, DEQ developed a contingency remedy. Details on the selected remedial action and contingency remedy are presented below and in greater detail in Section 10.

1.2. SCOPE AND ROLE OF THE SELECTED REMEDIAL ACTION

The selected remedial action addresses the presence of polychlorinated dibenzo-p-dioxins and furans (dioxins/furans), metals, petroleum hydrocarbons (including polynuclear aromatics hydrocarbons or PAHs), polychlorinated biphenyls (PCBs), and volatile and semi-volatile organic compounds (VOCs, SVOCs) in the "Upland" portion of the Willamette Cove property. The Upland extends from top of riverbank landward, east and away from the Willamette River. Cleanup of the Willamette Cove riverbank, beach, and in-water contamination are conducted under the Portland Harbor Superfund Site in-water actions, overseen by the United States Environmental Protection Agency (USEPA).

[1] The five tribes are the Confederated Tribes of The Grand Ronde Community of Oregon, the Nez Perce Tribe, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon.

Soil contamination throughout the Upland exceed acceptable levels for both human health and ecology (plants and animals), and "hot spots" (elevated levels of contamination) are present. (Note that hot spot concentrations differ for humans versus ecology.) Groundwater contamination has also been identified in parts of the Site, notably in the West Parcel, which may require cleanup or other actions. Cleanup actions for groundwater are not presented in this ROD, but the need for additional investigation efforts is acknowledged. After the collection and analysis of additional groundwater data from the Upland, and forthcoming in-water (pre-design) investigation under USEPA, DEQ will determine whether a complete groundwater-to-surface water pathway is present which may require additional action.

The selected remedial action for the Willamette Cove Upland Site consists of the following elements:

1. Excavation and offsite disposal of all soil exceeding hot spot levels for human health.
2. Excavation and offsite disposal of soil exceeding non-dioxin/furan (e.g., metals including mercury) hot spot levels for ecological health.
3. Consolidation and onsite capping of: a) soil posing an excess risk to humans but below hot spot levels; and b) soil with higher risk levels relative to plants and animals, including hot spots. Capping of consolidated soil will consist of a demarcation layer and a minimum of 3 feet of clean cover material.[2] The consolidation area will be engineered to meet long-term requirements for stability and tailored to accommodate Metro plans for a nature park (with a regional trial). Preliminary estimates indicate the Upland can accommodate approximately 23,000 cubic yards of contaminated soil in a consolidation feature compatible with plans for the property.
4. Excavation and offsite disposal of soil exceeding risk levels for humans or plants/animals may be required in cases where either in-place capping or onsite consolidation and capping are not feasible due to space limitations, flooding or seismic concerns, etc. To the extent this is necessary, a preference will be given to offsite disposal of soil posing a higher risk to humans or plants and animals.
5. Following offsite disposal and onsite consolidation and capping, residual soil contamination posing a lower-level risk to plants and animals would be covered in-place. Cover thickness would be determined based on the level of residual risk; however, a minimum 1-foot of clean topsoil will be necessary.[3]
6. Completion of investigation efforts to determine whether groundwater contaminants have the potential to migrate to the Willamette River. The investigation is expected to include both additional Upland sampling and data analysis, and in-water investigation as part of (Portland Harbor Superfund Site) pre-design investigation under USEPA. If a complete groundwater-to-surface water migration pathway exists, source control measures will be evaluated.[4] Following completion of this work, DEQ would prepare a Source Control Decision.
7. Long-term monitoring and maintenance of all engineering controls, including consolidation area caps and soil covers, to confirm the ongoing effectiveness of these cleanup actions. A Cap Inspection and Maintenance Plan and Contaminated Media Management Plan will be developed, as well as a Community and Outreach Plan. The long-term monitoring and maintenance plan will include a discussion of contingency measures. In addition to regular monitoring, the cleanup action will be subject to periodic reviews, which provide an opportunity to evaluate the implementation and

[2] The final cap thickness and composition will be determined during remedial design.
[3] Remaining ecological hot spots, if any, will be capped by 3 feet of clean soil or alternative DEQ-approved material.
[4] Potential source control options are presented in the *Revised Groundwater Source Evaluation and Alternatives Analysis* (Apex, 2020).

performance of a remedy to determine whether it remains protective of human health and the environment. The periodic "protectiveness" reviews would include potential changes in land and water uses for the Site and nearby area.

8. Institutional controls, including recording of a deed restriction or equivalent, with the property identifying the nature of contamination, use restrictions (e.g., residential), and necessary long-term controls.

Implementation of the selected remedy will allow for full access of the Upland site, on and off trails, in accordance with Metro's intended future use. This includes the engineered cap areas, which will be designed to withstand normal human activity (as well as storms and seismic impacts).

As noted above, DEQ has also incorporated a contingency remedy which allows for Metro, during remedial design and in consultation with DEQ, to perform additional measures including additional removal activities to align with final plans for use of the Willamette Cove Site. Under this framework, Metro can eliminate or greatly reduce the volume of soil to be consolidated onsite and instead transport the soil offsite for disposal at a regulated waste facility.

2.SITE HISTORY AND DESCRIPTION

2.1. SITE LOCATION AND LANDUSE

The Willamette Cove Site stretches approximately 3,000 feet on the northeast bank of the Willamette River in the St. Johns area of Portland, Oregon (see Figure 1: Site Location Map). The property is comprised of the following Multnomah County tax lots in Section 12, Township 1 North, Range 1 West of the Willamette Baseline and Meridian: TL 200 (8.33 acres); TL 300 (8.85 acres); TL 2200 (1.38 acres); TL 2300 (0.74 acres) and TL 5400 (5.02 acres). DEQ's environmental cleanup site information (ECSI) system designates the Willamette Cove as site No. 2066. While the property is approximate 24 acres, the total area of the Upland is approximately 19.1 acres (above top of bank).

The riverfront property is positioned between river mile 6 and 7 of the Willamette River, north (downriver) of downtown Portland and south (upriver) of the St. Johns Bridge. As shown in Figure 2: Site Map, the property varies in width from 100 to 700 feet between the Willamette River and Union Pacific Railroad (UPRR) tracks to the north. The tracks are situated alongside the toe of the vegetated bluff, which rises at a steep angle offsite to the east. Residential areas of the Cathedral Park neighborhood occupy the terrace above Willamette Cove, and the St. Johns and University Park neighborhoods to the north and south. Willamette Cove is bordered to the northwest by North Richmond Avenue and the adjoining "Crawford Street" properties (ECSI No. 2363 and 6167). The primary point of access to the site is North Edgewater Street, extending from the bluff margin (and North Willamette Boulevard) to the East Parcel area. The property can also be reached on foot by means of North Richmond Avenue, or from the river.

To the southeast, an embankment for the Burlington Northern Santa Fe (BNSF) railroad bridge separates the Willamette Cove and the McCormick & Baxter Creosoting Company property (ECSI No. 74). The "M&B" site is a USEPA Superfund Site, which has undergone remediation and subject to long-term monitoring. A portion of Willamette Cove has been impacted by releases from M&B and a sediment cap covers a southeast section of the "cove" (see Figure 2).

For the purposes of site investigation work, and roughly corresponding to tax lot boundaries, three upland areas have been designated for the Site: East Parcel, Central Parcel, and West Parcel. Willamette Cove has a notable crescent shaped indentation in the riverbank, or "cove" feature, located immediately downriver (north) of the embankment leading up to the BNSF bridge and approximately 800 feet from the main river channel. The cove was formed in the early 1900s during construction of the bridge and placement of the embankment, which extends into the river. A large sand beach is exposed in the inner portion of the cove during seasonal low water conditions.

The Site was largely created by historical filling of land adjacent to the Willamette River, and is generally flat-lying above the riverbank. Berms and hummocks are occasionally present, especially in the West and East Parcels. Historically the West Parcel contained an embayment utilized as a log pond (see Figure 2), which has since been backfilled. While terraced above the Willamette River, in general the property is low-lying and accessible from the river during lower river stages, particularly the inner cove area. In general, surface elevations range from 30 to 44 feet North American Vertical Datum 88 (NAVD88). The West Parcel is slightly higher (32 to 44 feet) and the southeast portion of the East Parcel dips as low as 28 feet. The 100-year floodplain and 500-year flood plain elevations (32 and 37 feet NAVD88, respectively) are depicted on Figure 3: Site Elevation and Floodplain Map. The top of bank (TOB) is generally located at 32 feet NAVD88 (see Figure 4: Bankline Cross-Sections), but ranges 28 to 40 feet. The riverbank is moderately

to steeply-sloped in the West and Central Parcels, and more variable in the East Parcel with gentle to moderate slopes behind the inner cove beach area and very steep below the BNSF abutment.

The property is currently zoned as Open Space (OS) and portions are covered by the City of Portland Greenway overlay zones (gq). According to the City, an OS zoning is intended to preserve and enhance public and private open, natural and improved park and recreational areas. The River General (g) overlay allows for uses and development, which are consistent with the base zoning, allow for public use and enjoyment of the waterfront, and enhance the river's natural and scenic qualities. The River Water Quality (q) overlay zone is designated to protect the functional values of water quality resources by limiting or mitigating the impact of development in the setback.

The Willamette Cove property has a history of development and use spanning over 100 years. Figure 5: Historical Photos, show examples of historical operations. Historically the site was utilized for industrial purposes. Former buildings and related infrastructure have generally been removed. However, remnant infrastructure is scattered across the parcels including a large concrete foundation and paved roadway in the East Parcel. Concrete footings or foundation elements are present in areas across the site, and structural pilings exist within the cove and along the riverbank. Riprap is also present along most of the riverbank on the West and Central Parcels, and variety of debris dispersed amongst the parcels as remnants of industrial uses.

The property is currently vacant, and native and non-native vegetation has reclaimed the parcels and provides habitat to wildlife. Approximately one-third of the Site is covered with hardwood forest that is targeted by the City and Metro for restoration. Native trees include madrone, big leaf maple, and Oregon white oak. The remainder of the site is primarily scrub/shrub or meadow plant communities.

Metro, a tri-county governmental agency, purchased the property in 1996 pursuant to Metro's Open Spaces, Parks, and Streams Bond Measure. Metro has held the property for the purpose of creating a green space area. Restoration plans include a natural area to support aquatic, bird, and native vegetation species. A multi-use trail alignment through the natural area is shown on the City's comprehensive plan and is part of the regional trail plan adopted by Metro. The proposed trail is part of the longer Willamette River Greenway, which was identified as Goal 15 in Oregon's Statewide Planning Goals & Guidelines in 1973.

The general understanding of future development of the Site is summarized below from the Trail Alignment Refinement Report (Alta Planning & Design, 2010), modified based on discussions with Metro.

- The site "presents a significant open space opportunity along the riverfront."
- The zoning allows for "public use and enjoyment of the waterfront" that "enhance the river's natural and scenic qualities" but also requires uses that "protect the functional values of water quality resources by limiting or mitigating the impact of development."
- The City's draft North Reach River Plan indicates that the site is considered a potential mitigation site and allows "ecologically sensitive" trails to the river.
- Metro and the City are developing a restoration plan that focuses on restoration of the Oregon white oak and madrone plant communities on the site.
- The paved multi-use trail would be developed on existing open corridors through the site. It would be 12 feet wide with 2-foot shoulders.
- Viewing platforms and/or soft surface trails to the water's edge could be strategically placed to control use of the site and to view scenery or wildlife.

In 2020 and following the public comment period on DEQ's Staff Report, Resolution No. 20-5149 was introduced before the Metro Council. The resolution was adopted and amended during the Metro Council session on December 10, 2020. Under terms of the resolution, Metro:

1. Authorized Willamette Cove as a Metro parks and nature destination, eligible for Parks and Nature Bond Measure ("2019 Bond Measure") funds;
2. Metro Council affirms its support of and commitment to explore trail development, habitat restoration, and a broad range of passive recreational activities at Willamette Cove consistent with its use as a natural area, for example but not limited to, walking, hiking, bicycling, beach access, wildlife viewing, picnicking, and cultural interpretation;
3. Metro Council shall convene a work session within thirty days of the issuance of the DEQ Record of Decision for Willamette Cove to discuss additional and voluntary actions that Metro could take at the site to further improve its environmental condition; and
4. Metro staff shall prepare a plan for meaningful public engagement to identify community priorities for future passive recreational opportunities and trail development consistent with protection and restoration of natural resources at Willamette Cove, and submit this plan to Metro Council within four months of the date DEQ issues the Record of Decision.

2.2. PHYSICAL SETTING

2.2.1. Climate

The Portland area has a temperate marine climate characterized by wet winters and dry summers. The majority of rainfall occurs from October to May. According to records from 1871 to 2017 provided by NOAA,[5] average rainfall in Portland is 42.9 inches. December is the wettest month, with rainfall averaging 6.9 inches. July is the driest month, averaging 0.6 inches of rainfall. The average annual temperature is approximately 54 degrees Fahrenheit (^{o}F), with a normal maximum near 81^{o}F in July-August, and normal minimum of 35^{o}F in December-January.

2.2.2. Geology

The site is located in the Portland Basin, an approximately 770 square mile topographic basin in the Puget-Willamette Lowland, with its long axis oriented northwest. Studies indicate that as much as 1,800 feet of late Miocene and younger sediments have accumulated in the deepest part of the basin, with most sediments carried in from the east by the Columbia River. (Within the sequence of basin sediments, both local and regional volcanic influence are observed, along with reworking of basin sediments through river and erosional processes.) Naturally deposited near-surface geologic materials (primarily silts, sands, and gravels) in the site vicinity are generally non-lithified, the two most prominent sources being: a) deposits associated with Pleistocene catastrophic flooding, and b) Quaternary river and stream deposits. At depth lie course-grained materials with varying degrees of lithification deposited by the ancestral Columbia River (Troutdale Formation, Miocene). The basin is underlain at depth by thick basalt sequences of the Columbia River Basalt Group (middle Miocene).

[5] https://www.wrh.noaa.gov/pqr/pdxclimate/index.php

Structurally, the Portland Basin is transected by a series of northwest-to-southeast trending shallow, crustal faults. Major faults in the vicinity of the Site include the East Bank Fault, roughly aligned with the east bank of the Willamette River in the site vicinity, and the West Hills Fault located approximately one mile to the west across the river and paralleling the east bank of the river. Small magnitude seismicity in the vicinity of these faults over the past few decades suggests that these structures may be seismogenic (capable of generating earthquakes). The potential for seismic activity in the Site vicinity is discussed later in this ROD as it relates to the resiliency of remedial alternatives, including the selected Site remedy.

The State of Oregon Portland Quadrangle geologic map[6] for the area shows surficial deposits along both sides of the Willamette River in the site area are dominated by flood deposits, alluvium, and human placed artificial fill.

Surface and near-surface geologic materials (hereafter "soil") in the Willamette Cove Upland consist of artificial fill and Pleistocene alluvial deposits. Early maps of the area indicate the current upland portion of the Site consisted of a strip of lowland adjacent to the current UPRR railroad tracks. Based on historical maps and photographs, fill was placed on this lowland and outward into the Willamette River prior to and concurrent with development. The thickness of the fill across the site likely varies from about 20 to 30 feet; however, in places, it could be up to 60 feet (such as in the log pond on the West Parcel filled in the 1970s). Fill and alluvial deposits in the Upland consist of silts and sands. These units are often distinguished from natural deposits based only on historical topographic maps and the presence of anthropogenic debris in the fill. Debris encountered in explorations at the Site consisted mostly of bricks, metal, and wood, with lesser amounts of glass, asphalt and concrete. In the West Parcel, debris is only present along the southern half (riverside) of the parcel at depths of up to 35 feet below ground surface (bgs). In the Central Parcel, debris was present between 12 and 27 feet bgs in the western half of the parcel (only surficial debris was encountered in the east half). An area of concentrated debris (brick and metal) was encountered from 2 to 5 feet bgs near the former building foundation located on the Central Parcel. (This concentrated area of debris was removed during the 2015/2016 soil removal action). In the East Parcel, debris was present along the southeast perimeter, at depths of up to 15 feet bgs. Naturally deposited materials encountered in site borings, extending to a depths of 70 feet bgs, were a mix of alluvial and catastrophic flood deposits. The Troutdale Formation was not encountered.

2.2.3. Hydrogeology

Hydrogeologic units of the Portland Basin are well described in publications including USGS Water Resource Investigations Report 90-4196 (*A Description of Hydrogeologic Units in the Portland Basin*, Oregon and Washington, 1990). The geologic units discussed above in Section 2.2.2 are generally water-bearing, and eight or more major hydrogeologic units have been mapped for the Portland Basin. Groundwater within 100 feet of ground surface is generally unconfined. Aquifer units of local to regional importance in the area include the following: Unconsolidated Sediment Aquifer (USA); Troutdale Gravel Aquifer (TGA); Troutdale Sandstone Aquifer (TSA); Sand and Gravel Aquifer (SGA); and Columbia River Basalt Aquifer (CRBA). Important confining units are present at the base of the TGA and TSA within portions of the Portland Basin.

[6] *Geologic Map of the Portland Quadrangle, Multnomah and Washington Counties, Oregon, and Clark County, Washington*. State of Oregon, Department of Geology and Mineral Industries (DOGAMI); USGS GMS-75, 1991.

The TGA, TSA, and SGA are all considered important aquifer resources and utilized by the City of Portland and others for drinking purposes. The USA is less utilized because of limited productivity and proximity to ground surface (and potential sources of pollution). Regional groundwater gradients are generally in the direction of the Willamette and Columbia Rivers, with groundwater discharge to surface water a significant flow pathway.

At the Site, shallow groundwater is unconfined and largely present in alluvial or flood deposits. In the West Parcel where deep filling has taken place, shallow groundwater lies within both fill and underlying native material. As the Troutdale Formation was not encountered in site borings, all groundwater within at least 100 feet of ground surface is presumed to be part of the USA.

In addition to the advancement of "one-time" borings and collection of shallow groundwater samples in various site areas, nine groundwater wells (MW-1 through MW-9) have been installed in the uppermost saturated zone (water table aquifer) and water levels gauged over several years. As shown in Figure 6: Groundwater Sampling Locations, the wells are positioned immediately above and along the top of bank to assess contaminant impacts in the most downgradient portion of the Upland. Depth to groundwater generally ranges from 21 to 37 feet bgs, corresponding to 7 to 15 feet NAVD88. Higher groundwater elevations have been observed at MW- 2, which may be impacted by an (upgradient) City of Portland stormwater feature, or represent localized perched water conditions.

In general, the direction of flow in shallow aquifers is to the west, towards the adjacent Willamette River. Water level data from the U.S. Geological Survey Willamette River gauging station (located at the Morrison Bridge in downtown Portland, approximately 6 miles upriver from the site and adjusted for the distance from the gauging station) were compared to the well elevation data collected during four 2016 monitoring events (February, June, September, and December) to confirm groundwater gradient. Westerly flow was confirmed, although DEQ notes that the linear arrangement of the wells is less-than-ideal for gradient "triangulation". In general, water levels at the Site indicate that the overall groundwater gradient is toward the river. Short-term, local reversals in gradient may occur near the riverbank, but these reversals would occur only during maximum water level events that are of short duration.

2.2.4. Surface Water and Stormwater Features

Surface Water

The Willamette River, adjacent to the site, is positioned approximately river mile (RM) 6.7 from the confluence of the Columbia River. Along this reach, the river flows to the northwest and is about 1,500 feet wide. In Portland, the river flows at an average rate ranging from 11,100 cubic feet per second (cfs) in summer to 34,000 cfs in winter (USACE, 2014). The elevation of the 100-year and 500-year floodplain along this reach is 32 and 37 feet NAVD88, respectively (FEMA, 2010). At the Morrison Bridge station (RM 12.8) flood stage is considered 23 feet NAVD88, and moderate to major flood stages 29 and 33 feet NAVD88, respectively. The 1996 flood crested at 33.6 feet NAVD88.

The majority of the Willamette Cove Upland was not flooded during the February 1996 flood and the mapped extent is shown on Figure 3. The top of bank was breached in some areas, however, the site has a slightly increasing grade above top of bank which prevented the flood from reaching most of the upland area.

Stormwater
The majority of the property is vegetated and precipitation either infiltrates or runs off via sheet flow. Surface and near-surface soils are comprised of fill, and generally contain a significant sand fraction. As such, rainwater infiltrates readily into the ground. Neither sheet flow nor significant ponding of water have been observed by DEQ at the Site. The flat to gently-sloped site grade generally prevents stormwater flow over the top of bank; however, minor runoff may occur in areas.

To assess the potential for stormwater conveyances to be present, both riverbank inspections and a review of City of Portland utility records was completed. Six potential outfalls were identified at the Site through a combination of inspection and records review; five were determined to be no longer active. One active outfall is present (City of Portland storm sewer system OF-49). Stormwater from properties located upslope and east of the Site is conveyed through a stormwater line below the Central Parcel to OF-49, discharging to the Willamette River. At present, there are no storm drains or stormwater features that discharge surface water from the Site.

2.3. SITE HISTORY

The Willamette Cove Upland was extensively used for industrial activity from the early 1900s to 1970s, including a cooperage, lumber mill, and dry dock-related activities. Significant riverside and over-water activity also occurred, notably the operation of dry docks adjacent to the Central Parcel, with associated activities extending onto the riverbank and upland areas. While the focus of this ROD is on the Upland extending from top of bank landward, information on riverbank and in-water industrial activities, including historical photos are provided for contextual purposes. Figure 5 present historical photos representing the early 1920s to peak industrial development at the site.

West Parcel. Prior to industrial development, the West Parcel was either undeveloped shoreline or used for residential purposes. A map from 1855 shows the William Caples homestead situated near the present day intersection of North Richmond Avenue and the UPRR tracks. The West Parcel was developed in 1901 as a plywood mill and operated as a wood products facility into the 1960s. The facility expanded in the 1930s and contained sixteen buildings including over-water structures. In 1963, the plant discontinued plywood production. Woodworking businesses occupied the parcel during the mid-1960s to 1970, including a cabinet shop and prefabricated home manufacturer. Around 1972, buildings on the West Parcel appear to have been demolished and the former log pond on the parcel was filled by 1976. The property was purchased by the Portland Development Commission (PDC) in 1979 and thereafter remained vacant. In 1996, Metro purchased the property.

Historical features on or adjacent to the West Parcel that may have contributed to contamination present include a glue mixing and gluing room, glue storage, presses, debarkers, an oil house, a blacksmith shop, a grinding room, fuel tanks, and an underground petroleum pipeline in the railroad right-of-way. Possible contaminants associated with these features are metals (from grinding); PAHs (from fuel and hydraulic oil use); PCBs (from hydraulic oil and electrical equipment); phenol and formaldehyde (from glues); total petroleum hydrocarbons (TPH); and VOCs (from use of solvents to clean metal). No sources were initially identified suggesting dioxins/furans contamination in the West Parcel. A former log pond on the West Parcel (see Figure 2) was backfilled with import fill reportedly sourced within the Portland Harbor, including the Arkema Chemicals Company site (ECSI No. 398) located directly upstream and across the river from Willamette Cove (Integral, 2008). Imported fill had the potential to contain chemicals associated with Arkema, such as pesticides.

Central Parcel. Pre-1900 maps of the area show the bluff northeast of the Central Parcel extended to the river. As such, the Central Parcel upland did not exist or consisted of riverbank along the present day UPRR tracks. From about 1905 through 1953, the Central Parcel was owned by the Port of Portland and occupied by dry docks and shops. The Central Parcel development began in 1903, in conjunction with the construction of the St. Johns dry docks nearby and downriver.

Between 1903 and 1924, shops and ancillary structures were constructed on the parcel to provide support for dry dock activities. Initially, the dry dock complex consisted of one slip. In the 1920s, a second slip was added and dredge fill was placed between the dry docks and the UPRR tracks, creating the Central Parcel upland. The dry dock facility extended from the upland to several hundred feet into the river and westward (see Figure 7: Historical Site Features). The western portion of the Central Parcel was sold in 1950 and incorporated into the plywood and lumber mill operations on the adjacent West Parcel. The remainder of the Central Parcel was sold in 1953 and developed as a lumber mill. The majority of the former shops were demolished in the 1950s to early 1960s, and the pier structures that supported the dry docks were removed from 1966 through 1969. The lumber mill was no longer in use by 1970. Smaller businesses appeared to have occupied the parcel into the 1970s for a variety of purposes including log rafting, a marine salvage company, a demolition contractor facility, woodworking facilities, and boat building. By the 1982 timeframe, the property was under PDC ownership, under whom remaining site buildings were demolished. Metro purchased the property in 1996.

Historical features on or adjacent to the Central Parcel which may have contributed to contamination at the site include a machine shop, blacksmith shops, an air compressor room, an oil warehouse, a paint shed, a fuel oil standpipe, a debarker, a saw filing room, dry docks, a power house, transformers, and an underground petroleum pipeline in the railroad right-of-way. Possible contaminants include metals, PAHs, PCBs (from transformers and hydraulic oil), TPH, and VOCs. No sources were initially identified suggesting dioxins/furans contamination in the Central Parcel. An area of concentrated debris was encountered and removed during a soil removal action in 2015/2016. During the excavation, a layer of multi-colored soil was found directly on top of areas of concentrated debris. This layer of soil ranged from approximately one to three inches thick and consisted of white, red, and black layers. Distinct from and below the multi-colored soil was debris from an unknown source. The debris consisted of brick and metal concentrated from approximately 2 to 5 feet bgs but present up to the ground surface. A matrix of white to gray colored soil was observed in the debris within areas of concentrated brick. The location of the debris area coincided with the highest concentrations of dioxins/furans found in soil at the site.

East Parcel. Prior to development, the East Parcel was a floodplain occupied by marshes, small ponds, or wet prairie. Historical maps show an island (a sand bar) inside the harbor line along the southwest perimeter of the parcel. The UPRR tracks immediately northeast of the Willamette Cove and below the bluff were laid in 1902. The railroad bridge and its embankment were constructed between 1906 and 1908, with the tracks laid in 1909. The embankment parallels the southeast perimeter of the parcel and formed the crescent "cove" shoreline.

The East Parcel was developed and occupied by a cooperage plant (i.e., wood barrel manufacturer) from 1915 until the 1950s. Prior to construction of the plant, the upland area was filled to its present grade (approximately 28 to 35 feet NAVD88 in elevation) and the sand bar was removed. The southern portion of the plant including a dock was constructed by 1915, and subsequently a large warehouse in the 1920s. The main portion of the riverward cove was used as a log pond. By 1950, a new building was used for veneer sizing. A loading dock and connected railroad were demolished by 1957, and the mill reportedly was closed by 1963. A variety of wood related businesses occupied the parcel into the 1970s and log rafts

occupied the cove until at least 1972. PDC purchased the property in 1980 and demolished the buildings by 1982. A large concrete foundation of approximately 47,000 square feet, remnant of the former warehouse, remains present. In 1996, Metro purchased the property.

Historical features on or adjacent to the East Parcel which may have contributed to contamination include a machine shop, a grinding room, a saw filing room, an oil house, a transformer house, a battery charging room, a glue mixing and gluing room, presses, a timber debarker, and an underground petroleum pipeline in the railroad right-of-way. Possible contaminants include formaldehyde, metals, PAHs, PCBs, phenol, TPH, and VOCs. No sources were initially identified suggesting dioxins/furans contamination in the East Parcel.

Offsite Sources. Environmental investigation conducted and/or cleanup sites in the immediate vicinity of the site include McCormick & Baxter, BNSF line, UPRR line, and Crawford Street. Excepting the elevated BNSF rail line and M&B, both located southwest of the site, none of these properties are known or suspected sources of contamination to the Willamette Cove Upland. Contaminants including metals have been detected in the railroad embankment within the East Parcel, suggesting that fill used to create the embankment may contain contaminants or subsequent releases have occurred impacting the area.

2.4. REGULATORY HISTORY

A succession of site-specific investigations and removal actions have been implemented at the property since 1988, which are documented in the project administrative file (ECSI No. 2066). Information is also available on DEQ's ECSI electronic database.

In November 2000, the Port of Portland and Metro entered into a Voluntary Agreement (ECVC-NWR-00-26) with DEQ to perform a remedial investigation/feasibility study (RI/FS) and implement any needed source control measures to prevent releases to Portland Harbor.

In December 2000, the USEPA identified the Portland Harbor area of the lower Willamette River as a Superfund Site (ID No. ORSFN1002155) and placed it on the National Priorities List (NPL), mainly due to concerns of contamination in Willamette River sediments and the potential risks to human health and the environment from consuming the fish. The Portland Harbor Superfund Site (PHSS), or Portland Harbor, expanded to include approximately river mile 1.9 to 11.8. The USEPA selected a final action for the Portland Harbor documented in the January 2017 Record of Decision (ROD) and describes the remedial alternatives that were considered and selects a final remedy for the in-river portion of the harbor, including riverbanks.

USEPA entered into a 2001 Memorandum of Understanding (MOU) with the DEQ, six federally recognized Native American Tribes (tribes), two other federal agencies, and one other state agency.[7] Under the MOU,

[7] Government parties that signed the MOU include: Oregon Department of Environmental Quality, the Confederated Tribes and Bands of the Yakama Nation, the Confederated Tribes of the Grand Ronde Community of Oregon, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, the Confederated Tribes of the Warm Springs Reservation of Oregon, the Nez Perce Tribe, the National Oceanic and Atmospheric Administration, the U.S. Department of the Interior (National Marine Fisheries Service and U.S. Fish and Wildlife Service), and the Oregon Department of Fish and Wildlife.

DEQ is the lead agency for addressing sources of contamination in the upland portions of the Superfund Site (i.e., source control), and USEPA is the support agency.

Willamette Cove is located within the Portland Harbor and subject to the USEPA ROD. DEQ is the lead agency for assessment and cleanup of upland facilities that could pose a source of sediment contamination to the harbor, and correspondingly the Willamette Cove was identified by DEQ for upland assessment. DEQ's selected remedial alternative presented in this report is intended to address the "Upland" portion of Willamette Cove (top of riverbank and landward). This ROD also presents the current status of the Willamette Cove source control evaluation (for stormwater and groundwater).[8]

Prior to 2000, environmental assessments were conducted at Willamette Cove related to property transfers, including soil and groundwater sampling of areas of interest that could be attributed to former uses and locating/removal of buried objects, such as underground storage tanks. Sediments in and near the cove were also sampled during early studies, the neighboring M&B site, and the Portland Harbor. These investigations detected contaminants of interest, such as metals, PAHs, PCBs, TPH, and VOCs.

The McCormick and Baxter Superfund Site (ID No. ORD009020603; DEQ ECSI No. 74), located immediately upstream to the Willamette Cove, was added to the NPL in 1994. The M&B site has undergone investigation and cleanup to address contamination originating from the former creosote wood-treating facility. River sediment adjacent to Willamette Cove has been impacted by a non-aqueous phase liquid (NAPL) plume migrating from M&B under the BNSF railway right-of-way toward Willamette Cove. In addition to controlling upland NAPL sources, the M&B cleanup included construction of a multi-layer sediment cap that extends into the most southeastern portion of the Willamette Cove below the toe of the railroad embankment (see Figure 8: Sheen and NAPL Observations).

2.4.1. Upland Remedial Investigation

The purpose of remedial investigation (RI) activities was to identify and characterize contaminants released into the environment at or from the site. Remedial investigation activities were performed using a phased approach. Subsequent investigations were performed to address data gaps to complete human health and ecological risk assessments (HHRA and ERA, respectively) and a source control evaluation (SCE), and in preparation of removal actions (elevated metals in 2008 and dioxin/furan hot spots in 2015/2016). The first phase of the remedial investigation involved soil and groundwater sampling between April 2001 and September 2002. The results as well as historical investigations are presented in the RI Report (Hart Crowser, 2003).

2.4.1.2. *Soil*

Building on previous environmental assessments and review of historical uses at the property, areas of potential concern were identified for soil sampling (and groundwater discussed below). The first phase of the RI was a broad assessment for chemical contamination across the site and to assess each area of potential concern. A primary list of chemicals for analytical testing was developed (metals: arsenic, copper, lead, mercury, zinc; PAHs; TPH); however, additional chemicals were analyzed (e.g., pentachlorophenol,

[8] Characterization and source control actions for the riverbank will be completed under USEPA oversight in accordance with Portland Harbor ROD.

organochlorine pesticides, SVOCs, and priority pollutant metals). The Phase I soil characterization included:

- Twenty-six test pits (TP-16 through TP-40, and TP-32B) were completed to assess soil characteristics and collect samples from surface and near-surface soils. (Test pits TP-1 through TP-15 had been completed during previous assessments.)
- Thirty push probes (B-1 through B-30) were advanced to depths generally ranging from 28 to 40 feet to assess subsurface soils (and to obtain groundwater samples discussed below).
- Seven hand-augured borings (HA-5 through HA-11) along the riverfront/ beach (HA-1 through HA-4 were previously performed by others) to assess historical concerns, fill material and possible petroleum seepage from the M&B site.

Based on the results the list of contaminants of potential concern (COPCs) were refined and areas requiring further assessment (i.e., data gaps) were identified to achieve RI objectives. Subsequent phase II sampling focused on delineation of contamination in surface soil at several specific locations and on a site-wide basis. The phase II soil characterization included the following:

- Thirty-eight surface soil samples (SS-1 through SS-37) from the upper 6 inches to delineate the extent and magnitude of contaminants in surface soil, including obtaining additional data to assess site-wide PAH concentrations.
- An erosion assessment was performed by means of a walking reconnaissance to observe the entire Upland and adjacent riverbank to observe surface water drainage and assess for erosional features.
- A debris assessment was performed to document the extent of slag and other debris (brick and pieces of metals, such as wire, cables, etc.) on the cove beach area. Debris included pieces of metal.

The primary chemical compounds detected were metals, PAHs, and TPH. PCBs and pesticides were each detected in two samples. Formaldehyde was detected in three samples from the West Parcel. Dioxins/furans analysis was not incorporated into the study based on site information at the time.

Subsequent investigations (summarized briefly below) were conducted to further delineate contamination and in preparation of removal actions. Figures 9 through 11 present an overview of soil sample locations by sampling method (discrete, composite, incremental) performed at the site (approximately 1998 to 2016). Soil data collected over the approximate 20-year timespan has also been assembled into tables and the most comprehensive presentations are provided in the feasibility study reports (Apex, 2017 and 2019).

Additional Soil Sampling of Riverbanks

Riverbank sampling was performed to assess the presence and magnitude of PCBs, PAHs, and metals in potentially erodible riverbank soil for evaluating this source control pathway, and for evaluating risk to human health and the environment. A series of phased riverbank sampling events followed from 2005 to 2012 to characterize contamination on the riverbank.[9,10] Riverbank sampling locations were generally limited to below top of bank (approximately 32 feet NAVD88) and above mean high water (MHW) at 13.3 feet. Ordinary high and low water lines (OHWL and OLWL) are approximately 20.1 and 6.9 feet NAVD88, respectively. Riverbank soil sampling methods included a combination of discrete and composite sampling

[9] The results of riverbanks sampling in greater detail is presented in a series of reports (BBL/Ash Creek/NF, 2006; Ash Creek/NF, 2008; Ash Creek/NF, 2008; Ash Creek, 2012).

[10] Further characterization of the riverbank and erodibility studies will be conducted under USEPA oversight in accordance with the Portland Harbor ROD.

in the West, Central, and East Parcels.

Based on the results of the first phase of riverbank sampling in 2005, additional sampling was conducted in 2007 to assess the lateral extent of PCBs in the riverbank at the boundary between the East and Central Parcels. Further delineation of the riverbank included analytical testing for dioxins/furans following detections of this compound class in sediments within the vicinity of the wharf historically serving the Central Parcel. The third round of riverbank sampling was performed in 2010. Dioxins/furans were detected and additional sampling of soil (by means of incremental sampling methods or ISM) was conducted in the vicinity of the former Wharf Road area in 2012.

Additional Soil Sampling for Dioxins/Furans

Surface soil sampling was conducted from 2014 through 2016 to support additional risk analysis, and design and completion of removal actions. The sample series, locations, methods, and analytes for the additional upland sampling events are summarized in the table below, as well as referenced reports with greater detail. While surface soil sampling focused on dioxins/furans and mercury, additional analysis included contaminants of concern (COCs) already detected at the site. Incremental sampling methods were used to assess surface soil concentrations over larger decision units (DU's) or exposure units: one DU for each East and West parcel and two DU's for the Central Parcel (see Figure 11: Baseline Exposure Units). Subsequent soil sampling used composite and discrete sampling to further delineate areas with elevated concentrations.

Surface soil sampling was also conducted to support design of a removal action (discussed in Section 2.4.3.3) focused on hot spot, or "highly concentrated" levels, of contamination in soil. This removal action was performed from October 2015 through January 2016 to remove hot spot levels (see Figure 12: Removal Action Areas). Soil sampling was conducted to confirm the removal of soil hot spots, including confirmation samples taken on the sidewalls and base of the five removal areas.

Additional Upland Soil Sampling Summary

Sample Series	Parcel	Sampling	Analysis
Incremental Surface soil Sampling Results (Apex, March 2014)			
DU-4 through DU-7	West, Central, East	ISM	Dioxins/Furans, PAHs, Metals,
Surface Soil Sampling – Remedial Design (Apex, May 2014)			
Area-1-1 through Area-6-16	West, Central, East	Discrete	PAHs, Metals
Surface Soil Sampling Results (Apex, June 2014)			
DU-6-COMP-1 through DU-6-COMP-8	Central	Composite	Dioxin/Furans
DU-5-COMP-5-1 through DU-5-COMP-5-6, DU-6-COMP-1-1 through DU-6-COMP-8-6	Central	Discrete	Dioxins/Furans, Mercury
Vertical Soil Characterization Results (Apex, April 2015)			
Area-2-10, Area-2-14, Area-3-3, Area-6-6, Area-6-9, Area-6-17, DU-6-COMP-5-3, DU-6-COMP-5-6	West, Central	Discrete	Dioxins/Furans, Metals, PAHs, SVOCs
Removal Action Completion Report (Apex, May 2016)			
RA-1 to RA-3, RA-5, RA-6	West, Central	Composite	Dioxins/Furans, Metals, PAHs, PCBs, SVOCs

2.4.1.3. *Groundwater*

Groundwater investigation has included both the collection of one-time "grab" samples, and multiple sampling events using shallow groundwater wells in the upland. Monitoring well sampling has been confined to the Upland, while grab sampling has occurred in both the site upland and near or adjacent to the river. The distinction between upland and non-upland sampling is important, particularly as it relates to the observation of sheen (both upland and near the river) and free-phase liquids (i.e., NAPL, adjacent to the river only). A summarization of well and grab sampling follows. Sampling locations are shown in Figure 6, while sampling results are discussed in Section 3.1.2.

Monitoring Well Installation and Sampling. During the initial phase of the site remedial investigation (2001-2002), seven groundwater monitoring wells (MW-1 through MW-7) were installed and sampled for contaminants of potential concern. Groundwater monitoring wells were installed with well screen intervals bisecting the shallow (water table) aquifer. Groundwater well locations and analytes to monitor were selected based on the results of previous grab groundwater sampling (1988 through 2001, discussed below) and knowledge of historical site uses/activities. Initial sampling occurred in February and May 2002 for COPCs including metals, PAHs, TPH, and VOCs. Monitoring wells were resampled in 2005 in two events to capture both dry (August) and rainy season (December) conditions. After a long period of no sampling, upland wells were redeveloped and sampled in 2016 at the request of DEQ. Four events were completed encompassing a full range of seasonal conditions, with the suite of chemical analytes broadened to incorporate contaminants (e.g., dioxins/furans) detected during more recent soil sampling events. The primary purpose of the 2016 sampling was to develop a robust, up-to-date groundwater data set to support upland remedy selection and source control decision-making. Two additional groundwater monitoring wells were installed on the eastern portion of the Site at DEQ request. In the 2016 sampling events, samples from the nine monitoring wells were analyzed for dioxins/furans, metals, TPH, PAHs, PCBs, pesticides, SVOCs, VOCs, natural attenuation parameters, and total organic carbon. More recently (2020), sampling of monitoring wells for selected contaminants has occurred, with results to be considered in upcoming source control decision-making.

Grab Sampling Events. Independent of well sampling, multiple grab groundwater sampling events occurred at Willamette Cove. As shown in Figure 6, most samples were collected in the upland. A few, notably in the vicinity of the former Wharf Road and Inner Cove, were collected at or near shoreline, largely to investigate sheen or free product thought to be associated with historical over-water activities. Grab sampling events are summarized in the table below. While Upland results are most relevant to DEQ decision-making, near-shore data are provided and relevant to whether contaminants detected in the upland and near the river, respectively, are "connected."

Groundwater sampling results are presented in Section 3.2.3, including a discussion of so-called dissolved phase sampling results from both monitoring wells and borings, and observations of sheen or free product. The location of sheen and product observations are given particular attention given their significance from both a remedy selection and source control perspective.

In general, contaminants were detected at low concentrations or not detected above relevant screening values in the East and Central Parcel. Elevated contaminants were detected in the West Parcel and appear to be largely associated with the former log pond fill.

In addition to chemical sampling, hydraulic head/elevation data have been collected from site monitoring wells to determine groundwater flow direction. As discussed above in the hydrogeology section, the

inferred groundwater flow direction is southwesterly, towards the Willamette River. Groundwater elevation data from the nine upland wells, along with river water level data were used to calculate groundwater gradients, discussion of which is presented in Section 5 of the *Revised Groundwater Source Control Evaluation and Alternatives Analysis* ("Revised GW SCE"; Apex, 2020). The report presents the general gradient as perpendicular to the river (southwest) and downward toward the river at a magnitude in the range of 0.006 to 0.02. A groundwater mound is present in the vicinity of MW-2, the origin of which is unclear, but does not alter the conceptual groundwater flow model.

To support source control decision-making for a potential groundwater pathway to the river, additional groundwater sampling will occur in the upland (in groundwater wells located above the TOB) and porewater (where groundwater discharges to the river). A groundwater source control evaluation and analysis of potential response action alternatives, if needed, was completed in June 2019 (draft) and January 2020 (revised version referenced above) to address comments received by DEQ and Portland Harbor MOU partners. The evaluation serves to inform future "pre-design" data needs to determine whether groundwater is a source of contamination to the river, and if necessary, select a groundwater action.

Groundwater Sampling Summary

Sample Series	Location	Sampling	Analysis
Remedial Investigation Report (Hart Crowser, 2003) - Includes Historical "Pre-RI" Data			
SE/E (1988/89)	West, Central, East	Grab	Metals, PAHs, PCBs, Pesticides, TPH, SVOCs/VOCs, Total Halides
TB (1995)	West, Central, East	Grab	Metals, PAHs, PCBs, TPH, SVOC/VOCs
B (2001), MW-1 to MW-7 (2002)	West, Central, East	Grab; Monitoring Well	Metals, Halides, PAHs, PCBs, Phenols, TPH, SVOCs/VOCs, Formaldehyde
2010 Source Control Sampling Results (Ash Creek, 2011)			
WC	Wharf Road	Grab	Metals, PAHs, PCBs, VOCs
Trench 2 and 4	Cove Beach	Grab	Metals, PAHs, PCBs, Pesticides VOCs
December 2016 Groundwater Data Report (Apex, 2017)			
DP, MW-1 to MW-9	West Parcel[1]	Grab; Monitoring Well	Arsenic III/V, Dioxins/Furans, Metals, Nitrate-Nitrite, PAHs, PCBs, Pesticides, Sulfate-Sulfide, SVOC/VOCs
Groundwater Monitoring Reports (Multiple Reports – See Administrative Index)			
MW-1 through MW-9	West, Central, East	Grab; Monitoring Well	Dioxins/Furans, Metals, PAHs, PCBs, Pesticides, TPH, SVOC/VOCs

Notes:
[1] Samples were collected in the West Parcel to assess groundwater contaminant conditions associated with former log pond fill.

2.4.1.4. *Stormwater*

The stormwater source control pathway was also evaluated. Based on site observations, the majority of the site is vegetated and precipitation either infiltrates or runs off via sheet flow. The site grade generally prevents stormwater flow over the top of bank; however, minor runoff may occur in areas. At present, there are no storm drains or surface water features that discharge surface water from the site.

A 1998 reconnaissance conducted by the City of Portland identified six potential outfalls (shown on Figure 8). These potential outfalls were evaluated and the following concluded:

- OF-49: A City of Portland storm sewer outfall located on the Central Parcel near the boundary with the West Parcel drains property above the Willamette Cove site and no onsite stormwater enters this system.
- WR-189: This potential outfall is a 24-inch diameter corrugated metal pipe located on the West Parcel, near OF-49. It is no longer active, and its purpose is unknown.
- WR-190: A 6-inch diameter concrete pipe that is no longer active, and its purpose is unknown.
- WR-191 through WR-193: Steel pipes in the range of 2 to 5 inches in diameter were found near the boundary between the Central and East Parcels. It is unknown if these pipes were outfalls, but they are no longer active.

Stormwater mainly infiltrates onsite and there are no remnant stormwater conveyances draining the Site. Based on site reconnaissance information, a stormwater pathway from the Upland area (above top of bank and inland) to the river is not present.

2.4.2. Source Control Evaluation

The property is located within the Portland Harbor Superfund Site, and correspondingly upland source control investigations were guided by 2005 USEPA/DEQ *Portland Harbor Joint Source Control Strategy*, also known as the JSCS.

The objective of a source control evaluation (SCE) is to determine whether existing and potential sources of contamination at the site have been identified and if additional characterization or source control measures are needed. Each potential pathway to mobilize contamination from the site to the river is explored and these determinations generally rest upon demonstrating that site-related information provides sufficient support to source control decision-making.

Screening of site data against regulatory values is the first line of evidence evaluated in the source control process. Site groundwater and stormwater data were compared to the Portland Harbor Cleanup Levels (CULs) presented in Table 17 of the January 2017 PHSS ROD, and for contaminants without CULs, screening level values (SLVs) presented in Table 3-1 of the 2005 JSCS were used.

Potential pathways for transport of contamination to the river identified at Willamette Cove include groundwater discharge and riverbank erodibility. As noted above, the riverbank pathway will be further evaluated under EPA oversight. A *Groundwater Source Evaluation and Alternatives Analysis* (Apex, 2020) has been completed, which further examines potential impacts from Central and East Parcels. Groundwater is considered a potentially complete pathway for the Site and additional remedial design sampling will be completed to further delineate the groundwater pathway and determine the final action for groundwater.

2.4.3. Interim Removal Actions

Three interim removal actions (identified on Figure 12) were completed at Willamette Cove.

2.4.3.1. *Removal Action – Inner Cove (2004)*

On July 1, 2004, a petroleum sheen was observed at the Site during implementation of the remedial action addressing impacts from McCormick & Baxter. The sheen was observed on the water, in the innermost portion of the cove (see Figure 8) adjacent to the East Parcel, during the removal of pilings near the shoreline. Test pits were excavated in the area of the sheen in July 2004. One of three test pit locations, directly inland from mean low water (MLW), indicated the presence of NAPL in soil. The soil with petroleum was bounded by a nearby test pit located farther inland and by a third test pit located to the southeast toward the M&B site.

On October 28, 2004, DEQ, Port, and Metro performed a removal action with the following objectives: (1) investigate the nature and extent of petroleum product along the innermost beach of the cove; and (2) remove mobile petroleum product inland of MLW to the extent practicable through soil excavation. The removal action delineated the extent and successfully removed the mobile petroleum product inland of MLW. Approximately 20 tons of soil were excavated and disposed of offsite at a permitted landfill. The removal action concluded that the sheen and NAPL a result of previous overwater activity, based on the complete delineation and removal of the NAPL (inland OLWL) and the co-location of the NAPL with the location of historic overwater activities associated with former cooperage operations. The test pits and removal action indicated there was not a continuing source to the river from the upland area.

2.4.3.2. *Removal Action – Metal Hot Spots (2008)*

The purpose of this removal action was to remove soils with lead and other metals to reduce risks posed to ecological receptors, for instance localized adverse effects to plant, bird, or mammals. An area on the eastern portion of the Central Parcel contained elevated concentrations, including hot spots, in surface soils. Concentrations of metals included lead up to 4,990 milligrams per kilogram (mg/kg), copper 1,650 mg/kg, chromium 348 mg/kg, zinc 2080 mg/kg, and mercury 32.1 mg/kg. [A mg/kg is equivalent to parts per million (ppm).]

Approximately 987 tons of soil containing lead and other metals were removed from the site in June 2008 and disposed at the Hillsboro landfill. This included 356 tons of soil that was stabilized (i.e., treated with a reagent) prior to disposal to remove the hazardous characteristic and 631 tons of soil that did not require stabilization before disposal. Remnant structures and debris were encountered, some of which were also removed. The extent of the excavation was based on the RI data and the physical features around the area and up to 1.5 feet in depth. Post-removal soil sampling from the approximate final removal action grade coincided waste characterization sampling. Results are documented in the removal action report (Ash Creek, 2008c).

2.4.3.3. *Removal Action – Hot Spots (2015-2016)*

The discovery of dioxins/furans in the riverbank prompted additional delineation in the Upland. Surface soil sampling was conducted in 2014 and 2015 for dioxins/furans and other site contaminants using the ISM protocol to support additional risk analysis. Based on the detection of high concentrations of dioxins/furans and other contaminants in the upland and ongoing access by the public, it was determined that a time-sensitive removal action was necessary. The removal action goal, as outlined in the *Final Removal Action Engineering Design Report* (Apex, 2015) approved by DEQ, included the removal and

offsite disposal of high concentration hot spots and soil with dioxin/furan concentrations above 1,000 nanograms per kilogram(ng/kg), equivalent to 1 part per billion (ppb).[11]

From October 2015 through January 2016, a removal action was conducted at Willamette Cove. The five removal areas are shown in Figure 12. The removal activities were conducted in accordance with the approved design and included the following:

- Approximately 5,000 tons of soil containing dioxins/furans, PAHs, and/or metals above hot spot levels (including brick/metal debris encountered in one of the excavation areas) were excavated and disposed of at the Wasco County landfill.
- Special excavation and backfill were used around madrone, big leaf maple, and Oregon white oak trees.
- Disturbed areas were seeded with native grasses.
- Temporary fencing was placed around the remaining upland PAH hot spot area.
- The haul road was restored by surfacing with gravel.

Confirmation sampling documented removal of soil as specified in the approved design report (see Apex May 2016 *Removal Action Completion Report*). Confirmation samples were taken on the sidewalls and base of the five removal areas. Excavation continued until soil concentrations were below the remediation goal (1 ppb dioxins/furans) as verified by confirmation sampling. Excepting the debris area excavated to 5 feet (identified as brick and metal debris on Figure 12), soil concentrations below hot spot levels were achieved with 0.5 to 1-foot depth of excavation in the other four removal areas.

The 2015/2016 removal action removed the majority of human health hot spots in the Upland. Excluding dioxins/furans, remaining hot spots are primarily located along the riverbank that was not included in the removal action (copper, lead, and mercury) and in the central portion of the Central Parcel (primarily mercury but includes other metals). Remaining dioxins/furans in Upland soil are generally below 1 ppb. Confirmation sample results have been incorporated into the screening conducted as part of the feasibility study and source control evaluation for the Upland.

[11] The removal action remediation goal of 1ppb dioxins/furans in soil is below the human health hot spot value (1.5 ppb dioxins/furans) developed in the final risk assessment. That is, human health dioxin/furan hot spots were removed during the 2015/2016 removal action. While ecological hot spots were also removed during the removal action, hot spots remain onsite across the Upland, in part to the lower-risk threshold for ecology.

3. RESULTS OF INVESTIGATION(S)

3.1. NATURE AND EXTENT OF CONTAMINATION

Investigations of soil, groundwater, and surface water began in the 1990s, and continued when Metro and the Port of Portland entered into a Voluntary Agreement with DEQ in 2000. Characterization of the nature and extent of contaminants at the Site was performed during the remedial investigation and subsequent investigations to support completion of the risk assessments summarized below, and development and evaluation of remedial alternatives presented in Section 5. It has been determined that the Willamette Cove Upland is impacted with a wide range of contaminants including dioxins/furans, metals, PAHs, PCBs, and SVOC/VOCs. The nature and extent of contamination in each of these media are summarized below.

The Locality of the Facility (LOF) is defined as any point where a human or an ecological receptor contacts or is reasonably likely to come into contact with contaminants from the subject Site. The LOF takes into account the likelihood of the contaminants migrating over time.

For this project, the entire Upland is considered to be within the LOF. Groundwater beneath the site is towards and into the Willamette River. As such, the adjacent riverbank and river are also included. Properties to the north were not included as they lie upslope and upgradient of the Site. In summary, the LOF includes the entire Upland and the adjacent riverbank and river.

As noted above, the selected remedy in the ROD does not address the riverbank and river sediments, which will be conducted under USEPA oversight. For the purpose of this ROD, the primary concern is coming into direct contact with contaminated soil, particularly highly concentrated hot spots in surface soils. Groundwater is impacted in the upland area above TOB but whether contaminants detected are migrating to the river at unacceptable levels will be further evaluated in coordination with forthcoming in-water activities. Stormwater which could potentially transport contaminants is no longer a pathway of concern for the Upland.

3.1.1. Soil

Contamination extends across the entire Upland, and discussed below, above risk levels for human health and ecology (i.e., plants and animals). Table 1 summarizes the COCs contributing to Upland soil risk to humans and ecology in each Parcel, while Table 2 presents the COCs posing risk to site-related human health and ecological receptors. Tables 3 through 5 summarize COCs exceeding human health preliminary remediation goals (PRGs)[12] and hot spots, and Tables 6 and 7 provide COCs exceeding ecological PRGs and hot spot values.

Figure 13: Human Health Risk Area and Figure 14: Ecological Risk Area summarize the locations of estimated cleanup areas above risk levels, including hot spot areas, based on upland soil exposure pathways. Note, various areas shown on the figures were determined by defining each locus of sampling points where soil data exceeded a PRG corresponding to an unacceptable baseline risk pathway or a hot spot level. Lateral and vertical extent of contamination will be further delineated in remedial design sampling and/or confirmation sampling following excavation.

[12] Development of PRGs are discussed further in Section 3.2 (Risk Assessment).

3.1.1.1. *Lateral Extent*

West Parcel. Soil contamination is present across the West Parcel posing risk to humans and ecology. Ecological risk is primarily attributed to dioxin/furan contamination with additional contribution from metals. Dioxins/furans are also a primary risk driver for human health, and to a lesser extent from benzo(a)pyrene (BaP). Excess risk for dioxins/furans is based on an ISM sample DU-7, which is representative of the entire parcel (see Figure 11). Removal of the high concentrations above human health hot spots in 2015/2016 may have reduced concentrations of metals; however, there is no data to support reduction of dioxin/furan concentrations harmful to ecological habitat (with a lower risk threshold). Therefore, the lateral extent of the entire West Parcel is considered to have soils above PRGs and ecological hot spot concentrations. (Note, the Port anticipates the area exceeding risk will be substantially reduced based future remedial design sampling). The West Parcel no longer contains human health hot spots but soil concentrations exceed one or more PRGs.

Central Parcel. Soil contamination is present across the Central Parcel posing risk to humans and habitat. Ecological risk is attributed mainly to dioxins/furans and mercury with additional contribution from dibenzofuran, metals, and PAHs. Ecological hot spots resulting from dioxins/furans are present throughout the parcel. Scattered ecological hot spots for dibenzofuran, PAHs, and metals have also been detected. Human health risk present is primarily from dioxins/furans and benzo(a)pyrene, with additional contribution from arsenic and lead. Human health PRG exceedances have been observed throughout the west end of the Central Parcel and a small BaP hot spot area. The east end of the Central Parcel exceeds PRGs for dioxins/furans with metal PRG exceedances interspersed. Dioxin/furan hot spots were excavated during the 2015/2016 removal action and disposed offsite.

East Parcel. Soil contamination is present across the East Parcel posing risk to humans and habitat primarily from dioxins/furans, with additional contribution from zinc for ecological receptors. Based on the exceedance of both human health and ecological PRGs for dioxins/furans in the ISM sample, the entire parcel will be considered to have soil concentrations above PRGs, as well as ecological hot spots for dioxins/furans. The removal action included a limited area on the East Parcel and human health hot spots are no longer present.

3.1.1.2. *Vertical Extent*

Based on site investigations, soil contamination appear generally limited to the upper 3 feet. This assumption is supported by vertical profile sampling conducted in preparation of the 2015/2016 removal action (when five areas of high concentration of human health hot spots were excavated) and post-removal confirmation sampling. Soil up to 1.5 feet bgs was collected at multiple locations to support removal to remediation goal concentrations (which captures current human health hot spot values for dioxins/furans). This vertical soil sampling showed that concentrations of metals, PAHs, and dioxins/furans decreased below the top 6 inches to 1-foot of soil below ground surface.

During the removal action excavation continued until soil concentrations were below the remediation goal (i.e. 1,000 ng/kg dioxins/furans) as verified by confirmation sampling. In general soil concentrations below hot spot levels were achieved with 0.5 to 1-foot depth of excavation in the five areas. One exception was the debris area within the Central Parcel, which was removed to a depth of 5 feet bgs but the total area of greater depth was small compared to the total hot spot areas removed.

At the West Parcel, soil concentrations were achieved below PRGs and hot spot levels after excavating to 1-foot bgs. In the Central Parcel, soil concentrations were below hot spot levels, but not below PRGs after excavating from 0.5 to 1-foot bgs. Based on overall contaminants of concern in the East Parcel compared to the West and Central Parcels, it is expected soil with concentrations above PRGs on the East Parcel is limited to 1-foot bgs.

There is limited information to distinguish between the depths of soil with concentrations above ecological screening levels from that above human health screening levels. With the exception of arsenic, human health PRGs and hot spot levels exceed those for ecological receptors. As the screening levels are generally higher for human health it is reasonable to conclude that soil exceeding ecological screening levels is deeper than that exceeding human health. The Port has assumed that soil exceeding ecological risk extends 0.5 to 1-foot deeper than human health PRGs. Table 8 summarizes estimated depths of contamination above human and ecological risk levels at each parcel.

Note the uncertainty in depths was considered when evaluating the remedial alternatives. The depths of soil contamination will be further delineated by performing "remedial design" sampling.

West Parcel. Given there is limited data to support the depth of soil contamination above ecological PRGs, a 2-foot soil depth was assumed. Based on existing data and previous observations at the West Parcel, a 1.5-foot depth was estimated to remove soil above human health PRGs. With that said, backfill placed in the former log pond is a probable area containing deeper contamination.

Central Parcel. For the Central Parcel, the depth of soil contamination above human health PRGs differed between the east and west ends of the Parcel. Data from the removal action showed an excavation depth of 1-foot was sufficient to remove soil above PRGs, however, this depth was not sufficient at the west end. The west end of the Central Parcel corresponds to the location of ISM sample DU-6, the debris area, and the higher concentrations of dioxins/furans in soil. A depth of 3 feet was assumed representative of soil contamination above ecological PRGs in that area, and 2 feet for human health. For the east end, a 1-foot depth of soil contamination was assumed with ecological risk and 0.5 feet for human health.

East Parcel. Concentrations on the East Parcel are similar to those on the east end of the Central Parcel. Therefore, the Port assumed a depth of 1-foot as representative for soil with concentrations above ecological PRGs on the East Parcel and 0.5 feet for human health.

3.1.2. Groundwater

To refine the list of groundwater contaminants of potential concern, multiple lines of evidence were considered independently and collectively to identify the potential for adverse effects. Central to this analysis is current and reasonably likely future use of groundwater. Shallow groundwater at the site is not used for drinking or other purposes, nor is such use expected in the future. Construction/excavation workers are unlikely to come into direct contact with groundwater given the water table depth in the Upland is greater than 15 feet. The primary beneficial use of groundwater is recharge to the adjacent Willamette River.

3.1.2.1. *Chemical Analysis of Groundwater, Dissolved and Total*

To assess the potential for contaminants in groundwater to migrate to the Willamette River or sediments, groundwater sampling results were compared to the groundwater Cleanup Levels (i.e., CULs) from Table 17 of the PHSS ROD, and JSCS SLVs were used for contaminants without CULs. Contaminants that exceeded a relevant screening level at least once were retained as COPCs. These COPCs included the following: metals, PAHs, PCBs, dioxins/furans, pesticides, and select SVOCs/VOCs.

To assess contaminants of concern with the potential to adversely impact sediment and surface water, all data collected at the site were considered including data collected over more than a 20-year time span, grab samples, monitoring well samples, and dissolved and total analyses.

In evaluating the data, and as discussed in the *Revised Groundwater Source Control Evaluation and Alternatives Analysis* (Revised GW SCE) the following concepts were used: 1) monitoring well data are, in general, more representative of concentrations that have the potential to migrate to the river; 2) dissolved concentrations are considered more representative of concentrations with the potential to migrate towards the river; 3) more recent data are more representative of current conditions; and 4) comparison of grab and monitoring well results collected in close proximity both spatially and temporally provide a basis for interpreting historical grab groundwater results.

The following were determined to be relevant COCs in Upland groundwater: arsenic, dioxins/furans, 4,4-DDD, pentachlorophenol, PAHs, PCBs, and TPH-diesel. Contaminant plots, based on *average* concentrations for individual COCs, are presented the Revised GW SCE.

Groundwater at the West Parcel (corresponding to the location of the former log pond fill) has the potential for adverse effects on surface water and sediment (see Figure 15: Potential Groundwater Source Control Area). The remaining parcels have contaminants in groundwater that are commonly below, or modestly above, screening values for Willamette River human and ecological receptors as identified by USEPA. Based on evaluations presented by the Port/Metro, groundwater on the Central and East Parcels does not appear to adversely impact sediments or surface water adjacent to the Site. With that said, the assessment of the groundwater pathway is ongoing.

The Revised GW SCE, with support from further assessment of the groundwater pathway including additional sampling activities in the Upland and porewater (where groundwater discharges into the river), will be used to determine whether groundwater contaminants have the potential to migrate to the Willamette River. The supplemental groundwater investigation(s) will be included in pre-design sampling to be completed in the Willamette River adjoining the site, part of in-water work overseen by USEPA. If a complete pathway exists, contaminants could be addressed through in-water capping, although other remedial options, including those in the Upland (presented in the above-referenced report), will be considered.

3.1.2.2. *Sheen and NAPL Observations*

Observations of sheen and/or separate-phase petroleum hydrocarbons are depicted in Figure 8. NAPL has not been observed in the Upland; however, sheen observations include:

- A petroleum sheen in groundwater grab samples at SE/E-9, SE/E-10, SE/E-12, SE/E-13, and SE/E-19, collected in 1988-1989.

- A petroleum sheen in upland groundwater wells during two sampling events in 2002. Light sheens were observed on water from monitoring wells MW-1 (February and May) and MW-3 (May only) on the West Parcel, and from monitoring well MW-4 (May) at the west end of the Central Parcel. In six subsequent sampling events in 2005 and 2016, sheens were not observed from the monitoring wells.

Both sheen and NAPL have been observed in the East Parcel shoreline area including:

- The "McCormick & Baxter NAPL Seep" (petroleum, nearshore) observed between 1983 and 2004 in the inner cove adjacent to the southern portion of the East Parcel. The seep originated from historical releases at the M&B site southeast of the BNSF railroad embankment and was capped in 2004 during construction of the M&B sediment remedy. The seep is no longer present.
- The "Inner Cove Sheen/NAPL" was observed on the water in the innermost portion of the cove adjacent to the East Parcel in 2004 during construction of the M&B cap. Test pits were completed and petroleum NAPL was observed in one test pit. The extent of NAPL was confined to the zone between MHW and the OLWL. The soil where the NAPL was observed was removed and disposed of offsite, as part of the 2004 Inner Cove removal action (see Section 2.4.3.1). Test pitting within the inner cover in low water conditions, completed under DEQ oversight, identified both sheen and some residual petroleum product. Contamination was associated with relic structures (concrete foundations, rebar, etc.) presumably from the former cooperage. Test pitting was completed higher in the beach area (closer to the riverbank/upland) to determine whether observed petroleum might be coming from or connected to the upland site. Petroleum was not observed in excavation water. It should be further noted that petroleum sheens have generally not be observed in upland groundwater wells, leading DEQ to conclude that petroleum impacts in the lower beach area are associated with historical overwater activities. As this area is below OLWL, DEQ has recommended additional investigation as part of USEPA Portland Harbor work at the site.
- The "Wharf Road Sheen" was observed at the shoreline, during low water levels in the river, in the former Wharf Road area. Conducting test pits overseen by DEQ, sheen was not observed to extend northeast into the adjoining steeply-faced riverbank. The former Wharf Road connected the site upland to in-water dry docks, and detections are likely associated with this feature.

Except for the former NAPL seep associated with the adjacent M&B site, the shoreline sheen/NAPL observations are not connected to an upland source. These areas will be addressed by in-water remedial action. Forthcoming pre-design sampling under EPA is expected to include sampling to more fully characterize the extent of petroleum below top of bank within the Inner Cove and Wharf Road areas.

3.2. RISK ASSESSMENT

The standards for a protective cleanup are defined in the Oregon Revised Statute and Oregon Administrative Rules. ORS 465.315 sets standards for degree of cleanup required, risk protocol, hot spots of contamination, etc. OAR 340-122-0084 describes the requirements for risk assessments while OAR 340-122-0115 provides additional definitions of protectiveness.

The results of the risk assessment (RA) for human health and ecological receptors at the Willamette Cove site are summarized below. Human health risk is discussed in Section 3.2.1 and ecological risk is discussed in Section 3.2.2.

An analysis of the baseline risk for human health and ecological receptors at the site was submitted in draft form to DEQ in 2007 (Ash Creek/NF, 2007). The baseline risk assessment was revised based on comments from DEQ and additional data collected during the revision process. The revisions were presented in separate updated risk assessment documents for human health and ecological receptors, respectively (Formation, 2013 and 2014a). Note, these documents are termed residual risk assessments (RRAs), although they were subsequently revised, and do not constitute residual risk assessment discussed in Section 8.2. The conclusions of the RRAs were updated to include new information as additional remedial investigation and actions were completed, which were documented in technical memoranda (Formation, 2014b; Port, 2018), and included in the appendices of the *Revised Feasibility Study and Source Control Evaluation* ("Revised FS/SCE", Apex, 2019a).

3.2.1. Human Health Risk Assessment

3.2.1.1. *Human Health Conceptual Site Model*

Based on the RI data, a human health Conceptual Site Model (CSM) was developed, which describes sources, exposure routes, and human health receptors. Figure 16: Human Health Conceptual Site Model shows are diagram of identified exposure pathways. The elements of the CSM include upland soil and groundwater exposure, sources to the river, and in-water/sediment exposure. This ROD is limited to Upland soil.

For the purpose of evaluating baseline risk, the site was divided into six exposure units as shown on Figure 11. Two of these units, Central Beach Unit and Inner Cove Beach Unit, are not on the Upland but rather are located below MHW. Risks for these two units are not the subject of this remedial action and will be addressed as part of the PHSS in-water cleanup process. The former Wharf Road unit was originally separated from the remainder of the Central Parcel because it was believed that the dioxin/furan detections were unique to that area. Subsequent sampling showed that dioxins/furans were detected elsewhere on the Central Parcel, therefore, for contextual purposes potential baseline risks for the former Wharf Road unit are discussed with the Central Parcel. Soil samples were collected in 2014 to delineate areas of high concentration soil following completion of the RRAs for human and ecological health. The data were reviewed to assess any impact on the baseline risk assessments, and the results were submitted in a technical memorandum (Formation, 2014b). During design and implementation of the 2015/2016 soil removal action, additional soil samples were collected. These data were incorporated into the evaluation of COCs for the Site. A technical memorandum summarizing that evaluation was submitted in December 2018 (Port, 2018). The memorandum is included as Appendix G to the Revised FS/SCE.

There is no human beneficial use of groundwater, as such, there are no complete exposure pathways to groundwater within the Upland. (Risks associated with sources to the Willamette River are not discussed here.) This section addresses direct contact risk from Upland soil only. Upland soils are defined as those from top of bank landward to the property boundary. Note, the updated risk assessment presented in the Revised FS/SCE included all available data above TOB and the upper portion of the riverbank above MHW (which was the upland study area identified during development of the FS prior to USEPA undertaking oversight of the whole riverbank). Upland data were screened against PRGs, which are presented in Appendix E of the Revised FS/SCE.

The following current and future receptors were evaluated:

- **Recreational Trespasser/Park User - current/future (RT/PU):** This scenario represents current and planned future recreational use, such as accessing the site for running, hiking, observing nature, or other similar passive recreational activities. Although access for these activities is currently not legal, such use is regularly observed. Active recreational use is not currently planned to be allowed. The baseline scenario conservatively assumes an individual may use the site, including active recreational uses, over 26 years. Exposure and risk calculations assume child and adult exposures, and screening levels apply from 0 to 3 feet bgs.
- **Transient Trespasser - current/future (TT):** This scenario represents current exposures to trespassers that may camp at the site for relatively short periods of time during a two-year period. While Metro has indicated that camping at the site is not allowed and enforced with regular patrols, it has occurred in the past and cannot be ruled out in the future pending final cleanup, and is thus included as a potential human exposure. The scenario applies only to adults, and screening levels apply from 0 to 3 feet bgs.
- **Onsite Construction Worker - future (CW):** This scenario represents individuals that may have contact with soils while building structures or conducting earthwork associated with the potential recreational development. The scenario assumes relatively high contact with soils, but for time periods that are associated with short-term construction projects. The scenario applies only to adults, and screening levels apply from 0 to 10 feet bgs.

3.2.1.2. *Human Health Risk Screening*

Contaminant concentrations for each environmental medium were compared with conservative risk-based concentrations (RBCs) to determine which media and contaminants posed potential risk to human health. If detected concentrations of chemicals in a particular medium did not exceed the screening levels, then that medium was eliminated as a medium of potential concern and was not evaluated further. Chemicals and pathways that exceeded the screening levels were carried through for detailed evaluation in the baseline risk assessment.

Screening of data occurred over many years, beginning with the initial risk assessment in 2007. Screening assessments were refined over time as more data were collected. For assessment of risk in surface soils (0 to 3 feet bgs), data were screened against RBCs for the three identified human receptors. Exposure to subsurface soils (3 to 10 feet bgs) is only applicable to the CW scenario, and correspondingly, subsurface soil data were screened against the CW risked-based concentrations. Table 3 shows the preliminary remediation goals that were developed from RBCs. For chemicals with both cancer and noncancer effects, the lowest RBC was selected. RBCs for inorganic chemicals were compared with background concentrations. Because the recreational RBC for cancer is below naturally-occurring levels of arsenic (background) for the Willamette Basin, DEQ's prescribed background level (8.8 mg/kg) was selected as the PRG.

A detailed summary is presented in the 2019 Revised FS/SCE (see Appendix G, Table 1). Tables 4 and 5 show a summary of the chemicals of concern identified as contributing to unacceptable human health risk in the Upland.

3.2.1.3. *Human Health Risk Assessment Results*

The December 2013 risk assessment report, as updated by the December 2018 memorandum, describes in detail the procedures used to evaluate the potential risks associated with the chemicals and media retained for evaluation following the screening step. Results are summarized below by parcel. Table 2 summarizes the human health (and ecological) risk drivers for Upland soil. Note, PRG exceedance ratios (ERs) are the ratio of the soil concentration to the PRG.

West Parcel - Surface Soil

- Arsenic, dioxin/furan toxicity equivalent (TEQ), and benzo(a)pyrene toxicity equivalent (BaP Eq) were detected above human health PRGs in surface soil. Screening levels were exceeded only for the RT/PU receptor.
- COCs were not detected above hot spot concentrations.
- Arsenic was detected above the PRG in 2 of 10 samples with a maximum ER of 1.0. The arsenic PRG is based on natural background levels.
- BaP Eq was detected above the PRG in 2 of 8 samples with a maximum ER of 2.3, resulting in a conclusion of unacceptable risk. Given the limited data, quantitative estimation of risk is uncertain.

West Parcel – Subsurface Soil

- Three subsurface soil samples were analyzed for PCBs. PCBs were not detected above PRGs.
- The primary human health risk driver on the West Parcel is dioxin/furan TEQ in surface soil. Secondary risk in surface soil may be contributed by BaP Eq. Unacceptable risk is present only for the RT/PU receptor.

Central Parcel – Surface Soil

- Antimony, arsenic, lead, dioxin/furan TEQ, and BaP Eq were detected above human health PRGs in surface soil. Dioxin/furan TEQ exceeds screening levels for all three human health scenarios. The remaining COCs exceed only for the RT/PU receptor.
- BaP Eq was detected above hot spot concentrations in one area.

Central Parcel – Subsurface Soil

- Two subsurface soil samples were analyzed for antimony, copper, and dioxin/furan TEQ. These COCs were not detected above PRGs.
- The primary human health risk drivers on the Central Parcel are dioxin/furan TEQ in surface soil (exceeds for RT/PU, TT, and CW receptors) and BaP Eq. Secondary risk is associated with lead and arsenic (for the RT/PU receptor).

East Parcel – Surface Soil

- Each human health COC was detected above PRGs in surface soil on the East Parcel. Each of these COCs exceeds screening levels for the RT/PU receptor. Antimony and copper also exceed for the CW receptor.
- COCs were not detected above hot spot concentrations.
- PCBs were not detected above PRGs in the upland, but sampling was limited. The presence of PCBs on the riverbank could be an indicator of PCBs in the upland, but the exceedance ratio is relatively low. PCBs are unlikely to pose a human health risk on the East Parcel.
- BaP Eq concentrations did not exceed PRGs in upland soil samples, although two samples in the riverbank did exceed PRGs.

- Sample RA6-S17 exceeds the PRG for antimony and lead. This sample was located on the sidewall of the Area 6 excavation from the 2015/2016 removal action. The excavation was limited at that location by the concrete building slab located on the East Parcel. Soil was removed up to the concrete slab, and this sample represents soil from under the concrete at the edge of the excavation. The other metals exceedances are discrete or composite samples associated with the riverbank and may not be representative of the Upland. Metals are not expected to pose unacceptable human health risk on the East Parcel.
- The human health risk driver on the East Parcel is dioxin/furan TEQ in surface soil for the RT/PU receptor.

East Parcel – Subsurface Soil

- Subsurface soil samples were not analyzed from the East Parcel.

3.2.2. Ecological Risk Assessment

Ecological risk was evaluated in an iterative fashion throughout several risk assessment and feasibility study documents, as several site characterization and removal actions occurred over several years. Screening for ecological risk initially occurred within the 2003 RI Report and was incorporated in the 2007 Baseline Risk Assessment. Risk assessment conclusions from the Baseline Risk Assessment identified "localized risk to current and future plant and invertebrate receptors, due to elevated concentrations of metals in surface soil in a limited area of the eastern portion of the Central Parcel." A removal action was recommended and implemented in 2008 to mitigate this risk, which was co-located with unacceptable risk to potential future recreational users. The removal action included the excavation and offsite disposal of elevated metal contamination, including lead, copper, chromium, zinc, and mercury. A residual risk assessment was subsequently prepared and finalized (Formation, 2014a), which incorporated additional characterization of dioxins/furans in soils near the Wharf Road, also located on the east side of the Central Parcel.

Updates to the 2014 RRA were made to incorporate sampling results from additional sampling conducted in January through April of 2014 for dioxins/furans, metals, and PAHs. These updates to risk assessment conclusions were documented in a technical memorandum (Formation, 2014b), and summarized in a 2014 Feasibility Study (see Section 3.0 and Appendix C - Updated Baseline Risk Evaluation, Apex, 2014). This residual risk assessment was used to inform the 2015/2016 removal action areas. The primary update was the identification of significant risk in the Central Parcel due exceedance of acceptable risk levels of dioxins/furans (up to 11,000 times the RBC), high molecular weight PAHs (up to 58), antimony, and elevated soil for mercury (250), lead (94), copper (78), and zinc (12).

The focus of the 2015/2016 removal action was primarily to remove upland soil with dioxins/furans above the human health remediation goal (mammalian TEQ of 1,000 ng/kg, or 1 ppb). The removal action also included select hot spot concentrations of metals and PAHs within the removal areas (RA1 West Parcel, and areas RA2-RA6 on the Central Parcel). Concentration data, screening, and hot spot identification for soils removed can be found in the *Removal Action Completion Report* (Apex, 2016). Confirmation samples taken in the sidewalls and base of the excavation areas, along with any soil not removed during these actions, were used to update the exposure point concentrations and the identification of COCs. This assessment is included the 2019 Revised FS/SCE (see Appendix G - Re-Evaluation of Soil Data to Identify Chemicals of Concern – Technical Memo). The COC list and associated RBCs (from Appendix G) were used to develop PRGs for remedial actions in upland soil.

3.2.2.1. *Ecological Risk Conceptual Site Model*

An ecological-based CSM provides information about contaminant sources, release mechanisms, potential receptors, and exposure pathways for ecological risk. Figure 17: Ecological Conceptual Site Model shows are diagram of identified exposure pathways. The 2007 baseline risk assessment contains the fundamental ecological scoping, receptor-pathway interactions checklist and descriptions (see Appendix A-2), and a species of special interest list (see Appendix A-3) developed using information from the Oregon Natural Heritage Information Center. This list included special status species such as fish (e.g., sturgeon, Chinook, steelhead) the painted turtle, several listed bird and mammalian species including the bald eagle (de-listed in June 2007), American peregrine falcon, yellow-billed cuckoo, tricolored blackbird, and the Townsend's big eared bat.

The ecological risk assessment evaluated four representative ecological receptor groups protective of the sensitive and non-sensitive species: plants, invertebrates, birds and mammals. Plants and soil invertebrates were evaluated for direct contact and toxicity to site soils. Birds and mammal exposure included: a) incidental ingestion of site soil, and b) ingestion of dietary prey such as plants, invertebrates for ground feeding species in close contact with the soil. Carnivorous birds and mammals were assumed to feed primarily on small mammals from the site.

Assessment endpoints included (surrogates in parenthesis):

- Survival, growth and reproduction of resident songbirds (American robin).
- Survival, growth and reproduction of resident small mammals (short-tailed shrew)
- Survival, growth, and reproduction of resident raptors (red-tailed hawk) with home ranges that include the site; and
- Survival, growth, and reproduction of resident mammalian predators (long-tailed weasel) with home ranges that include the site.

3.2.2.2. *Exposure Assessment*

Contaminants of interest were evaluated at different spatial scales depending on the receptor. This included: 1) site maximum concentrations for immobile or nearly immobile receptors (i.e., plants, soil invertebrates, or 2) 90% upper confidence limit (90% UCL) of the mean concentrations for more mobile wildlife receptors (i.e., birds, mammals). In addition to 90% UCL on mean concentrations, samples using incremental sampling methods were used to characterize average exposure for mobile receptors. ISM samples were collected primarily in 2014 as a part of the additional characterization that occurred after the 2014 baseline residual risk assessment.

As a part of the RI, the site was divided into three parcels (West, Central, and East), corresponding with different historical use of the site. These parcel sizes were used to represent exposure areas of ecological receptors such as ground feeding bird and mammal species. The definition of soils in the risk assessment included the upland, riverbank, and beach soils of the parcels, but only upland soils (generally landward of top of bank), are considered part of the final remedial action. Therefore, two of the exposure units that occur below top of bank on the west side of the Central Parcel (Central Beach Unit), and the East Parcel (Inner Cove Beach Unit), are not described further as a part of the selected remedial action for the Willamette Cove Upland Site.

The potential concentrations of COPCs in forage and prey items were estimated based on methods and bioaccumulation factors developed by USEPA in the Ecological Soil Screening Guidance (Eco SSL; USEPA, 2007). In order to cover root depths and burrowing mammals, the soil column down to 3 feet bgs was used to evaluate ecological exposure. The diet of resident hawks and larger mammals such as weasels were assumed to feed entirely on small mammals. Soil and food ingestion rates, uptake equations into prey items, and area use factors can be found in the 2014 RRA (see Tables 3-1 through 3-9). In some cases, updates to the 2014 exposure assessments were incorporated, including site-specific updates to bioavailability. For example, in the case of lead, RBCs were calculated assuming 75% bioavailability from ingested food (ATSDR, 2007).

3.2.2.3. *Ecological Effects Assessment*

Ecological benchmark values (EBV) were used to identify exposure levels that correspond to acceptable risk levels (ARLs) of toxicity. It was determined in the risk assessment that there are no threatened and endangered (T&E) species exposed to upland soils. Oregon rules identify ARLs for non-T&E species based on risk to populations. The population ARLs have two elements: 1) a probability no greater than 0.1 that more than 20% of the local population experiences exposures greater than the EBV for a given chemical, and 2) there are no other observed significant adverse effects on the health or viability (growth and reproduction) of the local population. Therefore, lowest observed effect level (LOAEL) values based on growth or reproduction were used as the EBVs and are levels where a small portion of individuals in a population may be affected. Ecological benchmark values used for each assessment endpoint (plants, invertebrates, birds and mammals) can be found in the 2014 RRA (see Tables 4-3 through 4-21).

For wildlife (birds and mammals), assumptions regarding exposure (soil and food ingestion rates), along with the ecological benchmark values, were used to back-calculate site-specific RBCs representative of acceptable risk. For plant and soil invertebrates with direct contact with soil, the RBCs represent concentration thresholds protective of toxicity. The comparison of site data to RBCs by receptor are shown in the Appendix G tables of the 2019 Revised FS/SCE: Table 3 (plants), Table 4 (soil invertebrates), Table 5 (ground feeding birds), Table 6 (ground feeding mammals), and the chemicals of concern by receptor are summarized in Table 8. Ground feeding species with small home ranges represent the potentially most exposed ecological receptors, as they feed on vegetation and invertebrates that are in close contact with the soils. Therefore, RBCs for ground feeding species applied over each exposure area (West, Central and East Parcels) were assumed to cover risk identified for hawks and weasels identified in the 2014 RRA.

3.2.2.4. *Ecological PRGs and Hot Spot Levels*

Upland soil RBCs and Oregon-based hot spot levels for ecological receptors are presented in Table 6. Preliminary remediation goals were identified as the receptor-specific RBC unless one or more of the four receptor specific RBCs was below background concentrations. In these cases, a background concentration was identified as the PRG, while also retaining PRGs for other receptors that are above background. Additionally, background levels were applied differently to account for the type of sample collected (discrete, average ISM). Average (ISM) samples are compared to average background levels, and discrete samples are compared to 95^{th} upper prediction limits (UPLs). For example, the background PRG for chromium is 76 mg/kg as a UPL for comparison to discrete samples, and 39 mg/kg as an average (large composite or incremental samples). Comparisons to both RBCs and PRGs are provided in the 2019 FS/SCE (see Appendix E, Table E2a). Ten times the RBCs represent ecological hot spot levels.

It is important to note that the RBCs for dioxin/furan TEQ presented in Table 7 is for mammals, reported as an RBC of 6.1 ng/kg and a hot spot of 61 ng/kg. For birds, the RBC developed using avian toxicity equivalency factors (TEFs) is 89 ng/kg, with a hot spot of 890 ng/kg avian TEQ. For simplicity, a mammalian TEQ concentration protective of avian TEQ was estimated using a regression model shown in the 2019 FS/SCE - Appendix G, Attachment 4, which also provides location specific dioxin/furan congener concentrations and hazard quotients. The mammalian TEQ protective of birds is 35 ng/kg mammalian TEQ, with a hot spot of 350 ng/kg (see Appendix G, Table 5).

3.2.2.5. *Ecological PRGs Exceedances*

Comparisons between soil concentrations and PRGs allow for an estimate of location and magnitude of the exceedance for each COC. PRG ERs, as noted above, are the ratio of the soil concentration to the PRG. ERs > 1 indicate unacceptable risk (above RBC or background), and ERs > 10 indicate hot spot concentrations. Tables and figures provided in the 2019 FS/SCE (see Appendix E - Upland Soil Chemical Data Screening and Figures) summarize ERs used for FS planning. Tables E2a through E2e show location specific exceedance ratios above PRGs by parcel, sample location, and receptor for all soil located landward of mean high water. Cumulative ERs (or "summed ERs") are also presented and describe the magnitude of exceedance for COCs found at given location. Figures E1 through E14e illustrate the distribution of maximum ERs by COC, and Figures E15 through E18e show the locations of cumulative summed ERs for each receptor (plants, invertebrates, birds, and mammals).

Summary of Receptor-Specific Ecological PRG Exceedance Ratios (Adopted from FS Report)

COCs	West Parcel				Central Parcel				East Parcel			
	Plant	Invert	Bird	Mam-mal	Plant	In-vert	Bird	Mam-mal	Plant	In-vert	Bird	Mam-mal
Antimony	NC	NC	NC	NC	2.4	0.2	NA	4.5	1.5	0.1	NC	2.9
Arsenic	0.5	NA	NC	NC	2.2	NC	NC	NC	1.4	0.1	NC	NC
Chromium[b]	0.5	0.5	NC	NC	0.9	0.9	NC	NC	0.6	0.6	NC	NC
Copper	1.5	1.3	1.2	1.2	19.6	17.1	15.6	16.7	4.6	17.1	15.6	16.7
Lead	0.4	0.03	1.3	0.4	11.8	0.8	18.0	11.6	6.2	0.4	9.4	6.1
Mercury[a]	1.2	3.6	4.9	0.1	88.7	115.7	150.7	7.5	11.6	23.3	23.3	1.5
Nickel[b]	0.4	0.1	NC	0.7	2.6	0.4	NC	2.6	1.1	0.4	NC	2.2
Selenium[c]	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC
Zinc[b]	0.9	1.3	NC	NC	3.5	0.8	NC	3.1	3.8	3.8	NC	3.4
Total PCBs[c]	NA	NA	0.2	1.1	NC	NC	NC	NC	NC	NC	NC	NC
Total LPAHs	NC	0.03	NC	NC	NC	1.6	NA	NC	NC	0.01	NC	NC
Total HPAHs	NC	0.4	NC	1.1	NC	18.0	NA	57.9	NC	0.1	NC	0.3
Dibenzo-furan[c]	NC	NC	NC	NC	NC	NC	NA	58.3	NC	NC	NC	NC
Dioxin/ Furan TEQ	NA	NA	1.2	16.9	NC	NC	29.1	424.6	NC	NC	0.7	10.0
Max Cum PRG ER[d]	5.1	6.8	8.5	20.4	94.7	117.4	160.3	432.8	30.4	24.2	28.2	18.0

Notes:
NA= RBC not available
NC= RBC available but not calculated in the FS and will be calculated in the residual risk assessment using Table 6.
[a] Lowest PRG and hot spot level below background; background ER shown
[b] Lowest PRG below background; background ER shown
[c] Data limited or detection limits above PRGs
[d] Represents only cumulative risk for the receptors and pathways that were presented in the FS; complete cumulative risk calculations should be presented in the residual risk assessment.

Above PRG | Above Hot Spot

While the 2019 FS/SCE summarizes maximum PRG exceedance ratios and cumulative ERs for upland soil located landward of mean high water, the table above presents exceedances landward of top of bank, consistent with the focus of this remedial action.

3.2.2.6. *Ecological Risk Assessment Results*

Risk in upland soils across all parcels is driven primarily by concentrations of dioxins and furans, copper, lead, mercury, zinc, and total high molecular weight PAHs (HPAHs). COCs above risk levels also include antimony, arsenic, nickel, selenium, total PCBs, total low molecular weight PAHs (LPAHs), total high molecular weight PAHs (HPAHs), and dibenzofuran. Plant and invertebrate chromium RBCs were exceeded site-wide, but below background based on the FS dataset. Site wide risk to Total PCBs is largely unknown due to a limited dataset for soils above top of bank. This data gap will be addressed during remedial design sampling. The most significant risk and high concentration hot spots are found within the Central Parcel, and West and East Parcel soils immediately adjacent to the Central Parcel.

Non-dioxin hot spots above background are found primarily on or adjacent to the Central Parcel, with significant maximum ERs for individual COCs of copper (20), lead (18), mercury (151), and HPAHs (58). Dioxin/furan concentrations are above PRGs and hot spot levels site-wide for mammals (maximum ER of 425), but risk and hot spot exceedances for birds are located primarily on the Central Parcel (maximum ER of 30). Maximum cumulative ERs found in the Central Parcel, range up to 160 for non-dioxin COCs and 433 when dioxins/furan TEQ is included. Ecological risk to these COCs are identified for all receptor groups, indicating the potential for effects at multiple trophic levels throughout the ecosystem.

West Parcel. The sample type available for the West Parcel are primarily parcel-wide average ISM exposure point concentrations, and exceedances over smaller spatial scales is uncertain. Maximum cumulative ERs are 5.1, 6.8, 8.5 and 20.4 for plants, invertebrates, birds, and mammals, respectively. Hot spots were identified for dioxin/furan TEQ for mammals and mercury for birds based on parcel-wide average ISM samples. No samples have been collected below top of the riverbank.

A summary of West Parcel maximum individual PRG ERs >1 landward of top of bank include:

- Copper: Plants (1.5), invertebrates (1.3), birds (1.2), and mammals (1.2)
- Mercury: Plants (1.2), invertebrates (3.6), birds (4.9)
- Total HPAHs: Mammals (1.1)
- Total PCBs: Mammals (1.1)
- Zinc: Invertebrates: (1.3)
- Dioxin/furan TEQ: Birds (1.2) and mammals (16.9)

Note, limited upland soil samples were tested for PCBs (2), selenium (3), and dibenzofuran (1).

Central Parcel. PRGs are exceeded in the Central Parcel for dioxins and furans, metals (antimony, arsenic, copper, copper, lead, mercury, nickel, and zinc), total high and low molecular weight PAHs, and dibenzofuran. Maximum cumulative risk ERs are 95, 120, 160, and 433 for plants, invertebrates, birds and mammals, respectively. Risk is identified across all receptor groups and trophic levels, indicating the potential for impacts within multiple trophic levels within the ecosystem. In addition, significant ERs are present across a larger spatial scale as compared to the East and West Parcels.

Similar to PRG exceedances, hot spot levels of mercury, copper, lead, dioxins and furan TEQ (birds and mammals), dibenzofuran, and HPAHs are found across multiple groups of ecological receptors. Unlike the West and East Parcels, risk is similar between the riverbank and upland soils.

A summary of maximum individual PRG ERs >1 landward of top of bank include:

- Antimony: Plants (2.4) and mammals (4.5)
- Arsenic: Plants (2.2)
- Copper: Plants (20), invertebrates (17), birds (16), and mammals (17)
- Lead: Plants (12), birds (18), and mammals (12)
- Mercury: Plants (89), invertebrates (116), birds (151), and mammals (7.5)
- Nickel: Plants (2.6) and mammals (2.6)
- Zinc: Plants (3.5), mammals (3.1)
- Total LPAHs: Invertebrates (1.6)
- Total HPAHs: Invertebrates (18) and mammals (58)
- Dibenzofuran: Mammals (58)
- Dioxin/furan TEQ: Birds (29) and mammals (425)

Limited (4) upland soil samples were tested for PCBs, but detection limits were greater than PRGs. Selenium was primarily non-detect in upland soils, but detection limits were greater than PRGs.

East Parcel. As compared to the West and Central Parcels, the East Parcel contains the most significant PRG and hot spot exceedances of copper (ERs of 679, 594, 542 and 579 for plants, invertebrates, birds and mammals, respectively), antimony (ERs of 38, 2, and 71 for plants, invertebrates and mammals), PCBs (ER of 19 for mammals), zinc (ER of 10 for plants, invertebrates and mammals), and nickel (ER of 6 for plants and mammals). However, these exceedances are found riverward of top of bank and will be addressed as a part of the in-water action. Exceedances of PRGs and hot spot levels in upland soil are found primarily in soils adjacent to the Central Parcel where significant concentrations of lead and mercury remain within 2015/2016 Removal Action Area 6 (RA6) and extend over the parcel line (see 2019 FS/SCE, Appendix E figures). The most significant exceedance ratios are for copper, lead, mercury, and dioxin/furan TEQ (mammals) as summarized below. Maximum cumulative risk ERs were 30, 24, 28 and 18 for plants, invertebrates, birds, and mammals, respectively. However, the upland average ISM concentrations of soil indicate high magnitude exceedances are likely contained within smaller areas as noted above.

A summary of individual PRG ERs >1 for samples in the East Parcel above top of bank are included below:

- Antimony: Plants (1.5) and mammals (2.9)
- Arsenic: Plants (1.4)
- Copper: Plants (4.6), invertebrates (17), birds (16), and mammals (17)
- Lead: Plants (6.2), birds (9.4), and mammals (6.1)

- Mercury: Plants (12), invertebrates (23), birds (23), and mammals (1.5)
- Nickel: Plants (1.1) and mammals (2.2)
- Zinc: Plants and invertebrates (3.8) and mammals (3.4)
- Dioxin/furan TEQ: Mammals (10)

Limited upland soil samples were tested for PCBs (3 samples), dibenzofuran (1) and selenium (5), but detection limits were greater than PRGs.

3.3. BENEFICIAL USE AND HOT SPOT DETERMINATION

OAR 340-122-155(9) defined beneficial uses of water as any current or reasonably likely future beneficial use of groundwater or surface water by humans or ecological receptors.

OAR 340-122-155(32) defines soil as a hot spot when the hazardous substances present pose a risk to human health or the environment exceeding the acceptable risk level, the extent to which the hazardous substances:

(A) Are present in concentrations exceeding risk-based concentrations corresponding to:
(i) 100 times the acceptable risk level for human exposure to each individual carcinogen;
(ii) 10 times the acceptable risk level for human exposure to each individual noncarcinogen; or
(iii) 10 times the acceptable risk level for exposure of individual ecological receptors or populations of ecological receptors to each individual hazardous substance.
(B) Are reasonably likely to migrate to such an extent that the conditions specified in subsection (a) or paragraphs (b)(A) or (b)(C) would be created; or
(C) Are not reliably containable, as determined in the feasibility study.

3.3.1. Groundwater Beneficial Use Determination

A beneficial use determination for groundwater and surface was completed in the RI Report. Beneficial uses were evaluated for each water-bearing zone considering current use and the following factors listed in OAR 340-122-080(3)(f)(F):

- Historical land and water uses
- Anticipated future land and water uses
- Concerns of community and nearby property owners
- Regional and local development patterns
- Regional and local population projections
- Availability of alternate water sources

Available records (e.g., water rights, points of diversion, water well records) were obtained from the Oregon Water Resources Department to assess current and historical water uses near the site. This information also was used to assess the reasonably likely future beneficial uses of groundwater and surface water. Review of historical files, such as Sanborn fire insurance maps, show piping supplying water (presumably City water) to the Site. No historical water supply wells were identified. At adjacent properties (Lampros Steel and M&B) water supply wells were identified, which are no longer in use or abandoned. In 1962, a 248-foot well was installed at 6850 North Lombard Street, about a half mile northeast of Willamette Cove. It was abandoned in 1998.

Shallow site groundwater has not been used historically and is not being used currently as drinking water or irrigation water, or for other purposes. Future onsite water sources, to the extent needed, will be supplied by the City of Portland drinking water system. Drinking water for adjacent properties and the surrounding general area is supplied by the City. Water used for commercial or industrial purposes in the area is likewise supplied by the City. The source of City water is the Bull Run Reservoir, located east of Portland in the Cascade Mountain foothills, with seasonal supplementation from the Columbia South Shore Wellfield. There is no known use of groundwater for irrigation in the Site vicinity.

The reasonably likely future beneficial use is recharge to surface water. Beneficial uses for surface water in the Willamette River Basin are identified in OAR 340-41-0340.[13] Beneficial uses for the Willamette River at Willamette Cove/Portland Harbor include aesthetic quality, water supply, recreation, transportation, wetland areas, fishing and hunting, anadromous fish passage, and fish and wildlife habitat (salmonid fish rearing, salmonid fish spawning, resident fish and aquatic life and fishing). Groundwater discharge will be further evaluated in coordination with in-water activities conducted under USEPA oversight.

3.3.2. Soil Hot Spots

As defined under OAR 340-120-0015(32), human health and ecological hotspots are present in the Willamette Cove Upland above the top of riverbank.[14] Following the 2015/2016 removal action, remaining human health hot spots include a limited area for carcinogenic PAHs, as shown in Figure 13. Ecological hot spots are present in the entire Upland, as shown in Figure 14. Upland hot spot values are presented in Tables 3 and 6. Hot spots identified within the riverbank and adjacent river sediments will be addressed under USEPA oversight.

3.4. ESTIMATE OF CONTAMINANT SOIL VOLUME

Based on the remedial investigation data and risk assessments described above, the extent of soil impacted by COCs at concentrations that exceed respective PRGs and hot spot levels were calculated. For development of remedial alternatives described below, dioxin/furan and non-dioxin/furan hot spots are distinguished, as well as human health and ecological risk. This allows evaluation of alternatives other than removal or capping of the entire site.

The interim removal action performed in 2015/2016 removed human health dioxin/furan hot spots from the site. It is estimated 800 square feet (sf) of soil containing human health non-dioxin/furan hot spots remain in the Upland. Soil contamination above human health PRGs is present in the entire upland property above the riverbank (i.e., approximately 19.3 acres or 843,000 sf).

Ecological hot spot levels for dioxins/furans are also present across the Upland. Non-dioxin/furan (i.e., metal) hot spots are present, primarily in the Central Parcel. Given the incremental sampling methods were used to characterize average parcel-sized exposure concentrations for dioxins/furans in the West and East Parcels, the Port anticipates that currently defined ecological hot spots on those parcels will decrease based on further delineation of hot spots during remedial design sampling.

Deducting the concrete pad area (47,000 sf) in the East Parcel and the debris area removed in 2015/2016 (5,200 sf), approximately 790,000 square feet or 18.1 acres of exposed surface soil with unacceptable risk is present in the Upland. That is, approximately 18.1 acres require some form of remedial action to restore the Site to safe conditions.

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[13] Basin-Specific Criteria (Willamette) Beneficial Uses to Be Protected: (1) Water Quality in the Willamette Basin (Figure 1: Oregon Basin Index Map) must managed to protect the designated beneficial uses shown in Table 304A; (2) Designated fish uses to be protected are shown in Figures 340A and 340B.

[14] In terms of groundwater, NAPL is not present in Upland groundwater. However, COCs may be present above hot spot levels, which will be further evaluated as part of the ongoing groundwater specific SCE.

The table below summarizes areas exceeding PRGs, including the extent of hot spot levels. Contamination depth estimates (ranging from 0.5 to 3 feet) were used to develop approximate quantities of soil that require remedial action, estimate costs, and compare the feasibility of alternatives in the following sections. Table 8 provides calculated volumes of soil requiring remediation and Figure 18: Remedial Action Area Extent and Depth provides approximate depths by parcel. Remedial design sampling will be performed to provide better resolution in preparation of remedial implementation.

Willamette Cove Upland Contaminated Soil Areas Exceeding PRGs

Contaminated Soil Quantities[1,2]	Units	Parcel			Total
		West	Central[3]	East[4]	
Ecological Risk Areas					
Above PRGs	sf	187,800	346,800	256,000	790,000
Dioxin/Furan Hot Spots	sf	187,800	346,800	256,000	790,000
Non-Dioxin/Furan Hot Spots	sf	187,800	92,700	0	280,000
Assumed Non-Dioxin/Furan Hot Spots After Remedial Design Sampling[5]	sf	18,800	92,700	0	111,000
Human Health Risk Areas					
Above PRGs	sf	187,800	346,800	256,000	790,000
Dioxin/Furan Hot Spots	sf	0	0	0	0
Non-Dioxin/Furan Hot Spots	sf	0	800	0	800
Uplands Areas					
Total	sf	187,800	352,000	303,000	843,000
Total	acre	4.3	8.1	7.0	19.3

Notes:
[1] Estimated quantities based on site investigations and will be modified based on remedial design sampling.
[2] Depths of contamination are currently estimated to be present 0.5 to 3 feet bgs.
[3] Central Parcel total area minus concentrated debris area (5,200 sf excavated to 5 feet) during 2015/2016 soil removal action.
[4] East Parcel total area excludes the concrete pad (47,000 sf) covering the ground surface.
[5] Port anticipates remedial design sampling will further delineate and reduce this hot spot area (currently defined using ISM) to 10 percent of this parcel.

4.PEER REVIEW SUMMARY

Technical documents produced during the investigation of the Willamette Cove site have been reviewed by a technical team at DEQ. The team consists of the project manager and engineer, a hydrogeologist, and human health and ecological toxicologists. The team unanimously supports the selected remedial action. Refer to the technical team evaluation file for more detailed information.

5. DESCRIPTION OF REMEDIAL ACTION OPTIONS

5.1. REMEDIAL ACTION OBJECTIVES

The process for selection of a remedial action by DEQ is outlined in OAR 340-122-0090, focusing on selection of an action that: a) is protective of present and future public health, safety, and welfare of human health and the environment as specified in OAR 340-122-0040; b) is based on balancing of remedy selection factors; and c) satisfies requirements for hot spots of contamination. DEQ's Guidance for Conducting Feasibility Studies (1998, updated 2006) provides more detailed guidance on the remedy selection process, including the development of remedial action objectives, identification of general response actions, identification and screening of remedial technologies, and assembly of remedial action objectives for evaluation. Each of these steps were considered by DEQ, and discussed below, in the identification of a remedial action for the Upland.

Remedial action objectives (RAOs) and acceptable risk levels, as defined in OAR 340-122-115(1) through (6), were developed based on the identified beneficial uses, exposure pathways and the risk assessment. RAOs are media-specific goals for protecting human health, safety, and the environment. RAOs are developed to address the standards established in OAR 340-122-0040. Specifically, the remedial actions must achieve the numeric standards for protectiveness that correspond to acceptable risk levels; treat or remove hot spots to the extent feasible; prevent or minimize future releases and migration of hazardous substances in the environment; and provide long-term care or management as necessary and appropriate.

RAOs provide the framework for developing and evaluating remedial action alternatives, as any remedy DEQ selects or approves must achieve these site-specific goals.

5.1.1. Site-Specific Remedial Action Objectives

Site-specific RAOs were developed for soil for the purpose of achieving protection of human health, ecological receptors, and beneficial uses. Preliminary Remediation Goals, or acceptable risk levels, were calculated (see Tables 3 and 6) for soil to protect the identified beneficial uses and potential receptors.

The RAOs[15] for the Willamette Cove Upland Site consist of the following:

1. Prevent exposure of human receptors (recreational/park user, transient trespasser, construction worker) to soil containing COCs at concentrations exceeding individual and cumulative acceptable risk levels.
2. Prevent exposure of ecological receptors (mammals, birds, invertebrates, plants) to soil containing COCs at concentrations exceeding individual and cumulative acceptable risk levels.
3. Remove or treat soil hot spots of contamination to the extent feasible and practicable.
4. Prevent further migration of contaminated upland soil to the river, to the extent practicable.

[15] Groundwater RAOs will be developed and addressed under the groundwater source control evaluation and future source control decision-making.

5.2. REMEDIAL ACTION ALTERNATIVES FOR SOIL

General response actions and remedial technologies were screened in the Feasibility Study (FS). A draft Feasibility Study and Source Control Evaluation (FS/SCE) was completed in September 2017 and a revised FS/SCE was provided in March 2019 (Apex, 2017 and 2019) presenting cleanup options to address human health and ecological risk. In June 2019, the Port provided a response to comments received on the revised FS/SCE.

Given the upland contains hot spots of soil contamination, the FS included an evaluation of a treatment-based alternative and/or an excavation and offsite disposal alternative per OAR 340-122-0115(31)(b). The general response actions included containment, excavation and disposal, in-situ and ex-situ treatment, and engineering and institutional controls to address soil contamination. Several remedial technologies were evaluated for each general response action. The technologies were screened in accordance with OAR 340- 122-0085, having to meet the threshold criterion of protecting human health and the environment and considering their relative merits/drawbacks with respect to the balancing criteria including: level of effectiveness, ease of implementation, and relative cost. Tables 9 and 10 provides the rationale for eliminating or carrying forward general response actions and technologies for a detailed evaluation based on site characteristics, soil conditionals, and contaminate type.

Bioremediation Technologies Screened Out

The draft FS examined a broader range of remedial technologies, including various types of in-situ and ex- situ bioremediation methods: bioventing, bioaugmentation, biostimulation, land treatment, monitored natural attenuation, phytoremediation, biopiles, composting, landfarming, and slurry phase biological treatment. These technologies were determined to be ineffective in treating the *full range* of site contaminants, including those less amenable to treatment (metals, PCBs, and dioxins/furans) based on current remediation science, or would not be expected to be sufficiently effective to meet the very low (part per trillion) cleanup levels for some contaminants. Also, some of the bioremediation treatment options would take a long time (perhaps years) to be fully effective, and would be incompatible with the intended future use of the property and concerns about ongoing risk to site users (site use is discouraged but cannot be entirely eliminated given its size).

Only remedial alternatives considered capable of restoring site conditions to protective levels, in a reasonable time frame, were carried forward in the final FS. In light of recent interest in bioremediation treatment at Willamette Cove, including mycoremediation, DEQ conducted a literature search in 2019 and consulted with USEPA to determine if advancements have been made with this form of bioremediation. No case studies were found to treat dioxins/furans “in-situ” at the magnitude and scale of Willamette Cove. The current state of the science suggests that bioremediation is unlikely to be effective in reducing concentrations of recalcitrant contaminants *to below acceptable levels in a reasonable timeframe*. In summary, bioremediation technology at this time would not pass the primary requirement that the remedial action be protective. In the event that additional information becomes available on the effectiveness of bioremediation for treatment of the contaminants of concern, DEQ will consider to what extent it might complement the Willamette Cove remedy.

General Response Actions and Applicable Technologies

Technologies that were carried forward after the initial screening and combined to develop comprehensive remedial action alternatives are summarized below and in Table 9.

Institutional Controls. These include legal or administrative actions such as deed restrictions, long-term site management plans (cap inspection/maintenance and contingency plans), or public access restrictions to reduce exposure to hazardous substances.

Engineering controls. These physical measures prevent or minimize exposure to hazardous substances or reduce the mobility or migration of hazardous substances.

Cap. This engineering control involves the placement of material over the contaminated area to prevent contact with the underlying media. The cap material can be tailored to site-specific needs. A soil-based cap and limited hardscape (such as a path) is compatible with plans for a park. Capped areas can be engineered in a manner to achieve long-term stability, which may require additional reinforcement to withstand future storm events, flooding, and/or seismic events. Demarcation material is typically installed below the cap to differentiate between contaminated soil and clean cap material.

Removal and Disposal. This technology involves the physical removal of contaminated soil using excavation methods. Disposal options include transport to permitted landfills offsite and/or consolidation onsite in a pre-determined location.

In-situ Treatment. Amendments can be added to the soil to immobilize and/or reduce the bioavailability of contaminants by sorption processes.

Ex-Situ Physical Treatment. Excavated soil can undergo a separation process to distinguish levels of contamination prior to transport offsite and/or consolidation onsite. Solidification (stabilization) technologies can be applied to contaminated soil after removal to immobilize contaminants as well as reduce their toxicity and/or leachability.

Assembly of Remedial Action Alternatives

Remedial Action Alternatives (RAAs) were developed using the general response actions/remedial technologies that were determined to be applicable to the Site through the technology screening process described above. RAAs were built by applying various combinations of remedial technologies. Applicable remedial technologies and the supporting rationale for these applications are summarized below and in Table 11. Technology applications were determined based on the nature, magnitude, and depth of surface and subsurface exceedances of PRGs and hot spots. Viable response actions and technologies that can meet the RAOs were assembled into remedial action options. These RAAs were organized into four main categories including no action (for comparison purposes only), capping, excavation, and a combination capping and excavation of contaminated soil.

Remedial Alternative 2 options center on the construction of a cap over contaminated soil, while Remedial Alternative 3 options concentrate on excavation (removal) scenarios. Remedial Alternative 4 options unite capping and excavation scenarios to capitalize on distinctive strengths of these technologies. Under these main technologies, the individual alternatives incorporate themes. For instance, “alternative” excavation represents an effort to preserve native trees to the extent possible (while achieving protectiveness), rather than “standard” excavation, which would require clearing all upland vegetation. Another theme incorporates onsite consolidation, which diverts a portion of contaminated soil slated for offsite disposal (under full removal) and isolates the contaminated soil in an engineered containment cell. This scenario also to serves to minimize “capped” areas across the Site to a focused area or areas. Onsite consolidation also has the potential to lessen construction-related impacts to the community (and energy consumption) through reduction of truck/barge trips, amongst other considerations.

Common elements to the remedial action alternatives include institutional controls, such as long-term site management plans (excepting complete removal). Remedial alternatives 2 through 4 options incorporate remedial design sampling. All the alternatives (except no action) entail substantial construction activities and correspondingly will require a comprehensive health and safety program for site workers, as well as measures to protect the community.

The following RAAs were developed for the Willamette Cove Upland Site.

5.2.1. Alternative 1: No Action

A "no action alternative" is included for comparative purposes only as stipulated in OAR 340- 122- 0085(2) and DEQ guidance. Under this alternative, no remedial would be performed. There would be no reduction in site risk, and thus this alternative is not considered protective by DEQ.

5.2.2. Remedial Alternative 2 Options: Capping

For this alternative, with two "options", unacceptable risk posed by contaminated soil would be managed by construction of an engineered cap (a barrier) to isolate contaminated soil. The cap would be comprised of clean soil or other DEQ-approved material(s). Contaminated soil, including hot spot material, would not be removed from the site under the alternative.

Where applicable, cap material would be placed in consultation with an arborist as to not endanger native trees deemed worthy of protection by Metro. Typical cap cross-section details are illustrated in Figure 19: Typical Cross-Section. After placement of the soil-based cap, the surface would be finished with native grasses, shrubs, and trees. A temporary irrigation system would be required for at least the first growing season.

Under these capping alternatives, contaminated soil including hot spots are not removed. Given their persistent nature, contaminants would not be expected to degrade and will be present *in perpetuity*. Institutional and engineering controls, such as site management plans, signage, and designated pathways will be required. Routine, long-term cap inspection and maintenance will be necessary for as long as contamination is present. Deed restrictions would be recorded on property deeds that limit site uses to passive recreation activities. A deed restriction will also identify the presence of the cap and contamination.

Operation and maintenance (O&M) would include irrigation, cap inspection/repair, plant inspection and replacement, herbivore control, and invasive species control. Active inspection and maintenance is expected, including after extreme weather events that may cause erosion or cap damage, such as an uprooted tree or damage to future site infrastructure. Protocols of how to address damage to the cap would be incorporated into site management plans.

5.2.2.1. *Alternative 2a: Standard Cap*

This alternative consists of:

- installing an engineered cap over the entire Upland to prevent human or animal/plant contact with underlying contaminated soil.

Figure 20: Alternative 2a illustrates the proposed cap area. In general, existing vegetation would be cleared to the ground surface. Demarcation fabric would be installed and covered with imported clean material (mainly soil, and rock if needed) with the upper 1-foot comprised of suitable topsoil to support vegetation. The final cap thickness would be at least 2 feet to account for mixing expected as a consequence of burrowing animals, plant growth, rainfall, runoff, and wind erosion. The concrete slab on the East Parcel could be incorporated into the final cap. The cap would cover a total area of approximately 790,000 square feet for a total quantity of 59,000 cubic yard (for a 2-foot soil cap).

Table 12 provides implementation tasks and expenses. The estimated alternative cost is 8.2 million dollars.

5.2.2.2. *Alternative 2b: Amended Cap*

This alternative consists of:

- placement of a 1-foot thick amended soil cap over contamination areas to prevent human or ecological exposure, and reduce contaminant bioavailability; and
- access restrictions (signage) or other controls to prevent human or animal/plant exposure to contamination.

Figure 21: Alternative 2b presents the proposed amended cap concept. Amendments are intended to reduce bioavailability of contaminants. During the design phase, immobilization additives (e.g., activated carbon or AC) would be evaluated for use in the thin-layer cap. Prior to capping, non-native trees and shrubs/grasses would be closely mowed and invasive species would be removed (disposed in an offsite landfill), but native trees would remain. No demarcation would be installed prior to cap installation. The concrete slab on the East Parcel could be incorporated into the final cap. The 1-foot thick cap would cover a total area of approximately 778,000 square feet for total quantity of 29,000 cubic yards (for 1-foot amended soil cap).

This alternative is a relatively lower cost alternative that could, under certain conditions, be protective and was included in the FS to provide a comparison to more costly and conservative approaches. Table 13 provides implementation tasks and expenses. The estimated alternative cost is 5.5 million dollars.

5.2.3. Remedial Alternative 3 Options: Excavation

This remedial action approach includes three options, each based on the general concept of removal of contaminated soil from the Upland, and either transport offsite for disposal or consolidation and capping in an onsite containment “cell”. Prior to implementation, extensive sampling would be required to determine the extent of necessary excavation.

Confirmation sampling would also be conducted to verify the final depth of excavation has removed soil above the PRGs (human health and ecological). Based on current site investigation data, the excavation depth is assumed to be 2 feet for the West Parcel, 3 feet for the west end of the Central Parcel, and 1-foot for the east end of the Central Parcel and East Parcel. Typical excavation cross-section details are illustrated in Figure 19. It is assumed that USEPA-designated hazardous wastes are not present. If necessary, stabilization could be used as a supplemental technology to treat hazardous wastes to non-hazardous conditions prior to disposal in a Subtitle D landfill; otherwise, hazardous wastes would require disposal at a Subtitle C landfill.

If contamination is encountered deeper than 3 feet, the remedial design/ remedial action would need to consider whether additional excavation is feasible. As a contingency measure, focused areas could be incorporate an engineered cap as a protective alternative.

Regardless of final placement of excavated soil (onsite or offsite), 1-foot of clean topsoil will be installed over removal areas and the surface finished with native grasses, shrubs, and trees. A temporary irrigation system would be required for at least the first growing season.

Depending on the specifics of the remedial alternative 3 option, operation and maintenance may include a combination of irrigation, cap inspection/repair, plant inspection and replacement, herbivore control, and invasive species control. Active inspection and maintenance is expected for capped areas, including after extreme weather events that may cause erosion or cap damage such as an uprooted tree or damage to future site infrastructure. Protocols of how to address damage to the cap would be incorporated into site management plans.

5.2.3.1. *Alternative 3a: Standard Excavation and Offsite Disposal*

This alternative consists of:

- complete removal of contaminated soil above human health and ecological risk levels; and
- offsite disposal of all excavated soil in a regulated landfill.

All vegetation would be cleared, including native trees, and soil would be excavated throughout the Upland using standard construction equipment. The Site would be backfilled with clean soil, regraded using remaining (clean) soil, or a combination of both. Continued monitoring would not be necessary given all contamination is removed under this option.

The total area of the excavation would be approximately 790,000 square feet with a total quantity of approximately 50,000 cubic yards. A foot of topsoil (to support vegetation) would cover a total area of approximately 790,000 square feet for a total quantity of 29,000 cubic yards. Finish grades would generally be consistent with the existing, leaving surface drainage substantively unchanged. Figure 22: Alternative 3a depicts the proposed excavation area. There would be no institutional or engineering controls. Site use would be unrestricted.

Table 14 provides implementation tasks and expenses. Note, the Staff Report (and Table 14) did not account for the 1-foot of topsoil cover, which purchase and placement is estimated to add 1.3 million dollars to the original estimated cost of 11.3 million dollars.

5.2.3.2. *Alternative 3b: Alternative Excavation and Offsite Disposal*

This alternative consists of:

- complete removal of contaminated soil from the Upland, excepting in areas where native trees are present and limit full excavation; and
- offsite disposal of all excavated soil.

Within the drip line (i.e., canopy) of designated trees, low impact excavation techniques would be used to remove soil to the maximum extent practicable without damaging the trees.[16] Outside of these areas, soil would be excavated using standard techniques. The remainder of this alternative would be the same as Alternative 3a. This alternative allows the conservation of native tree species under an excavation alternative. Note, it may be necessary to remove some native trees if highly contaminated soil cannot be removed using the revised excavation techniques.

The total area of the excavation would be approximately 730,000 square feet (all soil above PRGs including hot spots) with a total quantity of approximately 45,000 cubic yards. Figure 23: Alternative 3b shows the proposed excavation area and Table 15 presents the estimated cost.

There would be no institutional or engineering controls, and site use would be unrestricted. This is the most conservative cleanup approach (while preserving native trees to the extent possible). Note, the Staff Report (and Table 15) did not account for the 1-foot of topsoil cover, which purchase and placement is estimated to add 1.3 million dollars to the original estimated cost of 10.7 million dollars.

5.2.3.3. *Alternative 3c: Standard Excavation and Onsite Consolidation*

This alternative consists of:

- excavation of all contaminated soil exceeding human health and ecological risk levels; and
- consolidation of all excavated soil onsite beneath a cap.

In general, existing vegetation would be cleared (including native trees) and soil would be excavated using standard construction equipment. Separation technologies could be used to separate rock and debris from contaminated soil, reducing the amount of material consolidated beneath the cap. This alternative is primarily intended to allow comparison with 3a and 3b.

As with the 'capping only' alternative, secondary technologies associated with capping would also need to be implemented and long-term cap inspections and maintenance would be necessary. The consolidation area would contain soil above acceptable risk levels, including hot spots. No offsite disposal is planned for this alternative; however, the action would remove contaminated soil from other portions of the site to a designated area or areas. The consolidation area would need to be engineered for long-term stability and withstand events, such as extreme storms, flooding, and earthquakes. The thickness of the consolidation area cap would be a minimum of 3 feet thick for a soil-based cap, with an underlying demarcation material. It is anticipated the cap would need to be reinforced (such as rock) for stability and to prevent burrowing

[16] In cases where contaminated soil above risk levels, specifically hot spots, cannot be removed using alternative/low-impact excavation methods, tree removal would be necessary.

of animals. The cap surface could be comprised of topsoil to allow for native plantings or other park infrastructure, such as asphalt paths.

Areas outside the consolidation area would no longer contain soil contamination posing risk and therefore institutional or engineering controls would not be necessary and site use would be unrestricted. The removal areas (not covered by the consolidation area) would be backfilled with clean soil, regraded using existing site soil, or a combination of both. The upper 1-foot would consist of topsoil and the surface replanted with native plants. Continued monitoring outside of the consolidation area would not be necessary given all contamination above risk levels would have been removed. Long-term cap inspections and maintenance in perpetuity would be required for the consolidation area.

Given no offsite disposal is planned for this alternative, the consolidation area covers a considerable portion of the Upland. An example is provided in Figure 24: Alternative 3c. The final dimensions and shape of the consolidation area would be designed to accommodate future park plans to the extent possible. The total area of the excavation would be approximately 631,000 square feet (total upland area minus the consolidation area footprint) for a total quantity of 42,000 cubic yards. For cost estimate purposes, it is assumed this volume would create a consolidation area covering 200,000 square feet. For reference, the West and East Parcels are approximately 188,000 and 303,000 square feet, respectively. If the consolidation area is located in the East Parcel and incorporates a vegetated cap, 1-foot of topsoil would cover a total area of approximately 842,000 square feet (i.e., entire Upland including the concrete pad) for a total quantity of 31,000 cubic yards.

Table 16 provides implementation tasks and expenses. The estimated cost for standard excavation and onsite consolidation is 10.4 million dollars.

5.2.3.4. *Alternative 3d: Standard Excavation, Offsite Disposal and Consolidation*

This alternative includes:

- excavation of contaminated soil with non-dioxin/furan hot spots for ecological and human health (estimated 4,100 cubic yards) for offsite disposal; and
- excavation and consolidating the remaining soil contamination onsite beneath a cap (approximately 38,000 cubic yards).

The remainder of this alternative is the same as Alternative 3c consisting of a considerable consolidation area (see Figure 25: Alternative 3d).

Accounting for additional offsite disposal (see Table 17), the estimated cost is 10.9 million dollars.

5.2.4. Remedial Alternative 4 Options: Focused Excavation and Capping Hybrids

This alternative presents three “options” (4a, 4b, and 4c), all focused on excavation and offsite disposal of highly concentrated contamination, and followed with either construction of a standard cap, amended cap, or onsite consolidation area. Extensive remedial design sampling will be performed to further delineate contamination present and inform extent of excavation required prior to construction activities. Confirmation soil sampling would also be performed following excavation. Note, if sampling activities

encounter additional dioxin/furan hot spots for human health, this soil will be excavated and disposed offsite.

A typical cross-section of a consolidation area is illustrated in Figure 19. Whether a cap or cover, 1-foot of topsoil will be necessary and the surface finished with native grasses, shrubs, and trees. A temporary irrigation system would be required for at least the first growing season.

As with the capping only alternative, secondary technologies associated with capping (engineering and institutional controls) would also need to be implemented and long-term cap inspections would be necessary. Controls will be recorded as restrictions on the property deeds and will identify areas of contamination remaining onsite (under engineered caps).

Operation and maintenance would include irrigation, cap inspection/repair, plant inspection and replacement, herbivore control, and invasive species control. Active inspection and maintenance is expected, including after extreme weather events that may cause erosion or cap damage, such as an uprooted tree or damage to future site infrastructure. Protocols of how to address damage to the cap would be incorporated into site management plans.

5.2.4.1. *Alternative 4a: Focused Standard Excavation, Offsite Disposal, Standard Cap*

This alternative is comprised of:

- excavation of contaminated soil with non-dioxin/furan hot spots for ecological and human health (estimated 4,100 cubic yards) for offsite disposal; and
- in-place capping of remaining soil contamination exceeding risk levels for humans or plants/animals (i.e., entire Upland).

The estimated volume to remove non-dioxin/furan hot spots is 4,100 cubic yards. The final depth of excavation would be determined by verification sampling, but based on the remedial investigation data the excavation depth is assumed to be 1-foot. Confirmation sampling would be completed to verify removal of the soil above hot spot levels. It is assumed hot spot removal areas would still require a cap given underlying soil are presumably above PRGs.

Consistent with the standard cap described in Alternative 2a, the site would be cleared of vegetation and covered with demarcation material and capped with 2 feet of clean soil (upper 1-foot topsoil). Focused areas may require additional reinforcement materials for stability. The concrete slab on the East Parcel could be incorporated into the final cap.

Figure 26: Alternative 4a presents representative excavation and cap areas. The cap area would cover approximately 790,000 square feet (upland area minus the concrete pad) for a total quantity of 59,000 cubic yards (for 2-foot soil cap).

Table 18 provides implementation tasks and expenses. The estimated cost is 9.5 million dollars.

5.2.4.2. *Alternative 4b: Focused Alternative Excavation, Offsite Disposal, Amended Cap*

This alternative involves:

- excavation of contaminated soil with non-dioxin/furan hot spots for ecological and human health (using alternative methods to preserve native trees) and disposal at a regulated landfill;
- in-place capping of remaining soil presenting an excess risk using a thin, amended cap; and
- restrictions to public access through the use of signage or other protective measures.

Amendment application (consistent with Alternative 2b) is intended to reduce bioavailability of contaminants. The excavation volume for offsite disposal is estimated to be approximately 4,000 cubic yards, slightly less than the Focused Standard Excavation (estimated 4,100 cubic yards) due to the special consideration of soil around native trees. The 1-foot-thick cap would cover a total area of approximately 778,000 square feet (upland area minus the concrete pad and designated tree areas) for total quantity of 29,000 cubic yards (for 1-foot amended soil cap). See Figure 27: Alternative 4b.

Table 19 provides implementation tasks and expenses. The estimated alternative cost is 5.9 million dollars.

5.2.4.3. *Alternative 4c: Focused Alternative Excavation, Offsite Disposal, Onsite Consolidation, and Cap*

This alternative involves:

- excavation of contaminated soil with non-dioxin/furan hot spots for ecological and human health (using alternative methods to preserve native trees) and disposal at a regulated landfill;
- onsite consolidation and capping of soil exceeding human health levels;
- onsite consolidation and capping of soil with higher risk (hot spots) to plants/animals, and
- cover residual (only) ecological risk with clean topsoil.

Soil excavation (while preserving native tress) and offsite disposal of non-dioxin/furan hot spots is estimated at 4,000 cubic yards. While excavation and consolidation activities would target remaining soil above human health PRGs, it is anticipated the extent of removal to achieve this outcome would also result in the removal of the majority of ecological risk (including ecological hot spots). If non-dioxin/furan ecological hot spots substantially exceed feasibility study estimates, during remedial design DEQ will consider the placement of this contamination within the consolidation area. Based on investigation data, the excavation depth was assumed to be 1.5 feet for the West Parcel, 2 feet for the west end of the Central Parcel, and 0.5 feet for the east end of the Central Parcel and East Parcel. The final depth of excavation would be determined by verification sampling.

Approximately 23,000 cubic yards of contaminated soil would be placed in the consolidation area but quantities would be further evaluated during remedial design. Unanticipated soil contamination may require offsite disposal due to size restraints for an onsite consolidation area. An example consolidation area (covering approximately 116,000 square feet) is presented in Figure 28: Alternative 4c for illustration purposes. The final location and dimensions (e.g., shape) of the consolidation area would be determined during remedial design, including stability considerations and accommodating future park plans to the extent possible.

The consolidation area would be engineered for long-term stability and containment of soil above human health risk levels (including ecological hot spots). The consolidation cap would be designed to withstand natural events, such as extreme storms, flooding, and earthquakes. The base of the consolidation area cap would consist of demarcation material as an indicator of underlying contaminated soil. The consolidation area cap presumably would need to be reinforced for long-term stability and prevent burrowing of animals; however, the cap surface could be comprised of topsoil to allow for native plantings or other park infrastructure, such as asphalt paths.

Following excavation activities outside the boundaries of the proposed consolidation area, it is estimated the remaining contamination will consist of ecological risk or no risk covering approximately 727,000 square feet (e.g., the Upland minus the 116,000 square feet consolidation area). Areas containing soil above residual ecological risk levels would be covered with clean imported soil. The soil cap thickness (at least 1 to 3 feet) will be determined based on the magnitude of ecological risk remaining. For instance, a 1-foot clean soil cap may be sufficient above low-level contamination, while greater concentrations would need to be capped with additional clean soil. All ecological hot spots (if any remain due to deeper contamination) would be capped with 3 feet of clean soil. Areas no longer containing contamination would not be capped; however, a 1-foot topsoil "cover" for vegetation growth purposes would be necessary. Cap or cover surfaces would be finished with native grasses, shrubs, and trees, and properly irrigated. Long-term monitoring and maintenance in perpetuity would be required for the consolidation area.

For reference, the West and East Parcels are estimated to be 188,000 and 303,000 square feet, respectively. If the consolidation area incorporates a vegetated cap, 1-foot of topsoil would cover a total area of approximately 840,000 square feet (i.e., entire Upland).

Implementation of this alternative will allow for full access of the Upland site, on and off trails. This includes the engineered cap areas, which would be designed to withstand normal human activity (as well as storms and seismic impacts).

Table 20 identifies implementation tasks and expenses. The hybrid alternative is estimated to cost 8.8 million dollars.

5.2.5. Periodic Monitoring, Review and Contingency Plan

There are a number of uncertainties at the site that make it difficult to predict the long-term reliability of any of the remedial action alternatives described above, including:

- Heterogeneity in the subsurface.
- Potential changes in future groundwater or surface water use patterns (i.e., beneficial uses).
- Potential changes in future land use and zoning.
- Changes in community concerns regarding remedial actions.
- Long-term performance of remedial cap areas.

Because of these uncertainties, a periodic monitoring, review and contingency plan will be developed that will evaluate the performance of the remedy, and any changes that may affect the ability of the remedy to meet the RAOs. The objective of the periodic monitoring, review and contingency plan will be to maintain

the overall protectiveness of the selected remedy by establishing a series of decision criteria and related response actions for each potential area of uncertainty identified above, and the RAOs.

The first component of the contingency plan will be a review of both remedy performance and local land and water uses. If the supplemental monitoring is necessary and indicates that the RAOs are not being met, additional remedial actions will be evaluated to ensure that human health and the environment are protected.

6. EVALUATION OF REMEDIAL ACTION OPTIONS

6.1. EVALUATION CRITERIA

The criteria used to evaluate the remedial action alternatives described below are defined in OAR 340-122-090, and establish a two-step approach to evaluate and select a remedial action. The first step evaluates whether a remedial action is protective; if not, the alternative is unacceptable and the second step evaluation is not required. The remedial alternatives considered protective are evaluated and compared with each other using five balancing factors. The five balancing factors are 1) effectiveness in achieving protection, 2) long-term reliability, 3) implementability, 4) implementation risk, and 5) reasonableness of cost.

An evaluation of how each alternative achieves the specific requirements for treatment of hot spots is also included. The alternative that compares most favorably against these balancing factors and complies with the hot spot criteria is selected for implementation. A residual risk assessment is then conducted for the selected alternative to document that it is protective of human health and the environment.

6.2. PROTECTIVENESS

The protectiveness of a given remedial action is evaluated by comparing actual or estimated future COC concentrations to the PRGs (see Tables 3 and 6). The pathways or beneficial uses for which the anticipated maximum concentration of a COC exceeds the acceptable risk level are:

- Exposure to soil by humans (construction workers, recreational, and transient), and
- Exposure to soil by mammals, birds, invertebrates, and plants.

These are the pathways and beneficial uses that will be directly evaluated to establish if a given remedial alternative is protective.

OAR 340-122-090 states that protectiveness may be achieved by any of the following methods:

- Treatment
- Excavation and offsite disposal
- Engineering controls
- Institutional controls
- Any other method of protection
- A combination of the above

With the exception of hotspots, there is no preference for any one of the above methods for achieving protectiveness. Where a hot spot has been identified, OAR 340-122-090(4) establishes a preference for treatment to the extent feasible, including a higher threshold for evaluation of the reasonableness of costs for treatment.

Alternative 1 - No Action would not take any action to minimize potential human or environmental exposure, by reducing concentrations of COCs, or using engineering or institutional controls. The potential for future exposure of human or ecological receptors exposed to soil that exceed the acceptable risk levels would still exist. Therefore, Alternative 1 is not protective and will not be evaluated further. All other

alternatives are protective and were carried forward into the balancing factors evaluation.

6.3. BALANCING FACTORS

The nine remedial action alternatives determined to be protective are evaluated against the following balancing factors defined in OAR 340-122-090(3):

Effectiveness in achieving protection. The evaluation of this factor includes the following components:

- Magnitude of the residual risk from untreated waste or treatment residuals, without considering risk reduction achieved through onsite management of exposure pathways (e.g., engineering and institutional controls). The characteristics of the residuals are considered to the degree that they remain hazardous, taking into account their volume, toxicity, mobility, propensity to bioaccumulate, and propensity to degrade.
- Adequacy of any engineering and institutional controls necessary to manage residual risks.
- The extent to which the remedial action restores or protects existing or reasonably likely future beneficial uses of water.
- Adequacy of treatment technologies in meeting treatment objectives.
- The time until remedial action objectives are achieved.

Long-term reliability. The following components are considered when evaluating this factor, as appropriate:

- The reliability of treatment technologies in meeting treatment objectives.
- The reliability of engineering and institutional controls needed to manage residual risks, taking into consideration the characteristics of the hazardous substances being managed, the ability to prevent migration and manage risk, and the effectiveness and enforceability over time of the controls.
- The nature and degree of uncertainties associated with any necessary long-term management (e.g., operations, maintenance, monitoring).

Implementability. This factor includes the following components:

- Practical, technical, legal difficulties and unknowns associated with the construction and implementation of the technologies, engineering controls, and/or institutional controls, including the potential for scheduling delays.
- The ability to monitor the effectiveness of the remedy.
- Consistency with regulatory requirements, activities needed to coordinate with and obtain necessary approvals and permits from other governmental bodies.
- Availability of necessary services, materials, equipment, and specialists, including the availability of adequate treatment and disposal services.

Implementation Risk. This factor includes evaluation of the potential risks and the effectiveness and reliability of protective measures related to implementation of the remedial action, including the following receptors: the community, workers involved in implementing the remedial action, and the environment; and the time until the remedial action is complete.

Reasonableness of Cost. This factor assesses the reasonableness of the capital, operation and maintenance (O&M), and periodic review costs for each remedial alternative; the net present value of the preceding; and if a hot spot has been identified at this site, the degree to which the cost is proportionate to the benefits to human health and the environment created through treatment of the hot spot.

In general, the least expensive remedial action is preferred unless the additional cost of a more expensive corrective action is justified by proportionately greater benefits to one or more of the other balancing factors. For sites with hot spots, the costs of remedial actions must be evaluated to determine the degree to which they are proportionate to the benefits created through restoration or protection of beneficial uses of water. A higher threshold will be used for evaluating the reasonableness of costs for treatment of hot spots than for remediation of areas other than hot spots. The sensitivity and uncertainty of the costs are also considered.

6.4. EVALUATION OF BALANCING FACTORS

Table 21 summarizes the evaluation of each of the remedial action alternatives that met the protectiveness criteria against the balancing factors, while Table 22 scores the alternatives by comparing each alternative against the other, producing an overall ranking. Table 21 also describes how each alternative compares to all of the sub-criteria for each of the balancing factors. This comparative analysis summarize the major conclusions of this comparison and provide additional discussion for differentiating issues at this site discussed below.

7. COMPARATIVE ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

Nine remedial action alternatives (plus no action alternative) are compared with each other for each remedy selection criteria identified in Section 6.1. A brief discussion of the merits of the various alternatives of DEQ's "balancing factors" is summarized below. Table 22 includes one tool of comparison consisted of scoring, or ranking, the alternatives against each other by balancing factor categories, with the most favorable alternative (i.e., 4c) outranking the others.

7.1. PROTECTIVENESS

This criterion is pass/fail. An alternative must be protective as defined by OAR 340-122-040 to be acceptable. All options (except no action) were determined to be protective, at least on a short-term basis, as they are expected to prevent exposure to contaminated soil. As discussed below, some of the options may not be protective on a long-term basis where cap or cover elements are thin and disturbance may occur over time. Complete removal is highly protective given all contamination is removed and contained at a regulated landfill. The thin amended cap alternative would provide a limited level of protectiveness compared to the other options and is considered the least conservative alternative.

7.2. EFFECTIVENESS

Complete removal would be the most effective option given all contamination would be removed offsite, including all human health and ecological hot spots, to a regulated landfill. Consequently, site uses would be unrestricted after implementation. All options could be constructed in a similar timeframe. For capping options, smaller cap areas and thicker caps were deemed more effective. A minimum of 3 feet is considered appropriate to be protective of burrowing animals. As such the thin caps, as well as the standard cap alternative, would not be highly effective to prevent exposure to burrowing animals. A soil consolidation strategy would remove the majority of the contamination and all human health risk from a substantial portion of the Upland and would be capped with a thicker reinforced engineered cap. Alternative 4c improves on this concept by removing all human health hot spots from the Site and the consolidation area manages remaining human (and ecological) risk through capping. A thin amended cap would be the least effective in managing risk through engineering and institutional controls, particularly areas containing hot spots given the potential for disturbance over time.

7.3. LONG-TERM RELIABILITY

Complete removal provides the greatest long-term reliability given all contamination would be removed offsite and the only option that does not rely on institutional and/or engineering controls to ensure long-term protectiveness. Alternative excavation around native trees is comparable to standard excavation. Leaving contamination onsite (the remaining alternatives) would require long-term controls. For capping alternatives, alternatives that included removal were assumed more reliable, and alternatives that included thicker caps were considered more reliable. The consolidation area strategy would isolate contamination to a focused area and an engineered cap would be designed to withstand more extreme conditions (compared to a soil cap across the Site). The thin amended cap options provide limited reliability, particularly long-term. While amendments can reduce bioavailability, thin caps are more easily breached whether due to

storms/erosion or human and animal activity. A thin cap contains the highest level of uncertainty, would not protect borrowing-natured animals and human protectiveness relies on institutional controls (such as signage or fences), which are also less reliable than more robust engineering control (thicker cap) options. Alternatives that require less long-term maintenance were assumed more reliable.

For any of the alternatives that involve leaving contaminated soil onsite, either within or outside of a consolidation cap, the vulnerability of the Site to flooding and/or seismic events must be considered when evaluating long-term reliability. Portions of the Upland are vulnerable to flood. As illustrated in Figure 3, the 100-year flood zone encompasses the lower upland portion of the East Parcel and the 500-year flood would cover the majority of the Central/East Parcels. The potential for significant seismic activity exists, and DEQ notes that the prominent West Hills fault is located less than a mile west of the site. From the perspective of flooding and seismic concerns, the full excavation option is most reliable, while alternatives that entail leaving hot spot contamination in place and covered by thin capping elements are least reliable. Hybrid alternatives that involve offsite disposal of human hot spot soil, and a combination of offsite disposal and onsite containment of ecological hot spot material and more elevated non hot spot soil (e.g., 4c) are expected to have an acceptable level of long-term reliability if properly designed.

7.4. IMPLEMENTABILITY

The alternatives use similar equipment and techniques, are similarly compatible with other actions, have similar periods of construction, but have differing levels of transportation requirements and impacts. With that said, consolidation and capping strategy employs a combination of technologies, and consequently greater complexity would necessitate greater planning and construction logistics. A thin amended cap would be the easiest alternative to implement. Complete removal would be most difficult to implement.

Alternatives with fewer transportation impacts (using material quantities and truck/barge mileage as surrogates for impact; actual transportation methods will be evaluated during design with a preference for barge) were assumed to be more implementable.

7.5. IMPLEMENTATION RISK

Excavation activities involve the disturbance and movement of contaminated soil. With this activity, there are one or more of the following risks: worker exposure; and release of contaminated to soil during excavation, transport, and disposal. Alternatives with greater material quantities carry greater risk from dust, spills or incidents, noise/pollution, destruction of habitat, and generation of greenhouse gases and therefore rank lower. Alternatives were generally ranked based on barge/truck/train mileage as a surrogate for material transportation impacts (higher-ranked alternatives having fewer transportation trips or miles), quantities of earthwork (lower quantities rank higher), and impacts to site habitat (less destruction ranked higher).

Complete removal carries the greatest risk given extensive quantities of contaminated soil would need to be excavated, loaded, and transported offsite. Capping only scenarios contain less risk for worker exposure; however, site-wide capping would require substantial import of material. The thin cap alternative bears the least implementation risk.

7.6. REASONABLENESS OF COST

The thin amended cap alternative has the lowest cost (and the least conservative option). Complete removal or complete capping options are the most conservative and most expensive alternatives. Alternative 4c is hybrid conservative approach, not the least or most expensive.

8. RECOMMENDED REMEDIAL ACTION IN STAFF REPORT

Based on the detailed evaluation of the soil remedial alternatives in Section 6 and 7, Alternative 4c (Focused Alternative Excavation, Offsite Disposal, Onsite Consolidation, and Cap) was recommended to address soil contamination currently present and uncontrolled within the Willamette Cove Upland Site. The recommended remedial actions were described in DEQ's *Staff Report Recommend Remedial Action for Willamette Cove Uplands Site*, dated March 2020. This recommended remedial action is a hybrid of technologies, which provides a protective and cost-effective approach to remove and contain contaminated soil, including hot spots. Alternative 4c foremost will restore the site to protective conditions, and in comparison of the remedy selection balancing factors outranked the other potential alternatives.

9. PUBLIC NOTICE, PUBLIC COMMENT, AND RESPONSIVE SUMMARY

Public comment on the recommended cleanup plan for the Willamette Cove Upland Site commenced Monday, March 2, 2020. Given community interest in the property, the Oregon Department of Environmental Quality committed to a sixty-day comment period. The comment period was extended on two occasions to conduct public outreach activities during the COVID-19 pandemic. The comment period in full was six months and ended on Aug. 31, 2020.

Community outreach began well ahead of the public comment period and continued in coordination with Metro, Port of Portland, Oregon Health Authority (OHA), and Portland Harbor Coalition Community (PHCC). Collectively our goal was to engage and educate the community on work occurring at the site, environmental risks at the property, and DEQ's proposed cleanup plan to restore site conditions protective for human health and the environment. As part of the *Train the Trainers* initiative that was funded by the Port of Portland, PHCC recruited volunteers from the community to be trained on Willamette Cove environmental risk concerns and plans for an upland cleanup, with the intent to share what was learned with the greater community and create a forum for further discussion and input. These workshops and related activities were supported by DEQ, Metro, OHA, and the Port of Portland.

DEQ attended and spoke at community centers and events, such as the Portland Harbor Superfund Site (PHSS) community forums and Sisters of the Roads Café, to share information about the Willamette Cove Upland Site. During the public comment period, DEQ presented at the Cathedral Park Neighborhood Association, provided a short announcement at the St. John's Neighborhood Association, and presented an update at the Portland Harbor Community Forum. DEQ also conducted a virtual public meeting with the Portland Harbor Community Advisory Group (CAG) on May 13, 2020. The presentation, including Q&A, was recorded and posted on DEQ's website for the Willamette Cove Upland: ordeq.org/willamettecove.

DEQ set up a webpage to provide information about the project and how to comment, including a copy of the proposed cleanup plan, factsheets and an executive summary (in four languages), and a story map for the project. The Staff Report published March 2020 presented DEQ's recommendation in greater detail based on previous work conducted at the site uplands, including remedial investigations, risk assessment, removal actions, feasibility study, and source control evaluation activities. These supporting documents were made available on the website and DEQ's Environmental Site Cleanup Information (ECSI) database for the Willamette Cove Site (Site ID No. 2066): ordeq.org/ecsi2066.

In addition to preparing information-sharing platforms and hands-on outreach efforts, the public comment period was announced in *The Oregonian* (as were the extensions), DEQ's public notifications page, DEQ and USEPA Portland Harbor e-mail "listservs", the Portland Harbor CAG, and a host of potential interested parties were contacted directly by DEQ, including tribal governments, USEPA, government agencies/offices, and community and environmental groups. Post cards were also prepared and mailed to residents of Cathedral Park and St. John's neighborhoods in June 2020 seeking public input and communicating the extended public comment period.

Responsive Summary

The following presents a response summary to public comments received during the March 2 to Aug. 31, 2020 public comment period on the recommended cleanup plan (Alternative 4c: Focused Alternative Excavation, Offsite Disposal, Onsite Consolidation, and Cap) presented in DEQ's Staff Report for the Willamette Cove Upland Site. DEQ received approximately 180 emails, a petition signed by nearly 300 individuals, several hand-written comments, two audio recordings and one video. Multiple emails contained comment letters and several letters and petitions were signed by multiple groups and/or individuals. Each email submission was given a sequential individual comment ID number, followed with the audio and video submissions. Several submissions were translated from Spanish and Russian into English (both languages are included). A master spreadsheet was developed by DEQ to track assigned identification numbers and the comments made in each submission and signature(s) to respective comments. Names of individuals who submitted comments are listed but additional contact information has been excluded to protect privacy. Names of businesses, organizations, and government entities submitting comments are listed and contact information for business and organizations have been retained. The comprehensive spreadsheet (minus individual contact information) is presented as Appendix B to this document (ROD).

A number of common themes were presented in the comment set. A large number of commenters requested more removal/offsite disposal of contaminated soil than DEQ's proposed cleanup remedy (Alternative 4c) while some commenters considered a less active cleanup is needed. Some comments were specific to concerns related to contaminant transport/disposal in their community. Multiple comments were related to future park uses and community accessibility, including access to the river. Many comments were intertwined and combined, and cover several topics. The most common comments are summarized and addressed below:

Comment No. 1: More Removal/Offsite Disposal. A large portion of comments call for a "full cleanup" of contamination or a "full removal" of contamination.

DEQ Response No. 1.
The full removal options (Alternative 3a and 3b) and DEQ's proposed cleanup remedy (Alternative 4c) are generally equivalent in the terms of the quantity of contaminated soil excavated (e.g., spatial and vertical extent). However, Alternative 4c incorporates consolidation of excavated contamination below human health hot spot values to designated areas onsite and containment under a reinforced cap (comprised of a minimum three feet of rock and soil). The cap will be engineered to withstand seismic and storm/flooding events. The types of contamination found on the property can also be reliably contained given their *immobile* physical characteristics.

Both the full removal and the proposed consolidation area approaches to site cleanup will encounter the same challenges if contamination exists at greater depths than current data suggests. If there is contamination below three feet, additional areas may require capping material to achieve protective conditions, including the full removal alternative. **Under both alternatives, it will be safe to access all portions of the site after construction, on and off trails. Site conditions will also be safe for wildlife.**

The proposed cleanup accomplishes equivalent protection to the full removal option, in terms of preventing exposure to contamination for planned site uses. The consolidation area cap will be designed for long-term reliability. Full removal contains greater implementation risk because it requires transporting substantial quantities of contaminated material offsite, which increases the chance of accidents or spills. There is also

a substantial environmental cost (carbon footprint) associated with transporting all site contamination to an offsite landfill.

These variables, among others are considered in the balancing factors used for remedy selection: effectiveness in achieving protection, long-term reliability, implementability, implementation risk, and reasonableness of cost. Implementation of 3b or 4c alternatives will restore site conditions to be protective for human health and the environment. Under the regulatory structure memorialized in Oregon cleanup rules and statues, Alternative 4c, is the preferred remedy.

Given recent interest from Metro to consider additional park features (in addition to a nature park with a regional trail), DEQ reviewed the proposed cleanup and has determined additional park uses are compatible with the recommended cleanup plan. Some park infrastructure may require additional measures (such as underlying barriers) to be effective long-term for certain uses (such as increased activity).

Acknowledging public input and to provide additional flexibility as Metro finalizes their vision for the site, DEQ has developed a contingency remedy. The contingency remedy allows for Metro, during remedial design and in consultation with DEQ, to perform additional measures including additional removal activities to align with final plans for Willamette Cove. Under this framework, Metro can eliminate or greatly reduce the volume of soil to be consolidated onsite and instead transport the soil offsite for disposal at a regulated waste facility.

Comment No. 2: Long-term Reliability & Cost for 4c. Comments in support for more removal/offsite disposal were frequently tied to concerns of potential future releases of remaining soil contamination despite containment under a robust engineered cap. Other concerns for onsite consolidation and containment questioned the adequacy of long-term monitoring and maintenance, as well as associated long-term costs.

DEQ Response No. 2. Onsite consolidation and capping has been successfully implemented in numerous instances along the Willamette River, state-wide, and nation-wide. DEQ notes that the Portland Harbor Superfund Site cleanup approved by USEPA incorporates capping of highly contaminated sediments including shallow and intermediate depth areas of the Willamette River. It is also anticipated the cleanup of contaminated riverbank areas will incorporate removal and capping methods.

The consolidation area cap will be designed in a manner to withstand seismic and storm or flooding events. Regarding a "Cascadia" Subduction Zone earthquake (of megathrust magnitude), the impacts to the greater Portland Basin area will be significant and devastating, destroying infrastructure along and over the Willamette River.[17] Unlike the widespread damage to infrastructure and instant loss of life that is likely to result from this type of earthquake, damage to the consolidation area has low potential to cause immediate harm to human health. The cap will be inspected on a regular basis and immediately following a seismic or storm/flooding event of a significant nature. If damaged, DEQ would require the property owner to restore the engineered cap to ensure protectiveness.

A monitoring and maintenance plan will be prepared for DEQ approval. At completion of cleanup activities, long-term inspections and maintenance would be incorporated into Metro's property management plans. Long-term costs for monitoring and maintenance (up to 30 years) have been accounted for in estimated project costs. Typically, as regular inspection and monitoring data accumulate, maintenance needs are better

[17] https://www.oregon.gov/oem/hazardsprep/Pages/Cascadia-Subduction-Zone.aspx

anticipated and monitoring needs decline. Monitoring will, however, continue as long as contaminated material remains on the property. DEQ will continue to conduct periodic "protectiveness" reviews, annually and then periodic ROD reviews, to ensure the remedial action remains protective for human health and the environment.

Comment No. 3: Bioremediation. Several comments support integrating bioremediation, specifically mycoremediation (fungi-based technology), into the cleanup plan. Expected potential benefits include "green" and less disruptive methods of cleanup and advancing technology development through research. The Port of Portland is currently funding bench (laboratory-scale) tests using mycoremediation and Willamette Cove contaminated soil. Some comments recognize these tests are in early stages of development and would only want bioremediation incorporated into the final remedy if it can be applied successfully at the site. To a much lesser extent, concerns were raised that using bioremediation or mycoremediation would be ineffective and therefore not useful in addressing soil contamination in the Willamette Cove Upland.

DEQ Response No. 3. DEQ has used bioremediation at multiple cleanup sites where the technology has proven effective, most notably in addressing petroleum and solvent contamination in soil and groundwater. Bioremediation was considered in several forms during remedy development and screening. DEQ determined that this technology is not able to effectively treat site-related contaminants of greatest concern that are present site-wide. While bioremediation has merit to treat contaminants such as petroleum and polyaromatic hydrocarbons (PAHs) in soil, it has not been proven successful in treating persistent, low-volatility contaminants such as dioxins/furans distributed across the upland property. Dioxins pose the primary risk to human and ecological health, are highly persistent, bioaccumulative, and are highly resistant to bioremediation. If new information emerges during remedial design that bioremediation methods can be applied effectively at the scale of the Willamette Cove project, DEQ will consider incorporating these methods into the final remedy.

Comment No. 4: Disruption to the Community. Concerns of disruption as a result of cleanup activities fell into two categories: removal/disruption to the ecosystem and disruption to communities.

DEQ Response No. 4. Implementation of an adequate cleanup will cause temporary disruption to the ecosystem and the community. Contamination at the site is currently uncontrolled and poses a risk to human health and ecology (plants and animals) until an adequate cleanup is implemented.

Due to the presence of contamination across the site, the current ecosystem will be disrupted under all cleanup alternatives. While native trees will be preserved to the extent possible, all other vegetation will be removed and underlying soil/debris excavated up to three feet (with the final depth depending on the confirmed depth of contamination). As part of the cleanup, native plants will be planted across the entire site (minus areas of park infrastructure, such as a paved regional trail). Re-establishing vegetation commonly requires some period to develop healthy growth, which may require watering during dry periods and regular maintenance, such as removal of invasive species and in some cases replanting areas with low success rates.

The neighboring community will be disrupted primarily by onsite construction noise and equipment, as well as transportation activities hauling material on and off the site. Increased traffic impacts to communities near Willamette Cove, along the traffic route, and near the disposal site will cause increased air emissions. For example, preliminary "ballpark" estimates taking into account import and export of soil and/or cap materials to implement a cleanup, the preferred remedy (Alternative 4c) may require more than

3,000 truck trips compared to more than 5,000 truck trips for the full removal alternative. For a medium-sized barge, this translates to approximately 30 barge trips versus 50.

Evaluating cleanup alternatives requires an understanding of implementation risk, including the potential for truck accidents or spills during transportation. The preferred remedy requires fewer trips (compared to the full removal alternative) and therefore implementation risk is lower. Transport options, such as rail and barge, will be explored as alternatives to trucking. It is anticipated the rail option would require construction of a spur for loading/unloading. DEQ preference is barge and/or rail transport but presumably material to a certain extent will be hauled on and offsite via trucks.

A community outreach and communications plan will be developed and updated to inform the community on the timing and types of construction activities in advance and during remedial implementation.

Comment No. 5: Access/Future Use. The majority of comments also highlighted the importance of unlimited human access, including preferences for potential futures uses of the site. Public input expressed a preference for a variety of uses, ranging from intensive park use to full preservation as a nature park with limited public access.

DEQ Response No. 5. DEQ's selected cleanup will allow for full access of the upland site, on and off trails, in accordance with Metro's proposed future use. Native trees will be preserved to the extent possible.

Access to the riverbank, beach, and river is outside the scope of DEQ's Staff Report and cleanup plan for the Willamette Cove Upland Site. The "Upland" extends from top of riverbank landward, east and away from the Willamette River. Cleanup riverward of the Upland is being conducted under USEPA oversight.

Decisions related to how the site is developed and managed are outside of DEQ's authority and will be decided by the property owner, Metro. DEQ's cleanup plan has been developed around Metro's stated intended use. DEQ can implement deed restrictions where certain activities would lead to unacceptable exposure. It is DEQ's understanding that Metro plans to initiate a community engagement process specifically for the Willamette Cove. The in-water group, in consultation with USEPA, have been conducting community outreach sessions (presently in the remedial design process in accordance with the PHSS Record of Decision).

Comment No. 6: Houseless Community. Comments mainly raised two points related to the houseless community: i) displacement, and ii) risk assessment calculations. Concerns included the displacement of the houseless community during the cleanup, and long-term implications related to future development and management plans. Others questioned how the risk levels were calculated and the rationale in determining soil cleanup levels for a recreational user are lower than those for the houseless using the site.

DEQ Response No. 6. At present the site poses an unacceptable risk to all human uses (and to plants and animals) as a result of soil contamination encompassing the entire property. During implementation of the cleanup, particularly during construction activities for health and safety reasons, only qualified and trained workers will be allowed to enter the site. After cleanup is complete, the Upland will be safe for camping and related activities. Decisions related to how the site is managed will be decided by the property owner.

DEQ toxicologists have been instrumental in completing a representative comprehensive risk assessment and development of protective risk-based cleanup levels for the site. Soil cleanup levels are lower (i.e., more conservative) for a recreational user compared to a person that may camp temporarily at the site. This

is explained by each users' duration of exposure at the site. Specifically, the risk-based cleanup levels for a recreational user includes exposure starting as a child into adult years, for a total of 26 years. While houseless community members may be present longer on a daily basis and a portion of the year, the exposure is not considered to span more than two years. The longer total time that recreational users are assumed to visit Willamette Cove compared with campers is the primary reason for the difference in cleanup levels. Cleanup levels, also called acceptable risk levels, direct the extent of remedial action necessary to restore the site to achieve protective levels. DEQ uses the lower, more protective cleanup levels for all site uses identified, currently and in the foreseeable future. In this case, selecting a remedy to achieve cleanup levels for a recreational (park) user also protects the houseless.

Comment No. 7: Pace to Cleanup. Several comments requested in one way or another, a rapid cleanup. Others comments were in general support of the proposed cleanup, which is viewed as a benefit for the community.

DEQ Response No. 7. An adequate investigation and risk assessment is necessary for a successful cleanup. Site discovery to cleanup is an interactive and comprehensive process, and is particularly complex on sites such as Willamette Cove. Investigation began at Willamette Cove in 2000 after the discovery of environmental contamination. At that time, little was known about the site in terms of contamination attributed to legacy industrial operations. Additional contaminants of concern (i.e., dioxin-furans) were found in the early 2010s. Several phases of investigation to determine the nature and extent of contamination helped to inform human health and ecological assessments, as well as screening and evaluating potential cleanup options. Early removal actions, focusing on the most mobile and/or highly contaminated soil occurred in 2004 (inner cove), 2008 (metal hot spots), and 2015 to 2016 (hot spots). Note, the 2015 to 2016 removal action included large-scale excavation and offsite disposal, during which most contamination representing "hot spot" level risk to human health was removed. After several revisions of the feasibility study evaluating potential cleanup options and supplemental data gap investigations, sufficient information is now available to select the comprehensive site-wide cleanup plan.

In terms of schedule, following DEQ's Record of Decision for the Willamette Cove Upland Site (early 2021), DEQ will enter into a legal agreement with Metro and the Port of Portland to conduct the cleanup. Next steps in preparation for cleanup action include a final, large-scale soil sample collection effort to refine the extent of excavation, particularly depth, necessary to achieve cleanup goals. This information will also be used to develop final plans for soil containment and offsite disposal.

Timing of the cleanup is also tied to the Portland Harbor in-water and riverbank work in terms of sequencing and construction logistics. DEQ anticipates that substantial portions of the riverbank will be subject to remedial action (under USEPA oversight), including laying back areas of the riverbank, which will impact the upland remedy. This will require close coordination between DEQ and USEPA for their respective cleanup actions before and during remedy implementation. DEQ has begun these coordination efforts with USEPA and the in-water cleanup group. In the interim, DEQ may pursue removal of hot spot areas of soil contamination in the uplands slated for offsite disposal under the selected remedy.

10. SELECTED SOIL REMEDIAL ACTION

DEQ's selected remedial action is consistent with Alternative 4c (Focused Alternative Excavation, Offsite Disposal, Onsite Consolidation, and Cap) presented in the Staff Report. The remedial action is based on the comparative evaluation against DEQ's remedy selection criteria to address soil contamination currently present and uncontrolled within the Willamette Cove Upland Site. This selected remedy provides a protective approach to remove and contain contaminated soil using a range of technologies. The remedial action preserves native trees (to the extent possible) and will restore the site to protective conditions. Following construction, people can safely access the entire Upland, on and off trails.

DEQ has also adopted a contingency remedy in consideration of public comment and to provide flexibility as Metro finalizes their vision for a nature park at the site. This contingency remedy permits Metro, during remedial design and in consultation with DEQ, to perform additional remedial activities to align with final plans for the Willamette, including reduction or even elimination of the consolidation area identified in Alternative 4c.

10.1. DESCRIPTION OF THE SELECTED SOIL REMEDIAL ACTION

Soil containing human health hot spots will be removed for offsite disposal; remaining soil exceeding human health risk levels and ecological hotspots will be excavated (using alternative techniques to save native trees) and consolidated onsite and capped; and remaining soil with residual ecological risk will be managed using covers. All soil contamination exceeding human health and ecological acceptable risk levels (i.e., the majority of the upland property above top of riverbank) will be addressed under this remedial alternative. These actions will result in all human health hot spots removed from the site, and ecological hot spots either removed or consolidated beneath an engineered cap. Figure 28 illustrates the features of the soil remedy. The estimated cost for Alternative 4c is 8.8 million dollars.

This hybrid alternative intentionally limits offsite disposal to highly concentrated contamination and relocates remaining soil above human health risk levels to a localized, robust containment feature. Consequently, soil in a large portion of the Upland will present *no human health risk* and only a modest risk to plants and animals, the latter primarily associated with dioxins/furans (in the part per trillion range) and addressed with a soil cover. Limiting offsite disposal to another location (i.e., landfill incumbent to institutional/ engineering controls) considerably reduces transportation miles, including truck trips through the adjacent community. It is preferable to limit transportation (miles and trips) and potential risk for related spills or incidents, as well as minimizing the carbon footprint of remedy implementation. This alternative aligns with DEQ's Green Remediation Policy and the EPA Region 10 Clean and Green Policy by reducing the demand placed on the environment during cleanup actions and to conserve natural resources.

DEQ's selected cleanup will allow for full access of the Upland site, on and off trails, in accordance with Metro's intended future use. This includes any engineered cap areas, which will be designed to withstand normal human activity (as well as storms and seismic impacts).

Soil Removal for Offsite Disposal
Human health hot spot areas will be excavated and transported offsite to a regulated landfill. It is estimated approximately 4,000 cubic yards[18] of soil containing non-dioxin/furan hot spots will be subject to removal offsite; however, final volumes will be based on remedial design sampling. Similarly, if human health dioxin/furan hot spots are detected during additional sampling, supplementary soil removal will be performed for disposal offsite as deemed appropriate by DEQ. The final depth of excavation will be determined by verification sampling.

Additional excavation and offsite disposal of soil exceeding risk levels for humans or ecology (plants and animals) may also be required if in-place capping or onsite consolidation and capping are not feasible due to space limitations, flooding or seismic concerns, etc. To the extent this is necessary, a preference will be given to offsite disposal of soil posing a higher risk to humans or plants/animals, particularly non-dioxin/furan ecological hot spots.

Soil Removal for Onsite Consolidation
Remaining soil above human health risk levels and soil with higher ecological risk levels will be excavated (using methods to preserve selected native trees) and consolidated onsite in an engineered cap constructed to isolate the soil and prevent human or animal contact. Excavation and containment of soil above human health PRGs is expected to also remove the majority of ecological hot spots. While there is preference for ecological hot spots to be contained under the consolidation cap (or disposed offsite at a landfill), it will be a requirement for non-dioxin/furan ecological hot spots (e.g., metals including mercury). It is estimated that 23,000 cubic yards of contaminated soil would be excavated and placed in the consolidation area but quantities will be further evaluated following remedial design sampling. Correspondingly, excavation depths to remove contaminated soil above cleanup levels will be determined by verification sampling. Unanticipated soil contamination may require additional offsite disposal due to size restraints, amongst other considerations, for the onsite consolidation area.

Covers for Residual Ecological Risk
Outside the consolidation area, remaining soil contamination may consist of ecological risk or no risk covering an estimated 727,000 square feet (i.e., the upland area minus the 116,000 square feet consolidation area). Areas with remaining residual ecological risk will be covered with clean imported soil. The soil cover thickness (at least 1 to 3 feet) will be determined based on the magnitude of ecological risk remaining. (While not anticipated, 3-foot soil caps underlined with demarcation fabric would be required for ecological hot spots.) In general, cover material will be comprised of clean imported soil (upper 1-foot topsoil); however, additional materials approved by DEQ could be used, such as asphalt paths. Institutional or engineering controls will be unnecessary for "cover" areas where no contamination remains. [19] Soil cover surfaces will be finished with native grasses, shrubs, and trees, and properly irrigated. In general, the site will be finished in a manner to manage stormwater onsite in an effective and controlled manner and minimize erosion of caps or covers.

Consolidation Area
The consolidation area will be engineered for long-term stability and containment of contaminated soil above human health risk levels (including ecological hot spots). The consolidation cap will be designed by professional engineers to withstand natural occurring events, including earthquakes, extreme storms, and flooding, in addition to human and animal impacts. The base of the consolidation area cap will incorporate

[18] This estimate includes non-dioxin/furan ecological hot spots, which are proposed for offsite disposal.
[19] Areas no longer containing contamination will still receive 1-foot of topsoil for vegetation purposes.

demarcation material as an indicator of underlying contaminated soil. The consolidation area cap will be comprised of a minimum 3 feet of clean material (unless otherwise approved by DEQ) and presumably would need to be reinforced for long-term stability and prevent burrowing of animals. The cap surface will be comprised of topsoil to allow for native plantings and/or the cap can incorporate park infrastructure using materials approved by DEQ. This may include asphalt paths or viewing platforms. The final cap design will be tailored in coordination with Metro's plan for a nature park with a regional trail. For instance, the consolidation facility will be designed to create an aesthetic fit with the site and its future use. Diverting stormwater around the consolidation area will be further examined during remedial design, as will the potential need for groundwater monitoring downgradient of any consolidation area to confirm that a containment cell will not impact groundwater quality.

For illustration purposes an example consolidation area (covering approximately 116,000 square feet) is shown on Figure 28. Final location(s) and dimensions (e.g., shape) of the consolidation area will be determined during remedial design, including stability considerations and accommodating future park plans to the extent possible.

Remedial Design/ Remedial Action (RD/RA)

Under the selected remedy, a robust pre-remedial design sampling investigation will further delineate soil contamination, extent and magnitude, to inform remedial design and minimize unexpected conditions during remedy construction. Comprehensive health and safety and contaminated media management plans will be prepared and identify preventive measures necessary to protect site workers and the adjacent community. Communication/coordination plans will inform the community of planned construction activities, including traffic routes, timeframe and safety measures. It is DEQ's preference that materials transported on/offsite will utilize barge transport to the extent feasible, limiting impacts to neighborhoods located proximal to the site. (Barge transport via the Willamette Cove occurred during the cleanup at the adjacent McCormick and Baxter site.) Feasibility of rail transport will also be evaluated and may require construction of a rail spur.

In addition to remedial sampling and design, remedial preparation will include obtaining required permits or waivers for construction from appropriate agencies, such as a construction permits and working in the City's designated Greenway.

RD/RA will require close coordination with in-water and riverbank remedial action activities under USEPA oversight. It is anticipated the greater part of the Willamette Cove riverbank will require remedial action, including setback of steepened riverbank areas. Riverbank setbacks will reduce the "Upland" property at/near the top of riverbank. Upland and riverbank remedial action areas will need to be compatible and merge, as well as the in-water remedy, into a comprehensive Willamette Cove remedy. This will require considerable planning between agencies, multiple liable/responsible parties for cleanup, and other stakeholders.

In terms of schedule, if a hiatus is expected between remedy selection and full implementation, DEQ will evaluate interim removal options for remaining human hot spots and potentially the most highly concentrated ecological hot spots. Additionally, DEQ will require that the Port and Metro consider additional measures to prevent exposure to site contaminants prior to full remedy implementation. The total estimated cost to implement the remedy (Alternative 4c) is $8.8M. DEQ's expectation is this estimated cost developed in the Feasibility Study (Apex, 2019) is intended to be reasonably accurate, within +50% to -30% of actual cost consistent with DEQ's Guidance for Conducting Feasibility Studies (1988, updated 2006).

Contingency Remedy
In consideration of public comment and recent interest from Metro to rethink elements of a future park at Willamette Cove and a commitment to engage the community in the process,[20] DEQ has incorporated a contingency option into the final remedy. The contingency remedy provides Metro the opportunity, during remedial design and in consultation with DEQ, to perform additional measures beyond those identified in the selected remedy outlined above, including additional removal activities to align with final plans for Willamette Cove. Under this process, Metro can eliminate or greatly reduce the volume of soil to be consolidated onsite and instead transport the soil offsite for disposal at a regulated waste facility. [21]

Metro would inform DEQ of their intention to invoke the contingency, presumably following pre-remedial design sampling but prior to preparing the Basis of Design Report (BDR) for the final remedy. This would require adequate preliminary plans on Metro's behalf to scope additional removal activities and refine remedial cost estimates.

Groundwater Source Control Evaluation
The ongoing groundwater source control evaluation will continue in consultation with USEPA and Portland Harbor partners. Investigation activities will be completed to determine whether groundwater contaminants have the potential to migrate to the Willamette River. Investigation will include both additional Upland sampling and data analysis, and in-water investigation as part of (Portland Harbor Superfund Site) pre-design investigation under USEPA. If a complete groundwater-to-surface water migration pathway exists, source control options will be evaluated.[22] Following completion of this work, DEQ will prepare a Source Control Decision.

Institutional Controls
Contamination that remains onsite (in a controlled manner), such as using engineering controls under the selected remedy, will require institutional controls to ensure long-term protectiveness through the following mechanisms:

- Site-management plans will be prepared and adhered to for the foreseeable future, including cap inspection and maintenance, contaminated media management plans, and contingency plans as needed.
- Site use restrictions and engineering and institutional controls will be memorialized on the property deed in the form of an easement and equitable servitudes, or comparable mechanism.
- DEQ will perform periodic reviews (initially more frequent to 5-year reviews) after remedy construction to ensure the selected remedy remains protective.

[20] On December 10, 2020, Metro Council adopted a resolution (No. 20-5149) to discuss additional and voluntary actions that Metro could take at the site to further improve its environmental condition; explore potential funding mechanisms; and a commitment to meaningful public engagement to identify community priorities for future passive recreational opportunities and trail development consistent with protection and restoration of natural resources at Willamette Cove.
[21] Areas of soil contamination, if encountered, that extend below 3 feet may require remedial caps/barriers and/or institutional controls to ensure long-term protectiveness.
[22] Potential source control options are presented in the *Revised Groundwater Source Evaluation and Alternatives Analysis*, dated January 20, 2020.

10.2. RESIDUAL RISK ASSESSMENT

OAR 340-122-0084(4)(c) requires a residual risk evaluation prior to selection of a remedial action alternative to demonstrate that acceptable risk levels, as defined in OAR 340-122-0015, will be attained in the locality of the facility:

- A quantitative assessment of the risk resulting from concentrations of untreated waste or treatment residuals remaining at the facility at the conclusion of any treatment or excavation and offsite disposal activities taking into consideration current and reasonably likely future land and water use scenarios and the exposure assumptions used in the baseline risk assessment; and
- A qualitative or quantitative assessment of the adequacy and reliability of any institutional or engineering controls to be used for management of treatment residuals and untreated hazardous substances remaining at the facility.

The remedy achieves acceptable risk levels through a combination of contaminant elimination (excavation and offsite disposal) and isolation (consolidation and capping) technologies. Both are recognized by DEQ and USEPA as adequate and reliable if properly implemented and maintained. The most highly contaminated soil would be removed from the site to a permitted landfill, eliminating the potential for future releases and migration. The majority of the contaminated soil remaining onsite, isolated in a containment cell, would be prevented from release/migration or direct contact with humans and ecology. This requires, however, that the cell be properly constructed, with monitoring and maintenance in perpetuity. Remedy design for the containment cell will include evaluation of risks associated with human disturbance, flooding, and seismic events.

Acceptable risk levels are discussed in Section 5.1 of this report (Remedial Action Objectives) and presented in Tables 3 and 6. Through the risk assessment process, these concentrations for individual upland COCs have been determined by DEQ to be protective for human and ecological (animal and plant) populations. RAOs are based on these risk-based criteria; cleanup to or below these levels would achieve these risk levels as follows:

- Contaminated soil removed from the site would no longer pose unacceptable risk to site users.
- Consolidation and isolation of contaminated soil remaining at the site would eliminate human and ecological exposure via normal routes of exposure (soil ingestion, dermal contact, and inhalation). Isolation would further prevent animal exposure via ingestion of contaminated prey or vegetation.

A final quantitative evaluation of residual risk will occur after collection of additional data (i.e., remedial design sampling) and completion of a remedial design.

11. STATUTORY DETERMINATIONS

The selected remedial action for contaminated soil and sediment at the Willamette Cove Upland Site is protective, and reflects the best balance of tradeoffs considering effectiveness, long-term reliability, implementability, implementation risks, and reasonableness of cost. Long-term monitoring and maintenance will be required to ensure the remedy remains protective over time. The selected action therefore satisfies the requirements of ORS 465.314 and OAR 340-122-0090.

12. SIGNATURE

March 31, 2020

Kevin Parrett, Manager
Northwest Region Cleanup Program
Department of Environmental Quality

Date

APPENDIX A: ADMINISTRATIVE RECORD

ADMINISTRATIVE RECORD INDEX

Willamette Cove
Portland, Oregon

The Administrative Record consists of the documents for which the selected remedial action for the site is based. The primary documents used in evaluating remedial action alternatives for the Willamette Cove site are listed below. Additional background and supporting information can be found in the Willamette Cove project file located at DEQ Northwest Region Office, 700 NE Multnomah Street, Suite 600, Portland, Oregon.

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APPENDIX B: PUBLIC COMMENTS

Appendix B Comments on DEQ's Recommended Cleanup Plan for the Willamette Cove Upland Site Public Comment Period - March 2, 2020 to Aug. 31, 2020	
No.	**Comment**
1	To whom it may concern; I would like to comment on the matter of the proposed cleanup solutions for the Willamette Cove Superfund site. Several options have been proposed, and some seem to me to disregard the fact that Willamette Cove is a beautiful place in an urban area that is being accessed by local communities, and I am hopeful that there will be a way to clean up the cove and provide community access. One of the main goals should be to make this a place that is accessible to the public. Option 3a, although attractive in that it would actually remove the toxins, would be a completely disruptive option. This would upend not only the entire ecosystem, but those who use the area and who live in surrounding areas. These surrounding communities would be greatly impacted by the traffic of moving that amount of land for years. There must be a less disruptive alternative. The options 3d and 4c include consolidation into a large area of land. I cannot help but feel that this is a band-aid, and this is just pushing contaminants to the side to be dealt with my future generations. Having a consolidated mass beside a river could very easily lead to release of these contaminants into the river if a natural disaster occurs. What happens if one day the superfund site, after years of effort, is finally seeing lowered levels and then a flood dumps large amounts of the consolidated soil back into the water supply? The one option that I am hopeful is being seriously considered is that of bioremediation. If we can find a way to work with natural systems and incorporate natural products into the environment to help rid the area of pollutants, this would result in a restoration process that is superior in many ways. Minimal disturbance, less pollution, and it would be more cost effective. I do understand that we do not yet know if this is a viable option, and that we are awaiting results of a bench test. It is my hope that if the bench test is successful, that you will seriously consider this option. It is important to many in the community to alleviate this problem with as little disturbance to the environment as possible. Please consider the importance of Willamette Cove to those who use it currently, and to those who wish to share this space as a community. If there is an option to clean up the cove and provide park access to the cove itself and not just a trail running through it the current community and future generations would see innumerable benefits. Thank you so much for your consideration Crystal Maloney

	To whom it may concern, This communication is in regards to the restoration plans for the Willamette Cove and its cleanup effort. I've reviewed the 2019 DEQ Feasibility and have specific concerns about a few key areas. The current proposed plan (Alternative 4c: Focused Alternative Excavation with Off-Site Disposal/On-Site Consolidation and Cap), with its limited off-trail access, appears to be short-sighted by prohibiting the following activities: * Water access - The lack of water access does not take into account the multiple regional communities who rely on that access for fishing, boating, and other activities that define our riverfront community. * Play areas - The space should provide designated locations along trails for people gathering and events to include children's play areas. Providing multiple ways for the local communities to engage with each other and commune with nature are important for protecting the fragile habitats at the site and building a deeper dedication by communities to the site's long term preservation. * Camping - This is likely an unpopular use case with certain stakeholders, but we cannot ignore the homeless population in our city. It would be better to include and therefore show respect of the needs of this community. These and other potential site uses aren't well covered by the current plan, which also risks failing in the event of natural disaster, contaminating the surrounding neighborhood with toxins via surface street removal, and not taking advantage of the potential of bioremediation.
2	The city has an opportunity with this project to develop a model of restoration and research that positions the city further as a leader in these efforts that matches our words. I believe that the best option for our community is outlined in Alternative 3b: Alternative Excavation with Off-Site Disposal. While this alternative has a higher up-front monetary cost, the ultimate costs seem to outweigh the short-term benefits. The most important difference: * Full Excavation - The proposed option (Alternative 4c) calls for only a partial excavation and infrequent monitoring. A more thorough excavation significantly reduces the off-trail concerns and eliminates failure risks associated with natural disasters and other unavoidable disturbances. Additionally, any plan needs to require the following amendments: * Monitoring - The feasibility study proposes "long term monitoring" only in certain cases and with no indication of frequency or duration that I could find. As our recent public health crisis illustrates, periodic monitoring is no substitute for regular monitoring and testing. This should be biennial at a minimum and in perpetuity. * Financing - Any and all monitoring should be financed by the identified responsible parties, which includes DEQ regular reviews. Please strongly consider Alternative 3b as the best, most forward-thinking option for our community. Regards, Karen Kincher, PMP Portland, OR

3	After consideration and as a concerned citizen, my preferred plan of remediation would be proposed plan 3b for the Willamette Cove site clean-up, favoring removal of contaminated sediment and protection of native plant species over consolidation and capping. I would also like to express keen interest in the bioremediation and mycoremediation bench test being proposed at the site and would like that data to be made public for consideration and comment. I would also like to express concern that proposed efforts to consolidate and cap contaminated sediments would pose great risk to future generations as we continue to deal with climate change and catastrophic climate events like floods that could disrupt consolidated sites. Seismic activity is also of great concern when considering capping. I would also like to include a further comment to urge Metro to consider its neighbors, both housed and houseless, when setting future restoration goals at the site. We should, as a community, expect the powers that be to aim to make this site clean enough and safe enough for us to use recreationally. Houseless individuals and their safety should also be taken into consideration and Metro should be willing to work with the community to propose alternate housing for our houseless neighbors who currently use the Willamette Cove as residence.
4	Dear Oregon DEQ, After reading and reviewing all of the available data on potential cleanup ideas of the Willamette Cove I have one major concern. A large population of the homeless community uses Willamette Cove as a place to live and survive. Their population has felt the biggest impact of the toxins and will be forced to leave the area upon cleanup. What actions are you going to take to ensure that this population is treated well and in a humane way. Legally you cannot move their belongings without their permission and there are no plans to provide a new location or some sort of housing in a local shelter. These people have dealt with the toxins in the worst way and deserve some sort of compensation for the toxins they have lived on for years. -- Billy Clay Southworth Pronouns: they/them
5	To Whom It May Concern: Thank you for the opportunity to comment on the clean-up process at the Willamette Cove. I am an Environmental Sciences student at Portland Community College and a resident of the Portland metropolitan area. I am interested in protecting the residents and wildlife from the pollutants that are present in the Willamette Cove and preserving the trees that grow there. I think that the clean-up methods (consolidation and capping) that are planned to be applied are not protective enough long-term solutions. Leaving the contaminated sediments can pose health and environmental risks in the future. Remaining pollutants can leach into the environment through natural processes, such as floods and earthquakes. In order to guarantee a safe environment for Portland residents, we need to implement the clean-up method that will have the least or no impact in the future. I highly recommend the use of bioremediation as a clean-up method if it will be proven to work. If the bioremediation will appear not to be effective, I highly encourage you to remove all the sediments contaminated with chemicals, whose concentration exceeds human health limits. We need to make the Willamette Cove a safe place for human use, such as swimming and fishing, and keep it healthy for future generations. Sincerely, Mariia Romanchenko

6	Hello, My name is Stella, I'm 20 years old, and I live near the Willamette River in South Portland and work as a kayak guide downtown. I take people on tours around the Ross Island archipelago and while the area has a ways to go rehabilitation-wise, my clients and I are able to paddle and swim there throughout most of the summer. If this stretch of the river were as contaminated as the water downstream in St. Johns, I wouldn't have this job (which I love!) and the people in my community wouldn't have nearly the quality or safety in recreation and connection with nature as we do. Paddling through North Portland, particularly through Willamette Cove, the water is dark green and turbid, there are remnants of old wooden and metal structures jutting out, and oil is visible on the river's surface. Beyond the visible signs of danger, the EPA states that the area is known to be contaminated with hazardous levels of heavy metals, PCBs, PAHs, pesticides, dioxins, and furans. Of course, you are aware of this and are proposing a plan to clean it up. My biggest hope for the proposal is that it will require the superfund site cleanup efforts to meet the goal of making Willamette Cove safe for public use, and continually monitor water/soil quality of the site to ensure that it remains safe. Equitable and safe public access to natural resources such as these is life-changing. The access I'm granted where I live has helped me form a more intimate relationship with the natural world than I ever could have without it. It is also important that the bulk of the jobs required to carry out the cleanup go to local residents who have been affected by pollution they did not cause - particularly the minority groups listed by Portland Harbor Community Coalition as "most affected" (Black/African, Native American, immigrants and refugees, and houseless people). This is an opportunity to repair some of the damage done to these groups and engage in a truly locally beneficial project. Thank you for your consideration.
7	I think it is important to consider the community desire to have public access to the river at the cove site. Since the area is already frequented by people in its current contaminated state, that use seems likely to continue after clean-up effort. Not cleaning the cove site to healthy levels for human exposure is putting many people at risk who will continue to recreate on site. Being the highest contaminated region of the superfund site, it would seem in good virtue to put the most effort into the cove area clean-up. Thank you for all of your efforts in the evaluation of this project and helping keep our city a safe home for so many. Briz
8	Dear Erin McDonnell: I request that the Willamette Cove deadline be extended to 60 days after we can have informational contact meetings with people so that residents in the neighborhood can be informed and included in the process. Informational meetings should include local people and neighbors and organizations that may use the area so that they are included in the informational processes and comment period. Any program and process work better when there is supporting community involvement before the bulldozers come. There should be informational meetings where people in the neighborhood who will be affected can be included. In addition, there is the City planned walking/bicycle path that will go through the area, so the bicycle group and pathway organization should be notified and informed for their input, review and comments. Reasons to extend the deadline include: (1) We would like to talk to people in the neighborhood and have a meeting for those interested. For example, one of our neighbors has photos and information about the history of the area that would be useful in reviewing the history of the area. (2) Some of the histories in the report are contradictory and we would like to research that at the library, the museum, and the historical organizations. (3) The source of toxins does not include the amount that comes from air pollution and the railroad line or a

	comparison to other similar nearby areas. The source of pollution is important, especially if it is still occurring. If the toxins are mainly from airborne pollution, then the problem is not as deep into the ground as the planned excavation. (4) Removing the concrete pads and asphalt should be part of the project. That removal is not included at this time. (5) We started a list of questions concerning the toxins, the areas that are being treated, the areas that were already recently treated, and an explanation of why an area that was treated recently shows another need for treatment. We would like the time to meet with DEQ to do a comparison of the maps and additional information that may support what appears to duplicate recent actions. (5) No consideration for all the current recovery of plants and animals is included, and there may be instances where the plans could be modified to take some of the plant recoveries that have occurred into consideration. (6) The current decline of toxins in water is not included or discussed, with the possibility that the decline of toxins on the ground may also have occurred. (7) The current deadline does not allow meetings of interested stakeholders together to share ideas, critique information, and choose the important areas to review. It is not possible with the limited meetings required during this Covid-19 period. Forcing the comment period to be before the adequate time when people can meet together, use the library, and have meetings does not allow community involvement in the process. Extending the time to 60 days after Covid-19 allows meetings would give the DEQ time to get community support for the proposal, answer questions and concerns and start the process off better. Helen Ost Portland, Oregon
9	Hello DEQ , I am Leonard, an Environmental Landscape Management student at Portland community college. I am also A resident of Portland and an avid outdoors person who conducts recreational activities with my family and friends. I am writing about my concern about the contamination issue going on at the Willamette cove property which is owned by Metro. I was given more detail about the current cleanup situation from the Portland Harbor Community Coalition and the Portland Harbor Community Advisory Group. I wanted to express how I would prefer that all the contaminated material be completely removed. I would also hope that other techniques like bio-remediation be looked into further as an approach, since it tends to show many positive benefits and successes in nearby states like California. The main reason I choose the complete removal Remedial Action Method is because I feel If the material is moved it may allow the water and the area that is contaminated to be open to the public. Me being a fisherman, is outraged that there is a limit to how many crappies I can eat per month. I lived in Kansas and New York where I fished for crappies and they had catch limits of 25-50 crappies per person with a license and there was no limit for intake because of pollution issues like here in Oregon. This being said please do the right thing by choosing the best methods to clean up the site, so me, my family and the rest of Oregon may one day enjoy the rivers and lands without worry about getting sick from it!!!

10	DEQ should aim for a more robust cleanup option. This should include preserving native trees and removing as much unsafe soil as possible. Consolidation and capping for cost savings that sacrifices human health is unacceptable. Consolidation is not safe for human and ecological health in the long-term. We do not support any redistributed, permanent storage of toxic sediment on the site. The cancer exposure limit should be lower for community members who are houseless than for occasional recreational users, not the reverse. Community members who are houseless and sleeping and staying at the site have direct exposure to cancer risk through touching contaminated soil, and accidentally ingesting as well as inhaling toxic dust, more so than recreational users. Collaboration with community stakeholders should be happening and continuing to happen on a yearly basis. Community input is vital and review of restoration and cleanup should continue to be monitored and updated. Any soil caps or covers should also be designed to withstand potential seismic and climate-related events and informed by the Multnomah County Climate Action Plan. Because of community recommendations, the Port and Metro are about to conduct a 3- to 6-month Bench Test (trial run) to determine whether the use of fungus and plants/trees are viable options to remediate the mix of contaminants at Willamette Cove. If the initial test has favorable results, I would support a full-scale application of the bioremediation method at the Willamette Cove site, and expect this method to be fully integrated into the final cleanup plan. Thank you, Tyler Wagner NE Portland resident Supporter of the Portland Harbor Community Coalition
11	Comments on DEQ's remediation plans for the Willamette Cove project The Willamette Cove project is a DEQ project, above the river water level location. It has been found that there is a large amount of low-level toxic material 28K cu yds, and some high-level toxic material. The plan is that the high-level material has to be removed, the low level material will be stored in-place. Some comments were made about moving it that need to be examined. 28k cu yds translates in to 1.86K truck loads of material assuming 15 yd trucks. So far just words with no high-grade awareness. The cost of a truck moving this type of waste operates at about $150/hr. In other presentation one of the consultants indicated that the trip length from the harbor site to the dump in Hillsboro was 23 miles. True if you google it, but if you follow the federal rules on highway toxic waste transport the distance is 63 miles, think road restrictions, tunnel route 26. The use of words when trying to describe overruns later in the project will be traced to these small word use details. Now if the material is stored on site the pile of low-level waste is about 100 yds by 50 yds by 6 yds high and this is fenced of so there can be no use of this grow forever. The hidden problem is that when the river goes rouge and this pile of toxic waste is washed down stream the river is well over the 100 year flood plain for the whole river. When the river finally returns to its normal level the toxic waste will have been deposited over the total flood plain down river. Admittedly at a low level, but the deposited silt across the total flood plain is contaminated. The moved material will have to be replaced to allow the Willamette Cove park to be useable. If the Army Corp dredging operation were to be contacted, they are always looking for a place to unload the clean material that they are

	removing when keeping the shipping channels open. A more coordinated operation with other agencies could be beneficial from a financial point of view. The use of the river as a transport route could also reduce the costs of this project.
12	To whom it may concern, The DEQ should be pushing for a more robust cleanup option that includes preserving native trees and removal of as much unsafe soil as possible (5.2.3.2 Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings, is unacceptable. 1. Consolidation is not safe for human and ecological health in the long-term. We do not support any redistributed, permanent storage of toxic sediment on the site. 2. The cancer exposure limit should be lower for the houseless community members than for occasional recreational users, not the reverse. Houseless community members sleeping and staying at the site have direct exposure to cancer risk through touching contaminated soil, and accidentally ingesting as well as inhaling toxic dust, more so than recreational users. 3. Institutional controls are unacceptable, because people and animals have accessed the full site since time immemorial, and will continue to do so, even if it is not currently the vision of Metro, the "property owner," to have people access the river at Willamette Cove in the future. 4. Collaborate with community stakeholders to set high standards for equitable implementation of future restoration, oversight and monitoring, every year. 5. Any engineered systems, such as soil caps or covers, used to contain contaminated materials at Willamette Cove must be designed to maintain protections for human and ecological health even in the event of potential seismic and climate-related events including earthquakes, river flooding, and fire. All capping used at the site should be designed to withstand the increased frequency and strength of severe weather events exacerbated by climate change referenced in the 2015 Multnomah County Climate Action Plan. 6. Because of community recommendations, the Port and Metro are about to conduct a 3- to 6-month Bench Test (trial run) to determine whether the use of fungus and plants/trees are viable options to remediate the mix of contaminants at Willamette Cove. If the initial test has favorable results, we support a full-scale application of the bioremediation method at the Willamette Cove site, and expect this method to be fully integrated into the final cleanup plan. Please take this information into account. Thank you for your time, Meg Bender-Stephanski she/her/hers University of Portland '21 B.A. Environmental Ethics & Policy
13	Hello, folks. I watched the video presentation and very much support moving forward with the planning and implementation of clean-up of this site. I live nearby and although I only occasionally make my way to the cove I do see many people from the surrounding neighborhood using it on a regular basis to walk, for bike riding or for walking their dogs. Of course, there are the folks in the tents and in the boats in the cove that are there for longer stretches of time. I would love to see it restored and elevated to park status, perhaps adding a link of the hoped for north side river pathway as well. I realize that everyone's budgets will be reduced in the wake of COVID-19, but I hope that this effort will be undertaken with some pace and not pause. Thank you, Daniel "Lee" Lower

14	Hello, I live in St Johns and look at Willamette Cove daily and think how wonderful it would be to hike and enjoy the river there. It is beautiful and I think my children should be able to enjoy it, with all the families in St. John's. My question is, does the clean up include making the river water at Willamette Cove safe to swim in and enjoy stand up paddle board, etc? I'd hate to have another situation where we look at this beautiful place and have to say no, sorry you can't enjoy it because of pollution. Thanks, Laura Birchard St Johns resident
15	Thank you for the opportunity to comment. We live in St.Johns and have long dreamed of a hiking/biking corridor that ran from Cathedral Park along the river through the Willamette Cove properties all the way downtown. To this end, one of the brown field sites around Cathedral Park could be turned into parking for hikers and bicylists who would prefer to not have to drag themselves back up that big hill into St. Johns. We are hoping that this clean-up is perhaps the start of something that could not only preserve/restore wildlife habitat along a beautiful stretch of the Willamette, but also give bicyclists (especially commuter bicyclists) a much safer, largely car-free route into downtown Portland. In regards to the contaminated soil clean-up, is it not possible to simply cover the existing contaminated soil with several feet of new soil contained by wooden or cement retaining walls, and then have the walking/biking trails covered in asphalt so that no direct human or pet contact with the contamination would occur? This is not an idea solution since the contaminants will still remain, but it would be a cost-effective one. Money saved could be spend extending the bike trail further south. Lastly, Willamette Cove would benefit from having a couple of osprey nesting platforms erected. The current pair of ospreys is nesting on top of one of the trestles right on the railroad bridge. Not ideal for them because of the noise and vibration! Please keep the community informed about what's going to happen. Sincerely, Michael Lyons
16	Hello, Thank you for asking for public input regarding the Willamette Cove project. I am excited that this area of the shore is going to be cleaned up. Does the city have any plans for the land once it is cleaned up? I think it would be really helpful to the residents of the North Portland neighborhoods if this area was turned into a green belt or park (similar to the running path along the SW Waterfront). Sincerely, Julie Julie Felberg, POPM Product Owner Oracle CPQ Portland, OR
17	DEQ Project Manager Erin McDonnell Re Willamette Cove cleanup. You all should proceed with light-speed. The site is a precious resource that appears abandoned. The old surface runoff barriers have been laying flat for years, garbage collects. Why are you taking so long and doing so little? Get going! Kevin Marley
18	I believe that the willamette cove site should be capped in the most economical way and reopened for public use as soon as possible. The priority should be speeding the return to public use.

19	To Metro, On March 2nd, public comments opened for the Willamette cove restoration project; a section of land in north Portland and a sector of the Portland Harbor superfund site. Willamette cove currently contains hazardous materials from when this site was last used by processing facility and ship construction from the 1930s to when these facilities stopped running. The materials onsite collectively include endocrine disruptors and materials that concern neural, dermal and respiratory healthy. This is a health hazard for individuals who may come in contact with them, and a concern for ground water, aquatic and terrestrial species, such as salmon, trout, turkey vultures, hawks and large mammals. This section of the Willamette cove restoration project addresses the terrestrial of the site. The long-term consideration of both aquatic and terrestrial species is crucial for restoration, since these species interact with other species in different regions, potentially bringing with them contaminants and may be biomagnified, which could be consumed by humans, specifically indigenous communities who rely of the river for a food source. The current remedial action plan that Metra and DEQ are planning on executing is the alternative 4 option in the DEQ staff report. The least expensive option in the alternative 4 option is the alternative 4b, which includes excavating highly contaminated soil, disposing highly contaminated soil offsite, constructing a thin, amended cap on areas that are not highly contaminated and restricting public access through signage and protective measures. This option does not promise a long-term solution, rather traps the contaminants onsite and releases partial approved public access. This option accounts for preventing bioavailability of contaminants and does implement preservation for native plant species. This plan does not account for the natural disasters of our region including flooding and earthquake. In the case of these events, this area would reopen as a superfund site and would compromise the prevention of bioavailability of these contaminants and public access to this area. Even as a listed superfund site, individuals are directly exposed to hazardous materials onsite by accessing the area and individuals are indirectly exposed to the contaminants onsite through bioaccumulation. Both humans and other species will continue to expose themselves to toxic materials on this site without thoroughly removing the hazardous materials from the site. By reviewing the DEQ staff report, alternative 3b includes the removal and disposal of contaminated soil offsite, and considers the preservation of native plant species. This would allow full access to the site and create a long-term solution for removing this site from the superfund list. As an addition to the alternative 3b option, furthering the study of bioremediation could be implemented. By testing the potential application of mycoremediation to the area, the highly contaminated spots, or hot spots, could be the focus of manual restoration, while applying and monitoring mycoremediation on the areas with less detected contaminants. This may benefit the project by advancing our understanding of applying biotechnology to restoration projects, specifically that of removing hazardous materials, and could set the foundation of a new approach for other restoration projects. From, Shane Habel

20	Hi there, I live in the St. Johns neighborhood, have been a resident since 2005. Willamette Cove is a hidden gem! It's like a no-man's land right in the middle of the city. I have walked through there with my dog numerous times but I am hesitant to go too frequently knowing about the contamination. This could be a fantastic park/green space for wildlife and people to enjoy and I am therefore in support of the cleanup project. There's also a lovely beach right there next to the bridge that could really be enjoyable if it weren't for the contamination. Thank you for your time and I know many people in the St. Johns neighborhood would love for this area to become more usable. Thank you, Todd Peres Portland, OR
21	I wanted to make mention of the remediation nearby North in Baltomore woods, also abandoned industrial. I have been watching the process as it changes slowly back into a more natural area, and am particularly fascinated with the wildflowers (AKA Weeds) that are all contributing to the cleanup, as well as some fungi. St Johns Wart, California Poppy, Dandelions, Mullein, Hairy Arnica, Chicory, Plantain, Amarynth, Wild Lettuce, Gumweed, Milk Thistle, and sunflower are all settling naturally, and part of a natural remediation process. They are also natural medicines that are well researched. The fast weeds set to work on the soil and change the ecosystem slowly; some capture heavy metals and help break down contaminants in the soil. I see Turkey Tail mushroom breaking down logs pressure treated with Arsenic and heavy metals; the same mushroom well established and researched to assist cancer recovery in China and Japan. This could be a great opportunity to showcase a natural remediation process (with research and proper planning and some volunteer work) with an informative walk path to isolate the public from the remediation sites and allow them to learn and observe from some distance. It isn't unrealistic to create a habitat to break down or absorb PCB, Arsenic, and Petroleum; Baltimore woods is already doing it naturally. I'm particularly fascinated with the plants that change through the season; how they interact with the ecosystem, how they communicate with smell and color, how they produce medicines and why, and how they cluster around different soil conditions, light, water. The idea of showcasing common weeds in a new light could be fascinating, maybe tracking and publishing research on soil sampling, metals absorption, CO2 absorption, Biomass generation or any other measurable improvements. Chernobyl is now a tourist destination, and a truly rare and wild part of the planet. It seems like an idea that the public could get behind to contribute something meaningful. This is certainly the time when people want to contribute to the cleanup of our planet, and maybe observing a natural process could remind us of the work that is happening all around. -Daniel Ferguson

22	To Whom It May Concern, Full and thorough clean-up of Willamette Cove is essential to the quality of life for both the animals and humans living at or near the site. This means no capping and leaving toxins on-site. All toxins must be completely removed from the site and a full remediation performed. The Willamette Cove site has for many years been a trail and nature walkway for many people living in the surrounding community. Several years ago, neighbors became aware of how truly contaminated the site is. That didn't stop many from continuing to use the site and surrounding trail. It has, therefore, become a serious danger to those using the site and the houseless who are camping on or near the site. As you are likely aware, the nearby University of Portland Franz Campus will be heavily used by UP students, staff and family. On the other side of the Willamette Cove site is the Cathedral Park Waterfront which, under the 2035 Comp Plan, has been re-zoned from industrial to Mixed-Use, High Density Residential. This area will have thousands more people in the next 5 to 10 years. That means thousands more people using Willamette Cove. Finally, the North Portland Greenway Trail passes through Willamette Cove. As the Cathedral Park Waterfront develops, so too will the Greenway Trail. As set forth above, use of the Willamette Cove site will increase exponentially in the very near future. The site should be thoroughly cleaned and should allow human access not only through the Greenway Trail, but should also allow human access to the water for swimming and other recreation. In addition to being necessary for human and animal safety, the site could become a very valuable asset for the surrounding community and the City of Portland. Thank you for your consideration. Best Regards, Jennifer Vitello
23	I just watched the "Willamette Cove Proposed Clean Up" presentation by Erin McDonnell, posted on You Tube May 20, 2020. I found the presentation illuminating and helpful. Thank you for offering it. Your plan seems reasonable and well thought out. I have no concerns. I encourage you to move on to the design phase as soon as is practicable. Right now, this area is "off-limits" to me, and I find that frustrating. Thank for your work. Sincerely, Jim Spence Portland, OR
24	Do your job. The first order of business is to be sure the health of the public is protected - air and water - for now and for the future. Make sure the clean up on the cove is of the highest standard - it will set a model for the rest of the clean up. Do your job.

25	Hello, My name is Toma Deavers. I am writing in regard to the Willamette Cove remediation project. I firmly believe that the corporations responsible for the toxic mess at Willamette Cove should be held responsible and should pay for the costs for a complete remediation process. The land needs to be completely cleared of all harmful toxins and returned to a state wherein it can accommodate human activity without posing serious health issues. All trees currently standing should absolutely be left standing. Thank you Toma Deavers Oregon Water Protectors MERP
26	Hello - I'm a St Johns resident who lives near Willamette Cove. When we moved here back in 2009, the vision of an eventual corridor that we could ride all the way to downtown was a strong part of the appeal. I'm in strong favor of taking what measures need to be taken to move cleanup forward. However, I would like to see it done in the most thorough way that is least invasive to the wildlife that has taken root there and to the river. The idea of caps makes me nervous, but I wonder if there would be a way, if you do go with this approach, to integrate a mycoremediation approach into it, meaning planting mushrooms on top of the caps to leach contaminants from the biomass over time. I am an engaged citizen and voter who runs a environmental and conservation citizen science non-profit based in Oregon and I would be happy to lend a hand via research, community building and offer my own physical support and labor. If we would need to raise funds for mycoremediation resources and consulting, I do have experience and am willing to engage in that way, as well. I am sure the last thing you want is another proposed solution (as a non-profit director, I understand that all too well!) but as an engaged citizen whose own back yard is at stake, I am compelled to put forth this idea, in case it hasn't been explored, along with an offer to support as I can. Thanks very much for your consideration. Regards, Katherina Audley Whales of Guerrero (http://www.whalesinmexico.com) National Geographic Explorer Katherina@whalesinmexico.com Portland, OR
27	Hello, I live in St. Johns and am excited about the prospect of a cleaned up Willamette Cove. I read over the proposal and think it is a great idea. Best, Jared Reynbery

28	Dear Erin McDonnell, I am excited at the prospect of a cleanup in the Willamette Cove area. I have hiked in this area several times and can appreciate its beauty and potential for a public space for all Portlanders, and North Portlanders specifically, to enjoy. I work as well as live in the St Johns area. As a Superintendent at Kinder Morgan Terminal 4, I am exposed to pollution along the Willamette on an ongoing basis. I have a personal stake in seeing these cleanups happen as quickly and as effectively as possible. I am making these comments personally as a resident of North Portland and not a s a representative of my employer. I have read through the documents associated with this cleanup project and have the following comment: - If you do remove contaminated soil to an offsite location, PLEASE do not place it near any waterway or populated areas. This defeats the goal of increasing public safety and only increases the risk of recontamination during floods or heavy rain events. I had heard that Terminal 4 was a proposed dumping site for these contaminants. This is a misguided idea for the aforementioned reasons. Regards, Emanuele Siragusa Portland, OR
29	Good morning, I'd like to submit the following comments regarding the Willamette Cove clean-up project. First, I'd like to express my disappointment in how very difficult it was to meaningfully participate in this process. Had I not been party of an adjacent progression, it would have been very difficult to identify the trade-offs associated with the alternatives and I still do not think adequate information was provided to that point-- even in the staff reports I went digging through. The public materials did not include much information even about the preferred alternative implications and trade-offs, including the CAG presentation. The alternatives and the trade-offs should have been front and center in these materials -- they do not inform participants of the other options they can support or the characteristics of the clean-up they can comment on (remediation type and results, etc.) As far as my comments on the alternatives, I support the option 3b that will provide unrestricted access to the area. Between the railroad and industry, Portlanders really have very little access to the water. For just 20% more in cost there could be unrestricted use of the full Willamette Cove area. Not pursuing that seems like a substantial missed opportunity. I currently do not feel I can support the preferred alternative 4c, because we don't have information as to how much of or the location of the land that will be use restricted. The East parcel is a large area often used by local neighborhood folk. It could reinforce that existing use with a lovely area with seating right above the beach. I feel that with option 4c we are probably locked into something like the existing asphalt that will limit the design to a parking lot that also caps the contaminated soil. I'd be far more supportive if that unusable area were along the current railroad tracks or underneath some of the utilities near the train bridge where people would not seek to or should not travel anyway. It would be helpful to know what the restricted size would be and what the limits are in locating the restricted soil to determine support for this option. I urge that you pursue option 3b and put the users (people, animals, plants) first. If option 4c must move forward, then take significant steps to minimize the size and impact of the unusable impact to the park area

	as a top design priority. Thank you, Alexandra Holmqvist
30	Greetings, Thank you for moving forward with the clean up and for the opportunity to comment. I live in the Cathedral Park neighborhood of St Johns and frequently walk and exercise adjacent to the site of the proposed cleanup. I am constantly astonished by the number of rabbits, raccoons and squirrels that share the space with me. I'm very concerned about the displacement of these animals and the many others whose presence is unseen. Can you please let me know how the protection of these animals is planned? What measures are being taken to mitigate disturbance to the thriving animal life in the uplands? Has a study on the affects to these animals been completed and if so, please let me know where I can access it. I understand the actions underway will benefit humans, animals, and plans in the long term but am worried about the short term effects. Thank you, Barb Siples
31	As a North Portland resident, I am very concerned that Alternative 4C will not be sufficient to ensure that this area is safe for wildlife into the future. Please choose instead either Alternative 3A or Alternative 3B, remove the contaminants entirely, and ensure that this area will not need to be cleaned up again at even greater cost in the future. Sincerely, James Pitkin Portland, OR

32	Hello! Thank you for taking comments on the cleanup plans for the Willamette Cove Site. I know that you are thinking about the big picture and want this area to be the best it can be. I appreciate your expertise in these matters and I do have some comments and suggested revisions. The preferred cleanup option that emphasizes consolidation and capping for cost savings, is unacceptable. Specific improvements to the plan that I feel are important include: This is extremely important!! The cancer exposure limit should be lower for houseless community members than for occasional recreational users, not the reverse. Houseless community members sleeping and staying at the site have direct exposure to cancer risk through touching contaminated soil, and accidentally ingesting as well as inhaling toxic dust, more so than recreational users. The carcinogenic Risk-Based Concentration for total PCBs for recreational users is 0.74 mg/kg. The same Risk-Based concentration for houseless community members is 14 mg/kg. That is two orders of magnitude higher. It should be lower than .74 mg/kg. This is also wildly important!! Preserve and plant native trees and shrubs and remove as much of the unsafe soil as possible (5.2.3.2. Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). Remove the contaminated soil!! The plan currently calls to remove only 4,000 cubic yards of material for offsite disposal (Section 8.1), so that would leave 23,000 cubic yards of soil with chemical concentrations exceeding human health limits on-site (Page 2, No. 2). Why? This is not cleaned up if you are leaving the contaminated soil there. Please rethink this. The plan also includes the idea that people will be blocked from accessing this area in an effort to keep them safe. You and I both know this wont be possible and wont be enforced. Please plan accordingly! Thank you! Lisa
33	Dear Oregon Department of Environmental Quality: I urge you to work closely with Metro, NW Tribes and Tribal members, and North Portland communities to provide a full and robust cleanup of Willamette Cove. DEQ should be pushing for a more robust cleanup option that includes preserving native trees and removal of as much unsafe soil as possible (5.2.3.2. Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings, is unacceptable. Specifically, I urge DEQ to: - Prioritize bioremediation with fungus and plants. - Remove all toxic soils that cannot be remediated. - Ensure Tribal Members treaty fishing rights are upheld through safe access to the River. - Protect houseless community members sleeping and staying at the site who face direct exposure. - Ensure the cleanup is not jeopardized by flooding and seismic events. - Allow for community access in perpetuity. The current plan is inadequate because: - It does not remove enough soil contaminants (4000 cubic yards of removal is insufficient when 23,000 cubic yards of soil are left contaminated). - It assumes a lower risk-threshold for houseless users. - It depends on keeping communities off the site. - It does not factor in seismic and flood risks. - It does not use bioremediation!

	Thank you for considering this comment. Stefanie Gross Twyford, Hampshire
34	Hello, I live in Cathedral Park, St Johns, and am concerned that the proposed cleanup plan 4C to address soil contamination on the upland portion of Willamette Cove is inadequate. I am joining my neighbors in the Cathedral Park Neighborhood Association in voicing our preferences for Alternatives 3A and/or 3B which calls for removing all the contaminated soil in the area to an approved hazardous waste dump. Complete removal will protect against toxins leaching back into soil and river from flooding or earthquake, both distinct possibilities in the foreseeable future. Thank you. Bethanye Barkus Portland
35	Hello, we welcome the cleanup project and we are supportive of the goals. A few items of feedback, as a nearby resident. 1. Site work during business hours would be preferred. 2. Bright lights/loud noises in the early morning or later afternoon/evening would not be preferred. 3. Regular monthly updates on progress and timeline would be greatly appreciated. 4. There are still remnants of cleanup work done a few years ago (plastic mesh fencing and erosion walls)—please be mindful of the cleanup of the cleanup. 5. We are supportive of the houseless being considered as part of the stakeholder group/end users. Thanks, Zac & Kristin
36	Thanks for pointing me in the right direction! And thank you for all of your efforts to date! As a Cathedral Park resident who's disobeyed the warning signs a few times to enjoy the beauty of Willamette Cove, I'm very excited for DEQ's proposed plan to remove and cap the human and environmental hazards of the area. I hope that Willamette Cove can one day be an extension of Cathedral Park, or at least connected by a waterfront trail as it's a lush, serene and prime waterfront space in the city. These actions will get us a step closer to Metro's vision, bringing safe access to nature to Portlanders. Thanks for the opportunity to comment! Shelby Schroeder

37	Dear Oregon Department of Environmental Quality: I urge you to work closely with Metro, NW Tribes and Tribal members, and North Portland communities to provide a full and robust cleanup of Willamette Cove. DEQ should be pushing for a more robust cleanup option that includes preserving native trees and removal of as much unsafe soil as possible (5.2.3.2. Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings, is unacceptable. Specifically, I urge DEQ to: - Prioritize bioremediation with fungus and plants. - Remove all toxic soils that cannot be remediated. - Ensure Tribal Members treaty fishing rights are upheld through safe access to the River. - Protect houseless community members sleeping and staying at the site who face direct exposure. - Ensure the cleanup is not jeopardized by flooding and seismic events. - Allow for community access in perpetuity. The current plan is inadequate because: - It does not remove enough soil contaminants (4000 cubic yards of removal is insufficient when 23,000 cubic yards of soil are left contaminated). - It assumes a lower risk-threshold for houseless users. - It depends on keeping communities off the site. - It does not factor in seismic and flood risks. - It does not use bioremediation! Thank you for considering this comment. Lila Berman Tucson, Arizona

38	Dear Oregon Department of Environmental Quality: I urge you to work closely with Metro, NW Tribes and Tribal members, and North Portland communities to provide a full and robust cleanup of Willamette Cove. DEQ should be pushing for a more robust cleanup option that includes preserving native trees and removal of as much unsafe soil as possible (5.2.3.2. Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings, is unacceptable. Specifically, I urge DEQ to: - Prioritize bioremediation with fungus and plants. - Remove all toxic soils that cannot be remediated. - Ensure Tribal Members treaty fishing rights are upheld through safe access to the River. - Protect houseless community members sleeping and staying at the site who face direct exposure. - Ensure the cleanup is not jeopardized by flooding and seismic events. - Allow for community access in perpetuity. The current plan is inadequate because: - It does not remove enough soil contaminants (4000 cubic yards of removal is insufficient when 23,000 cubic yards of soil are left contaminated). - It assumes a lower risk-threshold for houseless users. - It depends on keeping communities off the site. - It does not factor in seismic and flood risks. - It does not use bioremediation! Thank you for considering this comment. Bernadette Rodgers Portland, Oregon

39	Dear Oregon Department of Environmental Quality: I urge you to work closely with Metro, NW Tribes and Tribal members, and North Portland communities to provide a full and robust cleanup of Willamette Cove. DEQ should be pushing for a more robust cleanup option that includes preserving native trees and removal of as much unsafe soil as possible (5.2.3.2. Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings, is unacceptable. Specifically, I urge DEQ to: - Prioritize bioremediation with fungus and plants. - Remove all toxic soils that cannot be remediated. - Ensure Tribal Members treaty fishing rights are upheld through safe access to the River. - Protect houseless community members sleeping and staying at the site who face direct exposure. - Ensure the cleanup is not jeopardized by flooding and seismic events. - Allow for community access in perpetuity. The current plan is inadequate because: - It does not remove enough soil contaminants (4000 cubic yards of removal is insufficient when 23,000 cubic yards of soil are left contaminated). - It assumes a lower risk-threshold for houseless users. - It depends on keeping communities off the site. - It does not factor in seismic and flood risks. - It does not use bioremediation! Thank you for considering this comment. Kristin Wheeler Portland, Oregon
40	MEMORANDUM | July 22, 2020 TO: Erin McDonnell and David Lacey, Oregon Department of Environmental Quality (DEQ) Peter Shanahan, HydroAnalysis, Inc (HAI).; Jennifer Hart and Gail Fricano, Industrial FROM: Economics, Inc. (IEc) SUBJECT: Comments on the "Staff Report, Recommended Remedial Action for Willamette Cove Upland Site, Portland, Oregon," dated March 2020 This review of the Staff Report, Recommended Remedial Action for Willamette Cove Upland Site, Portland, Oregon (Staff Report; dated March 2020) has been prepared on behalf of the Five Tribes.[1] The Five Tribes previously submitted comments on the Revised Feasibility Study and Source Control Evaluation, Willamette Cove Upland Facility in a memorandum on April 10, 2019 and on the Port's subsequent Response to Comments in a memorandum on July 26, 2019. The Five Tribes also provided comments on the Groundwater Source Control Evaluation and Alternatives Analysis, Willamette Cove Upland Facility, Portland, Oregon in memoranda dated July 26, 2019 and February 27, 2020. GENERAL COMMENTS Design Considerations 1. Our memorandum of April 10, 2019 questioned the potential for erosion of the consolidation area, which will border the 100-year flood plain, if flooded. We believe page 39 of the Staff Report satisfactorily identifies

	the potential for flooding of the site as a design consideration. 2. Our memorandum of July 26, 2019 requested that the on-site consolidation area be designed so as not to detract from the appearance and use of the site for future passive recreation. This question regarding the future configuration and design of the on-site consolidation area will not be addressed until detailed designs are prepared but should be identified in the Staff Report as a consideration for design. The Staff Report states on page 55 that "The final cap design would be tailored in coordination with Metro's plan for a nature park with a regional trail." This suggests that the final design will fit future site use; however, we recommend including a more explicit statement that the consolidation facility will be designed to create an aesthetic fit with the site and its future use. East Parcel 3. In the July 26, 2019 and February 27, 2020 memoranda, we contend that the East Parcel needs additional consideration as a potential groundwater contamination source. The last paragraph of Section 3.1.2.1 on page 22 of the Staff Report says there will be additional groundwater sampling and possible consideration of "other remedial options, including those in the Upland." Given this Staff Report is intended to provide DEQ's recommendations for the Upland remedial action, deferring additional sampling and consideration of other remedial options to future remedial design efforts is not optimal. We remain concerned that the East Parcel may present a source of groundwater contamination and expect the pre- design investigation will include groundwater sampling in order to adequately characterize potential groundwater contamination on the East Parcel. We will pay particular attention to this issue when we review the pre-design investigation work plan and reporting. 4. Page 25 of the Staff Report discusses arsenic concentrations relative to background levels, and numerical background concentrations are given in Table 3. We recommend that the source of the background concentrations (DEQ, 2018) be cited. EDITORIAL COMMENTS 5. Page 17 and elsewhere – There are numerous references to the "debris area" that was excavated to 5-foot depth. We recommend identifying the location of this area on site maps. 6. Page 23 – In discussing the "Inner Cove Sheen/NAPL" the report states "Subsequent work suggest [sic] impacts associated with these samples were not connected to upland sources." As further justification that upland sources are not the source of the sheen, we recommend the report include a discussion of what the potential source(s) could be. 7. Page 24 – The last paragraph discusses recreational users as potential receptors. This discussion fails to clearly distinguish the current scenario (e.g., trespassing runners) from the future scenario (e.g., park users) and does not clarify that the future scenario is conservative in assuming active recreational use even though that use is not currently planned. The Feasibility Study provided a more clear and concise description of recreational users as potential receptors, and we recommend that DEQ clarify these scenarios in the Staff Report. 8. Page 34 – The last paragraph starts "Taking into account…" without stating how the referenced areas are taken into account. This sentence should be revised for clarity (e.g., "Deducting the concrete pad area…"). 9. Page 46 – There is a typo mid-page, "exaction" should be corrected to either excavation or extraction. REFERENCES DEQ, 2018. Fact Sheet: Background Levels of Metals in Soils for Cleanups. State of Oregon, Department of Environmental Quality, Environmental Cleanup Program, Portland, Oregon. January 25, 2018. [1] The five tribes are the Confederated Tribes of The Grand Ronde Community of Oregon, the Nez Perce Tribe, the Confederated Tribes of Siletz Indians, the Confederated Tribes of the Umatilla Indian Reservation, and the Confederated Tribes of the Warm Springs Reservation of Oregon.

41	Greetings, Thank you for your efforts. As you mention, this has been looked at since 1988. We have lived here since 1991. That's a long time. My only comment is that I would like to this area available to the public soon. I would love to see kayaks, row boats and canoes being able to put in at this are (but please, no more motor boats, they have a dock near the St. Johns Bridge). It would also be great to see this as a walking destination for people and areas for a picnic meal. Thanks again for your efforts, Mark Gast
42	Good day, OR DEQ! I am a self-employed sustainability consultant who focuses on sustainable event management. I was formerly an Environmental Scientist/Project Manager for ATC Associates in New York and Massachusetts from 2007 to 2011. I have a Masters degree from Tufts University in Urban & Environmental Policy & Planning. I am well aware of the logistics of toxic site remediation in general, and specifically am interested and in the loop about the status of Willamette Cove, and am emotionally invested in its future. In my opinion, the State (or Monsanto?) should fund a round of new groundwater monitoring well and soil testing at the site. I would be happy to take samples myself if the lab costs can be covered. I live literally right up the street from the site. The site is beautiful... a wonderful example of nature taking back what rightfully belongs to the Earth. Although parts of the site remain contaminated, much of the area seems to be quite clean. Of course, my intuition can only be confirmed with a new round of testing. The area has become known as "Pirate's Cove" to St. John's locals. It is like a historical art museum down there. Graffiti artists have made it a unique cultural artistic part of Portland. In my opinion, the State, DEP & Monsanto should continue to fund the continued remediation of the site. I would be happy to actively participate in this process in any and all ways. At the same time, I feel that the beach itself is a prime gathering location for Portlanders, and I would love to see it as an area where event producers could get a permit through the City to host daytime events. It is PERFECT for such events. Please call me if you would like to discuss in further detail. Thank you so much for all you do! Sincerely, Eric Giambrone EcotopianEnterprises.com

43	Oregon Department of Environmental Quality Erin McDonnell 700 NE Multnomah St., Suite 600 Portland, OR 97232 I urge DEQ to remove all contaminants from Willamette Cove to allow for expanded recreational uses, water access, social activities, and gathering spaces, and, especially, to prioritize the health and wellbeing of the local community and the environment. After decades of heavy industrial activities, the site became highly contaminated by toxins and hazardous substances. The site continues to expose people and animals to unsafe levels of toxins. The current preferred clean-up method would only remove the “hot spots” of contamination, leaving 23,000 cubic yards of toxic soil--the size of nine olympic sized pools. The remaining waste would simply be covered by clean sand or collected in a structure with layers of gravel, cobble, and topsoil. This plan falls far short of addressing other community concerns and prioritizing long term human and ecological well-being. The Environmental Protection Agency (EPA) released a study in 2018 “indicating that people of color are much more likely to live near polluters and breathe polluted air.” This rings true for the Willamette river communities whose industrial pollution started in World War II, when the area became a hub for docks to assemble war ships and tanks. Many African Americans migrated to work in these shipyards and were consequently exposed to toxins by residing and fishing along the river. A full cleanup would benefit all people, including the houseless community who are exposed to the site’s toxic soil, contaminated fish, and air pollutants daily. This is more important than ever to address in this current pandemic. A study from the Harvard School of Public Health found that a person who lives in a county for many decades with high levels of air pollution is 8 percent more likely to die from Covid-19. Oregon must implement a complete clean up of Willamette Cove because it's the moral thing to do alleviate unhealthful conditions in our populated environment. Caren Caldwell
44	Hello! I don't know what kind of input you are looking for in regards to the Willamette Cove clean up, but it would be really awesome if that area could be turned into a park and/or walking and biking trails that join up with Cathedral Park, once the site is safe for people. Thank you! Ashley

45	Dear DEQ Staff, I am a long-time resident of Portland. I am moved to comment out of love for our precious and abused Willamette River. The Willamette is so important to our quality of life and identity. I would like to see the river, and surrounding uplands, cleaned up in a responsible, timely, and effective way so that more people can enjoy it and so that fish and wildlife may thrive long into the future. People are naturally drawn to water. Even with the signage that is up, many people do not read it and are exposed to toxic sediments and soil. Clean-up should be done in a way to benefit the people most vulnerable to pollution like children, and the most nature deprived using minority contractors. This is an important habitat area and state of the art restoration techniques should be deployed. Again, the Willlamette Cove Uplands are a vital habitat and recreation area. I urge you to take every step to make sure the clean up is done thoroughly and all potential users are informed clearly, in different languages, of what is happening and what they need to do to stay safe. Every child should be able to play safely at the water's edge. Shorelines are very special places for exploration, relaxation, reflection, and building relationships with family and friends There are too few areas along the Willamette in Portland that are accessible. Those that are accessible should be clean and safe for humans and fish and wildlife. Thank you for taking these comments to heart. Sincerely, Jenny Holmes Portland, OR
46	I have read the descriptions of various remedial actions proposed in the Staff Report and I totally disagree that alternative 4C is the best option. Instead, the DEQ should adopt either alternative 3A or 3B. Plan 4C removes some but not all the contamination at the site. That which is not removed is concentrated and access is restricted. But I object to leaving any contamination at the site for two reasons. The community will suffer a residual health risk and also have to pay for monitoring and repairs in perpetuity. Also we in St Johns resent that our community is considered as an acceptable place to dispose of toxic waste. First, the perpetual commitment that any consolidation and capping plan implies, means that the long term health effects of the residual pollution are not fully controlled. Accidental release of toxins into the environment is a very real possibility if they are consolidated into a holding pen on site, whether from a large flood, a subduction zone earthquake, or simply neglect of the site by complacent or spendthrift future governments. All three of these extreme events are more or less guaranteed to happen, as the lifetime of the toxins in the soil is essentially infinite. And if the government would test and maintain the cap into perpetuity, the cost of plan 4C would effectively be infinite, much more than the estimated $8.8M! Given that we can be more or less sure of eventual release of the pollution, whether now or in the far future, we in North Portland feel that any discussion at all of leaving the toxins on site is unfair to us in the local neighborhood. We believe that Willamette Cove and indeed all the sister sites all up and down our river in the superfund zone should be cleaned to the full extent possible. After all, no one in North Portland or indeed anywhere else in the city wishes to live in a toxic waste dump. For these reasons, I strongly encourage you to adopt either alternative 3A or 3B, as these offer permanent, total protection for only marginally more up front cost and indeed no recurring cost at all. Thank you for taking my comments into account, Mark Abel Native Portlander and St Johns resident

47	Thank you for inviting public comment. DEQ's proposed action to clean up Willamette Cove needs more teeth, and more openness about long-term costs. To ensure public health, toxic sediment needs to be removed. The document itself states that "...a preference will be given to offsite disposal of soil posing a higher risk to humans or animals/plants". However, the DEQ plan calls to remove only 4,000 cubic yards of material for offsite disposal, leaving onsite 23,000 cubic yards of soil with chemical concentrations exceeding human health limits. I advocate removing more. PCBs are a proven carcinogen. The carcinogenic Risk-Based Concentration for total PCBs for recreational users is 0.74 mg/kg. The same Risk-Based concentration for homeless people encamped in Willamette Cove is 14 mg/kg. That is two orders of magnitude higher. It should be lower than .74 mg/kg The plan includes follow-up actions that will be required to maintain the Site, including maintenance of any engineered soil caps or covers and regular site monitoring. The plan proposes that DEQ will conduct periodic reviews "initially more frequent to 5-year reviews". The initial review increment needs to be defined specifically. Also, the longer term review interval should be one year at maximum. And the costs for long-term maintenance do not include DEQ review costs. They should. All capping used at the site should be designed to withstand the increased frequency and strength of severe weather events exacerbated by climate change, as the 2015 Multnomah County Climate Action Plan warns of. The fill can be unstable during seismic events, such as a major earthquake which is widely predicted. The DEQ plan mentions long-term seismic stability of the proposed soil cap, but does not consider the seismic stability of any engineered remedial actions. Please add them. Finally, the Port and Metro are about to conduct a 3- to 6-month Bench Test to determine whether the use of fungus and plants/trees are viable options to remediate the mix of contaminants at Willamette Cove. If the initial test has favorable results, I expect this method to be fully integrated into DEQ's final cleanup plan. Regards, Stan Jewett Aloha, Oregon
48	PLEASE plan for a more robust cleanup process that leaves native trees, removes as much contaminated soil as possible, and allows the site to be used for community priorities. Your current plan is terribly in adequate. It leaves contamination in place and underestimates the long-term costs of maintenance. Sarah McKenzie Portland, OR
49	I support of the no action alternative that allows natural recovery to continue for the Willamette Cove Uplands. I also like to see the l large concrete/blacktop area near the bottom of Edgewater St. be removed to allow natural plant and animal recovery in those areas. John Schumacher St. Johns Portland

50	Dear DEQ, I would like to indicate my support of the no action alternative and allow natural recovery to continue for the Willamette Cove Uplands. I further request that the large cement pad and the asphalt area be removed to allow natural plant and animal recovery in those areas. Sarah Cheverton Portland, OR
51	To whom it may concern: A very comprehensive evaluation of the project to clean up Will Cove Uplands was published on Next Door. I think it deserves consideration particularly for existing wild life that is thriving in the area. Also, if the money slotted for this project could be used for another that is short on funds it could be a wise decision on the part of DEQ. I am not asking that the project be dismissed, but to please take another hard look at it and make sure the proposed actions are correct. Thank you, Lori Kunkel (St. Johns Resident)
52	Dear Ms. McDonnell, My name is Julia Rosen and I'm a resident of St. Johns. I am excited to see progress on the Willamette Cove cleanup and I'm glad that DEQ has selected an alternative that will make significant progress toward remediating the area. I look forward to taking my family to visit the cove in the future. I'm writing because I want to voice my concerns about the transportation piece of the project. As you noted in the feasibility report, an increase in truck traffic near the site will worsen local air quality and road safety. I'm also worried about possible pollution from contaminated material that blows or drops off of trucks. To what extent will barging be used? If trucks are used, is there a plan to cover trucks carrying contaminated sediment? And will they be routed around residential areas as much as possible? I'm also concerned about communities adjacent to the landfill where these materials will be deposited. Has DEQ looked into whether this plan could adversely impact people living near the dumping sites? I am particularly concerned that there could be environmental justice issues associated with cleaning up a gentrifying area of Portland at the expense of low income residents or communities of color living elsewhere. Please take these issues into consideration as you move forward. Thank you for your consideration. Best, Julia

	Hello, My name is G Laster. I am both a resident of Portland and a Master of Landscape Architecture candidate at Harvard University. I am writing to you today about the uplands restoration at Willamette Cove. I would like to begin by acknowledging you for all the work you have done on this project, both the efforts that go seen and unseen by the general public. This work is critically important, so I want to thank you for it. For legibility, I would like to present my public comment as two sections: Community Impact and Environmental Impact. <u>Community Impact</u> I am a member of the Portland Harbor Community Coalition and a volunteer for Wisdom of the Elders. Both groups are involved in the community leadership side of the remediation and restoration process and have been working for years with Metro, the EPA, and DEQ. We are working for the government agencies working on this Superfund cleanup to recognize that this site is not a neutral site, but rather a site of great importance to the Native nations that have a historic relationship with the river and have been systematically displaced as well as the many Black residents and residents of color that have fished in this river for decades. This river, and this site, are more than recreational areas to some, they are sites of nourishment, self-sufficiency and deep meaning. We collectively allowed these sites to be defiled by industry, at the expense of those who have always relied on the river. Now that we are doing the work to clean up the river, we must remember those who have used and still use the river heavily. We must also remember whose land we reside on.
53	The ways which DEQ can ensure equitable outcomes for the cleanup of the Willamette Cove uplands is to structure in its agreements with Metro and all others involved, that community benefits agreements be written in to work contracts to benefit people from historically impacted groups. This could be a stipulation that cleanup contracts must go to a Native-owned landscape restoration company or that site design of the trails be done by a local Black landscape architect. It could be ensuring that the uplands will be a sanctuary for unhoused people. It should also be a public acknowledgement of these histories from a government agency, and this acknowledgement should be included in all correspondence with the public. Thus far, as I have attended meetings hosted by DEQ and seen documents prepared by the DEQ, there has been no acknowledgement of these histories or the impacts of industry on BIPOC populations. <u>Environmental Impact</u> In an early meeting with DEQ and Portland Metro, it was revealed that DEQ's plan for remediation was a combination of removal, consolidation and capping of contaminated areas, resulting in a partially restricted site. The cost is estimated to be around $8.8 million. The consensus among Portland Metro Council members was that it would be more than worthwhile to spend an extra 2 or 3 million dollars to ensure the public would have full access to the site in perpetuity. I am in complete agreement that the most favorable option put forward by the DEQ is that of mostly removing soil, protecting native trees. The result of this option would be no site restrictions, at a cost of around $10.7 million. It is of the utmost importance that in enacting this cleanup, DEQ fully removes all toxins possible, resulting in full access to the site. This is critical for not only the humans who use the site but also the animals that use it. Given that this cleanup is 30 years in the making, it seems fair to assume that there will never be a cleanup after this at the Willamette Cove site. So please do it fully and correctly the first time! Finally, as a landscape architect, I would urge the DEQ to pursue mycoremediation in the upland areas. It is a

	particularly safe, easy and cost effective method for filtering heavy metals and dioxins from brownfield sites. It also builds soil and supports native growth by ferrying nutrients from the soil to trees and shrubs. It works especially well in moist, sloping sites, so the Willamette Cove uplands could be a particularly good site in which to apply this method of remediation. This concludes my comment. Please confirm when you have received this message, and don't hesitate to contact me with any questions or comments. Thank you, G Laster
54	from: Patricia Horter Portland OR To benefit everyone in our community, I demand a full clean up of Willamette Cove uplands. That means removing all of the toxic sediment, and not capping or consolidating any contamination. DEQ's proposed remedy for this toxic site would only remove the hot spots of contamination, leaving 9 olympic sized pools of buried contamination. This proposal is not in any way appropriate for long term human health and ecological well-being. DEQ's remediation plan will also be useless after even a moderate earthquake, which is inevitable. Rather than in any way preserving Oregon's environmental quality, DEQ's plan appears to be serving someone else.
55	Hello, I received a request for comment in the mail about the proposed Willamette Cove clean up and temporary closure for soil sampling. I think this project will greatly benefit the environment and surrounding communities of the Cove area. The heavy industry along Portland's waterways have caused a lot of pollution and it is sad that not more of it was dedicated to nature conservation and public use. I'm happy efforts are being made to clean up these areas and reduce soil and water contamination. The health of our environment affects the health of us. I fully support the closure and clean up. Thanks! Skye McNeill

56	Hi, I am a St Johns' resident with a very strong interest in Willamette Cove. I am a photographer and naturalist who has been running and walking the trails at Willamette Cove for years. I notice that large numbers of other residents also use these trails, especially since the pandemic, which has highlighted the need for local wild areas as a place to recreate. (It's worth noting that Forest Park is not directly connected to St Johns, nor is it easily accessible to St Johns residents. And due to the pandemic, trailhead parking and trail use in Forest Park is overwhelmed with demand, pointing to a tremendous need for more wild places and hiking trails.) I believe that it would be a huge lost opportunity if the Willamette Cove property is developed in any way. The one asset that the heavily industrialized St Johns' area is sorely lacking is a wild area where residents can relax and connect to nature. If you look at the balance of amenities in St Johns, the one thing we are missing is a wild urban park. We do not need more manicured lawns like Cathedral Park, we don't need more soccer fields, we don't need more riverside development—what we need in St Johns is trails and a place to walk in nature. We also need a refuge for wildlife, and this property is now being used extensively by coyotes, beavers, and many other animals. The people of St Johns need a place to see and experience wildlife and natural places, so I ask that this be made the highest priority for the Willamette Cove property and I cannot support any other option. David Lukas
57	Dear Erin McDonnell, P.E. and Rebecca Wells-Albers, I'm in support of the current proposal given this is a pretty high level plan. I'm very fond of what another local park is working on, the Friends of Baltimore Woods. I just learned about this 30 year old project. I like that they're trying to bring it back to the natural oak and madrone habitat, with a bike path. Thank you for your effort on this project! Best, Scott
58	Thanks for the opportunity to comment. I strongly recommend that a cleanup of Willamette Cove upland and in-water be complete. A complete and reasonable cleanup would preclude leaving any toxins in place. Toxins can be safely transported out of a residential area and moved to a non-residential area for responsible containment. I also support a plan that will include appropriately researched restoration of trees and grasses to prevent erosion, enhance air-quality and bring the cove back to its once pristine condition. To consider a plan that would leave toxins in a residential area would present a continued danger to anyone housed, or un-housed in the area and to anyone using the area for recreation. Sincerely, Jane Terzis Cathedral Park resident

59	Portland Harbor Community Advisory Group Attention: Erin McDonnell Willamette Cove is presently posted "No Trespassing" because of harmful toxins in the soil. Shipyards and industrial activities have left a legacy of unregulated waste disposal along the banks of the river. All the while, people have been drawn to water as a means to reconnect with the natural world. This cove represents one of the few opportunities for the residents of North Portland to access the tranquility and flow of an open river as it passes through their neighborhoods. Located just upriver from Willamette Cove, the cleanup of a creosote plant on the McCormick and Baxter property offers a cautionary tale of what not to do in this instance. An inhospitable bare field fenced off from the public gives testimony to misguided priorities. Economies in the ecological remedy have benefited no one. The remaining lake of creosote beneath the surface restricts use of the property. The owner couldn't afford the cost of removing it and the Public hasn't benefited from paying a discounted price. DEQ's proposed remedy for Willamette Cove would revisit the compromises at McCormick and Baxter. Some of the worst toxins will be trucked away and the rest will be scraped into a pile and left on site. Again, money is saved and the future choices and health are compromised. Metro is the present owner of the property known as Willamette Cove. At a recent work-session, the Metro Council recognized that a full cleanup of the property was a foundational requirement for the unrestricted future use of the property, whatever that may be. Within the meeting, their enthusiasm led to conjecture of which funds may be available to supplement their share of a full cleanup. The caveat is that DEQ controls how the property may be used through their control of the cleanup. This brings us to the present moment. DEQ has agreed to take and consider public comment. The Port of Portland once operated a shipyard on the site. In recognition of their responsibility for the consequences of that activity, they have negotiated a 90-10 split of the remediation costs with the present owner, Metro. Metro has indicated a willingness to go beyond their share to achieve a full cleanup. This is thought to be in the neighborhood of an extra million dollars, or the cost of a few houses in this current market. The difference between the two proposals is the concentrated pile of contaminated soil left on site. What is scraped up will be replaced with clean soil brought in by trucks. Alternatively, the money spent to engineer, build and maintain this capped waste in perpetuity might be used to reload empty trucks with contaminated soil and return them to an accredited disposal site within the metro area. This needn't increase traffic through the neighborhood significantly. The benefit of this inconvenience might be new community parkland along the riverfront. Lastly, the Superfund program came into being as a means of addressing social justice issues created by industrial pollution. Within the boundaries of the Willamette Superfund designation DEQ is indicating that the proposed cleanup is good enough. By contrast, when the South Waterfront was cleaned up and developed, The City of Portland undertook the contractual costs allocated to the developer and delivered a pristine environment. Social justice? The communal vulnerability exploited by industrial pollution deserves a better outcome in North Portland. Thank you for your consideration. Michael Pouncil, Chair Doug Larson, Board Member Sarah Taylor, Board Member

60	Resolution to DEQ regarding Willamette Cove cleanup and development approved by npGreenway Board, August, 2020 Whereas the City of Portland for over 20 years has sought to increase its citizens access to the Willamette River (River Renaissance, N. Reach River Plan, N. Portland Greenway alignment study, etc.) Whereas Metro has owned Willamette Cove property for over 20 years and failed to date to clean up and develop the property, Whereas Metro has developed a half dozen prime natural areas and parks in suburban locations, Whereas Metro, the Port of Portland and Oregon Department of State Lands have legal obligation to clean up this river front property and shoreline, Whereas Trails and access to nature are widely accepted as essential to a healthy and prosperous community, Whereas Trails, separated from motorized traffic, are essential for climate friendly transportation to jobs and other destinations, and whereas Metro and the City of Portland will coordinate the upland development with Oregon Department of State Land shoreline cleanup to ensure an holistic project, npGreenway (aka Friends of N. Portland Willamette Greenway Trail) urges that DEQ, Metro, City of Portland and Port of Portland thoroughly clean up and then develop, for both active and passive recreation, the Willamette Cove property, including removal of all toxic material, preservation of all older trees, construction of a 14' hard surface Trail adjacent to the UP rail line, and provision for soft trail access to at least two areas on the River. We believe this can be accomplished in partnership with the Portland Harbor Community Coalition through careful analysis of toxic and contaminated material and project design with the provision of adequate funds from Metro, the City and the Port. NpGreenway Board, August, 2020
61	Hello, I live in the immediate vicinity of Willamette Cove and would very much like the area to be fully remediated and fully utilized as a natural area for North Portland residents to enjoy. Thank you, Nathan Stancil Portland, Oregon
62	Hi, I am a Portsmouth resident and I love walking down to the river with my dog, and jogging along the Willamette Cove. I am definitely afraid to let my dog roam around too much due to the know toxins, but it would be incredible if the area was cleaned up and open to the public. I am so glad this is being addressed and I hope the Metro does the right thing and repairs this natural area so that is safe for humans, plants and animals. Thanks! Mattie Bowden

63	Dear DEQ staff: I am writing to provide comments on the proposed cleanup plan to address soil contamination on the 'upland' portion of Willamette Cove. It is a little strange to have to separate comments on the upland and riverside portions of the site, but I understand the bureaucratic necessity. I am a local resident. My family and I have lived on N. Alma and N. Syracuse since 1980. Willamette Cove is the closest public space to our home. I have spent many hours there – playing with my children, walking my dog, watching wildlife, and taking walks with neighbors. Though better than nothing, as a 'park' Willamette Cove has been problematic. We didn't even know about the serious pollution for years, but when the Portland Development Commission owned the property it was sorely neglected, with lots of trash dumping, abandoned boats, and of course the expanses of concrete, rebar, and other junk all over the place. When Metro took control, we were hopeful that it would be cleaned up and turned into a real public park, not with a playground but clean and safe, with attractive natural plantings, an accessible waterfront, and a swimming area in the inviting river cove. We are encouraged that the worst of the polluted soil has been removed. Thank you. Please remove the rest of it. Please do not make an unsightly mountain of polluted soil with a 'cap' on top, particularly right near the cove! If you are putting the contaminated soil on trucks, don't just shift the dirt around within the site. Take the soil away to an appropriate storage location. That would be much safer, and the site would be much more attractive. We neighbors will not mind the temporary truck traffic needed to remove the dangerous soil. Please also remove the concrete pads, rebar, and other leftover industrial items. Planting more native trees and plants enjoyed by wildlife would be much appreciated. We also support the idea of having the North Portland Greenway Trail go through this area. Please work with Burlington Northern on plans to manage the area along the train track to make it less likely that sparks from trains will catch our neighborhood on fire, as almost happened in 2001. (This might be a Metro responsibility, rather than for DEQ.) In summary, Willamette Cove is a special and needed public space in North Portland. We neighbors want to use that property for recreation, and we also strongly support its use as wildlife habitat. We do not want an incomplete clean-up. We want it to remain in public ownership, not sold to a developer. Thank you for the opportunity to comment. Sheila Weinmann
64	I am happy to see that restoration of the decades of pollution at Willamette Cove is being undertaken. The thorough restoration of the waterfront in downtown Portland has resulted in public access and enjoyment for many people. I think restoration at Willamette Cove deserves the same level of support and to be restored for unlimited public access. Leaving a huge amount of contaminated soil on site is perhaps a fast way to partially reclaim this now publicly owned waterfront property. Incomplete restoration is half fast. Craig McPherson Portland, OR

65	I think that complete removal of all contaminated soil is the proper path. With contamination removed and clean soil brought in, new beautiful riverfront property would be given to the people of Portland. What a gift to our children and grandchildren! Gwen Scott Portland, Oregon
66	To whom it may concern: I write to you about the Willamette Cove - an area of the Portland Harbor Superfund site that needs a strong clean-up plan so it can become a beautiful and safe place for recreation and fishing. Please look to the proposal by the Portland Harbor Community Coalition. DEQ should be pushing for a more robust cleanup option that includes preserving native trees and removal of as much unsafe soil as possible (5.2.3.2. Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings, is unacceptable. Consolidation is not safe for human and ecological health in the long-term. We do not support any redistributed, permanent storage of toxic sediment on the site. Page 2, No. 3 indicates that "...a preference will be given to offsite disposal of soil posing a higher risk to humans or animals/plants". However, the DEQ plan calls to remove only 4,000 cubic yards of material for offsite disposal (Section 8.1), yet proposes to leave 23,000 cubic yards of soil with chemical concentrations exceeding human health limits on-site (Page 2, No. 2). This is about the same volume as 7 Olympic size swimming pools Thank you for improvements to this plan. Susan Palmiter
67	Уважаемое DEQ, Цель Восточно-европейской коалиции (EEC), некоммерческой корпорации - объединять восточноевропейские сообщества в Орегоне, продвигать восточноевропейскую культуру и активно поддерживать благотворительные, образовательные и гуманитарные дела. Восточно-европейская коалиция также является активным членом PHCC с 2012 года. Славянские/русскоязычные общины используют реку, в том числе бухту Вилламет по-разному: для отдыха - катание на лодках, рыбалка, плавание, прогулки, осмотр достопримечательностей, посещение фестивалей и концертов. Они живут на реке в плавучих домах и кондоминиумах. Они работают в тяжелой промышленности, на верфях, на предприятиях по переработке металлолома, в строительстве и ремонте мостов. Они работают в сфере высоких технологий и защиты окружающей среды, и они используют реку для таинства крещения. Восточно-европейское наследие основано на уважении к природе и жизни, которую она поддерживает. Реки и леса - это дары, которыми можно наслаждаться и защищать для будущих поколений. После ознакомления с планами DEQ по очистке Бухты Вилламетте мы считаем, что DEQ должен настаивать на более надежном варианте очистки, который включает в себя сохранение местных деревьев и удаление как можно большего количества небезопасной почвы (5.2.3.2. Альтернатива 3b: Альтернативные раскопки и удаление за пределы территории площадки в отчете DEQ). Предпочитаемый агентством вариант очистки, в котором особое внимание уделяется консолидации/уплотнению почвы и экономии средств, не является удовлетворительным. План DEQ предусматривает удаление только 4000 кубических ярдов материала для захоронения за пределами площадки (Раздел 8.1), но при этом оставляет 23 000 кубических ярдов почвы с

концентрациями химических веществ, превышающими допустимые пределы воздействия на здоровье человека (Страница 2, № 2). Мы считаем, что в долгосрочной перспективе, консолидация не безопасна для здоровья человека и окружающей среды, поэтому мы не поддерживаем перераспределение и постоянное хранение токсичных отложений на площадке.

В целом, план очистки, предложенный DEQ, может снизить некоторые риски для людей и животных, однако это все равно недостаточно, поскольку он оставляет загрязнение на месте в концентрациях, превышающих стандарты, основанные на человеческом и экологическом рисках, и потребует длительного срока мониторинга.

С уважением,

Vadim Riskin
President, East European Coalition
www.eecnorthamerica.org

[Translated into English:]

Dear DEQ,
The purpose of the East European Coalition (EEC) non-profit organization is to unite the Eastern European Communities in Oregon, promote Eastern European culture, and actively support charitable, educational, and humanitarian activities. The East European Coalition has also been a member of PHCC since 2012.

Slavic/Russian-speaking communities use the river, including Willamette Cove, in various ways: as a recreational area, including boating, fishing, swimming, walking, sightseeing, attending festivals and concerts. They live on the river in houseboats and condominiums. They work in heavy industry, shipyards, scrap recycling, bridge construction, and repair. They work in high technology and environmental protection, and they use the river to administer the Sacrament of Baptism. The East European heritage bases on respect for nature and the life it supports. Rivers and forests are gifts that can be enjoyed and protected for future generations.
Having reviewed the DEQ's cleanup plan for Willamette Cove, we believe that DEQ should insist on a more reliable cleanup option that includes preserving native trees and removing as much hazardous soil as possible (5.2.3.2. Alternative 3b: Alternative Excavation and Offsite Disposal in DEQ report). The Agency's preferred cleanup option, where particular attention is paid to soil consolidation/capping, and cost savings, is not satisfactory.

The DEQ's plan provides excavation of only 4,000 cubic yards of the material for offsite disposal (Section 8.1) but leaves 23,000 cubic yards of soil with chemical concentrations above human health risk levels (Page 2, # 2). We believe that in the long term, consolidation is not safe for human health and the environment. Therefore, we do not support the redistribution and permanent storage of toxic deposits on the site.
Overall, the DEQ's proposed cleanup plan may reduce some of the risks to humans and animals, but this is still insufficient as it leaves contamination levels above human and environmental risk standards on the site and requires long-term monitoring.

Respectfully,
Vadim Riskin
President, East European Coalition
www.eecnorthamerica.org

68	August 26, 2020 I am writing to DEQ about the proposed clean-up of Willamette Cove. The cleanup should meet the highest possible standards for public and environmental health. Since the long-term use of Willamette Cove involves public access, as a natural area, after the clean-up, it should be as safe as possible for the public to use. Abandon Alternative 4c. It is inadequate for what is needed. Please instead adopt Alternative 3b. Thank you, Stephen Ott
69	To Whom It Concerns, I want the greatest safety for Willamette Cove. I will have to rely on the best made points below: 1. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. 2. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. 3. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. 4. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. 5. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. I hope you will take these points seriously and follow the recommendations. Sincerely, Hillary Tiefer

70	Dear DEQ Staff, Please note the following comments regarding the cleanup if Willamette Cove: 1. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. 2. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. 3. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. 4. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. 5. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you for saving our river! Sincerely, Valerie Rullman (Portland resident)
71	Hello, I am writing this email to ask you to take a stand for clean up of Willamette Cove. I ask that the cleanup of Willamette Cove meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. * DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. * DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. Thank you for your consideration and please protect the public by setting high clean up standards for Willamette Cove. Dena Turner Portland, OR

72	To DEQ Project Manager Erin McDonnell RE: Comments on Proposed Upland Cleanup of Willamette Cove The focus of my comments is on the DEQ cleanup of the upland portion of the Willamette Cove site. The ability of Metro to restore the property to a park with recreational use will be affected by the type of cleanup chosen, and the effect on the current plants and animals by the proposed cleanup action. COMMENTS ON PUBLIC NOTICE The one page description public notice does not mention that there are different alternatives that are discussed in the proposal, giving the impression that there is only the one method available to use. The current animal and plant status and future desired outcomes are not included. The effects of the proposed cleanup plan on the animal community and plant community currently on the site is not included. It does not indicate there is time required to restore the site back to the current plant and animal communities, and then more time for restoration to the desired park animal and plant community. It does imply that once the cleanup action is complete, the area is ready for Metro to restore and to use as a park. It does not describe that the actions are primarily soil removal and plant removal, leaving barren soil/sand replacement over vast areas. Higher Toxic standards for wildlife Many cleanups of the Willamette upland site have been done. In 2016, the resulting report from the cleanup reported that the site had been cleaned to human required standards except for one hot spot that is actually part of EPA's cleanup area requirement. Now this additional report has additional soil removal needed because lower levels of toxins are required. It also indicates more work needed for human safety. The change from the prior report is not disclosed or discussed. We have been told that this additional report requiring more toxins to be removed in 2019 is required because wildlife has higher toxin standards than for humans. This need for higher toxic standards is not discussed or supported in the proposed action. We question the need and accuracy of the new report higher standards for wildlife. 1. There is no report of the wildlife that is there, the current health status of the wildlife, the toxins in the current wildlife, or any evidence that cleanup is needed for the wildlife. When asked about any studies done, we were told that the toxic levels need is based on some laboratory study of general reports on general animals in some general areas. The need for additional cleanup in this area is not substantiated by any study of the current animals in the Willamette Cove area, any comparison of animals or plants in similar areas, or any evidence of any harm done by toxins to current wildlife. We request that studies are done on the wildlife in the area that show the level of toxins in the animals that live there. This study of toxins in wildlife is needed to support the need for the cleanup, and identify the toxins that need cleanup. 2. The safety for human use should be included and explained. If the site is now not safe for humans, the explanation should be given, fully reviewed and explained how it differs from the prior report that reported toxins at safe levels for human use. 3. There is a substantial decrease in the ground water toxicity between 2002 and 2016 in the APEX report. There is no mention of any increase or decrease in the toxicity of the upland areas of the Willamette Cove. Is there also a decrease of toxicity also happening in the Willamette Cove Uplands area? Disclose the decrease that is occurring naturally in the report. Assuming a decrease, how long would it take to naturally reduce the level to the required level for wildlife. 4. There is no discussion of the protection or restoration of animal life that is currently living in or using the Willamette Cove uplands during or after the cleanup. This includes rabbits, ground squirrels,

mice, snakes, raccoons, opossums, coyotes and deer. Resident birds use the area as well as migrating birds such as cedar waxwings that eat the madrone berries.

5. There is no report of toxins in the existing plant life that would affect the animals that live and eat the plant life that is there. Are there toxins in the plants what would affect animals? There is no study of animal feces that indicates that any toxins are eaten and affecting the animals.
6. Plant recovery is occurring, back to the natural state of a White Oak/Madrone Canopy Woodland. In addition to large old Madrones, there are areas where small madrones cover the ground. Areas of young growing madrones are unusual, and this area would be devastated by soil removal and/or added soils. There are also six foot high slender oaks many years old and other native plants growing in the cleanup area. There is no discussion of the need to protect or replace the plant life there now if it is removed.
7. Existing non-native trees are acting as a nursery for native plant species growing under them. There is no report of saving or replacing the native plants that are growing under the non-native trees.

Long term recovery to White Oak/Madrone Canopy Woodland

8. Photos from 1904 indicate that the area was a White Oak/Madrone Canopy Woodland that extended to the edge of the water. How to mitigate the soil removal and restore this natural native woodland should be included in the report.
9. Reports of soil fill and wetlands on the site do not agree with the 1904 photo showing White Oak/Madrone Canopy Woodland that extended to the edge of the water.
10. The report states that if higher toxicity is found in a specific area, additional excavation can be done. Similarly, I request that if there are current native plants in a specific area, then the excavation should be limited if the toxicity in that area is low.
11. As a farmer or restoration expert knows, the type of soil is essential to support the type of plant and animal life. The source and type of the appropriate soils replacement should be included in the report. Sand is not appropriate, and would encourage a sterile area with invasive plants.
12. The timeline of the recovery of the White Oak /Madrone Canopy Woodland with the action proposed should be included. A comparison of an alternative of No Action, or Minimal Action with a timeline should be included.
13. Plant recovery is currently happening. A plant list should be included.
14. If there is a reduction of toxicity occurring naturally, how long that would take to reduce the toxicity naturally to safe levels? Compare that to the time for recovery from the proposed action to a White Oak/Madrone Canopy Woodland after the proposed action.
15. The cement pad and asphalt should be removed to allow plant recovery and reduce the toxicity of cement and asphalt.
16. The source of pollution should be verified to determine future issues and the expected depth of the toxins. Similar industries in Linton do not have the same toxicity levels. If the toxins are are primarily from automobiles from the bridge and the train along the edge of the property, then this is a continuing issue. How long will it be before another toxic cleanup is required if the source of the toxins is not mitigated? Is the depth of soil removal affected by the cause of the toxins?
17. The 1910 Trail Alignment Report reports that "the restoration plan is based on current soil and vegetation assessments. Restoration of Oregon white oak and madrone plant community in the uplands is a key objective…in concert with the remediation and mitigation measures that are being planned for the property." Is this still an objective of the cleanup proposed?
18. Climate change needs to be factored into a recovery of the site after the cleanup. Hotter, drier summers affect recovery time, water needed, and time for recovery. Restoration of the area needs to include planting, watering systems and regular maintenance. A time line should be included in the report.
19. I request that as much natural recovery area as possible should be retained.

20. A review of a No Action Alternative should be studied, with possible No Action areas included. Areas requiring less soil removal should be identified. Areas with small newly started native plants should be identified.
21. The proposal should include a study and timeline of the natural reduction of remaining toxins, retaining as much current native plant recovery as possible. There should be a description of the desired site improvement 5, 10, 20, 50 years in the future.

I Request the following additions to the Proposed Upland Cleanup of Willamette Cove

A. Describe a major cleanup goal of the project is to allow the restoration of a native white oak and madrone plant community. This is a unique opportunity to restore a thriving upland plant and animal community along the Willamette River.
B. Include a study and evaluation of the current ongoing natural recovery of Madrone and white oak community. This includes current plant lists and all resident animals, and other animals that use the site.
C. Disclose the harmful effects of the proposed soil removal on the currently recovering plant and animal community and also the actions that are needed to mitigate the proposed action to the current community.
D. Include a study and evaluation of any toxins that are found in the plants and animals that currently live in the area.
E. Use the study of toxins in the current plants and animals to evaluate what toxins are dangerous to the animals and may need removal.
F. Balance is needed in the evaluation of this project, using science as a way to maximize the opportunities for restoring a white oak/madrone plant community. The timing of this project as part of the Superfund settlement, sets this as an example to be followed when there are other actions. The unique characteristics and opportunities make this an important project to succeed and have a favorable affect on the area.
G. Add a No Action Alternative evaluation for the site, or for special areas within the site.
H. Use risk assessment and the evaluation of the current recovery to identify areas for a No Action Alternative.
I. Use the current ongoing natural recovery of the madrones and white oak plant community as a part of the proposed action. Identify, protect and enhance the current recovery.
J. Include the features, a timeline, actions and maintenance needed for the restoration to the goal of a native white oak and madrone canopy similar to the photo of 1904.
K. I request that the DEQ proposed alternative leave the site in as good or better wildlife habitat as when the cleanup started. This includes additional actions to restore areas where soil removal has harmed the existing plant and animal communities.

Helen Ost

73	I am concerned that the Oregon DEQ's preferred cleanup alternative for this superfund site does not go far enough. I strongly urge you to choose Alternative 3b (Alternative Excavation and Offsite Disposal) for the best future for Portland and its citizens. 1. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access once the cleanup is completed. It is critical that public and environmental health be prioritized at this site. 2. While the cost differential of $2.8 million between Alternative 3b and DEQ's preferred alternative seems high, in today's world that cost is not as significant as the future loss of safe natural river habitat for human enjoyment. 3. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Best Regards, Kris Guptill Portland
74	COMMENTS RE DEQ PROPOSED WILLAMETTE COVE CLEANUP I support delaying a decision until the studies proposed below are completed or if one must be made now, I support the No Action alternative. I oppose the DEQ alternatives to strip the vegetation from the 27-acre Metro Willamette Cove natural area and bury the surface toxins under two feet of "clean soil". DEQs analysis of the Willamette Cove site did not determine the sources of the toxins on the site. It did not examine the significant natural revegetation nor where and how some of it is occurring and did not consider allowing that natural recovery to continue. Our residence along N. Willamette Blvd. overlooks and is adjacent to Willamette Cove open space. Our section of N. Willamette is a busy road. We have to scrub black dust, presumably tire dust, from the crevasses in our white front door every year. When we have lived on lightly trafficked streets we have not had this occur. When I saw a picture showing an outdoor storage area for dimensional lumber waiting to be shipped from a former sawmill as an area slated as cleanup because of dioxins, furans, and PAHs at levels unsafe for resident wild animals, I began to question the past businesses did it story line. DEQ appears to have looked for a set of toxins on the property and when it found them blamed them on the prior businesses. The hypothesis that the prior businesses were to blame was not supported scientifically. The attempts to link them to those past businesses do not provide a clear pathway for doing so. The closest one of DEQ guesses is that the glues used in plywood making somehow resulted in the toxins. Here I presume that the organic toxins are what is being alluded to. Yet the 3 plywood mills in Linnton all got clean bills of health. The single plywood mill, sawmill, and whiskey barrel maker and ship repair facility on the property I contend would have gotten clean bills of health if a search had been made for the current toxins when those businesses vacated the land. No measurements of toxins were made until approximately 50 years after those businesses vacated the land. My hypothesis: The toxins in the surface layers of the soil are because the land is in the air shed of the St. Johns Bridge. Dioxins, furans, PAHs, PCBs and lead are among toxins that come out of the exhaust pipes of internal combustion engines. The specific dioxins, PAHs, furans, and PCBs in the surface soil of the property are those that are water insoluble and bind tightly to soil particles. They are not washed out with rain nor do they migrate through the soil. As long as the bridge is used by internal combustion engine traffic, the Willamette Cove Uplands and the adjacent lands within its air shed will continue to be polluted by the toxins

coming out of the tailpipes of internal combustion engines as they have been since 1931.

Over several years, DEQ completed cleaning the site of toxins to safe human use levels by 2016. In 2019, DEQ determined that the area was unsafe for animals by relying on theory based animal standards. Animal surveys of numbers and health are needed to confirm the theoretical standards and to establish a baseline of wild animals carrying capacity including birds, invertebrates, mammals, reptiles and amphibians.

Some information linking the three named classes of organic toxins to internal combustion engine exhaust:

1.Dioxins:
"Combustion processes are the main sources of the dioxin emission to the ambient air (see Fig.1.) [4], [9]. Taking the emission percentage of several sources into consideration as the reasonable factor, the road transport is seemed to be not as significant as other sources of dioxins but the road transport sources of dioxins are widespread and they are placed inside human living surroundings, especially in highly urban area. Norms of natural environmental protection in highly industrialized countries include limits of the dioxin emission into ambient air. Dioxins are thought to be the most carcinogenic substances. They have not only allergic features but also they can damage DNA code and have destructive impact on pregnancy. Due to dioxin impact on humans, analysis of transport sources of dioxins should be taken into investigation. It is very probable, that the trace concentration of dioxins (a few ppm) can be more destructive than the NOX or even PAH (polycyclic aromatic hydrocarbons) emission from the IC engine. Moreover, it is worth of noticing that the small dioxin dose does not bring immediate effect on our health. They destroy living creatures by their long-term negative influence on organic tissue as a result of their accumulation feature in the adipose tissue. Up-to-date limits of the dioxin emission from IC engines are not mentioned but it seems it is only a matter of time. The Californian EPA regulations, which are considered to be the strongest in the world, include dioxins (PCDD, PCDF and PCB) on their lists as toxic components of exhaust gases from the IC engine."
https://pdfs.semanticscholar.org/328c/940ea2eb7928d9a141999fb7dcedd633cb2b.pdf

2. PAHs:
https://superfund.oregonstate.edu/all-about-pahs

3. Furans:
https://www.epd.gov.hk/epd/english/international_conventions/pops/faq_no13.html

The second set of toxins on the property are heavy metals. Tire dust and related vehicle materials from St. Johns bridge traffic and airborne particles generated by railway brake pads are the best explanation for the source of heavy metals on the property.

A. "Tire dust is a significant pollutant, especially as a source of zinc in the urban environment. This study characterizes the morphology and chemical composition of heavy metal particles embedded in tire dust and traffic-related materials (brake dust, yellow paint, and tire tread) as measured by a field emission scanning electron microscope equipped with an energy dispersive X-ray spectrometer (FESEM/EDX). In 60 samples of tire dust, we detected 2288 heavy metal particles, which we classified into four groups using cluster analysis according to the following typical elements: cluster 1: Fe, cluster 2: Cr/Pb, cluster 3: multiple elements (Ti, Cr, Fe, Cu, Zn, Sr, Y, Zr, Sn, Sb, Ba, La, Ce, Pb), cluster 4: ZnO. According to their morphologies and chemical compositions, the possible sources of each cluster were as follows: (1) brake dust (particles rich in Fe and with trace Cu, Sb, and Ba), (2) yellow paint ($CrPbO_4$ particles), (3) brake dust (particulate Ti, Fe, Cu, Sb, Zr, and Ba) and heavy minerals (Y, Zr, La, and Ce), (4) tire tread (zinc oxide). When the chemical composition of tire dust was compared to that of tire tread, the tire dust was found to have greater concentrations of heavy metal elements as well as mineral or asphalt pavement material characterized by Al, Si, and Ca. We conclude that tire dust consists not only of the debris from tire wear but also of assimilated heavy metal particles emitted from road traffic materials such as brake lining and road paint."

Characterization of Heavy Metal Particles Embedded in Tire Dust
By Kouji Adachi and Yoshiaki Tainosho
In Environment International Vol 30 Issue 8 Oct 2004 p. 1009-1017

B. "Brake pads on wheel-mounted disc brakes are often used in rail transport due to their good thermal properties and robustness. During braking, both the disc and the pads are worn. This wear process generates particles that may become airborne and thus affect human health. The long-term purpose of 'Airborne particles in Rail transport' project is to gain knowledge on the wear mechanisms in order to find means of controlling the number and size distribution of airborne particles. In this regard, a series of full-scale field tests and laboratory tests with a pin-on-disc machine have been conducted. The morphology and the matter of particles, along with their size distribution and concentration, have been studied. The validity of results from the pin-on-disc simulation has been verified by the field test results. Results show an ultra-fine peak for particles with a diameter size around 100 nm in diameter, a dominant fine peak for particles with a size of around 350 nm in diameter, and a coarse peak with a size of 3–7 μm in diameter. Materials such as iron, copper, aluminum, chromium, cobalt, antimony, and zinc have been detected in the nano-sized particles."
A Study of Airborne Wear Particles Generated from Organic Railway Brake Pads and Brake Discs
By Saeed Abbasi, et al
Wear vol 273 issue 1 Nov., 2011, p. 93-99

The third possible source of toxins on the property is leakage from the petroleum line that runs adjacent to the railway tracts along the back edge of the property. This would be the closest source of the deep contaminants at the site of the former log pond and the lesser concentration of contaminants appearing to emanate from the petroleum line to the deep contaminants.

A separate issue here, is why isn't the petroleum line marked. Out at the airport, the petroleum line between Marine Dr. and the bicycle/pedestrian path is marked on both sides at regular intervals. The line here should at least be marked at every road crossing. Aren't there state and federal rules(laws) requiring this? In Linnton as part of the site checking it was discovered that one of the petroleum storage tanks was leaking and the leak was fixed. Is the pipeline within the railway right of way? Is it in some way illegal? Would it be disruptive of rail use to fix a leak?

Since the businesses on the property all shut down and their buildings were removed in the 1950s and 1960s, the site has been steadily recovering. A great deal of vegetation has colonized the site, some native and some non-native. The mature madrones out in the open provide berries for cedar wax wings and robins. The non-native trees provide habitat for woodpeckers and hummingbirds and other birds and animals which include rabbits, ground squirrels, mice, snakes, raccoons, opossums, coyotes, and deer. DEQ claims that the levels of toxins is unhealthy for small animals but have not cataloged or quantified the animals on site or examined resident fauna for deleterious effects of living on the property. So many rodents and other small mammals live here that coyotes successfully raised a litter of pups on the property last summer. Red tail hawks nest in the remnant Douglas fir stand adjacent to the property. The non-native trees serve as nursery trees for Oregon white oaks and madrones as part of natural recovery.

No place else in Oregon that I am aware of has been targeted and stripped of its vegetation to remove automobile exhaust toxins, and to remove automobile, truck, and train associated heavy metals.

I ask that the No Action alternative be chosen. Allow natural recovery to continue toward closed canopy oak/madrone woodland as shown in a 1904 photo. The photo was taken when the clam shell came into view as the Railway cut was being completed. The photo shows the whole shoreline from the ferry to the cut was closed canopy white oak/madrone forest to the edge of the water. It was shown me by a member of the St. Johns Heritage Association.

I request that the large cement pad and the asphalt area be removed to allow natural plant and animal recovery in those areas. A reason for not doing so was given to me an active participant in PHCAG: that there might be the above organic toxins under the slab. Those compounds migrate very little because as stated above they bind tightly to the soil particle upon which they land and they are water insoluble. A person who identifies with PHCC has written that she is afraid to walk the trails (access roads) because the toxins are volatile. DEQ and EPA need to educate the public and the groups they support on the properties of the toxins in the soil and make sure they understand the meaning to reduce the spreading of misinformation.

My request at this time is that my hypothesis be adopted or that it be tested. My hypothesis can be tested by sampling for tire micro particles and asbestos micro particles and other micro particles associated with vehicles. To do so, I request that the San Francisco Estuary Project and 5 Gyres Institute be contacted for how to proceed with sampling for evidence of vehicles as the source of those contaminants and that the authors of the two papers cited be contacted for how they collected and performed their analyses. An article in the Los Angeles Times on October 2, 2019 titled "The biggest likely source of micro plastics in California coastal waters? Our car tires". It contained a link to the San Francisco Bay Microplastics Project of the above institutes.

I do not believe that DEQ can ignore the findings of the various researches that I have referenced. Either accept them and redo the recommendations for moving forward or repeat their tests and then redo the recommendations for moving forward.

Finally, the No Action alternative is the only one that does not contribute to global warming. All the other alternatives are business as usual. If gasoline or diesel is priced at $2.50 per gallon, then a minimum 8 million pounds of CO2 are produced for every million dollars of the various action alternatives. We are in a climate emergency. Look around the world, regionally and locally; wildfires, heatwaves, more heavy tropical storms and furious hurricanes, sunny day flooding due to sea level rise, and flash flooding are occurring in multiple places every day from the Arctic to the Amazon to accelerating melting of ice in the Antarctic and Greenland. Above 80 degrees latitude it has been above freezing for over 2 months. A German icebreaker had no difficulty reaching the North Pole, as the ice is thin and patchy.

On the Columbia River there have been large salmon kills from too warm water. In Portland the amount of snow and number of days with snow on the ground is declining, as are the number of winter chill hours declining. Precipitation is coming less in the form of many misty days and more in the form of rain with dry days between. Summers are hotter and drier. Toxic algae blooms are occurring on the Willamette River. DEQ and EPA need to take Global Warming seriously and not just pay lip service to it.

As DEQ has not made a scientific case for the basis of its action alternatives, and if an alternative must be chosen at this time, I ask the No Action alternative be adopted and that the other DEQ alternatives all of which would turn the site into a biological desert by removing almost all of the existing vegetation and overlaying the existing surface toxins with 2 feet of "clean soil" not be chosen.

John Ost
Portland, Oregon
August 27, 2020

75	Hello, I'd like to add a comment re the willamette cove cleanup project. As a community member in ne Portland and as a social worker primarily serving the houseless/housing insecure community in n Portland, my strong preference for this project is to have bioremediation or full removal of toxic materials to an offsite location. Caching some of the toxic materials on site is a temporary fix and does not ensure permanent safety and access to our communities. The environmental destruction that took place at the cove was not an accident, it was a byproduct of greed and disregard for others. The long term renewal of willamette cove must not be guided by the same principles. Best, Chris Copland
76	My wife and I want the Cove to be as clean as possible. We wish implementation of plan 3B. We don't wish to see contaminants, remaining under some cap, only to be dislodged by some flood caused by climate change. We wish the area to be able to be reclaimed for wildlife and recreational use. We wish large form trees to be retained. Scrap plan 4C. Robert B. Bernstein Laura Webb
77	1. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. 2. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. 3. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. 4. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. 5. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential.

78	The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you for your time, Barb Greene N Portland

79	Email to: Oregon Department of Environmental Quality cc Lynn Peterson, Metro President RE: Willamette Cove Super Fund Clean-Up Date: August 28, 2020 Dear DEQ Staff: I am writing to ask that DEQ strive for the highest standards of public service and environmental common sense when it comes to your efforts to clean-up Willamette Cove at the Portland Harbor Superfund Site. Willamette Cove is one of only a few areas in the project that is expected to have public access as a Metro Natural Area after the clean-up is completed. Leaving an estimated 20,000 plus cubic yards of contaminated soil onsite and under caps – as DEQ's preferred Alternative 4c plan would – could undermine human and wildlife health and possibly restrict future use of the area. By contrast, Alternative 3b (Alternative Excavation and Offsite Disposal) would remove a substantial majority of contamination from Willamette Cove uplands while striving to preserve as many mature trees as possible. The additional cost of Alternative 3b – an estimated $2.8 million - would be well worth the relatively small investment for the dividends it could provide in the way of public access and administrative flexibility for generations to come. That said, I urge you to approve the 3b alternative for the Willamette Cove clean-up to best serve the long-term interests of our city and its citizens. Thank you, Lloyd Vivola Portland, Oregon
80	Removal and revetment of the material to stable ground in central Washington should be done concurrently with in-water dredging work near the site. Our 62 cu M environmental bucket with the Pelican Plate cover to seal the load at the riverbottom/working face is actually larger than the aggressive rock bucket pictured. The only way to handle toxic goo is slowly and carefully. The only way slowly works is with a big, accurate (within an inch) bucket. Our Backacter1100 will change the way environmental dredging is done. The Duwamish River pcb cleanup was just thrashed by smaller clamshell dredges, scattering toxic muck everywhere. When a clamshell bucket grabs trash, the load is lost. Best regards
81	Please clean up Willamette Cove with Alternative 3b, not 4c, for long term reliability. Thank you, Robyn Bluemmel Portland

82	Dear Oregon Department of Environmental Quality, The strongest possible cleanup option for the Willamette Cove Superfund Site is essential for a growing Portland metro area. -We want a cleanup that will allow for swimming! -The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. -DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). -DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. -Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards - for swimming! -DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you, Stone
83	As a citizen of Oregon, I'm writing to ensure that the Oregon Department of Environmental Quality (DEQ) adopts the strongest possible cleanup option for the Willamette Cove Superfund Site. 1. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. 2. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. 3. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. 4. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. 5. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you for protecting our river! Richard Emery & Heidi Beaver Portland, OR

84	Hello, I am a citizen of Portland and I am writing to you about the proposed cleanup of Willamette Cove. It is my urging that DEQ pursue the most aggressive cleanup measures (3b). Please see pasted text below - I have copied this from a source but it is my own personal stance as well. 1. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. 2. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. 3. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. 4. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. 5. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you, Sarah Carr
85	Hello, Thank you for welcoming public comments regarding the cleanup of Willamette Cove. As a Portland resident, the health of the Willamette and public access to natural areas is a top priority for me. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. I believe the difference in cost between Alternative 3b and DEQ's preferred alternative is justifiable given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. Thank you, Rory Cowal
86	Please keep that nast soil out of my town! Please don't let rainwater runoff from that nasty polluted soil contaminate our water. Please don't cover Hillsboro in dust from these trucks delivering that soil to the dump. Please don't pollute Hillsboro!

87	1. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. 2. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. 3. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. 4. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. 5. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you, Kristin Anne Conrad-Antoville & Anthony Antoville Portland OR
88	Dear DEQ, The need for cleanup of the Willamette River has been long-standing. A (small?) portion of the pollutants may have been carried downriver by now, MANY years following their introduction into the soil and water, but they obviously are not gone. This is the time for DEQ to get this cleanup done, and get it done well. Putting one's head in the sand, so to speak, is a dangerous and ineffective plan. The sand, after all, is badly polluted. Having grown up in North Portland, about 4 miles from Willamette Cove, I recreated many summer weekends in the Cove. It is a superficially beautiful place. It's time to make it beautiful both on the inside and the outside, by removing the pollutants. DEQ could be on the cutting edge of cleanup efforts if you were to use technologies that are showing themselves to be extremely beneficial in other water cleanups around the world. The irony, perhaps, is that the technologies are biological, relatively simple, and showing themselves to be safe. Thank you for considering a thorough cleanup of Willamette Cove. Shawn Looney Linnton community, Portland, Oregon

89	To whom it concerns, I just read an alarming notification that tons of polluted river bed soil from the Willamette River Cove decontamination project are going to be dumped at the Hillsboro Dump location. That is alarming because so many families with young children live right across the street in Magnolia Estates. In addition, the Tualatin river is right next door to the Hillsboro dump which runs the risk of this contaminated soil reaching the waters during rainy season. Why does Hillsboro and it's community have to bare the brunt of Portland's pollution cleanup? This is not acceptable for our community. We do not need nor want that contaminated soil here in our own. Sincerely, Malderine Birmingham
90	To: Oregon Department of Environmental Quality Re: Public Comment Regarding the DEQ Staff Report Recommended Remedial Action for Willamette Cove Upland Site I would like to provide feedback regarding the proposed remedial action outlined in the DEQ Staff Report for the remediation of the Willamette Cove Upland Site. In the Staff Report, DEQ recommends option 4c, Focused Alternative Excavation with Off-Site Disposal/On-Site Consolidation and Cap. DEQ claims that this remedial option sufficiently addresses the human health and ecological risks associated with soil contamination at the site. However, I believe that the recommended plan leaves too much contamination in place, requires too many restrictions on the property, and passes the risks and costs of the contamination on to future generations. In regard to the concern about diesel trucking of sediment loads through neighborhoods, I disagree that should be used as a reason to leave more contaminated soil onsite. Certainly barges are preferred. However, diesel particulate filters on trucks are documented to remove 90% of diesel particulate emissions. Such filtered trucks are easily found in the three-county Portland area. The following spreadsheet compiled from 2016 ODOT and 2018 DMV data lists every truck fleet in the tri-county area and the amounts of filtered and unfiltered trucks in the fleet: portlandcleanair.org/files/data/DIESEL_FlEETS_noUHAUL.xlsx (Look at the third tab Comm-Public) ODOT provided and updated data set in 2020, located here: portlandcleanair.org/files/data/PDXLIST1.XLS As each individual truck is listed per line in the spreadsheet, updating the fleet analysis would require a programmer. However unfiltered truck replacement is an exceptionally slow process in Oregon and the 2016 results are unlikely to have changed much. Choosing only filtered trucks can be easily achieved for this project by choosing fleets without unfiltered trucks. Of fleets in the tri-county area, 932 fleets with only filtered diesel trucks have 1-2 trucks; 128 only-filtered fleets have 3-10 trucks, 18 only-filtered fleets have 11-89 trucks. As a courtesy to neighbors I suggest leafleting houses along the proposed route, alerting them that only filtered trucks were chosen, and the expected duration and hours of operation. The ideal months of operation for such a trucking operation are summertime when the ceiling for pollution rises to 10,000 feet, as opposed to winter when inversions keep airborne pollution close to the ground.

	We would want to work with the performing party, DEQ, Metro, and Portland Harbor Community Coalition to ensure an inclusive procurement process can happen before any new contracts or subcontracts are determined, as well as having dialogue with existing contractors about these high roads environmental standards. We are also circulating this proposal to the 39 Neighborhood Association boards, six churches and synagogues, three coalitions, and three other local organizations whose boards and decision makers have provided a liaison in our cooperative effort to address industrial air pollution in the Portland area. - Greg Bourget Executive Director Portland Clean Air (503) 995-5453
91	Very thorough plan, not enough (leaving much to be huge problems down the road, e.g. earthquakes, floods, etc) but how many more generations of children are going to grow up, grow old, and die before the disgusting mess is cleaned up? JUST DO IT!!!!!
92	To whom it may concern, I am a 27 year old North Portland resident and frequent user of outdoor public spaces in the area. I would not be comfortable with the current proposal to cap the dredged and excavated contaminated on site near the Willamate Cove. Not only is it potentially dangerous if contents were to leak to the surface or to groundwater, but the plan accounts for only 30 years or ' in perpetuity' as defined in the proposal of monitoring of this capped contaminated soil. What then? Meanwhile during my lifetime and my children the community will have the mental stress of the uncertainty of the cap in a time where stress and mental health issues are at an all time high. Although moving the soil has it's environmental and cost concerns, it is bringing the toxins full circle rather than sequestered for 30 years. Dealing with the issue In a responsible manner allowing for innovative solutions such as green transportation and true soil restoration using permaculture methods. The time is not to fall back into the same old patterns, it is a time of a Green Industrial Revolution. Now is the time to be bold to achieve what needs through pioneering methods rather than litteraly putting a bandaid on the problem. Please remove soil from the site to a landfill with the proper mechanisms to handle this type of contamination. Please fund Innovative community led solutions. You don't need to do this alone, we will all chip in together! All the best, Alexander Rhodes

93	To Whom It May Concern: I object to the removal of contaminated river soil being transferred to the Hillsboro dumpsite. You don't take contaminated soil and transfer it to another location without decontaminating it first! It's hazardous no matter where it is-you have to do your due diligence before you contaminate a second location in Hillsboro. Who's brilliant idea was this? Please reconsider this ill advised plan. You must clean the soil FIRST then you can transfer it anywhere you want. To transfer it without doing that is an affront to the people living nearby and certainly to the environment, especially the Tualatin River! You need to do better. Respectfully, Lauren Dixon
94	Hello Upland Cove Committee- I am a resident of Hillsboro and a concerned parent/citizen. I recently heard about a plan to dump contaminated waste in the Hillsboro dump. I am urging you to consider the many local water ways including Jackson Bottom Wetlands and Tualatin River as well as the nearness of several residential neighborhoods and schools. I understand you need to find a unique solution for a challenging problem but Hillsboro is not that solution. There are more remote locations with far less inter connected ecologies that would be more suited to this type of highly sensitive material. Thanks for listening. Danielle Meininger
95	*[Spanish text, hand-written, translated into English:]* It is good that you clean
96	*[Spanish text, hand-written, translated into English:]* I think that everything in this area should be cleaned up at all costs because this is bad for the people and for future generations.
97	*[Spanish text, hand-written, translated into English:]* No more toxic or contamination. Pull out bad materials. Clean up total. I wanted clean life.
98	*[Spanish text, hand-written, translated into English:]* Must be clean.

99	Ladies and Gentlemen: DEQ should be pushing for a more robust cleanup option that includes preserving native trees and removal of as much unsafe soil as possible (Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings, is unacceptable and merely passes the problem on to future generations while leaving the community vulnerable to exposure to contamination. Complete removal of any soil exceeding human and ecological risk limits is the only effective remedial option for the site. However, if constructed, any engineered systems, such as soil caps or covers, used to contain contaminated materials at Willamette Cove must be designed to maintain protections for human and ecological health in the event of potential seismic and climatic events including earthquakes, river flooding, and fire. I support the exploration and inclusion of alternative remedial methods, including bioremediation, in the final cleanup plan, as long as they do not minimize cleanup levels or further delay the cleanup. I do not believe that the risk models used by DEQ and EPA to calculate acceptable risk levels consider the disproportionate exposure of BIPOC, low-income and houseless communities to environmental contamination. Nor do I believe that reducing the carbon footprint of the cleanup requires limiting the amount of contaminated soil removed from the site. I believe that maintaining the future oversight and monitoring of the site in perpetuity is cost prohibitive and unrealistic. I urge the Department of Environmental Quality to select remedy 3b, Alternative Excavation and Off-site Disposal, for Willamette Cove. Alternative 3b will permanently address the risks from contamination in the present instead of leaving it for future generations to take care of later, it will eliminate the need for perpetual maintenance of a soil cap, it will ensure that a catastrophic flood or earthquake will not create potential exposures to contaminated soils, and it will eliminate the need for restrictions on the use of the property. Thank-you. Very truly yours, Judy Wilder Portland, OR
100	Not sure how accurate my neighbors are but Ive heard rumors that the designated location for the disposal of the waste is at the Hillsboro disposal. If that is the case I am VERY MUCH AGAINST this. Increased amounts of dump trucks traveling down Minter Bridge Rd containing HIGHLY POLLUTED materials leaving dust trails and residue. Plus polluted run off water from rains entering into Tualutin River and the surrounding wet lands. I have very many small children living with me and we, along with all our neighbors would be exposed to all this unwillingly. Why are they bringing that waste into Hillsboro? If this is the designated location please don't do it. Thank you.

101	Hello, I am writing with some thoughts about the clean up of this superfund site. I swim in the Willamette river 4-5 times a week for recreation and exercise. I have a deep desire for any superfund clean up to allow for swimming. It is critical that the highest possible standards for human use (i.e. swimming) be the standard for this clean up. Anything less than that sells short the area for future public access. Public and environmental health is at stake and should not be compromised. Please do not plan for capped contaminated soils. Please select Alternative 3b to excavate and remove contaminated soils offsite. That is the safest option for human use of the river, which is something we truly want to encourage. The Willamette River is the gem of the Portland Metro Area and is becoming an international destination for swimmers. This is something we want to encourage as much as possible. Thank you for your consideration, Christina Malango Portland, OR
102	Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal) and abandon its preferred alternative (4c). The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million. While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. Please select alternative 3b. Sincerely, Francisco Gadea Portland, OR
103	I strongly urge DEQ to abandon its choice of 4c and select Alternative 4B. The cost difference of 2.8 million is not too high a price in order to meet the highest possible standards to protect public and environmental health. Kathryn Sheibley Portland, OR

104	I strongly support the following: -We want a cleanup that will allow for swimming! -The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. -DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). -DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. -Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards - for swimming! -DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Sincerely, Scott Lomas
105	I am writing today to express my support for the alternative 3b action at WIllamette Cove. This permanently addresses the contamination. We've been fighting this fight for far too long and I don't want this to be something we're leaving for my daughter's generation to deal with. We are right next to a giant fault line. Flooding and earthquakes could easily negate any solution that utilized a soil cap. Fix the problem, don't just put a bandaid on it. Emilie Saks-Webb Director of Operations Cascade Environmental Solutions cascade-environmental.com
106	Hello, We are very excited about the potential of the Willamette Cove to serve as another outdoor space for urban children to get acquainted with nature. We believe (and scientific studies support) that early access to nature is critical for healthy human development and makes us better people. We all feel better after some peaceful time in nature. Our concern is that the proposed cleanup of the cove will leave significant quantities of contaminated soils on site, limiting the site's usefulness. The cost to remove them is not insignificant, but if the children of our city, not to mention the adults and the urban wildlife, can benefit from this site for decades to come, we believe it is a worthwhile investment. On the other hand, if the lesser solution is chosen, we leave the problem for future generations, again. Let's please be better than those who came before us and kicked the can down the road on environmental protections. Let's do the job right the first time, and create a wonderful place for all of Portland to appreciate nature. Thank you for your consideration. Zac Wheeler (and family)

107	Hello there, Thanks for taking community input on this cleanup project. I'd like to encourage the DEQ to require and pursue stronger cleanup measures. As Portland residents, we need the healthiest communities possible and those are built from the ground up – meaning, we must be removing more contaminated soil from the Willamette Cove site, (Alternative 3b int he DEQ report) preserving native trees, and more beyond the current plan to focus on consolidation and capping which may be the cheaper option now but will have larger, worse impacts for our health over the years. I understand that while the report gives a nod to doing offsite disposal of higher-risk soil, only 4,000 cubic yards are actually slated for removal, which leaves tens of thousands of cubic yards behind? That doesn't sound like a safe solution to me, even if it is "consolidated and capped" it is still well within reach of community members, along with the soil, water, and air we rely on. In addition to getting this dangerous material offsite, we need to ensure it is processed by a robust green jobs industry that can process it relatively safely. It's completely unacceptable that the risks of leaving this contaminated soil in the ground fall disproportionately on low-income, unhoused, and/or Black, Indigenous, and additional communities of color. For instance, the carcinogenic Risk-Based Concentration for total PCBs for recreational users is 0.74 mg/kg while the same Risk-Based Concentration for houseless community members is 14 mg/kg – how is that fair or just? Please consider reversing these thresholds and lowering them altogether, considering the already-increased health risks that our present society imposes on oppressed communities such as unhoused folks (of whom there are even more now, with the pandemic and rising housing costs). This is a large-scale issue, both over time and space. While the degree of contamination more than likely requires monitoring forever, the DEQ estimated costs of maintaining the site in its plans merely up until 30 years from now – while I understand it's unreasonable to enter a million or even a thousand years when crunching numbers, it's disheartening to be reminded that vigilance in monitoring this site will likely dip over the years, which is why we need to invest as much as possible upfront in removing the bulk of the contaminated material to better manage the future workload. Importantly, any ongoing maintenance and monitoring at the site should trigger inclusive procurement policies for future work. The proposal and bidding process should be designed in coordination with community stakeholders to give preference to local businesses representing the full diversity of the communities who have been impacted historically or currently by contamination at the Willamette Cove and Portland Harbor Superfund. Please also take closer looks at the compounding risks on this already fragile site such as seismic activity, flooding, fire, and/or additional impacts of our changing climate. To wrap up on a hopeful note, I am encouraged that pilot projects in bioremediation are under way, as recommended by community members. I strongly encourage you to listen to the calls from Portlanders to increase capacity of bioremediation efforts if the initial tests are at all promising. In closing, I am concerned that the current plan needs serious re-working in light of its underestimation of the long-term costs of maintenance, insufficient protection of current and future community health, and inadequately addressing risks to our soil, air, water, people, plants, and animal life. Please take my and other community members' concerns and requests seriously, and thank you again for taking the time to wholeheartedly read and understand these comments. Sincerely, -Julie Oatfield Portland, OR

108	I have a series of questions regarding the proposed clean up process: 1. What precautions and emergency plans are in place to deal with any accidental spill of materials (dioxins, heavy metals and PCB's) while transporting them from the site to a licensed land fill. 2. What route will be taken from the work site to the land fill? 3. How will residents, businesses and schools be given notice of the movement of this material through their neighborhood, how far in advance will such notice be given and how will you verify they actually received the notice? Note: It is not sufficient to say "we sent everyone a letter." 4. How will airborne dust particles containing dioxins, heavy metals and PCB's created when the contaminated ground materials are dug up be prevented from drifting into the adjacent neighborhood and the city park on North Crawford? 5. When removing, consolidating and capping, what is to prevent these chemicals and heavy metals from leaching into ground water and the Willamette River over time and further contaminating the environment? Thank you for considering these questions and including actions items in your final plan to address the community safety concerns mentioned. Best regards, Dave Chamberlain Portland, OR
109	Greetings, As a swimmer and paddler on the Willamette River, I am writing to support any and all endeavors to keep the river a healthy place to recreate. In order to do that, I believe the cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. I also urge the DEQ to: • select Alternative 3b (Alternative Excavation and Offsite Disposal). • abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. • not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you for listening, Deb Miller Landau Writing // Editing // Content Strategy

110	I am writing to provide comment on the cleanup of the Willamette Cove Upland property. By way of background, I have been a resident of the St Johns neighborhood for nearly 30 years and in the past I served as chairperson of the Neighborhood Association's Land Use Committee. I am well familiar with the Willamette Cove area. I strongly believe it is in the best interests of the community (both present and future generations) and the environment to completely remove all contaminants from the site. Consolidation of contaminants on the site may be a low-cost alternative, but it is short sighted and only passes the problem on to future generations who would inevitably need to clean it once again. Please do the right thing and clean up the contaminants once and for all, now. The staff report favors Alternative 4C, but that alternative has far too many uncertainties, unknowns and risks to be acceptable. The best alternative is Alternative 3A which calls for the complete removal of contaminated soil to a facility approved for hazardous waste. Although more costly in the short run, in the long run it's more cost-effective as it avoids the risk of recontamination and it protects the health of both humans, wildlife and the environment. Sincerely, Kevin O'Sullivan Portland, OR
111	To Whom It May Concern, I am writing to say that I am not in favor of the current proposal to try to contain the massive toxicity present at Willamette Cove in place. This proposal does not make the cove safe for human use. The Black, Indigenous and brown communities that are most heavily impacted by this superfund site are all clear that they do not stand behind this current proposal and want a full clean-up instead. I stand with them. I would support any efforts to clean this site fully for human use and ecological restoration that utilizes bio-remediation methods. Though this may take a longer period of time, I believe it will produce longer and more thorough rehabilitation of this beautiful place. Thank you, Elena Wood Corbett, OR

112	I urge you to choose the strongest cleanup option for the Willamette Cove Superfund Site. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. It is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. To accomplish this, DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you for considering this matter. Kimber Nelson, RN Brentwood-Darlington neighborhood
113	Dear DEQ. Willamette Cove is a very inviting place. Before I knew about the pollution there I went there to fish and swim. We live fairly close, near Cathedral Park. Bioremediation sounds great and we're attracted to the concept BUT in this case it will be too slow. It is also likely to be uneven in its effectiveness. People use the area all the time. We still walk there often and see neighbors there walking their dogs, going for walks like us, jogging and riding bikes. The cleanup needs to be quick and thorough. And please save as many of the beautiful trees there as possible. Dave & Laurie King PDX
114	Dear DeQ, I am a resident of the North Portland Neighborhood of St Johns. I am in favor of the Remedial alternative of 3 A which seems to be the best for all of ours safety. Containing these contaminates or doing this halfway seems to risky with the likelihood of a natural disaster such as an earthquake. Thanks Kelly Tadlock PORTLAND, OREGON

115	Greetings, As a swimmer and paddler on the Willamette River, I am writing to support any and all endeavors to keep the river a healthy place to recreate. In order to do that, I believe the cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. I also urge the DEQ to: • select Alternative 3b (Alternative Excavation and Offsite Disposal). • abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. • not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you for listening... Janice Lucas river swimmer
116	Greetings, Per public input requests, please consider: As a neighbor who lives two blocks away, I urge that whatever project is selected, and the manner in which it is completed, has as your leading criterion the least impact on local wildlife as possible. I am, via this plea, advocating for indigenous raccoons, skunks, eagles, hawks, beavers, falcons, crows, coyotes, nutria, geese, ducks, loons, rats, mice, snakes, finches, bluebirds, orioles, wide varieties of trees, flora and too many insect species to count. I have watched for years as these living beings have been dramatically reduced in numbers, some species having been driven out completely, as patiently they've endured arsonists, houseless encampments, wastes from nearby industrial tenants, litterers, boat dwellers and other human-derived footprint impacts. These poor plants and animals have suffered through so much, and so little remains on the Willamette that is undeveloped, left for them, from what was theirs entirely. When I do go down toward the cove, nothing has been more rewarding to see than to look back in time to how things used to be on the river banks. It's a bonafide treasure. The last thing I would want to see is habitat loss for yet more human interest development, or even if slated for true habitat rehabilitation, a massive scarring job led by heavy equipment, huge laborforce and anything else destructive and majorly disruptive. Each one of these plants and animals is precious, interactive and some are incredibly friendly. And they've been through enough. It would be most appropriate and due them to provide this last remaining untamed acreage entirely for them. Thank you for fielding public comments regarding this project. Best, Demetrios Joseph Deligiorgis Portland, OR

117	I urge that the clean up of toxins at and in Willamette Cove be removed as much as possible before being capped. This area is located in active community. A community that should feel safe. Don't pass this problem on to our grandchildren. Thank you for doing the best for future generations. Brenda H Smith Portland, OR
118	August 30, 2020 Erin McDonnel Oregon DEQ Lynne Peterson Metro Council President Bob Stacey Metro Councilor Hello Erin, Lynn and Bob! I would like to express nine important reasons for a more robust cleanup at Willamette Cove. 1) Doing North Portland Right. For years public agencies have been proclaiming how North Portland has been the dumping grounds for far too long and this needs to be fixed. Willamette Cove is a publically owned property, this is our chance for our leaders to walk the talk. 2) North Portland deserves greater access to the Willamette River. The Willamette River is Portland's second largest public space and natural area, owned by the citizens of Oregon. There is an opportunity to rehabilitate an area which will create a large swath of green space right on the river. This is a once in a generation chance to give North Portland a greater connection to wildlife and recreation in the city. 3) This public property must be cleaned to a gold standard. Businesses that are not headquartered in Portland, will likely do no more than the minimum cleanup dictated by law. The only tool we may have as a community for them to do more is some sense of moral authority. If we clean up this publically owned site to anything less than a gold standard how can we expect these outside business interests to do any more than minimum. How can we argue for them to do more when we did not do more ourselves. 4) Start the bar high early in the cleanup process. Willamette Cove will likely be the first site to be cleaned up. This cleanup will set the tone for the work that follows. Doing this work as a template for how we want to have other responsible parties to clean up their sites will allow for a moral bar. Cleaning this site up right will give hope and empower the North Portland community to dig in and ask more of out of state business interests. 5) The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. 6) DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. 7) DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. 8) The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential

	given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. 9) Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Ultimately, the plan that DEQ prefers does not actually address the issue of contamination at Willamette Cove. It will require issues that arise to be dealt with by future generations. Like many cleanup plans, this one leaves contamination in place, underestimates the long-term costs of maintenance, then uses the underestimated costs to demonstrate that the less-protective option is the most cost-effective. In the long-term, this cleanup would be less costly and more protective of human and ecological health if more robust remediation actions were conducted in the short-term. We urge the Department of Environmental Quality to select remedy 3b, Alternative Excavation and Off-site Disposal, for Willamette Cove. Alternative 3b will permanently address the risks from contamination in the present instead of leaving it for future generations to take care of later, it will eliminate the need for perpetual maintenance of a soil cap, it will ensure that a catastrophic flood or earthquake will not create potential exposures to contaminated soils, and it will eliminate the need for restrictions on the use of the property. DEQ's proposed cleanup plan may reduce some of the risks posed to people and animals by the contamination at the property in the short-term, however it is unacceptable because it leaves too much contamination in place at concentrations above human and ecological risk-based standards and will require "Long-term monitoring and maintenance in perpetuity…". Willie Levenson Human Access Project Ringleader

119	RE: Willamette Cove Upland Clean Up Plan Dear Oregon Department of Environmental Quality Please accept this Perspective on the Future of Willamette Cove from the Cathedral Park Neighborhood Association, the neighborhood which encompasses the Willamette Cove property. We believe the current vision of Metro for Willamette Cove is rooted in the past. When the vision for the Cove was last updated, the waterfront of the Cathedral Park Neighborhood under the St Johns Bridge was primarily zoned industrial with some commercial zones. The residential areas were away from the water, or up on the bluff, and primarily single family with some smaller apartment complexes. The business district was downtown St Johns and the primary routes in and out of the neighborhood were Willamette Boulevard, Lombard Street, and the St Johns Bridge. Edgewater Street, the only access street down to Willamette Cove, was blocked off to prevent cars from using it and pedestrians were discouraged from exploring by the lack of signage or any kind of welcoming entrance to the area. It makes sense that Metro would view this area as a low traffic area where contaminated soil could be collected and capped safely out of the way of the community with limited human contact. But this is not the case currently. Cathedral Park Neighborhood specifically and the North Portland Peninsula has changed since that time and the vision for Willamette Cove needs to change also. The residential areas of Cathedral Park have experienced infill with many multi-family complexes and townhouses replacing single family homes and filling up empty lots. The waterfront under the bridge has been rezoned to allow residential development on a larger scale. A 110-unit complex called Cathedral Village Apartments is in the planning stages and a number of other developments are planned but are waiting for decisions to be made involving clean up at the Steel Hammer Superfund site at Crawford and Burlington before proceeding. The University of Portland has expanded from the bluff down onto the waterfront area with practice fields and parking lots and has more plans for more expansion in the future. There is also an easement on the Willamette Cove property and the University of Portland property for a multi-use pedestrian path, the NP Greenway, that will connect the Cathedral Park and St Johns Neighborhoods with the University Park Neighborhood. It will also connect all of North Portland, with the Eastbank Esplanade and provide a safe passage from North Portland to Downtown for cyclists and pedestrians. In short, the community surrounding Willamette Cove has changed. What was once an isolated area that was mostly unknown to even nearby neighbors will be discovered by North Portland community members and Portlanders from all over the city as they pass through on foot or on bicycle. CPNA believes that a full removal of the contaminated soil will provide a safer environment for the neighbors who live there now and for the people who will discover Willamette Cove via the NP Greenway in the future. A full removal will also expand the possibilities for what the site can be used for in the future as the community grows. Very Best Regards, Jon Smart Chair, Cathedral Park Neighborhood Association

120	Hello As a local Portland nurse practitioner and a Willamette River swimmer, I am writing to ask you to work to meet the highest possible standards of Willamette Cove, for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. I urge DEQ to select Alternative 3b, removing the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. The preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps, should be abandoned. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Thank you Dana Mozer
121	To: Oregon Department of Environmental Quality Regarding the proposed remedial action outlined in the DEQ Staff Report for the remediation of the Willamette Cove Upland site. Like many other community members, I support the full removal of hazardous material from the site. We do not want to see that this site remain with its toxins where they are. We want the people and all forms of life to be protected. We demand access to clean water and safe areas for Portlanders to enjoy the Willamette river and its surrounding areas. Joe Rivera Soto he/him/his/él Hablo Español Candidate, M.S., Educational Leadership and Policy Post-Secondary Adult Continuing Education University Studies Peer Mentor Program Graduate Teaching Assistant Portland State University

	Hello! Thank you for all you do to support our beautiful river. I am a 4th generation Oregonian, my son a 5th. I have seen how the Willamette river has changed in my lifetime. It is green again! We can swim in it! This was not always safe not very long ago. More and more people are seeing our river as one of our many outdoor adventures. Continued actions need to happen to clean up the Willamette. I have included the requests from the Portland Audubon. I agree with and support these requests. Please do all you can to continue the process of healing our precious river(s). I have great pride and a sense of home when I look at our river. I see how it has changed for the better. I know this couldn't have been done without the commitment and work of my fellow Oregonians. Thank you. ~Raini Spring McPhate
122	1. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. Willamette Cove is one of only a few sites within the Portland Harbor Superfund Area that is anticipated to have public access (as a Metro natural area) once the cleanup is completed. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. 2. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal). Alternative 3b removes the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees to the degree possible. 3. DEQ should abandon its preferred alternative (4c) which would leave as much as 23,000 cubic yards of contaminated soils that exceed human and wildlife health risk levels onsite under caps. It would restrict future use of the site and perpetuate risk of releases and exposures in the future. 4. The cost differential between Alternative 3b and DEQ's preferred alternative is estimated at $2.8 million ($8.5 million versus $5.7 million). While this number is not insignificant, it is a relatively small differential given the increase in effectiveness, long-term reliability, site use flexibility and minimization of site use restrictions. 5. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential.

123	To: Erin McDonnell and Others it May Concern at Oregon Department of Environmental Quality Re: Public Comment regarding proposed cleanup of Willamette Cove Through my work in grassroots organizations and as a social worker who works with our unhoused neighbors, I have become familiar with the state and proposed cleanup of Willamette Cove. The current method of 4c would remove some contamination, but consolidate and cap the majority. After the impact that the industry and the contamination have had on Portland's communities, particularly the Indigenous, Black, immigrant, and unhoused communities, this is a far cry from the responsibility and accountability which our communities, future generations, and our River deserve. The remedy must take into account future use, and that future use must be decided and led solely by the impacted communities. Currently, the vague plan for future use is based around Willamette Cove becoming an ecological sanctuary with a trail which does not provide any beach access, conveniently making the case for toxins to remain. This is not what the community is asking for. Indigenous communities would still be denied the access and fishing which is their inalienable right. Several tribes and nations have also brought to your attention how ineffectively this solution protects groundwater or plans for earthquakes and natural disasters. A large proportion of our Black communities have been outspoken proponents of removing all the contamination. They have suffered enough due to the industrial pollution, where many of them work(ed) and live(d). Our Black communities deserve safe and healing access to the River at Willamette Cove, one of the rare sites along the Willamette which provides beach access. Many of our Immigrant communities, of which my family is part of, went through similar ordeals as a result of the industry and contamination, and should also be allowed access. Our unhoused neighbors, with whom I work and have developed many lasting friendships, are exposed to so many toxins on a daily basis and spend, on average, about 3 months at a time camping at Willamette Cove, sometimes also eating the fish and shellfish. Youth, who may enjoy the beauty and privacy that Willamette Cove has to offer, are also affected, unknowingly exposing themselves to substances which cause intellectual, cellular, and reproductive harm. I am confident that a cleanup which is complete and provides human access to the water can still be compatible with an ecologically protective model. It was not, after all, any of these communities which polluted Willamette Cove nor which diminished the availability of green and blue spaces for humans and wildlife alike. I disagree that any of the protective measures are sufficient. First, there is the issue of the cap. This cap will require maintenance forever. This is rather short-sighted to believe that our society and government will last in their current form for eternity. Our world has already changed many times over in the relatively short span of human history. We are putting a great burden on future generations, setting them up for exposure, and must do better by them. In addition, the on-site contamination would mean that institutional controls, such as signage, fences, deed restrictions, and perhaps some type of human enforcement, would be in place. Like the cap, who will upkeep all of these institutional controls indefinitely? Moreover, they do not work now and will never work in the future. People camp and live and hang out at Willamette Cove. When I was there myself, being shown an official tour of the site, I saw several people there, including a couple walking their dog right past signage and into the toxic area, despite seeing a horde of hazmat-suited people in front of them. I understand that a reason given for the consolidation is the carbon footprint and the risk of accidents calculated around trucking all of the soil to Wasco County. I appreciate that sentiment and am deeply committed to our environment, but this is intertwined with, not at the expense of, environmental justice issues. Only a solution which satisfies both of these interrelated needs should be permitted. Remember that the materials to make the cap, such as concrete, also are made via industry and cause pollution. Cleaner-running vehicles could be used, thus lowering the carbon footprint. This is an imperfect solution, but perfection is unlikely to be found given the tools available. Though there is a risk of vehicle accidents, the indefinite risk of cap puncture accidents is eliminated. Some communities do not want trucks going through their neighborhoods. I empathize with this concern, but in return they will receive a restored natural area

	and, most importantly, the short-term concerns of these communities should not be prioritized over the long-term concerns of the most impacted communities. I don't wish to dirty Wasco County or any other place on Earth, but the biohazard dump in Wasco County already, unfortunately, exists. It makes more sense to take all the contamination to one location, which has the unspeakable burden of being reserved for that purpose, than it does to take some of it and leave most of it, having a concentrated toxic load now in two locations. I acknowledge that none of these solutions are perfect. In fact, the violence which industry enacted on Earth and marginalized communities seems to be only remedied with more violence - digging up several feet of soil in Willamette Cove. The amount of that particular violence really doesn't change whether the soil is all trucked to Wasco County or if some is consolidated. Our communities - Human, Animal, Plant, Water, and Earth - require this contamination to be completely removed, to the largest extent humanly possible. However, if there is another method you are able to find, such as bioremediation, which is able to achieve this same goal without the violence to the landscape and in a relatively timely manner, then I am in favor of that option. I urge the DEQ and EPA to develop a remediation plan based on community-driven future use and to fund researchers who are currently studying the effects of mushroom bioremediation (or other types of bioremediation) in Willamette Cove. If, however, those methods are not found to be sufficient in breaking up the eliminating the contaminants, then the soil must be removed and taken to Wasco County, for the health of our community and all of the future generations. Thank you for your time and consideration.
124	Date: August 30, 2020 To: Erin McDonnell 700 NE Multnomah St., Suite 600 Portland, OR 97232 WillCoveUpland@deq.state.or.us From: Bob Sallinger, Conservation Director, Audubon Society of Portland Re: Willamette Cove Upland Cleanup Proposal Dear Ms. McDonnell, Please accept the following comments from Audubon Society of Portland (Audubon) representing our 17,000 members in the Portland Metropolitan Region. Audubon has been tracking the Portland Harbor Superfund process and associated upland cleanup issues for more than two decades. The restoration of Portland Harbor to ecological health is a top priority for Audubon and its members. Willamette Cove, which is one on only a small number of sites in the North Reach of the Willamette that is expected to provide public access once the public risk levels have been addressed, is of particular interest and importance. Audubon urges DEQ to adopt to adopt Cleanup Alternative 3b (Alternative Excavation and Offsite Disposal) which would remove all soils that exceed human health-based levels, but allow for retention of trees where possible. We view Alternative 3b as the only alternative that adequately protects human safety, environmental health and future site flexibility. Willamette Cove is a 27-acre site owned by Metro, with approximately 3,000 linear feet of waterfront along the east bank of the Willamette River, located just north of the Burlington Northern Railroad Bridge. Willamette Cove was purchased by Metro for use as a natural area in 1996 with greenspace bond measure funds. For years it has been posted and fenced off from public use due to high levels of contamination with furans/ dioxins, PCBs, lead, mercury, copper, hydrocarbons and multiple other contaminants, which were released prior to Metro's ownership. In recent months, community groups, including Audubon, have requested that Metro conduct a community based process to masterplan future use of this site and the Metro Council has indicated an intention to accommodate this request. Despite that significant size of the Portland Harbor Superfund Area, spanning ten linear miles of the Willamette River and covering more than 2,000-acres, as well as its close proximity to multiple

neighborhoods including Saint Johns, Linnton, Cathedral Park, University Park and Overlook, there is remarkably little public access to the river and this reach represents the most degraded stretch of the Willamette River over its entire 187-mile length. The area has been described as an "industrial sacrifice zone." As one of the few public sites with river access within the Portland Harbor Superfund Area, the remediation and restoration of Willamette Cove represents one of the most important and high profile cleanup processes within Portland Harbor. The decisions made at Willamette Cove will have significant implications for the health of the river and our communities. It is critical that the highest cleanup standards be met at this site.

Audubon urges DEQ to adopt to adopt Cleanup Alternative 3b (Alternative Excavation and Offsite Disposal) which would remove all soils that exceed human health-based levels but allow for retention of trees where possible. We do not believe that DEQ's preferred alternative, 4c, which would remove only "hotspots" and retain as much as 23,000 cubic yards of contaminated soil in exceedance of human health-based levels onsite by consolidating it onsite and burying it underground beneath permanent caps, is sufficient to protect human safety and environmental health and retain adequate flexibility for future use of this site.

Alternative 3b would remove all contaminated soils from uplands except in areas immediately adjacent to native trees where low impact excavation techniques would be utilized. Trees would still be subject to removal if highly contaminated soils could not be excavated using low impact excavation techniques. All excavated soils under this alternative would be taken to landfills. No instructional controls or other site restrictions would be required upon completion of this alternative. The Staff Report notes that "This is the most conservative cleanup approach (while preserving native trees to the extent possible)… [1] The Report further notes that "Complete removal would be the most effective option given all contamination would be removed offsite, including all human health and ecological hot spots, to a regulated landfill. Consequently, site uses would be unrestricted after implementation.[2]

We would note that we choose Alternative 3b with the understanding that native trees will be preserved using low impact techniques where possible, but that even in the vicinity of trees, priority will ultimately be placed on removal of highly contaminated soils. Audubon places a high value on the preservation of native trees and urges DEQ and PRPs to do everything possible to achieve their retention. The Oregon white oaks and madrones at this site are particularly valuable. However, we agree that at Willamette Cove, priority ultimately must be placed on protection of human safety and environmental health and this may necessitate tree removal in some instances where low impact excavation techniques are not effective.

The Selection of Alternative 4c as the "Preferred Alternative" is based on a faulty premise: The selection of Alternative 4c is based on the presumption that Metro will utilize the site exclusively as a natural area and that human activity will be restricted to the North Portland Greenway Trail which will bisect the property. DEQ's Feasibility Study ("FS") anticipates no beach or water access and the public will not stray beyond designated areas. The FS also anticipates that under the preferred alternative, permanent institution controls will be put in place to restrict activity potentially including signage, fences, and other barriers. Uses at the site would also be limited to "passive recreation activities (including but not limited to trails, benches, viewing areas, and in-water mitigation sites)" but would "not allow active uses such as designated child play areas, sports fields, or picnic areas." Metro would be expected to place these restrictions into the deed for the property.[3] DEQ states, "As the property owner, Metro recognizes that the presence of hazardous substances does limit the use of the Property, and therefore, only uses that are consistent with site cleanup goals will be implemented."[4]

We do not believe that the restrictions required under the Preferred Alternative are realistic, practical, desirable or consistent with the evolving vision of the community. Multiple community stakeholders, including Audubon, recently reached out to Metro and requested a public master planning process for this site to ensure that its full potential is achieved including the integration of ecological, equity and community

goals. Metro Council indicated that it is likely to accommodate this request.[5] The assumption that the vision for this site developed in 2010, with very limited public, input will ultimately dictate future site use is unrealistic either in the short-term or the long-term.

While Audubon continues to believe that the highest and best use of this site is as a fully restored natural area to benefit fish and wildlife and provide public access to nature, we also recognize that it is important that the public have real and meaningful input into the vision that guides this site. DEQ's remedy must be flexible enough to accommodate the widest possible range of uses over time. Remedies that restrict or limit site access or site use should be avoided.

Even assuming that the site remains fully prioritized as a natural area, we expect that the public interface will be much more dynamic than originally conceived, including spur trails extending from the Willamette Greenway, beach access and potentially other amenities. We have seen a marked shift in recent years in the public's desire to directly interact with the urban portions of the Willamette River. We have also seen a significant expansion in understanding of how the public interacts with nature in an urban environment, including culturally specific approaches that help make our natural areas more inclusive. We believe that both as a matter of public benefit and also as a matter of responsible natural resource stewardship, it is best to plan proactively for use and access, rather than ignoring demand and allowing it to happen haphazardly.

It is also important to note here that institutional controls such as signs, fences and other barriers, community outreach, etc., even under the highly contaminated, high risk current conditions, have proven ineffective. Despite a complete prohibition on access, the public regularly enters this site from both land and water. A cadre of boat campers have established a semi-permanent boat camp in Willamette Cove, shelters can regularly be observed on the landward portions of Willamette Cove and people and pets can regularly be observed on the beaches of Willamette Cove. There is an undefined population that utilizes the Willamette for subsistence fishing and this activity is also likely to increase as Willamette Cove becomes more accessible. If the agencies are unable to restrict site access under the current highly hazardous conditions, it is unrealistic to believe that these types of institution controls will be more effective once the site is remediated and much more accessible to public activity. The remedy should be based on a premise that all portions of this site may at some point be accessed by members of the general public.

DEQ's preferred alternative is simply not realistic and it fails to anticipate both official allowed uses as well as unfortunate illicit activity that may occur at this site. We urge DEQ in the strongest possible terms, to select a remedy that provides flexibility over time for evolving site use priorities, ensures public safety no matter throughout the entire site, and which is not predicated on institutional controls that have been proven ineffective over the past two decades since Portland Harbor was designated as a superfund site.

Cost: While cost is an important consideration, it should not trump public safety, ecological health and community values. The estimated cost differential between Alternatives 3b and 4c are relatively small for a site of this complexity. The FS estimates that 3b will cost $8.5 million versus $5.7million for DEQ's preferred alternative, 4c, for a differential of $2.8 million. We believe that the limited increased costs for alternative 3b is well worth the expense given the increases in protectiveness, effectiveness and long- term durability.[6] It will allow for unrestricted future uses of the site, eliminate the need for unproven institutional controls, and eliminate the risk of future releases due to earthquakes and flooding. It will allow the public to access this site with minimal fear or risk that they are exposing themselves to a serious health risk. Metro has finding available through its 2019 Greenspace Bond Measure to accommodate these increased expenses although we do believe that the costs should be spread among all PRPs for this site.

Equity and Inclusion: The entire Portland Harbor Superfund Area creates opportunities to advance equity and inclusion goals in our community. This remains an under-explored and under-developed area within the Portland Harbor Superfund process. It is particularly important that we advance these opportunities as public

sites such as Willamette Cove where public agencies have both a mandate and the ability to directly implement these goals. Equity and inclusion should be infused throughout the entire process including outreach and engagement, selection of a remedy, implementation of the remedy and future site use and management. We urge DEQ to consider equity and inclusion in all aspects of this project.

Institutional Controls during Cleanup Process: Given the failure of institutional controls to date and the heavy public access that continues to occur at this site, it will be critical that oversight agencies and PRPs redouble efforts during the implementation phase of this process. We would note that special attention needs to paid to vulnerable populations including houseless populations and people who are dependent on the river for subsistence.

Bioremediation: We have heard some suggest that DEQ should pursue bioremediation as a primary remedy at Willamette Cove. Audubon is strong proponent of bioremediation where it is an appropriate and effective remedy for contamination. While there may be some limited applications of bioremediation at Willamette Cove that are identified in the future, we do no view it as a primary remediation strategy for Willamette Cove. We concur the DEQ's assessment of bioremediation and its decision "screen out" this approach and not include it among the various cleanup alternatives considered in the report.[7] We have not seen any data that indicates that bioremediation is an appropriate strategy for a site of this size with such a complex array of contaminants present in the soil. Approving bioremediation as a primary remedy would require extensive research in the laboratory and then the field with no certainty as to the outcome of these tests. Willamette Cove has been contaminated for the better part of a century and has been on the CERCLA National Priorities List (NPL) for more than two decades. We urge DEQ to move forward with remediating the Willamette Cove uplands as expeditiously as possible using only proven technologies. This does not preclude additional research into bioremediation at Willamette Cove and integration of new proven technologies in the future, but remedial action at Willamette Cove should not in any way be delayed or diverted for this purpose.

Equity related Concerns about Off-Site Disposal: In recent weeks we have heard some entities argue that onsite disposal at Willamette Cove is appropriate in order to prevent transfer of contaminate soils to other communities. Where a community disposes of its waste is indeed and equity issue. To the degree that Metro believes it should revisit the strategies it currently utilizes for waste disposal, we would encourage it to do so; Audubon would be happy to participate in those discussions. We agree that if communities were required to keep more of their waste within their own boundaries, far more thought would be given to the implications of generating waste in the first place.

However, the raising of these concerns relative specifically and in isolation relative to Willamette Cove to justify adopting a lower cost and less effective cleanup strategy strikes us as specious. First, Willamette Cove is not a situation where the local community specifically benefited from the contaminated waste that was generated at Willamette Cove. The industrial activity that contaminated Willamette Cove and much of Portland Harbor was of statewide and national importance. Those who benefited the most financially from the activities at Willamette Cove and in Portland Harbor in general, are unlikely to have ever lived in the vicinity of Portland Harbor. In fact the local community has borne the brunt of what has been described as an "industrial sacrifice zone" while receiving very few of the benefits of this activity. Suggesting that the local community should now retain the waste that was generated at Willamette Cove as a matter of equity, actually turns the concept of equity on its head.

Second, the amount of contaminated waste generated at Willamette Cove, while significant, is a tiny fraction of the overall amount of contaminated waste that will be generated by the Portland Harbor cleanup process. To the degree that DEQ or others want to consider impacts at landfills, it should be done on a site-wide basis rather than in isolation at one of the few public sites within the Portland Harbor Superfund Area. It would truly be a bizarre outcome if contamination was left at one of the few public sites within Portland Harbor in the name of equity, while other private industrial sites were held to no such standard.

Finally, in a region that is projected to produce 700 tons of dry waste in 2020, more than double the amount it produced in 2011,[8] a holistic review of waste generation and disposal is warranted, but it should not be used as an excuse to perpetuate risk and inequity that has been associated with Willamette Cove for decades. Review of the Metro Region's waste dispose programs needs to be done in a holistic manner that truly looks at benefits and burdens, not on a site by site basis in a manner that is more likely to exacerbate than address inequities.

Coordination among Agencies: The cleanup of Portland Harbor is a remarkably complex process. This is compounded by the fact that the State via DEQ is responsible for the uplands while the federal government via EPA is responsible for the in-water portions. It is further compounded by an alphabet soup of additional local, state and federal agencies that have oversight responsibilities and a wide range of public, quasi-public and private PRPs. It is absolutely essential that the lead agencies, DEQ and EPA, as well as site PRPs Metro and the Port, not only conduct adequate public engagement at Willamette Cove, but also that they ensure maximum coordination between the upland and in-water portions of the process. It is critical that the remedies selected for the upland and in-water portions of Willamette Cove be integrated and harmonized.

Conclusion: We urge DEQ to select alternative 3b. This alternative maximizes removal of contaminants from the Willamette Cove uplands while protecting native treats to the extent practicable. It provides a much higher level of benefit in terms of public safety, ecological health and future site flexibility relative to DEQ's preferred alternative for relatively little increased cost. We urge DEQ to select 3b as the remedy for the Willamette Cove uplands.

Thank you for the opportunity to comment on this process. Please feel free to contact me if you would like additional information.

Respectfully,

Bob Sallinger Conservation Director
Audubon Society of Portland

[1] Staff Report at page 43.
[2] Staff Report at page 51.
[3] Feasibility Study at page 9.
[4] Feasibility Study at page 9.
[5] https://vimeo.com/438265276
[6] FS at Table 21.
[7] Staff Report at page 38.
[8] https://www.oregonmetro.gov/sites/default/files/2018/11/08/SW_Forecast_2019-20_FINAL.pdf

	Hello, I am writing to echo what PHCC has long been saying about the Portland Harbor cleanup, and especially Willamette Cove. DEQ should be pushing for a more robust cleanup option that includes preserving native trees and removal of as much unsafe soil as possible (Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings, is unacceptable and merely passes the problem on to future generations while leaving the community vulnerable to exposure to contamination. 1. CONSOLIDATION Consolidation is not safe for human and ecological health in the long-term. We do not support the redistribution or permanent storage of toxic sediment on the site. At the beginning of the report, DEQ states that "...a preference will be given to offsite disposal of soil posing a higher risk to humans or animals/plants". But in the end, DEQ's preferred alternative calls for the removal of only 4,000 cubic yards of material for offsite disposal leaving behind approximately 23,000 cubic yards of soill with chemical concentrations exceeding human health limits. This is about the same volume as 7 Olympic size swimming pools (see image below)! Where is the preference for offsite disposal reflected? DEQ's preferred plan appears to give preference to onsite containment. DEQ's report also notes that leaving behind the contaminated soil will require deed restrictions, contaminated soil management plans, and a soil 'cap' placed over the contamination that would require regular inspection and maintenance in perpetuity. Forever. 2. RISK FOR PEOPLE
125	We do not believe that the risk models used by DEQ and EPA to calculate acceptable risk levels consider the disproportionate exposure of BIPOC, low-income and houseless communities to environmental contamination. The scenarios that DEQ and EPA used to develop the carcinogenic and non-carcinogenic exposure limits must consider the disproportionate exposure of houseless community members to contamination in general. Houseless community members sleeping and staying at Willamette Cove have direct exposure to risk through touching contaminated soil, accidentally ingesting it, and inhaling dust containing airborne contamination. However, the carcinogenic Risk-Based Concentration for total PCBs for recreational users is 0.74 mg/kg while the same Risk-Based Concentration for houseless community members is 14 mg/kg. That is two whole orders of magnitude higher! The limits associated with exposure to contaminated soil for people experiencing houselessness should be lower than those of occasional recreational users, not the reverse, when considering several synergistic factors: 1) In this pandemic, there has been an incredible spike of houselessness in Portland. 2) Under Mayor Ted Wheeler's leadership, there has been a policy shift to substantially increase sweeps of houseless camps across the city. 3) Unhoused residents are getting pushed more and more out of downtown Portland and to the edges of the city. Many people cycle through spots along the Willamette River several times over many years, including Willamette Cove. 4) When people are swept and have to relocate and lose their belongings, they have compounded burdens and exposure to their health, where they are exposed to compounded environmental health risks in the air, water and soil. 3. INSTITUTIONAL CONTROLS We do not believe that institutional controls should be required to ensure the safety of the community. Institutional Controls (ICs) are measures put in place to ensure that a less-than-thorough cleanup will

maintain its protectiveness for the public. ICs include plans for dealing with contaminated soil and groundwater recorded on the property deed, restrictions on the usage of the property, and warning signs providing information to the public. ICs are unacceptable because historically people and animals have accessed the full site and will continue to do so into the future, even if it is not in Metro's vision or the DEQ's risk calculations.

The plan recommends a number of specific controls including a Contaminated Media Management Plan, a Community and Outreach plan, and deed restrictions for the property. These controls are often hard to implement in the short-term and very difficult to maintain in the long-term. For example, Contaminated Media Management Plans, which are put in place to notify anyone performing future work on a property about residual contamination, are difficult to maintain and enforce. Additionally, the cost estimate for the chosen remedy does reflect the potential devaluation of the property due to the restrictions and remaining risk at the site. Finally, Willamette Cove is a community asset and any restrictions on the usage of the property should only be permitted with the approval of the community that uses the property.

4. FUTURE OVERSIGHT AND MONITORING

We believe that maintaining the future oversight and monitoring of the site in perpetuity is cost prohibitive and unrealistic.

We have been warned by DEQ that even if the agency decides to do a more full cleanup, without consolidation, the West side of Willamette Cove is known to have contamination about 30 feet into the ground. If this is the case, we understand the challenge to dredge and remove that large amount of contaminated sediment, which in place of removal, would require capping or other controls. This will require DEQ follow up actions, including regular inspection, maintenance, and regular site monitoring. As per DEQ's plan, this work will be required at Willamette Cove for forever.

In the plan, DEQ states that it will conduct periodic reviews "initially more frequent to 5-year reviews". It is unclear what the initial review increment would be, but a 5-year review interval seems too long to ensure that the engineered controls are maintained appropriately. Additionally, DEQ estimated the cost of long-term maintenance at the site by using only a 30-year period when the plan states that the monitoring and maintenance will be required forever.

Any ongoing maintenance and monitoring at the site should trigger inclusive procurement policies for future work. The proposal and bidding process should be designed in coordination with community stakeholders to give preference to local businesses representing the full diversity of the communities who have been impacted historically or currently by contamination at the Willamette Cove and Portland Harbor Superfund.

5. WILLAMETTE COVE SEISMIC ACTIVITY & FLOOD SAFETY

Complete removal of any soil exceeding human and ecological risk limits is the only effective remedial option for the site. However, if constructed, any engineered systems, such as soil caps or covers, used to contain contaminated materials at Willamette Cove must be designed to maintain protections for human and ecological health in the event of potential seismic and climatic events including earthquakes, river flooding, and fire.

All capping used at the site should be designed to withstand the increased frequency and strength of severe weather events exacerbated by climate change referenced in the 2015 Multnomah County Climate Action Plan.

The DEQ's report indicates that Willamette Cove was built up from the shallow river bed using dredged fill, which can be unstable in seismic events. Based on the presence of the fill, we are concerned that liquefaction may occur in the event of a major earthquake. Although the DEQ plan mentions long-term seismic stability of the proposed soil cap, the cleanup plan must consider the seismic stability of the fill material at Willamette

Cove.

In addition to the risk from earthquakes, Willamette Cove is also at risk from catastrophic flooding events. While portions of the site are in the 100 and 500 year flood plains, the current flood risk maps may not reflect the potential for more frequent extreme flooding events.

2015 Multnomah County Climate Action Plan: Page 24

"More intense rain events in the winter may have far reaching impacts locally. Potential economic, social and environmental impacts from flooding may include water damage to homes and businesses, as well as roads, railroad tracks, levees, bridges and culverts. In addition, more rain falling in the winter will continue to stress Portland's systems for managing storm water runoff and urban flooding. Wetter winters may also increase the incidence of landslides, particularly following prolonged periods of precipitation when the soil is already saturated with water"

6. BIOREMEDIATION
We support the exploration and inclusion of alternative remedial methods, including bioremediation, in the final cleanup plan, as long as they do not minimize cleanup levels or further delay the cleanup.

Based on community recommendations, the Port of Portland and Metro are in the process of conducting a 3- to 6-month pilot test to determine whether the use of fungus and plants/trees are viable options to remediate the mix of contaminants at Willamette Cove. If the initial test has favorable results, we support the next stage of testing at the site with the bioremediation technology at the Willamette Cove site. If proven to work at the site, we expect this method to be integrated into the final cleanup plan. We want to ensure that any future bioremediation does not further delay or minimize the overall cleanup goals and timeline.

7. CARBON FOOTPRINT
We do not believe that reducing the carbon footprint of the cleanup requires limiting the amount of contaminated soil removed from the site.

In its plan, DEQ states that its preferred remedy aligns with DEQ's Green Remediation Policy and the EPA Region 10 Clean and Green Policy because it reduces the carbon footprint of the cleanup by limiting the amount of contamination removed by barge or truck. We find this argument disingenuous and misleading. Both the DEQ and EPA green remediation policies are very general and neither recommends limiting removal of contaminated soil from a site to reduce carbon emissions. While we also believe the goal of reducing the carbon footprint of the project is important, we don't think that should be an excuse for less removal of contaminated soil.

DEQ also discusses the risk of vehicle accidents as a justification for removing less contaminated soil. This is puzzling considering the risk of accidents that might puncture a soil cap or create a failure of a consolidation cell that is supposed to remain viable forever. We believe that DEQ can find a way to remove the contaminated soil from the site while also reducing the project's carbon emissions and lessening the risk of vehicle accidents. The EPA Policy even presents some ideas including using cleaner fuels, diesel emissions controls, or retrofitting older equipment.

We demand that any future remedial actions utilize technology and processes designed to reduce carbon emissions for all equipment involved in the cleanup. This will greatly reduce the carbon emissions resulting from the transportation, moving and/or capping of toxic sediments. Carbon reduction planning can be integrated with the inclusive procurement process informed by community stakeholders.

Ultimately, PHCC feels the plan that DEQ prefers does not address the issue of contamination at Willamette

	Cove. It will require issues that arise to be dealt with by future generations. Like many cleanup plans, this one leaves contamination in place, underestimates the long-term costs of maintenance, then uses the underestimated costs to demonstrate that the less-protective option is the most cost-effective. In the long-term, this cleanup would be less costly and more protective of human and ecological health if more robust remediation actions were conducted in the short-term. We urge the Department of Environmental Quality to select remedy 3b, Alternative Excavation and Off-site Disposal, for Willamette Cove. Alternative 3b will permanently address the risks from contamination in the present instead of leaving it for future generations to take care of later, it will eliminate the need for perpetual maintenance of a soil cap, it will ensure that a catastrophic flood or earthquake will not create potential exposures to contaminated soils, and it will eliminate the need for restrictions on the use of the property. DEQ's proposed cleanup plan may reduce some of the risks posed to people and animals by the contamination at the property in the short-term, however it is unacceptable because it leaves too much contamination in place at concentrations above human and ecological risk-based standards and will require "Long-term monitoring and maintenance in perpetuity…". I urge you to do the right thing and take the community's lead on this, who have been impacted by pollution, industry, and urban environmental cleanup for generations. Erin Goodling, PhD Portland resident
126	Thank you for the opportunity to comment on the for the cleanup of most Willamette Cove. Please prioritize the highest standards for environmental and human health at this site. In addition to helping ensure safety for all, that would allow for the flexibility going forward. That seems particularly important, as Willamette Cove will be only one of a very few publicly accessible sites in Portland Harbor. DEQ should select Alternative 3b (Alternative Excavation and Offsite Disposal) in order to remove the vast majority of contamination from the Willamette Cove uplands while also protecting mature trees. Leaving contaminated soils behind, as in alternative 4c, would risk continuing possibilities of releases and exposures. The cost differences between These alternatives seem well worth the advantages off effectiveness and future options. A choice that continues site and deed restrictions and other institutional controls is not in our long range best interests. Thank you. Susan Mates Portland, OR
127	Hi Erin- Perhaps, and not unexpected, many in the immediate community favor Plan 3A -- I agree 3A as well. However, what is the lead time for completed clean-up per top plans. I did not see this information in the documents. Thank you. --tj

	Ms. McDonnell and Oregon Department of Environmental Quality: Willamette Riverkeeper submits herewith its comments on the Oregon Department of Environmental Quality (DEQ) Proposed Environmental Cleanup Plan for the Willamette Cove Upland Site (the "Decision"). Willamette Riverkeeper and its members have direct and personal interests in the Decision, including clean water, safety, and public access to a livable environment. These interests are directly and impacted by the Decision. For decades, Willamette Riverkeeper has been involved in the Portland Harbor Superfund (approximately River Miles 0-11) and Willamette Cove Upland (approximately River Miles 6-7) sites. Willamette Riverkeeper as an organization began approximately when Metro acquired Willamette Cove in 1996. Willamette Riverkeeper remained involved with Harbor after it was listed as a Superfund site in 2000, through the development of work plans to address the nature and extent of the contamination in the areas, Superfund plan approval in 2016, and U.S. Environmental Protection Agency's issuance of the Record of Decision in 2017 on the Superfund site. The Willamette Cove Upland site is approximately 19.1 acres in size with 3,000 feet of riverfront property. Nearly 1/3 of the Willamette Cove property is covered with hardwood forest, including native trees. Staff Report at 4. The prior removal actions conducted at Willamette Cover already undertook special excavation techniques around madrone, big leaf maple, and Oregon white oak. Staff Report at 17. Willamette Riverkeeper appreciates DEQ including native tree preservation and limited excavation around these special vegetation features of the property. The goal of Willamette Riverkeeper's work is to ensure that the Willamette River will be clean and healthy for future generations of Oregonians and aquatic species and wildlife. Willamette Riverkeeper greatly appreciates the efforts the DEQ, the Port of Portland, and Metro have made over the years. These efforts enable the Decision to focus on a much narrower subset of problems. However, DEQ's Preferred Alternative
128	4c disappointingly stops well short of what must be done to satisfy DEQ's duties under Oregon's Removal or Remedial Action statutes (ORS 465.200 et seq.) and OARs 340-122-010 to 115 and Willamette Riverkeeper advocates for DEQ to pursue Alternative 3b. Legal Standard Under ORS 465.315(1)(a), "any removal or remedial action…. shall attain a degree of cleanup of the hazardous substance and control of further release of the hazardous substance that assures protection of present and future public health, safety and welfare and of the environment." The protectiveness of a remedial action shall be determined based on application of two factors, the acceptable risk level for human and ecological receptors' exposures, and a risk assessment undertaken in accordance with DEQ risk protocol. ORS 465.315(1)(b)(A), (B). The DEQ shall select or approve a protective alternative that balances five factors: (A) The effectiveness of the remedy in achieving protection; (B) The technical and practical implementability of the remedy; (C) The long term reliability of the remedy; (D) Any short term risk from implementing the remedy posed to the community, to those engaged in the implementation of the remedy and to the environment; and (E) The reasonableness of the cost of the remedy….. ORS 465.315.1(d)(A)-(E). Adopting Alternative 3b's Excavation & Removal Actions Are Key to DEQ Satisfying All 465.315.1(d)(A)-(E) Factors DEQ's limited approach by proposing Preferred Alternative 4c improperly discounts the fact that the entire

property is an ecological hot spot, mandating more extensive cleanup that Alternative 4c provides. DEQ removed hot spot soil in 2008 and 2015-2016, however hot spots still remain that exceed human health and ecological values. The Staff Report Figure 14 shows that the entire West Parcel exceeds one or more metals as hot spot concentrations for ecological risks, as does large sections of the Central Parcel. The entire East Parcel and about half of the Central Parcel exceed dioxin TEQ preliminary remediation goals and hot spot concentrations. Id. It is a bit misleading to call the concentration of these contaminants as hot spots when they essentially are the characterization of the entire site. PCBs PAHs, and Dibenzofurans appear in "spots", but heavy metals and dioxin are rampant across the site. Alternative 3b would remove 45,000 cubic yards of material; Alternative 4c would only remove 4,000 cubic yards.

DEQ's Costs Analysis Cannot Sustain Alternative 4c

The legal standard for DEQ's cost analysis is that "[t]he cost of a remedial action shall not be considered reasonable if the costs are disproportionate to the benefits created through risk reduction or risk management." ORS 465.315(1)(d)(E). "When two or more remedial action alternatives are protective …the least expensive remedial action shall be preferred unless the additional cost of a more expensive alternative is justified by proportionally great benefits" within one or more of the (A) – (E) balancing factors. For hot spots, the Director "shall use a higher threshold for evaluating the reasonableness of the costs…". Id. For the reasons discussed in these comments, Willamette Riverkeeper does not believe that Alternative 4c satisfies this criteria.

DEQ's justification for Alternative 4c undervalues the benefits and risk reduction that an additional project budget of $1.9M would provide if DEQ chooses Alternative 3b. ("The thin amended cap alternative has the lowest cost (and the least conservative option). Complete removal or complete capping options are the most conservative and most expensive alternatives Alternative 4c is hybrid conservative approach, not the least or most expensive.") Staff Report at 53. Alternative 3b transitions the site to a property with high value – one of "unrestricted" use. Staff Report at 43. Alternative 4c cannot demonstrate the same; Alternative 4c consolidates soil and caps it, but Willamette Riverkeeper worries that with so many outstanding questions about the site (such as groundwater), capping is an inferior option to excavacation and removal. Having a property with unrestricted use, and in such proximity to the City of Portland, has enormous benefits for long term public use of the property.

Unrestricted use also benefits public health by limiting public exposure to toxins; for Willamette Riverkeeper, this is a very important reason why Alternative 3b is the better choice. Willamette Riverkeeper advocates and actively works to facilitate and increase public access to, and use of, the river ecosystem. Each year, we have numerous trips and events in the Portland area alone. Since Metro acquired Willamette Cove property in 1996, Portland's population has skyrocketed from approximately 1.4M in 1996 to 2.1M in 2020; current projections estimate the City's population will continue to grow to nearly 2.5M only 15 years from now. Willamette Riverkeeper believes that the City needs Willamette Cove to become an integral part of the City's green space and river space in order to provide sufficient space for Portland's increasing population. Thus, it makes sense to select a cleanup alternative here that provides greater security for the public, which Alternative 3b provides. Given the amount time and resources DEQ, Metro, the Port, and the public have invested in the Willamette Cove Uplands project over the last two decades, an additional $1.9M is a proverbial "drop in the bucket" to finally attain a high degree of remediation – and public utility - of this publicly-owned property. Alternative 4c simply does not provide the effectiveness and long-term reliability that Alternative 3b provides.

Willamette Riverkeeper is also very concerned that the Alternative 4c long-term cost estimates are illusory, and the project will end up costing significantly more. Alternative 4c proposes a 1 foot or 3 foot cap, which DEQ claims will be protective of human health and ecological receptors. DEQ asserts that this cap would allegedly withstand natural events such as extreme storms, flooding, and earthquakes. Staff Report at 46.

Yet, this is the same cap which will require reinforcement for long-term stability and to prevent something as common as burrowing animals. Staff Report at 46-47; see also Staff Report at 28 (identifying several burrowing small mammals present at the site). And, the Revised Feasibility report states "in the long run, it is uncertain if the amended thin cap would reliably protect ecological species." RFS at 46. While DEQ states this referencing Alternative 2b, it appears that Alternative 4c would have a similar thin cap. Neither the question of stability and integrity DEQ raises, and of basic maintenance needs, inspires public confidence in the proposed cap, or in accuracy of DEQ's long-term cost estimates. Again, Alternative 3b will eliminate both of these problems by simply removing significant quantities of contaminated material and returning the property to an unrestricted use characterization. Alternative 3b is thus the choice DEQ must make under ORS 465.315(1)(d).

DEQ's overall approach that this proposed remediation project is a long-term solution is not really correct. Thirty years is the maximum foresight used in DEQ's planning for this project.
Willamette Riverkeeper believes this is too short of a timeframe to be characterized as "long term", especially in light of the degree of contamination. DEQ is to incorporate reliability of treatment, engineering, and uncertainties in evaluating long-term reliability (OAR 340-122-090(3)(b)), but without more information from DEQ on the proposed breakdown of contaminated material, 30 years is not be justified. Additionally, since Alternative 4c allows for significant project design and implementation changes, Willamette Riverkeeper is concerned that Alternative 4c may not be full implemented as it is currently being presented to the public. This is yet another reason to pursue Alternative 3b now; it is a much cleaner and straightforward solution.

In any of the alternatives, it is clear that there is much investigation left to do. The immediately proposed remediation action is thus only the "First Phase" of the "Final Plan", and it will take more effort, more time, and cost more money to identify, assess, and react to the incoming data. Because DEQ knows that additional information is coming and additional action is likely, Willamette Riverkeeper believes it makes more sense for DEQ to require now that more material be removed from the site through Alternative 3b. In particular, Willamette Riverkeeper is concerned with the groundwater issues and connectivity to the river.

Greenway, Floodplain, Climate Change, and Seismic Risks

The site is within the Willamette Greenway, and the City of Portland Greenway, so remedial sampling, design, remediation preparation, and other work in the Site will require Greenway permits. DEQ suggests that waivers may be available. Staff Report at 56. Currently, Willamette Riverkeeper does not see how the proposed remediation would be exempt from Greenway requirements designed to protect the Willamette River. Nor do we currently see sufficient information in the alternatives proposed at this stage of the project to address any Greenway criteria. We ask that once an appropriate alternative is selected, that DEQ and Metro and the Port formulate a plan that specifically addresses Greenway criteria and to make that plan available for the public to review and comment. This further demonstrates that what is proposed is only the "First Phase" of the "Final Plan." Lastly, the proposed cost estimates do not appear to incorporate any buffer for Greenway compliance.

The Site Elevation and Floodplain Map (Staff Report, Figure 3) shows that the West, Central, and East Parcels are affected differently by flooding. In the 500 year floodplain, the East Parcel is nearly entirely inundated, the Central Parcel significantly inundated, and the West Parcel minimally inundated. The 100 year floodplain follows somewhat the 500 year floodplain in the Central and West Parcels. Both flooding patterns would suggest that excavation of more material is a better solution for the health and safety of the Willamette River, and thus Alternative 3b would be a more reasonable solution than Alternative 4b. Willamette Riverkeeper is also greatly concerned because the DEQ's alternatives assessment for this site does not appear to have considered any impacts of climate change on sea level rise which will affect the City of Portland, higher flooding from upstream sources and increased rain. The U.S. Geological Survey has

	categorized these risks as "extreme but plausible" up to the year 2059.[1] Thus it is unreasonable for DEQ not to consider these factors in its analysis, especially in a project that is expected to span at least 30 years to approximately 2050. nor does it appear to have considered the threats of upstream dam failures. Failure to consider these factors means DEQ has not complied with the ORS 465.315(1)(d) factors. DEQ did acknowledge the potential for "significant" seismic activity in the Site vicinity and that the West Hills Fault is less than one mile away. Staff Report at 52. Willamette Riverkeeper believes that the most resilient solution is Alternative 3b, which excavates and disposes of material offsite. DEQ has acknowledged as much when it stated "From the perspective of flooding and seismic concerns, the full excavation option is most reliable, while alternatives that entail leaving hot spot contamination in place and covered by thin capping elements as least reliable." Id. The DEQ's Alternative 4c would only create potentially unstable consolidation and cap structures that would require additional (costly) reinforcement to withstand seismic events and flooding. Willamette Riverkeeper believes that if DEQ elects to proceed with Alternative 4c, the agency will have improperly valued the risks under the ORS 465.315(1)(d) balancing test. Conclusion Thank you for considering, and responding to, the questions and concerns raised by Willamette Riverkeeper. We look forward to continued involvement with you as a final decision is reached and cleanup is implemented and maintained. Sincerely, s/ Elisabeth Holmes Elisabeth Holmes, Staff Attorney Willamette Riverkeeper P.O. Box 293 Eugene, Oregon 97440 Tel. (541) 870-7722 Email: eli@willametteriverkeeper org [1] See U.S. Geological Survey and U.S. Army Corps of Engineers "Assessment of the Columbia and Willamette River Flood Stage on the Columbia Corridor Levee System at Portland, Oregon, in a Future Climate." (2019) (https://pubs.usgs.gov/sir/2018/5161/sir20185161.pdf).

129	As a long time local resident, I offer these comments on the WIllamette COve cleanup: Consolidation is not safe for human and ecological health in the long-term. I do not support the redistribution or permanent storage of toxic sediment on the site. I do not believe that the risk models used by DEQ and EPA to calculate acceptable risk levels consider the disproportionate exposure of BIPOC, low-income and houseless communities to environmental contamination. I do not believe that institutional controls should be required to ensure the safety of the community. I believe that maintaining the future oversight and monitoring of the site in perpetuity is cost prohibitive and unrealistic. I believe the complete removal of any soil exceeding human and ecological risk limits is the only effective remedial option for the site. However, if constructed, any engineered systems, such as soil caps or covers, used to contain contaminated materials at Willamette Cove must be designed to maintain protections for human and ecological health in the event of potential seismic and climatic events including earthquakes, river flooding, and fire. Please reconsider the plan being proposed, as it fails to address the basic purpose of the plan - providing safe access to our environment. Thank you for your time. -Leah Leah Gregory, LPC

130	8/30/2020 Dear Oregon Department of Environmental Quality; I would like to comment on plans to clean up the Willamette Cove upland site. I believe it is imperative to be as thorough as possible regardless of cost, as a cheap, sub-par cleanup will end up being far more costly to human and ecological health, and financially, in the long run. 1 - The current plan calls for leaving 23,000 cubic yards of soil on site, soil that has toxic chemical concentrations exceeding human health limits. This is unacceptable. Consolidating this soil on site and capping it, which would require inspection “forever,” is unrealistic, kicking an expensive can down the road, and expecting future governmental responsibility which is beyond what we are willing to do now. Be responsible now, rather than expecting it later. 2 - “Institutional controls,” where an inadequate cleanup depends on never ending monitoring to maintain viability, is pie in the sky thinking. DEQ is left toothless to effectively manage the vast array of tank farms across the river from the Cove site, and we’re supposed to believe DEQ will be given the resources to inspect an “out of sight, out of mind” collection of capped pollution in perpetuity? Ridiculous. Clean it up now. 3 - Any capping done -- allowable only over relatively benign soil -- must be designed and constructed to withstand catastrophes like flooding and fire, which we can expect to become more intense over time due to climate change, as well as the inevitable major seismic events. 4 - Bioremediation is an increasingly viable and effective means of addressing polluted soil and should be applied as much as possible, as it’s an effective long term solution to removing various toxins. 5 - Any native trees on the site should be left in place, especially the madrones, as they are a valuable legacy not likely to be replaced, if removed. Thank you for your consideration, Rob Lee, Harborton Frog Group
131	Hello, Please remove toxins from Willamette Cove! Please do more than consolidatng and capping just to save money, that is unacceptable. We need to solve and cleanup problem areas now, rather than leaving it for future generations. Thank you for all you do - and especially for helping to make Willamette Cove safe for plants, animals, and people. Marilyn Kongslie

132	To the Oregon Department of Environmental Quality: I urge you to adopt the strongest possible cleanup option for the Willamette Cove Superfund site, outlined below. An important opportunity exists here to clean up this highly toxic 27-acre site owned by Metro and create a publicly accessible and usable natural area, one of very few such sites within the 10-mile long, 2000+ acre Portland Harbor Superfund Area. -I oppose DEQ's preferred alternative (4C) to remove only the most contaminated soil and then bury it underground beneath caps. This is flawed thinking. Enacting the preferred alternative will only provide the excuse to restrict future use of the site -- given the likelihood of toxic leaching over time with resulting negative human health and overall environmental impacts. -I support the selection of DEQ alternative (3B) to remove maximal contamination from Willamette Cove uplands while giving protection to on-site mature trees that provide cooling shade, habitat, and carbon storage. Do the right thing. Really clean up the Willamette Cove Superfund site. Enable Metro to create a great public access area that also raises public awareness about Willamette River riparian values and the need for uncontaminated water quality to support a healthy river ecosystem. In support of a cleaner Willamette River, Lynn Herring
133	The remedy must take into account future use, and that future use must be decided and led solely by the impacted communities. Currently, the vague plan for future use is based around Willamette Cove becoming an ecological sanctuary with a trail which does not provide any beach access, conveniently making the case for toxins to remain. This is not what the community is asking for. Indigenous communities would still be denied the access and fishing which is their inalienable right. Several tribes and nations have also brought to your attention how ineffectively this solution protects groundwater or plans for earthquakes and natural disasters. A large proportion of our Black communities have been outspoken proponents of removing all the contamination. They have suffered enough due to the industrial pollution, where many of them work(ed) and live(d). Our Black communities deserve safe and healing access to the River at Willamette Cove, one of the rare sites along the Willamette which provides beach access. Many of our Immigrant communities, of which my family is part of, went through similar ordeals as a result of the industry and contamination, and should also be allowed access. Our unhoused neighbors, with whom I work and have developed many lasting friendships, are exposed to so many toxins on a daily basis and spend, on average, about 3 months at a time camping at Willamette Cove, sometimes also eating the fish and shellfish. Youth, who may enjoy the beauty and privacy that Willamette Cove has to offer, are also affected, unknowingly exposing themselves to substances which cause intellectual, cellular, and reproductive harm. I am confident that a cleanup which is complete and provides human access to the water can still be compatible with an ecologically protective model. It was not, after all, any of these communities which polluted Willamette Cove nor which diminished the availability of green and blue spaces for humans and wildlife alike. I disagree that any of the protective measures are sufficient. First, there is the issue of the cap. This cap will require maintenance forever. This is rather short-sighted to believe that our society and government will last in their current form for eternity. Our world has already changed many times over in the relatively short span of human history. We are putting a great burden on future generations, setting them up for exposure, and must do better by them. In addition, the on-site contamination would mean that institutional controls, such as signage, fences, deed restrictions, and perhaps some type of human enforcement, would be in place. Like

	the cap, who will upkeep all of these institutional controls indefinitely? Moreover, they do not work now and will never work in the future. People camp and live and hang out at Willamette Cove. When I was there myself, being shown an official tour of the site, I saw several people there, including a couple walking their dog right past signage and into the toxic area, despite seeing a horde of hazmat-suited people in front of them. I understand that a reason given for the consolidation is the carbon footprint and the risk of accidents calculated around trucking all of the soil to Wasco County. I appreciate that sentiment and am deeply committed to our environment, but this is intertwined with, not at the expense of, environmental justice issues. Only a solution which satisfies both of these interrelated needs should be permitted. Remember that the materials to make the cap, such as concrete, also are made via industry and cause pollution. Cleaner-running vehicles could be used, thus lowering the carbon footprint. This is an imperfect solution, but perfection is unlikely to be found given the tools available. Though there is a risk of vehicle accidents, the indefinite risk of cap puncture accidents is eliminated. Some communities do not want trucks going through their neighborhoods. I empathize with this concern, but in return they will receive a restored natural area and, most importantly, the short-term concerns of these communities should not be prioritized over the long-term concerns of the most impacted communities. I don't wish to dirty Wasco County or any other place on Earth, but the biohazard dump in Wasco County already, unfortunately, exists. It makes more sense to take all the contamination to one location, which has the unspeakable burden of being reserved for that purpose, than it does to take some of it and leave most of it, having a concentrated toxic load now in two locations. I acknowledge that none of these solutions are perfect. In fact, the violence which industry enacted on Earth and marginalized communities seems to be only remedied with more violence - digging up several feet of soil in Willamette Cove. The amount of that articular violence really doesn't change whether the soil is all trucked to Wasco County or if some is consolidated. Our communities - Human, Animal, Plant, Water, and Earth - require this contamination to be completely removed, to the largest extent humanly possible. However, if there is another method you are able to find, such as bioremediation, which is able to achieve this same goal without the violence to the landscape and in a relatively timely manner, then I am in favor of that option. I urge the DEQ and EPA to develop a remediation plan based on community-driven future use and to fund researchers who are currently studying the effects of mushroom bioremediation (or other types of bioremediation) in Willamette Cove. If, however, those methods are not found to be sufficient in breaking up the eliminating the contaminants, then the soil must be removed and taken to Wasco County, for the health of our community and all of the future generations. Thank you for your time and consideration. -- lara pacheco seed and thistle apothecary- Atabey Medicine apprenticeship program www.seedandthistle.com brown girl rise la clinica de bien estar/seasonal wellness clinic
134	Willamette Cove A Comment on proposal for clean up as designed by Oregon DEQ By Jackie Calder While I respect the diligence of the Port of Portland, Metro, Oregon's DEQ in working through and planning a design to improve the Willamette Cove I feel it falls short in thoroughness, long-term development and addressing the extent of contamination. I understand the contamination from the area consist of "Heavy metals, diesel fuel, polychlorinated biphenyls (PCBs) and dioxins." I understand the choice for clean-up of Willamette Cove is given in the following: The highest ranked, most

feasible cleanup option for upland soil was determined to be Alternative 4c: Focused Excavation with Offsite Disposal, Onsite Consolidation and Cap.

The cleanup option that has been presented contain the following elements:
-Removal and offsite disposal of all soil exceeding hot spot levels for human health.
-Remaining soil above risk levels for people would be consolidated and contained under an engineered cap, also called a consolidation area.
-Remaining soil with higher risk levels for animals and plants, including hot spots, would also be placed in the consolidation area, capped in-place, or disposed offsite.
-After these actions, remaining soil with residual, low-level risk to ecology would be covered with clean soil. Additional elements of this cleanup option include preservation of existing native trees, revegetation of -disturbed areas and long-term monitoring and maintenance of capped areas.[i]

But here are my questions and reasons for my doubts about your solutions.
1. Why have an engineered cap? When you remove cancer, do you not want to dispose of it permanently? This is not a single person with a carcinoma but a large tract of land with pollution that can affect land, flora and fauna and humans. What purpose does it serve to hang on to it? When flood, seismic activity or climate change damages the cap, then will Willamette Cove be in worse condition then if you removed the contamination and took care of it properly.
2. Why spend the money to maintain it for 30 years? Is it smarter to spend the money to remove it permanently then be forced to babysit it permanently? Won't it cost more to try and remove it later?
3. Or, is the area considered clean after 30 years? If not, who takes care of it after that or is it just forgotten?

Looking at Willamette Cove area, "East Parcel beach is also surrounded by the upland area, which is heavily vegetated with mature, tall trees and extremely dense ground vegetation."[ii] From this, one can see beauty from vegetation and local creatures, a potential for enjoying a verdant, woodsy riverfront beach but this is not ever possible if the solution suggested by officials is followed.
Its neighbor, McCormick & Baxter has been rendered truly that… A dead zone. Instead of a park, a boat dock, a soccer field or anything good and beautiful, the McCormack & Baxter is a fenced in, pumping, testing, empty useless area.
Why must another beautiful area next to our beautiful river, another neighborhood area, beach area, river connection be rendered as a dead space—useless, wasted, and fruitless?
If you compare the Willamette Cove site to the once Triangle Park site and evaluate what the University of Portland did to clean up the Triangle Park site, you will find that the University of Portland cleaned it up thoroughly and made a healthy, useful, University level sports area, a parking garage, and a boat dock.

It is my hope that you, the official final decision-makers will not just create one more dead zone along the Willamette River but make it useful for the wildlife and the people who live here and love it. You have the ability and foresight to do so.

Sincerely,
Jackie Calder
University Park Neighbor

[i] WillametteCoveExecSummary-en.pdf
[ii] Willamette_Cove_HC_04112013_finalx

135	Hello, I hope this email finds you well. I am writing in regard to the proposed Willamette Cove clean up plan. My understanding is that, for reasons of cost savings, the current plan prioritizes capping and consolidation and will remove only 4000 cubic yards of material. This plan is unacceptable in that it merely kicks the can down the road for future generations to be endangered by and have to deal with. Please please please deal with this problem responsibly, completely NOW, once and for all. Long term gains of removing the material will far outweigh the short term gains and cost savings you'll get. Just think, people will have to be dealing with these contaminated soils in perpetuity, worrying about leaks or breaches, or inevitable seismic activity. It's our responsibility to choose to fix this problem NOW, and ask the people and companies who caused the problem to pay for it, rather than allow our communities to continue to pay the price in perpetuity. Thank you and with respect, Natalie Taylor
136	I am responding to the request for public comment on the Willamette Cove Upland Remediation Plan as both a concerned local citizen and as a representative of the Oregon Sierra Club (SC) and the Portland Harbor Community Coalition (PHCC). This site is of particular concern to both the Oregon Sierra Club and the PHCC because it is one of the most promising river access points sites on the east bank of the Willamette River in the entire ten-mile stretch of the Willamette River in the EPA Superfund site. The east bank of the Willamette River is the residential area for most of the moderate-income, minority, houseless, and recent immigrant residents of the Portland metropolitan area. These are the local citizens who have been the most severely affected by the contamination of the river through employment, neighborhood pollution, subsistence fishing, and foraging, cultural practices, and recreation. The public agencies (US EPA, Oregon State DEQ, City of Portland, Multnomah County, Metro, and the Port of Portland) responsible for designing the on land and in water cleanup have repeatedly and publicly committed themselves to prioritize the concerns of these Oregonians. This area is one of the very few sites in the entire ten-mile Superfund stretch of the Willamette River which can easily be adapted to provide off-channel shallow water resting places essential to the survival and success of Salmon, Lamprey and other migratory aquatic species. This is an essential, and inadequately represented, consideration in the 10 mile Portland Harbor Superfund remediation design. In many public meetings, the majority of these less affluent Oregonians have expressed their desire to have this specific area of the Willamette cleaned to a level that can be developed as a naturalized recreation area with river access. This parcel was purchased by Metro with funds from a public parks and recreation bonding measure with the promise to the public that the acquired properties would be used for public recreation and natural areas. Given the concerns and priorities presented above and in many public meetings, the Oregon DEQ proposed plan is not responsive to the will of the public or the promises of these public partners. The plan for this 27 acre toxic, North Portland site should be modified so that rather than the proposed consolidatiopn and capping of the most toxic 4,000 cubic yards of the existing 27,000 yards of toxic soils in an on-site toxic dump the entire portion of the 27,000 yards of toxic soil that can not be adequately detoxified on-site should be removed to an off-site location. This would facilitate the development of the site with native vegetation for a naturalized area with walking paths, picnic tables, off-stream shallow-water aquatic areas, and river access in

	confirmation with public concerns. This would also ensure that future high water, seismic, and/or other extreme natural events would not lead to re-exposure and re-distribution of these highly toxic contaminants. Having spent decades, millions of dollars, and thousands of hours on the clean up of this Superfund site we should assure that the chosen remediation plan provides a truly permanent solution.
137	Dear DEQ, I support option 3b for cleaning up the Willamette Cove. Removing the toxic waste from that area? while preserving as many mature trees as possible, seems like an excellent investment for Portland's future. I don't feel that it would be in our interest to simply leave the mess there and cap it off. Thank you very much, Micki Carrier Portland OR
138	Hello, I have a number of concerns regarding the proposed capping of the Williamette Cove. It is in my belief that not doing an extensive clean-up process is delegating the responsibility of the toxicity for the site for future generations, which will cost exponentially more down the road. There is no savings here, economically and morally and ecology-wise this is a bad way to go about it. The consolidation of toxic residue on the site means it will be unusable as anything other than vacant land until the tenuous problem of toxic residue is remediated and removed. These are the same practices that the Portland Development Commission uses for homeless sites, which exposes houseless people to toxic residue. If this is your intention, to cut corners and expose people to toxic residue, then congratulations, you will achieve your aims of policy goal standards set by long-dead classist and racist and sexist urban developers that ruled the urban corridors for the 20th century. Leaving the problem for the future generations is what led to this situation in the first place. Please, I implore you to learn from your ancestral heritage at DEQ and to do a thorough job of cleaning up the site, so that everyone, including yourself, can find the time and need to utilize the site as the mini-slice of paradise it could actually be in these troubling times. Or you could kick the can down the road and say job well done and hope everyone forgets about it, as they will forget your name for having done nothing for anyone. To the future of Oregon. - benjamin

139	To whom it may concern, I am writing to voice my support for full clean-up of the Willamette Cove area in North Portland. Please select "Alternative 3b (Alternative Excavation and Offsite Disposal)" for your cleanup efforts. I grew up in North Portland in the University Park neighborhood, and later in St. Johns very close to this site. I have long wished that the stretch of the Willamette River between Kelly Point Park and Swan Island was cleaner and open for safe use by Portlanders and Oregonians. I visited this site about one year ago and was dismayed to see the large signs posted alerting people that the area is toxic and not safe to enter. I understand that one option under consideration is to leave contaminated material, potentially under caps, and continue to restrict human access to this site. This is not an acceptable option as it is unsafe for humans and wildlife, and wastes the potential for this site. This stretch of river could be a jewel in our parks and wildlife system--now is the time to invest in full cleanup and restoration. Thank you, Jonathan Linch
140	To Whom it Concerns: I support option 3B for the superfund site cleanup. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. The highest standards must be applied to protect the public, and the restoration of native wildlife to the area. Sincerely, Debbi Flittner Portland, OR
141	To whom it may concern, I have been a resident of North Portland for the past 20 years. Over that time, I have greatly appreciated one of the greatest features of the Peninsula--the proximity of nature, especially native wildlife and plants. Willamette Cove is within walking distance of my house. I have often appreciated the view of it from Willamette Bluff, where I have regularly seen Red Tail Hawks and other raptors hunting small prey above the trees and river bank. Within the forested area there are mature native Madrone trees. Although many of the Madrones on the Peninsula (and in our region in general) are declining, the ones in the cove were thriving last time I saw them, which suggests that the cove is an increasingly rare ecosystem. There is rich bird life, coyote sign can be found there, and there many signs of small burrowing animals. In fact, I have often thought it would be incredible if there were opportunities for urban nature education and land stewardship there (I am a graduate of Metro's Nature University program and have led many field-trips at Smith & Bybee Lakes nearby). So I was originally very excited to hear about clean-up plans for the cove. And because Metro had purchased the property, I thought for certain that any clean-up plans would prioritize the preservation of natural habitat. But it appears I was mistaken. For when I started reading through the Willamette Cove clean-up plan resources on the DEQ webpage, I saw it specifically stated that that the native madrone trees will not

	survive, because they will be half-buried in fill dirt. In fact, the more of the materials I read, the more it seemed like the "cleaned" Willamette Cove property would more closely resemble the "cleaned" McCormick and Baxter property directly to the south--still a barren wasteland and community eyesore 7 years since. Bio-remediation is a promising new area of research for removing toxins from contaminated land (without destroying the land in the process). But I saw no mention of it anywhere in the reports I read that listed clean-up options for Willamette Cove. I also saw no mention of wildlife studies being done in the area, which could give valuable insight on how much toxic impact there actually is on resident animal populations. ALL urban wildlife is exposed to toxins, it is unavoidable in an urban area. But what is the pollution threshold for populations to still remain successful, and where does Willamette Cove measure on that scale? All I can say for sure, is that if you remove (i.e. scrape off and/or bury) the habitat, the populations will not succeed. So I would like to request that more time be given to form a clean-up plan that gives more consideration and analysis of the needs of the native plant and animal populations of Willamette Cove, with consideration of alternative and low-impact ways of managing the industrial pollution in the area. I realize that such an approach could take a whole lot longer before the area might be considered safe for recreational use, but I feel that that would be a small sacrifice to make compared to the complete habitat-destruction that is likely with the current plan. Thank you, Monica Roxburgh Sears Portsmouth resident *[Postcript (received same day):]* Hello Erin and Rebecca, This is a quick follow-up to my public input emailed earlier. I now have read pieces from three other North Portland community members with similar concerns to the current plan as mine, including a letter that was published in our local paper, The St. Johns Review (Vol. 117, No. 16). I hope that there has also been a good response directly to DEQ from the community. And I hope that the public responses will be carefully reviewed, and any ideas and suggestions you have received from the community considered. Willamette Cove is our backyard--but it is also important and irreplaceable natural habitat. Thank you for your time, Monica Roxburgh Sears

142	Dear DEQ staff and Leadership, I have been a neighbor of Willamette Cove for over 17 years and grown to have a passionate interest in the well being of this property and our community. It needs to be thoroughly cleaned up and the contaminated soils removed off site so we can again use it as was originally envisioned and planned with Portland Parks and Metro acquired the property in the 1990's. I have personally spent many hours on the site both as part of my community volunteering while co-founding the non-profit trail advocacy group npGREENWAY (friends of the north portland greenway trail) as well as working as a professional designer and planner for Alta Planning + Design when Portland Parks and Recreation hired us to create a transportation and recreation trail alignment back in 2009. Today I am a Board Member for the 40 Mile Loop Land Trust and a local small business owner. I am deeply saddened that over 11 years have passed by and we still have not been able to build a trail on this site because the cleanup plans have been caught up in an endless roll of very sticky bureaucratic red tape. Thank you for working on clean up plans and I urge you to do the right thing and clean up the property thoroughly so it can again be enjoyed by local people, animals and plants. DEQ must commit to a more robust remedial design plan that includes preserving native trees and removal of as much unsafe soil as possible (Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings and other reasons, is unacceptable because it passes the problem on to future generations while leaving the community vulnerable to exposure to contamination. Feel free to contact me with any questions. Sincerely, Scott Mizee Portland, OR

143	To DEQ, In regards to the Willamette Cover Uplands proposed cleanup plan. I will start by giving a little bit of personal background. I bought a house near Willamette Cove, in the University Park neighborhood, in 1989, and at the time I could smell the creosote from McCormick & Baxter at my house. When McCormick & Baxter closed and the odor disappeared, I saw the value of my home begin to rise dramatically. I lived there for nearly 30 years, and during that time would explore areas along the river, including Willamette Cove. I also served a couple years as President of the University Park Neighborhood Association, a couple years as President of the North Portland Odor Abatement Committee and several years as Chair of the Portland Harbor Community Advisory Group. Over that three decades there were often signs posted in the vicinity of Willamette Cove warning people to stay out of the area. Those signs were frequently ignored and occasionally disappeared. It was quite common to see people walking along the beach at Willamette Cove, and the area of river bank from Willamette Cove to Lampros Steel was a popular area for houseless individuals to set up camp. I remember at one point years ago walking through that area and identifying that about 3 dozen people were living there in makeshift camps. While I appreciate the stated goal of Metro staff to turn the Willamette Cove area into a natural wildlife habitat, off limits to public access, I think it unfortunately does not account for the reality of the situation. If the proposed cleanup plan relies on "Institutional Controls" (or "IC" for "Ignored Contaminant"), hoping that signs will prevent people from entering the area, it will fail. For a cleanup plan in Willamette Cove Uplands to succeed, it must take into account the fact that the location and attractiveness of the site will result in neighborhood residents accessing the site regardless of any warning signs. I strongly encourage DEQ to adopt a plan that removes contaminants entirely from the site, instead of leaving any contaminants on site with a reliance on "Institutional Controls". jim Jim Robison Ridgefield, WA

144	I am writing today to give some comments on the Willamette Cove Uplands presentation. The remediation alternatives presented seem to address the contaminant concerns and the dangers presented to people and wildlife. For this area to be a vibrant part of North Portland's network of trails and greenways and natural spaces I believe it needs a mix of approaches. It should be possible to balance wildlife and habitat areas with recreational use. Allowing access by pedestrians and cyclists and people using mobility devices, and not prioritizing motorized vehicle access would be a big part of this, I believe. Motorized vehicles bring their own noise and pollution and space concerns, and the problems of what to do with the surface run-off from roadways is always present when motorized vehicles are present. A proposed alignment of a North Portland Greenway trail already exists and should be implemented as part of this project, to be integrated with other trail segments in a network, such as the Cross-Peninsula Trail, the trails at BES' Water Lab and Cathedral Park, and the proposed and existing trail networks all the way to the Esplanade and up to Kelley Point Park. This would add a way for green transportation and exercise to take place on this trail. The approach taken elsewhere of doing a different kind of cleanup for children's play areas should be implemented. Reconnecting kids to the water and environments such as riverbanks and uplands and natural areas helps instill the importance of ecology and wildlife protection in young people. Thank you, Adam Robins Adam Robins, Project Manager Convergence Architecture pronouns: he/him/his Portland, OR

145	To Whom It May Concern at Oregon Department of Environmental Quality, my name is linda senn, I have been a resident of portland oregon since 1974, I was 6 months old . I have played in this river, raised my family and at times lived in/around the superfund area. I was made aware of the contaminants of this beautiful river around 5 years ago. I am beside myself to learn the amounts of contaminants and what kinds.. I have been greatly troubled, and concerned for my and my family's health, as well as my neighbors of this great city/state. I ask you to do better much better. Just moving and covering(capping) the problem up is saving the matter for our future neighbors of Portland to manage. I am asking you to consider the real damages of your plans. As more and more portlanders are become unhoused neighbors looking for a place of refuge from our police state, consistent "sweep" (cleaning;by definition of the city of portland) and our weather. The waterways are looking inviting, it's seemingly SAFE.. Looking at the % of arrests in Portland in which 57% of them were unhoused folk. When folks are released they are released with no where to go. As we see now folks are living on the river thinking it's safe for food and a place to rest undisturbed. I ask that the DEQ do better by portlanders profoundly better. I ask the DEQ to find ways to heal the soil. Amagine what can be done if the land is restored, not moved or capped. I am asking you to push back on any shortcuts, or fast fixes think of your children's, children and so on .. this is the ways of the INDIGENTS folks of this land, they know very well the power of CLEAN HEALTHY WATER , IT IS LIFE source... I stand alongside PHCC's statement and their work; to do the healing work of our beautiful river. linda pronoun is Queen / anything respectable Board President, Sisters of the Road
146	*[DEQ note, link to video broken]* Video comment re: DEQ's Willamette Cove proposed cleanup: Laura Feldman Willamette Cove Comment 8-31-20 Laura Feldman.mp4

147	Hello, My name is Samantha Hernandez and this is my public comment for Willamette Cove. In spite of the hazards, surrounding community members still visit Willamette Cove. You can occasionally witness a neighbor taking their dog on a walk or a bike rider speeding on the trail, even a couple of boats floating idly on the water. It is important for this site to be thoroughly cleaned up because of its contamination, but also because of how important it is to local residents who are exposed to these toxins on a daily basis. The cove is a place for recreation, community gathering, and consolation during these very demanding and taxing times. Moreover, there is a growing concern about toxic soil and how it would create additional vulnerabilities for the surrounding population as climate change accelerates. The Cascadia earthquake, which occurs on average every 250 years, and last occurred in 1700, is one such vulnerability that calls for immediate action. In the event of a majorquake of 8.0 or more, it is possible that the sediment capping meant to cover the contaminated soil could crack or leak. This recontamination would be further exacerbated by Oregon's Critical Energy Infrastructure (CEI) Hub, which is just across the Willamette Cove. The CEI Hub holds approximately 90% of the fuel used to power the entire state of Oregon and the expected 9.0 magnitude shaking could cause the largest oil spill in the world, and threaten people living close to the CEI hub. A more immediate and robust clean up is needed for both the environment and the community. Thank you, Samantha Hernandez

148	Good afternoon, I write to you as an individual who has spent the entirety of his life growing up alongside major rivers. I spent 18 years growing up on the "yellow banks" of the Ohio River in western Kentucky where the silty and clayey brown waters of the Ohio were utilized nearly solely by barges hauling loads soy, grain, and coal; and only the brave boated or fished much less swam in the murky waters. Then I moved west for school and found myself living blocks away from the Spokane River for nearly 4 years. I was amazed by the clarity and color of the water I assumed only occurred in fresh mountain streams, but in the middle of downtown Spokane, the River was a highlight of the urban core rather than obstacle delaying one's commute. The river defined many of my favorite running and biking loops, a refreshing place to spend a hot summer day, and soothing space to relax and engage with the factor that shaped the region. Now, I've spent the last three years as a Portland resident and a recent homeowner. Portland and the surrounding region continues to impress me with its accessibility to natural areas including Forest Park, the Gorge, the Tillamook State Forest, and the many surrounding national forests. I interact with the Willamette River on a regular basis either running along the esplanade, swimming at Elk Rock Island, and biking across the Tilikum Bridge. When I was informed about the Willamette Cove superfund site, I was excited about the possibility of yet another point to engage with the River that defined Portland and the Willamette region's growth throughout history, but I became concerned that the site's contamination would limit the potential to reclaim the waterfront for public benefit. It is critical that public and environmental health be prioritized at this site and that the site retain maximum flexibility in terms of future uses. The cleanup of Willamette Cove must meet the highest possible standards for public and environmental health. I believe that DEQ should opt for Alternative 3b to remove the majority of contamination from the site to protect current and future ecosystems along the River. Given future use of this site as a natural area with public access, the cleanup should achieve the highest possible standards. DEQ should not adopt a remedy that relies on perpetuating site restrictions, deed restrictions, and other institutional controls that have proven ineffective in the past and will limit that ability of this site to reach its maximum potential. Investments may seem costly in the present, but the long-term dividends for the health of the river and the people who can benefit interacting with it will far surpass any cost. Thank you for consideration, Zac Garrard (He / Him / His)

149	1. I (and East European coalition that I represent) do not support the redistribution or permanent storage of toxic sediment on the Willamette Cove site. At the beginning of the report, DEQ states that "...a preference will be given to offsite disposal of soil posing a higher risk to humans or animals/plants". But in the end, DEQ's preferred alternative calls for the removal of only 4,000 cubic yards of material for offsite disposal leaving behind approximately 23,000 cubic yards of soil with chemical concentrations exceeding human health limits. DEQ's report also notes that leaving behind the contaminated soil will require deed restrictions, contaminated soil management plans, and a soil 'cap' placed over the contamination that would require regular inspection and maintenance in perpetuity. 2. I do not believe that the risk models used by DEQ and EPA to calculate acceptable risk levels consider the disproportionate exposure of BIPOC, low-income and houseless communities to environmental contamination. Houseless community members sleeping and staying at Willamette Cove have direct exposure through touching contaminated soil, accidentally ingesting it, and inhaling dust containing airborne contamination. However, the carcinogenic Risk-Based Concentration for total PCBs for recreational users is 0.74 mg/kg while the same Risk-Based Concentration for houseless community members is 14 mg/kg. That is two whole orders of magnitude higher! The limits associated with exposure to contaminated soil for people experiencing houselessness should be lower than those of occasional recreational users, not the reverse. The plan that DEQ prefers does not actually address the issue of contamination at Willamette Cove. It will require issues that arise to be dealt with by future generations. Like many cleanup plans, this one leaves contamination in place, underestimates the long-term costs of maintenance, then uses the underestimated costs to demonstrate that the less-protective option is the most cost-effective. In the long-term, this cleanup would be less costly and more protective of human and ecological health if more robust remediation actions were conducted in the short-term. Conclusion: I urge the DEQ to select remedy 3b, Alternative Excavation and Off-site Disposal, for Willamette Cove. Alternative 3b will permanently address the risks from contamination in the present instead of leaving it for future generations to take care of later, it will eliminate the need for perpetual maintenance of a soil cap, it will ensure that a catastrophic flood or earthquake will not create potential exposures to contaminated soils, and it will eliminate the need for restrictions on the use of the property. Sincerely, Irina Phillips. Member at Large East European Coalition

150	Comments on the cleanup options proposed by DEQ: - There needs to be full removal of contaminants at Willamette Cove to a certified offsite hazardous waste facility. Native trees should be left in place. Option 3b comes closest to those goals. DEQ's proposal (4c), with some toxins "capped" onsite makes the likelihood of recontamination and exposure too high due to the site being too close to a flood zone. It is also made up of unstable fill that could give way or liquify in a larger than expected earthquake or flood. The DEQ's discussion of the area also does not include the important information that the east side fault runs near the site making it especially vulnerable to an earthquake.. - Maintenance into perpetuity is included, it should be funded for more than 30 years. It should be funded for at least 100 years. - DEQ admits their recommended option (4c) has "uncertainties," but that a better option must show itself to be worth the cost (Staff Report: Recommended Remedial Action, pg 47). However, the cost of a re-do after a failure has not been factored in. The likely eventual failure of option 4c would be too costly, inefficient and damaging to the site & river. Option 3b would lessen the likelihood of recontamination and lessen the need for maintenance. - The report mentions the need to design the cleanup for extreme weather events, but is vague about what, if any treatments could withstand a large flood or earthquake. The public needs to know how these extreme problems would be dealt with. The devil is in the details and there aren't any given. The chance of recontamination and re-exposure is lessened greatly with full removal of toxins as outlined in option 3b. - The best and most protective option corresponds to DEQ's option 3b: complete removal of contaminants to a hazardous waste facility, while leaving native trees in place. The cost is about 20% more but would save funds on maintenance into perpetuity and the likely re-do of the cleanup. The site has outstanding potential as a natural area and is well worth the higher cost to give it the best chance for long-term restoration. Thank you, Barbara Quinn Portland, OR
151	With regard to the proposed clean-up plan for Willamette Cove: Have representatives of Metro, Port of Portland or DEQ made any effort to discuss the clean-up proposal with the Chinook Nation? It is my understanding that Portland sits upon unceded Tribal land. Not only are the Willamette River and its shores historically important to local tribal culture, but <u>if they were not ceded they remain tribal land</u>. Any decisions about the treatment and future use of Willamette Cove must therefore include Tribal participation and approval.

To: Oregon Department of Environmental Quality
Re: Public Comment Regarding the DEQ Staff Report, Recommended Remedial Action for Willamette Cove Upland Site

I would like to provide feedback regarding the proposed remedial action outlined in the DEQ Staff Report for the remediation of the Willamette Cove Upland Site. In the Staff Report, DEQ recommends remedial alternative 4c, Focused Alternative Excavation with Off-Site Disposal/On-Site Consolidation and Cap. DEQ claims that this remedial option sufficiently addresses the human health and ecological risks associated with soil contamination at the site. However, I believe that the recommended plan leaves too much contamination in place, requires too many restrictions on the property, and passes the risks and costs of the contamination on to future generations.

Risk Calculations

I would first list to address the risk calculations used for determining cleanup levels at Willamette Cove. The proposed plan is based on DEQ's calculations of risk to both human and ecological receptors. While this method may be sufficient for evaluating risk in a closed system, it is insufficient in practice, particularly when receptors include members of communities disproportionately exposed to environmental hazards in general. For these environmental justice communities, the risks associated with Willamette Cove are only a part of their total exposure to environmental contaminants. For example, people experiencing houselessness are often exposed to more environmental contamination than their housed peers. Does the "Transient Trespasser" risk scenario consider the increased contaminant exposure and environmental vulnerabilities of people experiencing houselessness?

152 One young woman experiencing houselessness recently testified to Portland Harbor Community Coalition that she unknowingly risked her health over a 3-month period while camping at Willamette Cove. While camping, she reportedly harvested and consumed an average of 50 clams per month. By camping at Willamette Cove and consuming shellfish harvested in its waters, she was likely exposed to contamination through dermal contact, ingestion and potentially inhalation. This young woman was unaware of the contamination at Willamette Cove and the dangers associated with exposure to the contamination in the soil, sediment, and shellfish. Was this type of scenario evaluated during the creation of the risk-based limits applicable for the site, specifically for the Transient Trespasser receptor scenario?

Leaving Contamination in Place

One of my primary disagreements with the plan is that it proposes to leave a large amount of soil exceeding human health and ecological risk levels at the site in a capped consolidation area. Option 4c recommends removing only 4,000 cubic yards of contaminated soil. In contrast, DEQ estimates that it would leave behind 23,000 cubic yards of soil containing concentrations of contaminants exceeding human health risk-based limits. Page 2, No. 3 indicates that "...a preference will be given to offsite disposal of soil posing a higher risk to humans or animals/plants". However, this priority is not reflected in the final remedy selection.

As the Staff Report indicates, leaving 23,000 cubic yards of contaminated soil in place will require the installation of a soil cap to ensure that the risk of exposure is reduced. If the cap were to degrade or fail, the public would once again risk being exposed to contamination in the soil at Willamette Cove. To address the possibility of a cap failure, DEQ proposes long-term inspections and maintenance. In the short-term (zero to a few years), using a cap to reduce risk might be effective in some situations, because public records and living memory ensure that operations and maintenance plans and inspection plans are followed. However, as the report states, "Given their persistent nature, contaminants would not be expected to degrade and will be present in perpetuity." (DEQ, 2020). How will DEQ ensure that future governments, property owners, or corporate entities will maintain their commitments in 50 years? 100 years? This is not conjecture; the report

clearly states that operations and maintenance of the cap will be required forever.

Ongoing Maintenance Needs

The Staff Report proposes follow-up actions that will be required to maintain the Site, including maintenance of any engineered soil caps or covers and regular site monitoring (page 2, No. 6). On page 56 under Institutional Controls, the plan explains that DEQ will conduct periodic reviews "initially more frequent to 5-year reviews" (DEQ, 2020). It is unclear what the initial review increment would be, but a 5-year review interval is excessively long to ensure that any engineered controls are maintained appropriately.

Restrictions on Property Usage

In addition to the need for maintenance of the cap from now to eternity, the Staff Report also indicates that leaving the contamination in place will require the imposition of deed restrictions on the property. The report does not mention the type of use restrictions that would be required if the contaminated soil is left in place. However, any restrictions on the use of the property would lower its value and reduce the community's options for future property usage and development.

Soil Cap Safety

The Staff Report indicates that any engineered cap will be designed to withstand future events such as earthquakes or floods. However, I am concerned that the final cap design will prioritize cost savings at the expense of adequate safeguards. I am also worried that the cap design will not consider the increasing danger of severe weather and flooding events driven by climate change. The report also mentions that the site was originally built up from the riverbed using dredge fill. Has this soil type been considered in the plan and when estimating the costs associated with the design, construction, and maintenance of the proposed cap over the contaminated soils?

Carbon Footprint

DEQ notes that its chosen remedy aligns with DEQ's Green Remediation Policy and the EPA Region 10 Clean and Green Policy because it reduces the carbon footprint of the cleanup by limiting the amount of soil removed by barge or truck. Both the DEQ and EPA policies are very general, each being less than two pages long, and neither recommends limiting active removal of contaminated media from a site to reduce carbon emissions. While I wholeheartedly support the goal of reducing the carbon footprint of the project, I don't think that should be used as an excuse for less removal of contaminated soil. Additionally, the engineered cap in the proposed remedial option is supposed to be there to reduce the risk to the community forever. Citing the risk of vehicle accidents as a reason for less removal in this circumstance is puzzling considering the risk of accidents that might puncture the cap or create a failure of the consolidation cell. I am confident that DEQ could find a way to remove the contaminated soil from the site while also reducing the project's carbon emissions. The EPA Policy even has some ideas including using cleaner fuels, diesel emissions controls, or retrofitting older equipment. Did DEQ consider using alternatives such as these to reduce the carbon emissions associated with the cleanup while also removing the contaminated soil?

Cost Estimate

I also find the cost estimates for the various capping options to be short-sighted and misleading. As the Staff Report states, capping options will require maintenance in perpetuity. However, the budget for option 4c uses only a 30-year time frame for estimating the cost of long-term maintenance. In reality, a cost estimate for future maintenance costs cannot be calculated because it has no upper limit. The costs are left off of the budget and passed along to future generations. Considering the true cost of future site maintenance, some

	of the other alternatives that were not selected as the final remedy are much more reasonable. Conclusion Ultimately, the DEQ's proposed remedial option does not actually address the issue of contamination at Willamette Cove. It merely kicks the can down the road to be dealt with by future generations. Like many cleanup plans, this one leaves contamination in place, woefully underestimates the long-term costs of maintenance, then uses the underestimated costs to demonstrate that the less-protective option is the most cost-effective. In the long-term, this cleanup would be less costly and more protective of human and ecological health if more robust remediation were conducted in the short-term. I urge the Department of Environmental Quality to select remedy 3b, Alternative Excavation and Off-site Disposal, for Willamette Cove. Alternative 3b will permanently address the risks from contamination in the present instead of leaving it for future generations to take care of later, it will eliminate the need for perpetual maintenance of a soil cap, it will ensure that a catastrophic flood or earthquake will not create potential exposures to contaminated soils, and it will eliminate the need for restrictions on the use of the property. Sincerely, Alexander Lopez III, R. G. Portland, OR
153	I am writing to register my concerns about the cleanup of Willamette Cove. The proposed plan calls for burying much of the toxic material on the site. I think this is very unwise. Willamette Cove is right on the banks of the river, and even at its widest point, the boundary is only a few hundred yards from the river, which would make it prone to a major flooding event. In addition, we are often told of the imminent Cascadia Subduction Zone earthquake, for which we all need to prepare. From viewing soil maps of the area (my neighborhood!), it is clear that much of the area along the Willamette in North Portland would be likely to experience soil liquefaction in the event of an earthquake. I do not believe that the buried material would be secured from leaking in the event of a flood or an earthquake. This area is meant to be used as a natural area after the cleanup is completed, so the choice of storing so much toxic material on site seems foolishly optimistic at best, and posing an imminent threat to the well being of people and the environment in the area if the worst happens. I would prefer that all toxic materials from the site be taken to a disposal location that is geologically more stable, and not on the very edge of a major river. What is the point of doing the cleanup, if the removed material simply leaks back out of the capped excavations that are being proposed? We need a solution that will last for decades, if not centuries, and not the "band-aid" approach that is called for in the current proposal. I have no other issues with the proposal as it stands. I hope the cleanup will be upgraded to include the removal of all toxic soils. Sincerely, Leah Passell

154	To: Erin McDonnell 700 NE Multnomah St., Suite 600 Portland, OR 97232 Subject: Willamette Cove Cleanup The current preferred clean-up method would only remove the “hot spots” of contamination, leaving 23,000 cubic yards of toxic soil--the size of nine olympic sized pools. The remaining waste would simply be covered by clean sand or collected in a structure with layers of gravel, cobble, and topsoil. This plan falls short of addressing other community concerns and prioritizing long term human and ecological well-being. The future plans for Willamette Cove are limited to a paved nature trail across the outer edge of the site. It does not include community priorities to create an inclusive riverfront such as: - water access for fishing, boating, swimming, water sports, and cultural ceremonies - social activities, like picnics, barbecues, recreational sports, children’s play structures - gathering spaces, bringing together people and nature, cultural events, ceremonies and other community activities. The Environmental Protection Agency (EPA) released a study in 2018 “indicating that people of color are much more likely to live near polluters and breathe polluted air.” This rings true for the Willamette river communities whose industrial pollution started in World War II, when the area became a hub for docks to assemble war ships and tanks. Many African Americans migrated to work in these shipyards and were consequently exposed to toxins by residing and fishing along the river. A full cleanup would benefit all people, including the houseless community who are exposed to the site’s toxic soil, contaminated fish, and air pollutants daily. This is more important than ever to address in this current pandemic. A study from the Harvard School of Public Health found that a person who lives in a county, such as Multnomah County, for many decades with high levels of air pollution is 8 percent more likely to die from Covid-19. Marginalized groups who have been disproportionately impacted by the contamination of the Willamette Cove deserve a better future. The cost of not cleaning this site will only grow in the debt we owe future generations. The costs of the cleanup due to inflation will only rise with time. Please take immediate action and ensure a just cleanup process is in place. Thankyou, Jessica Rojas Associate Director of the Northeast Coalition of Neighborhoods jessica@necoaltion.org -- Jessica Rojas Associate Director Northeast Coalition of Neighborhoods (NECN) www.necoalition.org
155	August 31, 2020 Via Email to: willcoveupland@deq.state.or.us Erin McDonnell, Project Manager Willamette Cove Uplands Oregon Department of Environmental Quality 700 NE Multnomah Street, Suite 600 Portland, Oregon 97232 Re: Public Comment Regarding the DEQ Staff Report Recommended Remedial Action for Willamette Cove

Upland Site (#2066)

Dear Ms. McDonnell and Oregon Department of Environmental Quality:

Please accept these comments from Center for Sustainable Economy on behalf of our members and supporters in Portland and across the region. We are writing to urge Oregon DEQ to commit to a more robust remedial design plan for the Willamette Cove Upland Site. A new plan must center on preserving native trees and removal of as much unsafe soil as possible (Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). Overall, this cleanup must be complete; exposure to contamination must not be left to future generations and vulnerable community members because of irresponsible cost-saving measures. Instead, this cleanup must reflect the real priorities of community members and people most-impacted by the Superfund—including Native Americans, African Americans, immigrants and refugees, houseless people, and area residents—who would like to see Willamette Cove become a multi-functioning site, restored and protected in perpetuity for river access, recreation, and wildlife habitat.

Currently, the agency's preferred cleanup option is incomplete. It emphasizes consolidation and capping for cost savings and other reasons. In the long-term, however, consolidation, capping, and incomplete remediation will cost the community more through inspection and maintenance fees, human health impacts, and future cleanup needs.

With our partners at Portland Harbor Community Coalition and Portland Harbor Community Advisory Group, we support:

• Offsite disposal in lieu of consolidation and capping.
• Complete cleanup for full public access in lieu of expensive and unfeasible institutional controls.
• New risk models that reflect the disproportionate exposure of houseless community members, who, under current City practices, are increasingly 'swept' from urban areas to live in contaminated sites along the river.
• Cleaner fuel standards, diesel controls, equipment retrofits, and other clean energy technology to reduce the carbon impacts of soil removal.
• Bioremediation integrated in the final cleanup plan, as long as it does not minimize cleanup levels or delay action.
• An Inclusive Procurement Process with community members and concluding with a Community Benefits Agreement for the site to ensure contracted parties prioritizes low-income, minority, and women workers, as well as community and environmental goals.

DEQ's current preferred plan does not adequately address the issue of contamination at Willamette Cove. Instead, it requires issues that arise to be dealt with by future generations. Like many cleanup plans, this one leaves contamination in place, underestimates the long-term costs of maintenance, then uses the underestimated costs to demonstrate that the less-protective option is the most cost-effective. In the long-term, the cleanup outlined above and detailed in depth by our partners at Portland Harbor Community Coalition (PHCC) would be less costly and more protective of human and ecological health.

In conclusion, we recognize our shared priorities with PHCC and the river communities they represent. We have a mutual desire to see a working river that is clean, restored, and accessible to all residents as part of our organization's vision for a sustainable, climate-resilient economy in Oregon. We urge you to recognize the importance of a full cleanup for the long-term use of this site, and complete a more robust cleanup plan for the Willamette Cove Upland Site.

Respectfuly,
Elijah Cetas
Grassroots Organizer // Center for Sustainable Economy ecetas@sustainable-economy.org

156	From: Caroline Skinner Portland, OR To: Oregon DEQ Here are my comments on the cleanup options proposed by DEQ for Willamette Cove: - I am hoping to get full removal of contaminants at Willamette Cove to a certified offsite hazardous waste facility. Native trees, especially madrone, should be left in place. Option 3b comes closest to meeting those goals. DEQ's proposal (4c), with some toxins "capped" onsite makes the likelihood of recontamination and exposure too high due to the site being close to a flood zone. It is made up of unstable fill that could give way or liquify in a larger than expected earthquake or flood. The DEQ's discussion of the area also does not include the important information that the east side fault runs near the site, making it especially subject to damage after an earthquake.. - Maintenance into perpetuity needs to be included, it should be funded for at least 30 years, but should be funded for up to 100 years. - DEQ notes their recommended option (4c) has uncertainties, but a better option must show itself to be worth the cost (Staff Report: Recommended Remedial Action, pg 47). However, the cost of a re-do after a failure has not been factored in. The likely eventual failure of option 4c would be too costly, inefficient and damaging to the site & river. Option 3b would lessen the likelihood of recontamination and lessen the need for maintenance. - The report mentions the need to design the cleanup for extreme weather events, but is vague about what, if any treatments could withstand a major flood like we had in 1996, or earthquake. The public needs to know how these extreme problems would be dealt with. There is a lack of detail in this area. The chance of recontamination and re-exposure is lessened greatly with full removal of toxins as outlined in option 3b. - Therefore, I believe the best and most protective option corresponds to DEQ's option 3b: complete removal of contaminants to a hazardous waste facility, while leaving native trees in place. The cost is about 20% more but would save funds later on maintenance into perpetuity and the likely re-do of the cleanup. The site has outstanding potential as a natural area, and it is well worth the higher cost for long-term restoration of the toxic legacy in North Portland. Thank you for your consideration.
157	I have attached 3 documents to show the nearly 300 signatures from unique individuals as well as a handful of individual comments that I expect DEQ will count as part of the total official public comments. This was our intention, especially during Covid-19, to allow people an option to sign onto a letter from the comfort and safety of their homes or their phones or other devices. We will submit PHCC's official letter separately. Attachments: -Online Change.org letter -Names and zip codes of individuals who signed letter -Personal comments that a handful of individual added to their signatures Thank you, Cassie Cohen, Executive Director 503-816-4342 *[Attached petition (text only) included below. Nearly 300 signatures were provided in the attachments.]*

Clean Up Willamette Cove! l Limpia
Willamette Cove!

Portland Harbor Community Coalition started this petition to Oregon Department of Environmental Quality

Help advance environmental justice by signing this petition!

The Oregon Department of Environmental Quality (DEQ) is seeking input on a proposed cleanup plan for the Willamette Cove by August 31st. Tell DEQ to remove all contaminants to allow for expanded recreational uses, water access, social activities, and gathering spaces.

What is Willamette Cove?
Willamette Cove is a 27-acre property located on the occupied lands of the Chinook,
Tualatin Kalapuya, Molalla and many other Tribes along the Willamette River, in what is now called Portland, Oregon. After decades of heavy industrial activities, the site became highly contaminated by toxins and hazardous substances. The site continues to expose people and animals to unsafe levels of toxins.

The current preferred clean-up method would only remove the “hot spots” of contamination, leaving 23,000 cubic yards of toxic soil--the size of nine olympic sized pools. The remaining waste would simply be covered by clean sand or collected in a structure with layers of gravel, cobble, and topsoil. This plan falls short of addressing other community concerns and prioritizing long term human and ecological well-being.

The future plans for Willamette Cove are limited to a paved nature trail across the outer edge of the site. It does not include community priorities to create an inclusive riverfront such as:
- water access for fishing, boating, swimming, water sports, and cultural ceremonies
- social activities, like picnics, barbecues, recreational sports, children’s play structures
- gathering spaces, bringing together people and nature, cultural events, ceremonies and other community activities.

The Environmental Protection Agency (EPA) released a study in 2018 “indicating that people of color are much more likely to live near polluters and breathe polluted air.” This rings true for the Willamette river communities whose industrial pollution started in World War II, when the area became a hub for docks to assemble war ships and tanks. Many African Americans migrated to work in these shipyards and were consequently exposed to toxins by residing and fishing along the river.

A full cleanup would benefit all people, including the houseless community who are exposed to the site’s toxic soil, contaminated fish, and air pollutants daily. This is more important than ever to address in this current pandemic. A study from the Harvard School of Public Health found that a person who lives in a county, such as Multnomah County, for many decades with high levels of air pollution is 8 percent more likely to die from Covid-19. Marginalized groups who have been disproportionately impacted by the contamination of the Willamette Cove deserve a better future.

Please submit a public comment using the information provided below, urging DEQ to expedite the cleanup process and prioritize the health and wellbeing of the local community and the environment by August 31st.

If you would like to send an email, please send one using the following email:
WillCoveUpland@deq.state.or.us

If you would like to send a letter, please send one using the following address:
Erin McDonnell

700 NE Multnomah St., Suite 600
Portland, OR 97232

Link for more information on Willamette Cove:
https://www.oregon.gov/deq/Programs/Pages/WillametteCove.aspx
I you would like to send a comment in video format, please send it to the following email:
pdxharborcommunitycoalition@gmail.com

¡Ayuda a avanzar la justicia ambiental a través de esta petición!

El Departamento de Calidad Ambiental de Oregon (DEQ) está pidiendo aporte de la comunidad sobre un plan de limpieza propuesto para la cala Willamette. Dígale a DEQ que elimine todos los contaminantes para permitir usos recreativos ampliados, acceso al agua, actividades sociales y espacios de reunión.

Que es Willamette Cove?
Willamette Cove es una propiedad de 27 acres ubicada en las tierras ocupadas de los Chinook, Tualatin Kalapuya, Molalla y muchas otras tribus a lo largo del río Willamette, en lo que ahora se llama Portland, Oregon. Después de décadas de actividades industriales pesadas, el sitio se contaminó altamente con toxinas y sustancias peligrosas. El sitio continúa exponiendo a personas y animales a niveles inseguros de toxinas. El método de limpieza preferido actualmente solo eliminaría los "puntos calientes" de contaminación, dejando 17,584 metros cúbicos de suelo tóxico- el tamaño de nueve piscinas olímpicas. El resto de los desechos simplemente se cubriría con arena limpia o se recogería en una estructura con capas de grava y tierra. Este plan no aborda las otras preocupaciones de la comunidad y no prioriza el bienestar humano y ecológico a largo plazo.

Los planes futuros para la Cala Willamette se limitan a un sendero natural pavimentado a través del borde exterior. No incluye las prioridades de la comunidad para crear una ribera inclusiva como:
-Acceso al agua para pesca, paseos en bote, natación, deportes acuáticos y ceremonias culturales.
-Actividades sociales, como picnics, barbacoas, deportes recreativos, estructuras de juegos infantiles.
-Espacios de reuniones que permite la reunión de personas y naturaleza, eventos culturales, ceremonias y otras actividades comunitarias.

La Agencia de Protección Ambiental (EPA) publicó un estudio en 2018 "que indica que las personas de color son mucho más propensas a vivir cerca de contaminadores y respirar aire contaminado". Esto suena cierto para las comunidades del río Willamette cuya contaminación industrial comenzó en la Segunda Guerra Mundial, cuando el área se convirtió en un centro de muelles para ensamblar barcos y tanques de guerra. Muchos afroamericanos emigraron para trabajar en estos astilleros y, en consecuencia, estuvieron expuestos a toxinas al residir y pescar a lo largo del río.

Una limpieza completa beneficiaría a todas las personas, incluyendo la comunidad sin hogar que son vulnerables a la tierra tóxica del sitio, los peces contaminados y contaminantes del aire diariamente. Esto es más importante que nunca para abordar en esta pandemia actual. Un estudio de la Escuela de Salud Pública de Harvard encontró que una persona que vive en un condado durante muchas décadas con altos niveles de contaminación del aire tiene un 8 por ciento más de probabilidades de morir por Covid- 19.

Envíe un comentario a DEQ para acelerar el proceso de limpieza antes del 31 de agosto!
Correo electrónico: WillCoveUpland@deq.state.or.us
Dirección: Erin McDonnell
700 NE Multnomah St., Suite 600
Portland, OR 97232

	Para más información: https://www.oregon.gov/deq/Programs/Pages/WillametteCove.aspx Si desea enviar un comentario en formato de video, envíelo al siguiente correo electrónico: pdxharborcommunitycoalition@gmail.com
158	*[Signature to petition with following comment:]* "I'm signing because I love the river and I love the animals who have the river as their home" - Rachel Wheeler
159	*[Signature to petition with following comment:]* "Time polluters clean up thier mess. Water is life and as usual the poorest folks are suffering most." -emily herbert
160	*[Signature to petition with following comment:]* "This petition is really close to my heart. We need our city leadership to ensure projects take into account the needs of our marginalized communities and consider the long term." -Karen Kincher
161	*[Signature to petition with following comment:]* "Clean it up!" -Kristy Wise
162	*[Signature to petition with following comment:]* "This needs to be cleaned up once and for all" -Ean Lake
163	*[Signature to petition with following comment:]* "I'm signing bc the entire river and city needs to be cleaned up! No more homeless boats and no more homeless camps on and along the river!!" -Aaron Woldrich
164	*[Signature to petition with following comment:]* "We need to keep our rivers safe and clean for people to play I ." -Christina Wilson
165	*[Signature to petition with following comment:]* "Many communities, like mine, drink the river water downstream from this site. We ask for the most careful and complete cleanup possible." -Cass Martinez
166	*[Signature to petition with following comment:]* "The Willamette is a beautiful river, deeply maligned. Please, DEQ, get it cleaned up by removing all contaminants and increasing recreational opportunities. Thank you." -Bernard Nagelvoort
167	*[Signature to petition with following comment:]* "I don't want this pollution in my neighborhood, parks and or rivers." -lindsay stathis
168	*[Signature to petition with following comment:]* "I live very close to the Hillsboro dumping location and my home backs to Jackson Bottom Wetlands. I don't want polluted run-off water to affect myself, my family, my neighbors, or the wildlife of the surrounding area." -Erika Probst
169	*[Signature to petition with following comment:]* "Please don't dump the soil in Hillsboro" -John Schoolcraft
170	*[Signature to petition with following comment:]* "This is a no brainer, we need to protect the health and well being of frontline communities as well as clean and protect our natural resources." -Rachel Hanes
171	*[Signature to petition with following comment:]* "I am signing on because I know after decades of living in nd near Portland that our waters all need as much protection from pollutants and pollutersa as possible and our riparian areas are critical habitat for the future of all river-dependent life. Only corporate or other greed will say otherwise." -Judy Todd
172	*[Signature to petition with following comment:]* "we live nearby and enjoy walks there and would love to swim." -Laurie & Dave King
173	Dear DEQ, I am a resident of the Cathedral Park/St Johns neighborhood and an advocate for the ecology of the Willamette River. I believe that Alternative 3b Alternative Excavation and Offsite Disposal is the best option provided to clean up the contamination of the cove and provide for its use by the community in the future. The area is within a 100 and 500 year flood plain in a seismically susceptable location on a river. Capping is not adequate and will require monitoring in perpetuity, adding to the cost over time, as well as restricted use. DEQ advised that a 12 inch soil cap would require that the land would be restricted to the degree that people could not actually recreate safely on that ground, and measures would have to be taken to keep people away such as obstructive landscaping and foliage. At the same time, we have an ecosystem and well established native trees that should be preserved. Thank you for giving the community to the opportunity to comment on the cleanup within our community. Amyl Freeberg St Johns/Cathedral Park Resident

174	I was asked to give an impact statement of how the cleanup at Willamette Cove is impacting the people I work with in my organization, Get Hooked. And honestly, I don't have one. Here is why: the cleanup at Willamette Cove does not really impact black communities, from my perspective. Willamette Cove is in the St. John's neighborhood, which has been gentrified. This was historically a black community, so if the cleanup happened 20 years ago, maybe my statement would be different? I even find myself questioning why is the cleanup happening at Willamette Cove and not Swan Island? Is the answer along the lines of…..Willamette Cove is a park in a now gentrified neighborhood that is going through a major residential and commercial upgrade? The communities that need the cleanup most are the communities that fish to eat, and, that happens at the Swan Island boat ramp. I see it with my own eyes every there – black and low income people fishing off the dock at a very dirty and polluted "park". Why not invest there? Is it because there is no economic gain? These are the questions I ask myself, and this is the impact statement coming from my point of view. Dishaun E. Berry dishaun91@gmail.com Founder/President "Get Hooked Foundation"
175	Dear DEQ staff, Thank you for offering the opportunity for members of the public to comment on the currently proposed clean-up of Willamette Cove. Unfortunately, the currently proposed plan does not go nearly far enough to ensure that Willamette Cove will be returned to a state where it is safe and accessible for all members of our community. We need a plan that does a lot more. Willamette Cove is a place that many members of the community currently use, and many more want to use more for recreational, social, and cultural purposes. This site can be a beautiful and cherished place for people to gather and enjoy our river ecosystems. Especially for local Native communities and communities of color, restoring and enhancing the ability for people to fish, gather, hold ceremonies, socialize, and participate in water activities in and around Willamette Cove could be a small but meaningful step to recognizing and taking action on the current inequities that those populations face in having access to clean air, water, and outdoor spaces. Yet instead of that kind of vision, the current plan includes only one paved trail and does not include developing any of the amenities that community members have advocated for. This is not enough. Additionally, the current plan intends only to remove "hot spots" of intense pollution from heavy industry, rather than comprehensively restoring soil and water quality across the 27-acre property. The majority of the polluted soil would simply be covered by sand or gravel - the equivalent of sweeping our pollution legacy under the rug. It is not a long-term solution. We have to start thinking in terms of spending our money, time, and care on generating real solutions to environmental injustices. A more comprehensive clean-up plan could put people to work doing important, deep restorative practices that would remediate soil, air, and water quality to benefit all of the city. Native, Black and other communities of color have been most impacted by environmental degradation of their neighborhoods and lands through our port and industrial activities. It is the work of the next economy to right this wrong and practice sincere and profound remediation. Please develop a more comprehensive and future-oriented plan for Willamette Cove. Thank you, Anaïs Tuepker Portland, OR

August 31, 2020

Erin McDonnell, Project Manager Willamette Cove Uplands
Oregon Department of Environmental Quality 700 NE Multnomah Street, Suite 600 Portland, Oregon 97232

Re: Willamette Cove Upland (Site # 2066) DEQ's Proposed Environmental Cleanup Plan Public Comments

Dear Ms. McDonnell and Oregon Department of Environmental Quality:

SUMMARY STATEMENT

DEQ must commit to a more robust remedial action plan that includes preserving native trees while also removing as much unsafe soil as possible (Alternative 3b: Alternative Excavation and Offsite Disposal in the DEQ report). The agency's preferred cleanup option that emphasizes consolidation and capping for cost savings and other reasons, is unacceptable because it passes the problem on to future generations while leaving the community vulnerable to exposure to contamination.

1. CONSOLIDATION

Consolidation is not safe for human and ecological health in the long-term. We do not support the redistribution or permanent storage of toxic sediment on the site.

176 At the beginning of the Staff Report, DEQ states that "...a preference will be given to offsite disposal of soil posing a higher risk to humans or animals/plants". But in the end, DEQ's preferred alternative calls for the removal of only 4,000 cubic yards of material for offsite disposal leaving behind approximately 23,000 cubic yards of soil with contaminant concentrations exceeding human health limits. This is about the same volume as 7 Olympic size swimming pools. Explaining it in this way, our coalition members could understand the amount of contaminated soil being left in place and began to voice opposition to consolidation. Where is the preference for offsite disposal reflected? DEQ's preferred plan appears to give preference to onsite containment. DEQ's report also notes that leaving behind the contaminated soil will require deed restrictions, contaminated soil management plans, and a soil 'cap' placed over the contamination that would require regular inspection and maintenance in perpetuity (forever).

2. RISK FOR PEOPLE

We do not believe that the risk models used by DEQ and EPA to calculate acceptable risk levels consider the disproportionate exposure of BIPOC, low-income, houseless communities, and working class residents to environmental contamination.

The scenarios that DEQ and EPA used to develop the carcinogenic and non-carcinogenic exposure limits must consider the disproportionate exposure of houseless community members to contamination not only at Willamette Cove, but also everywhere else they stay outside. Houseless community members sleeping and staying at Willamette Cove have direct exposure to risk through touching contaminated soil, accidentally ingesting it, and inhaling dust containing airborne contamination. However, the carcinogenic Risk-Based limit for total PCBs for recreational users is 0.74 mg/kg while the same Risk-Based limit for houseless community members is 14 mg/kg. That is two whole orders of magnitude higher. The limits associated with exposure to contaminated soil for people experiencing houselessness should be lower than those of occasional recreational users, not the reverse, when considering several synergistic factors:

1. In this pandemic, there has been incredible spikes of houselessness
2. Under Mayor Ted Wheeler's leadership, there has been a policy shift to substantially increase sweeps of

houseless camps across the city that have not let up during Covid-19.
3. Unhoused residents are increasingly getting pushed further out of downtown Portland and towards the edges of the city, including along the river.
4. When people are swept, have to relocate and lose their belongings, they have compounded burdens and increased potential exposure to environmental health risks in the air, water and soil.
5. People of color and working class residents who have resided in North Portland for generations have been disproportionately exposed to toxic air at unsafe levels (outside and some inside), and when compounded by exposure at Willamette Cove, they will be at risk of more adverse health effects.

3. INSTITUTIONAL CONTROLS

We do not believe that Institutional Controls (IC) should be required to ensure the long-term safety of the community.

ICs are unacceptable because historically people and animals have accessed the full site and will continue to do so into the future in all of the ways they have before, even if it is not in Metro's vision or in DEQ's risk calculations. DEQ's preferred plan would require a number of specific controls including a Contaminated Media Management Plan, a Community and Outreach plan, and deed restrictions for the property. These controls are often hard to implement in the short-term and very difficult to maintain in perpetuity, with public agencies and responsible parties facing inconsistant budgets from year to year.

The cost estimate for the chosen remedy also doesn't reflect the potential devaluation of the property due to the restrictions and remaining risk at the site. Additionally, as a community asset, any restrictions on the usage of Willamette Cove should only be permitted with permission from the property owner and with the approval of the community, including taxpayers, who are supposed to be represented by electeds and staff at public agencies.

4. FUTURE OVERSIGHT AND MONITORING

We believe that maintaining the future oversight and monitoring of the site in perpetuity is cost prohibitive and unrealistic.

We have been warned by DEQ that even if the agency decides to do a more robust cleanup without consolidation, the West side of Willamette Cove is known to have contamination about 30 feet below the ground surface. If this is the case, we understand the challenge of removing sediment at that depth, which in place of removal, would require capping or other controls. This will require DEQ follow up actions, including regular inspection, maintenance, and regular site monitoring. As per DEQ's plan, this work will be required at Willamette Cove for forever.

In the plan, DEQ states that it will conduct periodic reviews "initially more frequent to 5-year reviews". It is unclear what the initial review increment would be, but a 5-year review interval seems too long to ensure that the engineered controls are maintained appropriately. Additionally, DEQ estimated the cost of long-term maintenance at the site by using only a 30-year period when the plan states that the monitoring and maintenance will be required forever.

Inclusive procurement practices should be used when establishing contacts for any ongoing maintenance and monitoring at the site. The proposal and bidding process should be designed in coordination with community stakeholders to give preference to local businesses representing the full diversity of the communities who have been impacted historically or currently by contamination at Willamette Cove and the Portland Harbor Superfund Site. Portland Harbor Community Coalition and its members have successfully implemented inclusive procurement processes with the Port of Portland, Oregon State Department of Lands, and City of

Portland, with consent from the Governor's office, on the Willamette Cove in-water, Terminal 4, and the hiring of a facilitator for the Willamette Cove Community Advisory Board.
This has become a new standard that we fully expect to continue with other public agencies and other parties involved in the remedial design and cleanup of upland and in-water sites.

5. WILLAMETTE COVE SEISMIC ACTIVITY & FLOOD SAFETY

Complete removal of any soil exceeding human and ecological risk limits is the only effective remedial option for the site. However, if constructed, any engineered systems, such as soil caps or covers used to contain contaminated materials at Willamette Cove, must be designed to maintain protections for human and ecological health in the event of potential seismic and climatic events including earthquakes, river flooding, and fire.

All capping used at the site should be designed to withstand the increased frequency and strength of severe weather events exacerbated by climate change referenced in the 2015 Multnomah County Climate Action Plan. If they cannot, then funding should not be wasted on furthering the concept and implementation of such controls.

The DEQ's Staff Report indicates that Willamette Cove was built up from the shallow river bed using dredged fill, which can be unstable in seismic events. Based on the presence of the fill, we are concerned that liquefaction may occur in the event of a major earthquake. Although the DEQ plan mentions long-term seismic stability of the proposed soil cap, the cleanup plan must also consider the seismic stability of the fill material at Willamette Cove.

In addition to the risk from earthquakes, Willamette Cove is also at risk from catastrophic flooding events. While portions of the site are in the 100 and 500 year flood plains, the current flood risk maps may not reflect the potential for more frequent extreme flooding events due to climate change.

2015 Multnomah County Climate Action Plan: Page 24

"More intense rain events in the winter may have far reaching impacts locally. Potential economic, social and environmental impacts from flooding may include water damage to homes and businesses, as well as roads, railroad tracks, levees, bridges and culverts. In addition, more rain falling in the winter will continue to stress Portland's systems for managing stormwater runoff and urban flooding. Wetter winters may also increase the incidence of landslides, particularly following prolonged periods of precipitation when the soil is already saturated with water"

6. BIOREMEDIATION

We support the exploration and inclusion of alternative remedial methods, including bioremediation, in the final cleanup plan, as long as they do not minimize cleanup levels or further delay the cleanup.

Based on community recommendations, the Port of Portland and Metro are in the process of conducting a 3- to 6-month pilot test to determine whether the use of fungus and plants/trees is a viable option to remediate the mix of contaminants at Willamette Cove. If the initial test has favorable results, then PHCC supports the next stage of testing of the bioremediation technology at the Willamette Cove site. If proven to work at the site, then we expect this method to be integrated into the final cleanup plan. However, we want to ensure that any future bioremediation does not further delay or minimize the overall cleanup goals and timeline.

7. CARBON FOOTPRINT

We do not believe that reducing the carbon footprint of the cleanup requires limiting the amount of contaminated soil removed from the site.

In its plan, DEQ states that its preferred remedy aligns with DEQ's Green Remediation Policy and the EPA Region 10 Clean and Green Policy because it reduces the carbon footprint of the cleanup by limiting the amount of contamination removed by barge or truck. We find this argument disingenuous and misleading. Both the DEQ and EPA green remediation policies are very general and neither recommends limiting removal of contaminated soil from a site to reduce carbon emissions. While we also believe the goal of reducing the carbon footprint of the project is important, we don't think that should be an excuse for less removal of contaminated soil.

DEQ also discusses the risk of vehicle accidents as a justification for removing less contaminated soil. This is puzzling considering the risk of accidents that might puncture a soil cap or create a failure of a consolidation cell that is supposed to remain viable forever. We believe that DEQ can find a way to remove the contaminated soil from the site while also reducing the project's carbon emissions and lessening the risk of vehicle accidents. The EPA Policy even presents some ideas including using cleaner fuels, diesel emissions controls, or retrofitting older equipment.

We demand that any future remedial actions utilize technology and processes designed to reduce carbon emissions for all equipment involved in the cleanup. This will greatly reduce the carbon emissions resulting from the transportation, moving and/or capping of toxic sediments. Carbon reduction planning can be integrated with the inclusive procurement process informed by community stakeholders. We also support the comments that Portland Clean Air submitted to DEQ regarding Willamette Cove.

8. OUTREACH

We are grateful to the Port for offering resources to PHCC to conduct more expansive outreach beyond the agency's typical neighborhood association and PHCAG meetings. We are also appreciative of the consistent monthly phone meetings that all of the agencies conducted with community stakeholders involved in this project, including DEQ, OHA, EPA, Metro, and the Port of Portland, and the feedback that agencies took into account along the way to adapt outreach materials and presentations to suit the needs of diverse communities. We conclude this process with many lessons learned about the limitations and successes in reaching impacted communities for direct training and public comments, especially based on our experience with regard to our Willamette Cove Train-the-Trainers Cohort.

The extension of the final feasibility study and the need for parties to conduct further assessments of the groundwater source control issue caused the first delays to the timeline. PHCC and PHCAG had not sufficiently prepared our trainers or ourselves for the amount of delay and what that would mean for our outreach plans. The next delay was due to the

Covid-19 pandemic. This meant that the public comment start time and duration had to be extended. We did not anticipate how many months this would ultimately delay the original timeline, and how discouraged our trainers and community partners would feel about it.

It is important for DEQ to pay close and special attention to the feedback DEQ has heard directly and indirectly from Black people, especially those whose families have lived in Portland for generations. We have been able to bring many Black leaders in our community into our coalition and our projects over time, but often once the oversight agencies and property owners start to get involved, that is where the distrust comes in. In the case of Willamette Cove, as with other sites and projects, people believe that DEQ has already made a decision on the remedial design, and that this public comment period is just for show. That it won't

make a difference. There is ample historical evidence that since colonization here, verbal and written agreements that lead to decisions about the future of land have rarely benefited or served BIPOC communities. That Tribal treaties once signed were broken and remain broken. That promises and commitments of government representatives have fallen to the wayside in the name of economic development, often at the expense of Black and Brown folks. This time with Willamette Cove, it is more important than ever for DEQ to place your decision in this historical context and understand the power you have to shift business as usual, as well as begin to shift the hopelessness of so many community members that every day are suffering from disproportionate hardships due to institutional and structural racism.

Please review this news story today from KGW8 News here titled “Northeast Portland home riddled with bullets, police take 17 hours to respond”. One of our Willamette Cove Trainer’s family’s house was shot 20 times while they were away. They can’t help but suspect that it was a hate crime because they are the only Black family living on the block. This same trainer has been through constant traumatic hardships recently and throughout her life. Willamette Cove was important to her. Her brother was always an avid fisherman, who died prematurely. She expressed concerns to DEQ staff in the initial Willamette Cove training that she was only for the first time learning about the toxins on the Willamette Cove upland site and in the fish and how it impacts our health. She questioned why this had not been shared in years and decades past. But while her family was experiencing life and death situations, she understandably was unable to focus on Willamette Cove workshops or public comments. Another one of our Willamette Cove Trainers who identifies as Black and who grew up in Portland knew after the initial training that if she hosted a Willamette Cove Upland workshop for her people, they would get upset. She expressed that the Black community would distrust the authenticity of DEQ’s public comment process, assuming that DEQ has already made a decision to stick with this preferred alternative. Because of this, she also anticipated the need to warn her friends and families to stay away from the Willamette Cove site in the long-term. DEQ owes it to BIPOC community members especially to take seriously the community concerns and public comments for Willamette Cove upland, if DEQ wants to begin healing and restoring trust with the community.

Portland Harbor Community Coalition, trainers and partners were able to carry out some workshops on ZOOM and in-person. With Willamette Cove Trainer Osman Castellano, we hosted an in person, socially distancing workshop on Thursday, August 27th where 18 day laborers, volunteers and staff at VOZ Workers Rights Center participated and generated

comments. They asked good questions and related to the issue thinking about their homelands environmental issues and basic necessities tied to land and water. Several day laborers expressed interest in being part of the solution of cleaning up the Willamette Cove upland site and the river. Willamette Cove Trainer Sadie Atwell and we hosted another workshop on August 30th where we had about 6 participants, predominantly with Native American identities and connections to Willamette River trustee tribe, Confederated Tribes of Warm Springs, along with someone from the Coeur D'Alene Tribe and an Arizona-based Tribe. Warm Springs tribal member Vesta shared a real time concern of her people on the reservation who have lost their staff capacity to manage the wastewater treatment facility, placing the tribal members at risk of consuming water or even using the water for bathing or other purposes. This reminded PHCC members of the concern about long-term capacity for DEQ to monitor caps or consolidation remedies at Willamette Cove. Sia Atwell was able to interview and generate public comments from individuals, but was unable to do extensive outreach or host a workshop due to the enhanced needs of her caseload of people experiencing houselessness at JOIN during the pandemic. Anjeanette Brown, Willamette Cove Trainer, spread the word to her community base on social media. PHCC and PHCAG had several follow up meetings and conversations with the trainers. PHCC hosted another workshop with PHCC members and conducted outreach through social media, newsletters, and one-on-one outreach and support to coalition members to generate public comments. Portland Harbor Community Advisory Group (PHCAG) and Michael especially, focused their outreach in St. Johns and Cathedral Park, at PHCAG meetings, from posting flyers with information, and having conversations with people experiencing houselessness, neighbors, North Portland

residents and others who stay near, have frequented, or resided on Willamette Cove. We heard testimony about houseless community members who have stayed 3 months or more at the Willamette Cove upland site. One young woman shared she had harvested an average of 50 clams per month while staying at the site. One common theme was that most people had no idea the health risk at the Willamette Cove upland site, despite the signage.

9. FUTURE USE

We have the verbal commitment from Metro Council, our electeds, to problem solve around the cost increase of doing a full cleanup. We are beginning to plan next steps with Metro staff, senior management and Council on how to move forward a community process to determine the future use of Willamette Cove upland site, under the leadership of Metro Council position 5, Sam Chase. The Metro Council plans to work side-by-side with the leadership of the City of Portland, assuming that if there will be any future park features at Willamette Cove, there will have to be a partnership with Portland Parks & Recreation. We are in communication with EPA, DEQ, City and State Department of Lands and the Governor's office as well about the need to not only align agencies for the remedial design process, but also the future use determination, seeing that as agencies are aware, community members see the upland and in-water all connected. We are opposed to the idea of delaying any public involvement process to determine the future use of Willamette Cove upland and in-water, as we have verified with multiple representatives from DEQ and EPA that future use may be clarified prior to determining a remedial design and certainly before completing a remedial design process. We have been told that it could be helpful to get clarification from Metro and the other agencies before finalizing designs for cleanup.

10. CONCLUSION

Ultimately, DEQ's preferred plan does not adequately address the issue of contamination at Willamette Cove. Instead, it requires issues that arise to be dealt with by future generations. Like many cleanup plans, this one leaves contamination in place, underestimates the long-term costs of maintenance, then uses the underestimated costs to demonstrate that the less-protective option is the most cost-effective. In the long-term, this cleanup would be less costly and more protective of human and ecological health if more robust remediation actions were conducted in the short-term.

PHCC supports Alex Lopez's technical comments that he submitted to DEQ as a professional who has worked in the environmental cleanup industry for many years. We also echo the concerns voiced previously and more recently by the Confederated Tribes and Bands of the Yakama Nation that call for a full cleanup. We had several coalition members testify to Metro Council at a Metro Council Work Session that a full cleanup and a revisioning of the future use for the Willamette Cove Upland was necessary. We had several community partners testify and provide written testimony to the DEQ Environmental Quality Commission and Director of DEQ Richard Whitman as well as Metro Council about the need for a full cleanup and an expanded future use at the site. We also generated a few video testimonies for public comment that are uploaded to DEQ's Google Drive. Lastly, we support the near 300 people who signed onto our Change.org electronic letter, urging DEQ to endorse a more comprehensive cleanup of the Willamette Cove upland site. PHCC hopes that DEQ honors all of the comments of the individuals who signed our electronic letter and who also may have submitted comments directly to DEQ.

We urge the Department of Environmental Quality to select remedy 3b, Alternative Excavation and Off-site Disposal, for Willamette Cove. Alternative 3b will permanently address the risks from contamination in the present instead of leaving it for future generations to take care of later, it will eliminate the need for perpetual maintenance of a soil cap, it will ensure that a catastrophic flood or earthquake will not create potential exposures to contaminated soils, and it will eliminate the need for restrictions on the use of the property. DEQ's proposed cleanup plan may reduce some of the risks posed to people and animals by the

	contamination at the property in the short-term, however it is unacceptable because it leaves too much contamination in place at concentrations above human and ecological risk-based standards and will require "Long-term monitoring and maintenance in perpetuity…". We need DEQ to take the community comments extremely seriously in order to begin forming trusting relationships especially with Black, Indigenous, People of Color, people experiencing houselessness and working class residents and all the overlapping identities within these communities. We know the evaluation criteria are all supposed to be weighed equally in determining a remedy, yet we also know that everything is subjective, and in the case of oversight agencies, the subjectivity historically has been heavily weighted towards favoring cost-effectiveness out of concern for the budget of responsible parties. This is the perception of many community members when DEQ and other oversight agencies describe the balance of criteria. We know DEQ hopes that this will be the one and only design and cleanup for Willamette Cove. We do too, if done right. We realize this process has stretched DEQ and other agency representatives far beyond their typical expected roles, and that it would be unimaginable to have to go back and redo any part of this, since we have finally begun to move in the right direction. We appreciate all of the agencies' efforts to open up this process in a new and inclusive way. With that comes growth and expansion and requires agencies to break through barriers and use creative strategies to problem solve like never before, in continued and ongoing partnership with community partners. Respectfully, Cassie Cohen, Executive Director Portland Harbor Community Coalition & PHCC Executive Steering Committee Members -- Wilma Alcock, Art McConville, Abdulhadi Mohammed, and Vadim Riskin
177	I feel the best and most protective option complete removal of contaminants to a hazardous waste facility, while leaving native trees in place. The will lessen the chance of recontamination and re-exposure by doing it right the first time! Thank you, Michael Pouncil

178	The Portland African American Leadership Forum (PAALF) Janaira Ramirez - Advocacy Manager Email: Janaira@paalf.org Office: (971) 420-2233 August 31, 2020 Dear Oregon Department of Environmental Quality, I am writing to you to express our organizational concern about the clean-up plan for the Willamette Cove public area in North Portland. PAALF has been a long time convener of diverse African American communities in North and Northeast Portland. Our role is to advocate alongside community members for environmental protections and investments as we develop community leadership. The Willamette Cove clean-up plan does not ensure the maximum public protections or remediation process. This poses a potential risk to all those who frequent the area and exposes already vulnerable populations to greater environmental risks. The current plan to consolidate pollutants will still leave behind contaminated soil and leave the potential for groundwater contamination, which can affect human and wildlife. According to the March 2020 Status of Willamette Cove the Fact Sheet, there is present groundwater contamination in the upland area[1]. We urge you to take Alternative 3b: Alternative Excavation and Office Disposal per your report. Excavation and offsite disposal will provide proper protection and better security to many community members who continue to access the site. The institutional controls that would come with consolidation will not serve well as deterrents. Instead, community members should enjoy risk-free access to the area after a proper remediation process is carried out. Alternative 3b, excavation and disposal, will also reduce the likelihood of future threat to public and environmental health. As climate disasters increase in intensity and frequency, we run the risk of potential floods and seismic activity causing leaks and spills of the materials contained under a consolidation cap. To continue with an incomplete remediation process and signal to future monitoring of the site as the solution is simply a bandaid to the problem. Future monitoring of a contained site must be ongoing and heavily invested in to ensure the greatest maximum safety to the public. We fear this process will be more expensive than the DEQ has estimated, leaving the safety of the public at the hands of changing priorities and budget constraints. Thank you for taking the time to consider this comment and we urge you to take action to ensure greater public safety by opting for a full excavation and proper offsite disposal of the contaminated soil and materials. Thanks, Joy Alise Davis Executive Director Portland African American Leadership Forum (PAALF) [1] Fact Sheet: Status of the Willamette Cove Cleanup. DEQ Proposes Upland Site Cleanup - March 2020

179	My Comments on the cleanup options proposed by DEQ: - There needs to be full removal of contaminants at Willamette Cove to a certified offsite hazardous waste facility. Native trees should be left in place. Option 3b comes closest to those goals. DEQ's proposal (4c), with some toxins "capped" onsite makes the likelihood of recontamination and exposure too high due to the site being too close to a flood zone. It is also made up of unstable fill that could give way or liquify in a larger than expected earthquake or flood. The DEQ's discussion of the area also does not include the important information that the east side fault runs near the site making it especially vulnerable to an earthquake.. - Maintenance into perpetuity is included, it should be funded for more than 30 years. It should be funded for at least 100 years. - DEQ admits their recommended option (4c) has "uncertainties," but that a better option must show itself to be worth the cost (Staff Report: Recommended Remedial Action, pg 47). However, the cost of a re-do after a failure has not been factored in. The likely eventual failure of option 4c would be too costly, inefficient and damaging to the site & river. Option 3b would lessen the likelihood of recontamination and lessen the need for maintenance. - The report mentions the need to design the cleanup for extreme weather events, but is vague about what, if any treatments could withstand a large flood or earthquake. The public needs to know how these extreme problems would be dealt with. The devil is in the details and there aren't any given. The chance of recontamination and re-exposure is lessened greatly with full removal of toxins as outlined in option 3b. - The best and most protective option corresponds to DEQ's option 3b: complete removal of contaminants to a hazardous waste facility, while leaving native trees in place. The cost is about 20% more but would save funds on maintenance into perpetuity and the likely re-do of the cleanup. The site has outstanding potential as a natural area and is well worth the higher cost to give it the best chance for long-term restoration. Sincerely, Susan Gere Portland OR
180	I'm a concerned business owner in Portland Oregon and I request that DEQ follow thru on the proposed clean up plan for Willamette Cove. Please remove all contaminants to allow for expanded recreational uses, water access, social activities and gathering. The health of our community is vital and this is precious life giving water and land. Warmly, Savannah Mayfield, LMT, CEC (she/her pronouns) http://www.nurturelifecoaching.com
181	I feel the best and most protective option complete removal of contaminants to a hazardous waste facility, while leaving native trees in place. This will lessen the chance of recontamination and re-exposure by doing it right the first time! Thank you, Doug Beal

182	To Erin McDonnell, and all concerned, I'm writing to express my sincere hope that the DEQ gives Willamette Cove a complete cleanup. As I'm sure you are aware, this is a very high use area, and the health of the water, soil, and plants in this area have a big impact on North Portland residents and the rest of the river. I work as an acupuncturist in North Portland, and am aware that my patients and their families are going to the river for recreation, fishing, and spiritual purposes. Their health is always at the forefront of my thinking and my concerns. I want this river to be a place where they can feel safe to bring their families. Please bring the river cleanup to the highest possible standard. We cannot tolerate ANY toxic soil. I encourage the DEQ to consider creative possible solutions, like bioremediation, as alternatives to removing the soil and encasing it in plastic elsewhere, which would just make it someone else's problem. Thank you for hearing my concerns. Sincerely, Turtle Farahat she/they pronouns
183	To whom it may concern: I write as a very concerned resident of St Johns for nearly 10 years living directly above the west and central parcel on N Crawford for the past 5 years. I urge DEQ to select remedy 3b, Alternative Excavation and Off-site Disposal, for Willamette Cove. Alternative 3b will permanently address the risks from contamination in the present instead of leaving it for future generations to take care of later, it will eliminate the need for perpetual maintenance of a soil cap, it will ensure that a catastrophic flood or earthquake will not create potential exposures to contaminated soils, and it will eliminate the need for restrictions on the use of the property. THE NO ACTION OPTION IS NOT ACCEPTABLE. Consolidation is not safe for human and ecological health in the long-term. I do not support the redistribution or permanent storage of toxic sediment on the site, which will continue to put us at risk. I do not believe that the risk models used by DEQ and EPA to calculate acceptable risk levels consider the disproportionate exposure of BIPOC, low-income and houseless communities to environmental contamination. The government needs to begin taking responsibility for these environmental injustices by ending their perpetuation through inequitable decision-making criteria like these. I do not believe that institutional controls should be required to ensure the safety of the community. This public land should be a healthy, vibrant space, not an "enter-at-your-own-risk" stretch of some of the most beautiful waterfront in this City. Current management and usage has also led to exhorbitant costs for camo clean-up that could be mitigated through true clean-up and place-making, not by discarding it because it's not a wealthy area of the City with powerful people to stand up for it. I believe that maintaining the future oversight and monitoring of the site in perpetuity is cost prohibitive and unrealistic. It also places the long-term responsibility on future generations and makes it susceptible to potential budget cuts when the project is no longer top of mind. Let's be realistic that this has been put off for too long already and our regional resilience needs are only going to increase. Remediation action needs to take place now.

	Complete removal of any soil exceeding human and ecological risk limits is the ONLY EFFECTIVE REMEDIATION OPTION for the site because of the INEVITABLE seismic and climatic disasters. However, if constructed, any engineered systems, such as soil caps or covers, used to contain contaminated materials at Willamette Cove must be designed to maintain protections for human and ecological health in the event of INEVITABLE seismic and climatic events including earthquakes, river flooding, and fire. I support the exploration and inclusion of alternative remedial methods, including bioremediation, in the final cleanup plan, as long as they do not minimize cleanup levels or further delay the cleanup. Bioremediation, especially mycoremediation is an opportunity for the clean-up to advance science and show how Oregon is innovating instead of dragging it's feet on it's environmental sustainability promise. I do not believe that reducing the carbon footprint of the cleanup requires limiting the amount of contaminated soil removed from the site. This claim seems to be ludicrously hiding behind a policy that only becomes relevant in the context of short-term thinking. The remediation plan should include planting trees and even leaving certain trees where they are to the extent that the project's carbon footprint would be neutralized. Best regards, Angela Hamilton Portland, OR
184	Hello, I am concerned that the current plan for cleanup is not meeting community needs. The current preferred clean-up method would only remove the “hot spots” of contamination, leaving 23,000 cubic yards of toxic soil--the size of nine olympic sized pools. This plan falls short of addressing other community concerns and prioritizing long term human and ecological well-being. Additionally, the post-cleanup plans for Willamette Cove are limited to a paved nature trail across the outer edge of the site. It does not include community priorities to create an inclusive riverfront such as: - water access for fishing, boating, swimming, water sports, and cultural ceremonies - social activities, like picnics, barbecues, recreational sports, children’s play structures - gathering spaces, bringing together people and nature, cultural events, ceremonies and other community activities. These community needs must be prioritized. Thank you, Maggie Starr Portland, OR

185	*[Transcription from audio file:]* [Speaker: Unidentified] August 26th at St. John's. [Speaker: Brittany Wellday] I would like to say that my name is Brittany Wellday and I would love for the cleanup to be happening over here at the Willamette Cove. Just for the simple fact is as in the dirt and everything else is extremely toxin and would like a better way for all of our children and everything else coming to the community soon and all we need is just for you guys to know that we would love for all of this stuff to be cleaned up immediately and as soon as possible. Only because it is a further die toxins and toxin for all of our land and we would like for it to be cleaned up as soon as possible. As the taxpayer in this state let alone in this community as Oregon, I would like for somebody to send in at least take all of these toxins away off of this land. Thank you.
186	*[Transcription from audio file:]* [Speaker: Unidentifed] Wednesday the 26th of August. [Speaker: Brian Thompson] My name is Brian Thompson. I'm a St. John's resident here in Portland Oregon, on the Northside, Cathedral Park section. I think it's up to each of us individually that we have a responsibility from the time we arrive here to time to leave this earth, to take care of Mother Earth. Mother Earth is not like our typical mothers or paternal mothers where we are born to that. She inherit us and it is up to us as if we were her own flesh and blood. By blood by blood, to take care of her, to honor her, to cherish her, to listen to her, even if you don't know how to do that. It's about really listening to and being still and listening to the things around you. The wind, air, the birds will talk to you but at the same time Father Sky watches over Mother Earth and the rivers and a lot of times is that, it's like we are all like one. We are one nation, one people and it is up to each of us to know how to take care of each other but also take care of our rivers and make sure that our rivers are essential for travel but also clean for generations and generations of future children that come up. So it's up to us to take care of her and to take care of our rivers and make sure that when Mother's sick, we need to be at the make sure you take care of her, just like she takes her us in the flesh until we get better. Sometimes it takes a while but long story short on this is that it is up to each and every single one of us that are living, breathing right now to look out for the quality of our rivers, our streams, our natural habitats. [Speaker: Unidentifed] What do you think should happen at Willamette Cove? [Speaker: Brian Thompson] I think it needs… it should be held off. If nothing, it should be held off. I think we have a duty to meet her right and meet that challenge head-on when it's face to us and our best leadership comes from our ability to use our hearts and not for my heads but our hearts to tell what to do.
187	*[Transcription from video file:]* Yo pienso que lo que están haciendo ellos es muy bonito para la comunidad y espero que todo mundo apoye porque esto es esencial para todos, no nomás pa' nosotros, sino pa' las generaciones que vienen hacia atrás de nosotros. Estas personas están haciendo una labor muy bonita, muy sociable, y espero que esto llegue a varias personas que nos apoyen en hacer esto, y no a medias, sino como se debe de hacer. Mi nombre es Jesus de Leon y yo estoy a favor de las personas que están haciendo esto. Gracias. Gracias, y, ¿cómo se llama, señor? Jesus de Leon. Okay, gracias. *[Transcription from video file, translated from Spanish into English:]* [Speaker: Jesus de Leon] I think what they are doing is very nice for the community and I hope that everyone supports them because this is crucial for everyone, not only for us, but for the generations to come. These people are doing a very nice and sociable work, and I hope this reaches the ears of other people so they can give their full support, as it should be. My name is Jesus de Leon and I support what these people are doing.

	Thank you. [Speaker: Unidentified] Thank you, and, what is your name, sir? [Speaker: Jesus de Leon] Jesus de Leon. [Speaker: Unidentified] Okay, thank you.

Table 1
Upland Soil Risk Summary
Willamette Cove Upland Site
Portland, Oregon

	COCs Contributing to Upland Risk					
Receptors	Ecological			Human Health		
				Surface Soil		
Parcel	West	Central	East	West	Central	East
Antimony	--	X	--	--	--	--
Arsenic	--	--	--	--	X	--
Chromium	--	--	--	--	--	--
Copper	X	X	--	--	--	--
Lead	X	X	--	--	X	--
Mercury	X	**X**	--	--	--	--
Nickel	--	--	--	--	--	--
Selenium	--	--	--	--	--	--
Zinc	X	X	X	--	--	--
Total HPAH	--	X	--	--	--	--
Total LPAH	--	--	--	--	--	--
BaP Eq	--	--	--	X	**X**	--
Dibenzofuran	--	X	--	--	--	--
Total PCBs	--	--	--	--	--	--
Dioxin/Furan TEQ	**X**	**X**	**X**	**X**	**X**	**X**

Notes:

1. Upland Soil includes all samples located within the site boundary above mean high water
2. Ecological and Human Health - Surface Soil risk applies to soil from 0-3 feet below ground surface.
3. Human Health - Subsurface risk applies to soil from 3-10 feet below ground surface.
4. HPAH = High molecular weight polycyclic aromatic hydrocarbons
5. LPAH - Low molecular weight polycyclic aromatic hydrocarbons
6. PCBs = Polychlorinated biphenyls
7. TEQ = Toxicity equivalent
8. BaP Eq = Benzo(a)pyrene toxicity equivalent
9. COC =Contaminant of Concern
10. X = Bold denotes significant risk driver
11. X = Denotes secondary risk driver
12. = Shading denotes risk driver present above hot spot concentration

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 2
Ecological and Human Health Contaminants of Concern (COCs) in Upland Soil
Willamette Cove Upland Site

Chemical	Ecological				Human Health		
	Plant	Invertebrate	Bird	Mammal	Recreational Trespasser/ Future Park User	Transient Trespasser	Construction Worker
Antimony	X	X	NA	X	X		X
Arsenic	X				X		
Beryllium			NA				
Cadmium							
Chromium	X	X					
Copper	X	X	X	X	X		X
Lead	X	X	X	X	X		
Mercury	X	X	X	X			
Nickel	X	X		X			
Selenium	X						
Silver		NA					
Thallium		NA					
Zinc	X	X		X			
BaP Eq	--	--	--	--	X		
HPAH	NA	X	NA	X	--	--	--
LPAH	NA	X	NA		--	--	--
Dibenzofuran	NA	NA	NA	X			
Diesel[1]							
Total PCBs[2]		NA	X	X	X	X	X
Phthalates[1]							
Dioxins/Furans[3]	NA	NA	X	X	X	X	X

Notes:
Yellow Highlighted Cells indicate COCs new for this receptor, compared to Table 5-1 from Residual Risk Assessment.

PAHs = Polycyclic Aromatic Hydrocarbons
BaPEq = Benzo(a)pyrene Equivalent
HPAH = High molecular weight PAHs
LPAH = Low molecular weight PAHs
TPH = Total Petroleum Hydrocarbons
PCBs = Polychlorinated Hydrocarbons
SVOCs = Semi-volatile Organic Compounds
NA = RBC not available due to lack of TRV.

[1]Diesel range hydrocarbons and phthalates are retained as a COC due to number of samples and detected concentrations, no RBCs are available for comparing to receptor scenarios.

[2]PCBs were not included in post-2014 analyses, but were identfied in the Residual Risk Assessments as a COC for locations that are technically in the Inner Cove Beach EU, but at the boundary with the East Parcel and Central Parcel EUs. PCBs are retained as COCs in this analysis based on this previous analysis.

[3] For birds and mamamals, congener-based RBCs were normalized to 2,3,4,7,8-TCDD Toxicity Equivalents.

Table 3
Human Health Soil Preliminary Remediation Goals and Hot Spot Values
Willamette Cove Upland Site
Portland, Oregon

Chemical of Concern	Receptor Specific RBCs												Human Health	
	Recreational Trespasser/Park User[2]				Transient Trespasser[2,3]				Construction Worker[4]				PRGs	
	Cancer		Non-Cancer		Cancer		Non-Cancer		Cancer		Non-Cancer			
	RBC	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	PRG	Hot Spot
Concentration in mg/kg														
Antimony	nc	nc	24.3	243	nc	nc	98	980	nc	nc	31	310	24.3	243
Arsenic	1.4	140	74	740	29	2,900	370	3,700	15	1,500	97	970	8.8/4.4[5]	140
Copper	nc	nc	11,000	110,000	nc	nc	56,000	560,000	nc	nc	14,000	140,000	11,000	110,000
Lead	nc	nc	400	4,000	nc	nc	800	8,000	nc	nc	800	8,000	400	4,000
BaP Eq	0.55	55	60	600	32	3,200	270	2,700	17	1,700	74	740	0.55	55
Total PCBs	0.74	74	4	40	14	1,400	18	180	8.4	840	4.9	49	0.74	40
Dioxin/Furan TEQ	1.50E-05	1.50E-03	1.70E-04	1.70E-03	3.20E-04	3.20E-02	1.10E-02	1.10E-01	1.70E-04	1.70E-02	2.30E-04	2.30E-03	1.50E-05	1.50E-03

Notes:

RBC = Risk Based Concentration

PRG = Preliminary Remediation Goal

nc = not carcinogenic, so no cancer values calculated

mg/kg = milligrams per kilogram

PCBs = polychlorinated biphenyls

Dioxin/Furan TEQ = 2,3,7,8-TCDD toxicity equivalent

BaP Eq = benzo(a)pyrene equivalents

1. Upland Soil includes all samples located within the site boundary above mean high water
2. Data screened against the Recreational Trespasser/Park User and Transient Trespasser PRGs include samples from the surface to 3 feet below the surface.
3. Due to an error in DEQ's RBDM spreadsheet for calculating site-specific RBCs for non-carcinogens, some of the transient trespasser RBCs were incorrect in the FS report. This table shows the corrected values.
4. Data screened against the Construction Worker PRG includes samples from the surface to ten feet below the surface.
5. The PRG for arsenic is based on the background soil 90 percent upper prediction limit (8.8 mg/kg) and the background soil arithmetic mean (4.4 mg/kg). The correct comparison of confirmation sample data to background will depend on the method used to collect the soil samples.

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 4
Human Health Surface Soil Screening (0-3 feet bgs)
Willamette Cove Upland Site
Portland, Oregon

Chemical of Concern	Human Health Screening Levels (mg/kg)				Total Number of Samples				Highest Concentration Sample[6]			
	Discrete/ Composite		ISM		Analyzed	Above MDL	Above PRG	Above Hot Spot	Sample Name	Sample Type	Result (mg/kg)	ER
	PRG	Hot Spot	PRG	Hot Spot								
West Parcel												
Antimony	24.3	243	24.3	243	3	0	0	0	--	--	--	--
Arsenic	8.8	140	4.4	140	10	10	2	0	RA1 S4	Composite	8.92	1.01
Copper	11,000	110,000	11,000	110,000	10	10	0	0	DU-7	ISM	102	0.0
Lead	400	4,000	400	4,000	10	10	0	0	RA1 S4	Composite	48.9	0.1
BaP Eq	0.55	55	0.55	55	8	8	2	0	TP-21/S-2	Discrete	1.3	2.3
Total PCBs	0.74	40	0.74	40	2	1	0	0	WC-SSA	Discrete	0.111	0.2
Dixoin/Furan TEQ	0.000015	0.0015	0.000015	0.0015	1	1	1	0	DU-7	ISM	0.000103	6.9
Central Parcel												
Antimony	24.3	243	24.3	243	123	47	1	0	WC-SSV-1-1	Discrete	29.9	1.2
Arsenic	8.8	140	4.4	140	133	133	26	0	SS-19	Discrete	40.3	4.6
Copper	11000	110000	11000	110000	144	144	0	0	WC-SSP-1-1	Discrete	5440	0.5
Lead	400	4000	400	4000	146	146	21	1	WC-SSS-2b	Discrete	4040	10.1
BaP Eq	0.55	55	0.55	55	54	52	29	1	TP-22/S-1	Discrete	63.6	116
Total PCBs	0.74	40	0.74	40	21	2	0	0	WC-SSH-D	Discrete	0.21	0.3
Dixoin/Furan TEQ	0.000015	0.0015	0.000015	0.0015	54	54	41	2	WC-3 Surface	Discrete	0.0057	380
East Parcel												
Antimony	24.3	243	24.3	243	24	19	4	0	WC-SSL-1-2	Discrete	192	7.9
Arsenic	8.8	140	4.4	140	28	27	10	0	WC-SSL-1-2	Discrete	36.2	4.1
Copper	11000	110000	11000	110000	28	28	2	0	WC-SSL-1-2	Discrete	47500	4.3
Lead	400	4000	400	4000	26	26	6	0	WC-SSL-1-2	Discrete	3090	7.7
BaP Eq	0.55	55	0.55	55	20	20	2	0	WC-SSL-1-1	Discrete	0.89	1.6
Total PCBs	0.74	40	0.74	40	20	7	3	0	WC-SSH-3	Discrete	1.85	2.5
Dixoin/Furan TEQ	0.000015	0.0015	0.000015	0.0015	1	1	1	0	DU-4	ISM	0.0000612	4.1

Notes:

1. mg/kg = milligrams per kilogram
2. ISM = Incremental Sampling Methodology
3. PRG = Preliminary Remediation Goal
4. MDL = Method detection limit
5. ER = Exceedance Ratio
6. For analytes that have a lower PRG for ISM samples, this sample may not be the highest absolute concentration, but the highest concentraion of samples that exceed PRGs.
7. PCBs = polychlorinated biphenyls
8. Dioxin/Furan TEQ = 2,3,7,8-TCDD toxicity equivalent
9. BaP Eq = Benzo(a)pyrene Toxicity Equivalent
10. Upland Soil includes all samples located within the site boundary above mean high water
11. bgs = below ground surface

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 5
Human Health Subsurface Soil Screening (3-10 feet bgs)
Willamette Cove Upland Site
Portland, Oregon

Chemical of Concern	Construction Worker RBC[5] (mg/kg)		Total Number of Samples				Highest Concentration Sample			
	Discrete/ Composite		Analyzed	Above MDL	Above RBC	Above Hot Spot	Sample Name	Sample Type	Result (mg/kg)	ER
	RBC	Hot Spot								
West Parcel										
Antimony	31	310	0	0	0	0	--	--	--	--
Copper	14,000	140,000	0	0	0	0	--	--	--	--
Total PCBs	4.9	49	3	0	0	0	--	--	--	--
Dixoin/Furan TEQ	0.00017	0.0023	0	0	0	0	--	--	--	--
Central Parcel										
Antimony	31	310	2	0	0	0	--	--	--	--
Copper	14,000	140,000	2	2	0	0	RA3-D-B1	Composite	64.8	0.005
Total PCBs	4.9	49	0	0	0	0	--	--	--	--
Dixoin/Furan TEQ	0.00017	0.0023	2	2	0	0	RA3-D-B1	Composite	0.000144	0.6
East Parcel										
Antimony	31	310	0	0	0	0	--	--	--	--
Copper	14,000	140,000	0	0	0	0	--	--	--	--
Total PCBs	4.9	49	0	0	0	0	--	--	--	--
Dixoin/Furan TEQ	0.00017	0.0023	0	0	0	0	--	--	--	--

Notes:

1. RBC = Risk Based Concentration
2. mg/kg = milligrams per kilogram
3. MDL = Method detection limit
4. ER = Exceedance Ratio
5. Screening levels are the lowest of the cancer and non-cancer RBC
6. PCBs = polychlorinated biphenyls
7. Dioxin/Furan TEQ = 2,3,7,8-TCDD toxicity equivalent
8. Upland Soil includes all samples located within the site boundary above mean high water
9. bgs = below ground surface

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 6
Upland Soil Preliminary Remediation Goals and Oregon High Concentration Hot Spot Values – Ecological Receptors
Willamette Cove Upland
Portland, Oregon

Chemical of Concern	Receptor Specific Screening Levels and RBCs								Ecological PRGs			
	Plant		Invertebrate		Birds		Mammal		Sample Type			
									Discrete/Composite		ISM	
	Screening Level	Hot Spot	Screening Level	Hot Spot	RBC	Hot Spot	RBC	Hot Spot	PRG	Hot Spot	PRG	Hot Spot
Concentration in mg/kg												
Antimony	5	50	78	780	NA	NA	2.7	27	2.7	27	2.7	27
Arsenic	18	180	NA	NA	575	5750	83	830	18	180	18	180
Chromium	1	10	0.4	4	87	870	342	3420	76	76	39	39
Copper	70	700	80	800	87.7	877	82	820	70	700	70	700
Lead	120	1,200	1,700	17,000	33	330	122	1,220	79	330	33	330
Mercury	0.3	3	0.1	1	0.015	0.15	3.53	35.3	0.23	0.23	0.073	0.15
Nickel	38	380	280	2800	139	1390	20	200	47	200	23	200
Selenium	0.52	5.2	4.1	41	3.42	34.2	1.1	11	0.71	5.2	0.52	5.2
Zinc	160	1,600	120	1,200	673	6730	201	2010	180	1,200	120	1,200
Total HPAH	NA	NA	18	180	NA	NA	5.6	56	5.6	56	5.6	56
Total LPAH	NA	NA	29	290	NA	NA	100	1000	29	290	29	290
Dibenzofuran	NA	NA	NA	NA	NA	NA	0.01	0.10	0.01	0.1	0.01	0.1
Total PCBs	40	400	NA	NA	0.734	7.34	0.098	0.98	0.098	0.98	0.098	0.98
Dioxin/Furan TEQ	NA	NA	NA	NA	8.90E-05	8.90E-04	6.10E-06	6.10E-05	6.10E-06	6.10E-05	6.10E-06	6.10E-05

Notes:

NA = RBC Not Available

1. RBC = Risk Based Concentration
2. PRG = Preliminary Remediation Goal
3. ISM = Incremental Sampling Methodology
4. mg/kg = milligrams per kilogram
5. HPAH = high molecularl weight polycyclic aromatic hydrocarbons
6. LPAH = low molecular weight polycyclic aromatic hydrocarbons
7. PCBs = polychlorinated biphenyls
8. Dioxin/Furan TEQ = 2,3,7,8-TCDD toxicity equivalent
8. Upland Soil includes all samples located within the site boundary above mean high water
9. Data screened against ecological screening levels includes samples from the surface to three feet below the surface.

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 7
Ecological Soil Screening Summary
Willamette Cove Upland Site
Portland, Oregon

Chemical of Concern	Ecological Screening Levels (mg/kg)				Total Number of Samples				Highest Concentration Sample[6]			
	Discrete/ Composite		ISM		Analyzed	Above MDL	Above PRG	Above Hot Spot	Sample Name	Sample Type	Result (mg/kg)	ER
	PRG	Hot Spot	PRG	Hot Spot								
West Parcel												
Antimony	2.7	27	2.7	27	3	0	0	0	--	--	--	--
Arsenic	18	180	18	180	10	10	0	0	RA1 S4	Composite	8.92	0.5
Chromium	76	76	39	39	4	4	0	0	B-1/S-2	Discrete	20.6	0.3
Copper	70	700	70	700	10	10	1	0	DU-7	ISM	102.0	1.5
Lead	79	330	33	330	10	10	1	0	DU-7	ISM	43.00	1.3
Mercury	0.23	0.23	0.073	0.15	18	3	2	2	DU-7	ISM	0.359	4.9
Nickel	47	200	23	200	4	4	0	0	B-2/S-1	Discrete	19.7	0.4
Selenium	0.71	5.2	0.52	5.2	3	0	0	0	--	--	--	--
Zinc	180	1200	120	1200	10	10	1	0	DU-7	ISM	151	1.3
Total HPAH	5.6	56	5.6	56	8	8	1	0	TP-21/S-2	Discrete	6.351	1.1
Total LPAH	29	290	29	290	8	7	0	0	TP-21/S-2	Discrete	0.754	0.03
Dibenzofuran	0.01	0.1	0.01	0.1	1	0	0	0	--	--	--	--
Total PCBs	0.098	0.98	0.098	0.98	2	1	1	0	WC-SSA	Discrete	0.111	1.1
Dixoin/Furan TEQ	0.0000061	0.000061	0.0000061	0.000061	1	1	1	1	DU-7	ISM	0.000103	17
Central Parcel												
Antimony	2.7	27	2.7	27	116	42	18	1	WC-SSV-1-1	Discrete	29.9	11
Arsenic	18	180	18	180	126	126	5	0	SS-19	Discrete	40.3	2.2
Chromium	76	76	39	39	125	125	0	0	SS-19	Discrete	68.6	0.9
Copper	70	700	70	700	137	137	55	7	WC-SSP-1-1	Discrete	5,440	78
Lead	79	330	33	330	139	139	87	30	WC-SSS-2b	Discrete	4,040	51
Mercury	0.23	0.23	0.073	0.15	171	153	127	127	Area-3-15	Discrete	26.6	116
Nickel	47	200	23	200	125	125	9	0	WC-SSV-1-2	Discrete	144	3.1
Selenium	0.71	5.2	0.52	5.2	116	16	12	0	WC-SSV-1-1	Discrete	1.8	2.5
Zinc	180	1200	120	1200	130	130	58	1	WC-SSS-2b	Discrete	1,460	8.1
Total HPAH	5.6	56	5.6	56	54	52	25	5	TP-22/S-1	Discrete	324.43	58
Total LPAH	29	290	29	290	54	50	2	0	TP-22/S-1	Discrete	45.78	1.6
Dibenzofuran	0.01	0.1	0.01	0.1	9	6	6	1	RA2-S9	Composite	0.583	58
Total PCBs	0.098	0.98	0.098	0.98	21	2	2	0	WC-SSH-D	Discrete	0.21	2.1
Dixoin/Furan TEQ	0.0000061	0.000061	0.0000061	0.000061	54	54	49	23	WC-3 Surface	Discrete	0.0057	934

Please see notes at end of table.

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 7
Ecological Soil Screening Summary
Willamette Cove Upland Site
Portland, Oregon

Chemical of Concern	Ecological Screening Levels (mg/kg)				Total Number of Samples				Highest Concentration Sample[6]			
	Discrete/ Composite		ISM		Analyzed	Above MDL	Above PRG	Above Hot Spot	Sample Name	Sample Type	Result (mg/kg)	ER
	PRG	Hot Spot	PRG	Hot Spot								
East Parcel												
Antimony	2.7	27	2.7	27	24	19	12	3	WC-SSL-1-2	Discrete	192	71
Arsenic	18	180	18	180	28	27	2	0	WC-SSL-1-2	Discrete	36.2	2.0
Chromium	76	76	39	39	27	27	1	1	WC-SSL-1-2	Discrete	145	1.9
Copper	70	700	70	700	28	28	12	3	WC-SSL-1-2	Discrete	47,500	679
Lead	79	330	33	330	26	26	15	8	WC-SSL-1-2	Discrete	3,090	39
Mercury	0.23	0.23	0.073	0.15	26	20	3	3	RA6-S17	Composite	3.48	15
Nickel	47	200	23	200	25	25	7	1	WC-SSL-1-2	Discrete	306	6.5
Selenium	0.71	5.2	0.52	5.2	23	11	4	0	WC-SSO Composite	Composite	1.3	1.8
Zinc	180	1200	120	1200	28	28	19	2	WC-SSL-1-2	Discrete	1810	10
Total HPAH	5.6	56	5.6	56	20	20	0	0	WC-SSL-1-1	Discrete	5.58	1.0
Total LPAH	29	290	29	290	20	17	0	0	WC-SSL-1-1	Discrete	1.9976	0.1
Dibenzofuran	0.01	0.1	0.01	0.1	1	0	0	0	--	--	--	--
Total PCBs	0.098	0.98	0.098	0.98	20	7	5	2	WC-SSH-3	Discrete	1.85	19
Dixoin/Furan TEQ	0.0000061	0.000061	0.0000061	0.000061	1	1	1	1	DU-4	ISM	0.0000612	10

Notes:

1. mg/kg = milligrams per kilogram
2. ISM = Incremental Sampling Methodology
3. PRG = Preliminary Remediation Goal
4. MDL = Method detection limit
5. ER = Exceedance Ratio
6. For analytes that have a lower PRG for ISM samples, this sample may not be the highest absolute concentration, but the highest concentraion of samples that exceed PRGs.
7. HPAH = high moleculari weight polycyclic aromatic hydrocarbons
8. LPAH = low molecular weight polycyclic aromatic hydrocarbons
9. PCBs = polychlorinated biphenyls
10. Dioxin/Furan TEQ = 2,3,7,8-TCDD toxicity equivalent
11. Upland Soil includes all samples located within the site boundary above mean high water
12. Data screened against ecological screening levels includes samples from the surface to three feet below the surface.

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 8
Summary of Impacted Areas and Volumes - Upland Soil
Willamette Cove Upland
Portland, Oregon

Remedial Action Extent		West Parcel	Central Parcel		East Parcel	Total
			West End	East End		
Exceeding PRGs						
Ecological and Human Health	Depth (ft)	2	3	1	1	--
	Area (sf)	187,720	162,040	184,760	255,950	790,470
	Volume (cy)	13,910	18,000	6,840	9,480	48,230
Human Health	Depth (ft)	1.5	2	0.5	0.5	--
	Area (sf)	187,720	162,040	184,760	255,950	790,470
	Volume (cy)	10,430	12,000	3,420	4,740	30,590
Exceeding Hot Spot Levels						
Ecological	Depth (ft)	1	1	1	1	--
	Area (sf)	187,720	162,040	184,760	255,950	790,470
	Volume (cy)	6,950	6,000	6,840	9,480	29,270
Human Health	Depth (ft)	0.5	0.5	0.5	0.5	--
	Area (sf)	0	0	0	0	0
	Volume (cy)	0	0	0	0	0
Exceeding Non-Dioxin/Furan Hot Spot Levels						
Ecological	Depth (ft)	1	1	1	1	--
	Area (sf)	18,770	55,750	36,950	0	111,470
	Volume (cy)	700	2,060	1,370	0	4,130
Human Health	Depth (ft)	0.5	0.5	0.5	0.5	--
	Area (sf)	0	800	0	0	800
	Volume (cy)	0	10	0	0	10

Notes:

1. PRGs = preliminary remediation goals
2. ft = feet below ground surface
3. sf = square feet
4. cy = cubic yards
5. Within the 2015 soil removal action areas, depth exceeding PRGs is assumed to be that listed in the table minus 2015 excavation dept
6. The areas listed include the site from top of bank
7. The volume listed is for alternatives using standard excavation techniques. Alternatives using low impact excavation around native trees will have smaller volumes due to the exceptions listed above.
8. All quantities are from the top of bank inland towards the property boundary.

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 9
General Response Actions and Applicable Technologies
Willamette Cove Upland Site
Portland, Oregon

General Response Actions	Applicable Technologies	Description	Is Technology Applicalbe Based on Site Characteristics, Soil Condition, and Contaminant Type?
No Action	No Action	• No Action	Yes
Institutional Controls	Deed Restrictions/Soil Management Plan	• Can prevent disturbance of any required soil cap or other engineering controls, address notification of Site hazards, and ensure proper controls are implemented during future Site activities. • Protocols must be established for handling and managing contaminated soils during future site work to protect workers, public health, and the environment.	Yes
	Monitoring	• Laboratory analysis of soil samples.	Yes
Engineering Controls	Access Restrictions	• Use of fencing, signage, or other controls to limit access to impacted soils.	Yes
	Control of Building HVAC System	• Use HVAC system to maintain positive pressure in buildings. • Effective for removal of volatile organic contaminants.	No - No buildings on site.
	Vapor Barriers	• Installation of low-permeability barriers beneath structures to prevent vapor intrusion of sealants on floor slabs or paved surfaces. • Effective for control of volatile organic contaminants.	No - No buildings on site.
	Sub-Slab Depressurization or Sub-Floor Venting	• Installation of sub-slab venting systems or suction pits to create negative pressures beneath structures to prevent vapor migration to ambient air. Vapors are collected in the suction pit or venting pipes below the building and vented to the outside of the building, either passively or with fans. • Effective for removal of volatile organic contaminants.	No - No buildings on site.
Containment	Capping	• Installation of an engineered cap (e.g., soil, asphalt, impermeable liner) over impacted soils. Soil caps may include various amendments (e.g., organic matter) to reduce bioavailability of contaminants. • Effective for all types of contaminants	Yes
Removal And Disposal	Excavation	• Excavation of some or all of the contaminated soil for subsequent treatment and/or disposal. • Effective for all types of contaminants	Yes
	Off-site Disposal	• Off-site disposal of excavated soil at permitted disposal facility. Soils would require waste profiling and approval by the disposal facility. • Effective for all types of contaminants	Yes
	On-Site Consolidation	• Consolidate excavated soil in an on-site, capped disposal area. • Effective for all types of contaminants	Yes
In Situ Biological Treatment	Bioventing	• Bioventing involves inducing air or oxygen flow in the unsaturated zone to promote biodegradation of hydrocarbons and VOCs. Applications include injection of air or oxygen into subsurface, or extraction of air at rates lower than for SVE. • Effective organics and volatile contaminants. Not effective with inorganic contaminants.	No - not effective for all site contaminant types.
	Enhanced Bioremediation (Bioaugmentation, Biostimulation)	• Adding nutrients, electron donor/acceptor, or other amendments to enhance bioremediation. • Most effective with organic contaminants, but can be used to change oxidative state of inorganics. • Can be difficult to achieve contact with all contaminant mass, particularly in unsaturated soils.	No - not effective for unsaturated soils.
	Land Treatment	• Combination of aeration (tilling) and amendments to enhance bioremediation in surface soils. • Effective for organic contaminants in shallow soil that can be degraded aerobically. Not effective for deeper contamination or inorganics.	No - not effective for all site contaminant types.
	Monitored Natural Attenuation	• Using natural processes to reduce contaminant concentrations to acceptable levels. Process is closely monitored to verify exposures are acceptable prior to concentrations reaching acceptable levels. • Most effective with organic contaminants, but natural processes can change oxidative state of inorganics.	Yes
	Phytoremediation	• Phytoremediation is a process that uses plants to remove, transfer, stabilize, and destroy contaminants in soil or sediment. • Can be effective at removing a variety of organic and inorganic compounds from soil through plant uptake in vicinity of roots (rhizosphere).	Yes

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 9
General Response Actions and Applicable Technologies
Willamette Cove Upland Site
Portland, Oregon

General Response Actions	Applicable Technologies	Description	Is Technology Applicalbe Based on Site Characteristics, Soil Condition, and Contaminant Type?
In Situ Physical/ Chemical/ Thermal Treatment	Soil Vapor Extraction (SVE)	• SVE involves extraction of vapors from the vadose zone using system of vertical wells or horizontal vents and vacuum pumps/blowers. Treatment of the discharge may be required. • Effective for organic volatile contanminants.	No - not effective for all site contaminant types.
	Electrokinetic Separation	• Application of a low-intensity direct current through the soil between electrodes that are divided into a cathode array and an anode array. This mobilizes charged species, causing ions and water to move toward the electrodes. • Effective for removing inorganic ions and polar organics from saturated soil. • Most effective in low-permeability soils (particularly clays). Not effective for vadose zone soil without supplemental saturation.	No - not effective for all site contaminant types or unsaturated soils.
	Fracturing	• Development of cracks in low-permeability or overconsolidated soils to create passageways that increase the effectiveness of other *in situ* processes and extraction technologies. • Effective in in deep, fine-grained or consolidated soils.	No - not effective in shallow unconsolidated soils.
	Chemical Oxidation	• Chemically converts hazardous contaminants to less toxic compounds. Effective in destroying organic contaminants and oxidizing inorganic contaminants to less toxic/less mobile forms. Can include oxidant chemicals such as peroxides, permanganates, or ozone • Can be highly effective at destruction of organic contaminants or oxidation of inorganics. • Can be difficult to achieve contact with all contaminant mass, particularly in unsaturated soils.	No - not effective in unsaturated soils.
	Soil Flushing	• Water (or water containing an additive to enhance contaminant solubility) is circulated through the soil to desorb contaminants, recovered, and treated. Implementation can involve injection followed by removal (such as via vacuum truck). • May be effective for soluble inorganics. • Most effective for deep or saturated soils. • Requires significant power and infrastructure for water extraction and treatment.	No - not effective for all contaminant types or unsaturated soils and site does not have ready access to necessary infrastructure.
	Solidification/Stabilization/ Vitrification/Immobilizatioin	• Contaminants are physically bound or enclosed within a stabilized mass (solidification and vitrification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization), or additives are uses to to reduce mobility or bioavailability of contaminants (immobilization). Could be directly applied/mixed with soil or applied as part of an active capping approach. • Effective in shallow unconsolidated soils. • Effective on many contaminant types.	Yes
	Thermally-Enhanced Removal	• High-energy injection (steam/hot air, electrical resistance, electromagnetic, fiber optic, radio frequency) is used to increase the recovery rate of semi-volatile or non-volatile compounds to facilitate extraction (enhanced volatilization or decreased viscosity). Coupled with a • Most suitable to semi-volatile organic contaminants or viscous compounds that are not otherwise extractable with vapor extraction or fluid extraction technologies. Not effective with inorganics. • Requires significant infrastructure for power and material application.	No - not effective for all contaminants and site does not have ready access to necessary infrastructure.
Ex Situ Biological Treatment	Biopiles	• Excavated soils are mixed with soil amendments and placed in aboveground enclosures and aerated with blowers or vacuum pumps. • Effective for removal of organic contaminants from excavated soil. Not be effective for inorganics.	No - not effective for all site contaminant types.
	Composting	• Excavated soil is mixed with bulking agents and organic amendments to promote microbial activity. • Effective for removal of organic contaminants from excavated soil. Would not be effective for inorganics	No - not effective for all site contaminant types.
	Landfarming	• Excavated soil is placed in lined beds and periodically tilled to aerate the soil. • Effective for removal of organic contaminants from excavated soil. Would not be effective for inorganics	No - not effective for all site contaminant types.
	Slurry Phase Biological Treatment	• An aqueous slurry of soil, sediment, or sludge with water and other additives is mixed to keep solids suspended and microorganisms in contact with the soil contaminants. When complete, the slurry is dewatered and the soil is disposed of. • Effective for removal of organic contaminants from excavated soil. Would not be effective for inorganics	No - not effective for all site contaminant types.

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 9
General Response Actions and Applicable Technologies
Willamette Cove Upland Site
Portland, Oregon

General Response Actions	Applicable Technologies	Description	Is Technology Applicalbe Based on Site Characteristics, Soil Condition, and Contaminant Type?
Ex Situ Physical/ Chemical/ Thermal Treatment	Chemical Extraction	• Excavated soil is mixed with an extractant, which dissolves the contaminants. The resultant solution is placed in a separator to remove the contaminant/extractant mixture for treatment. • Can be difficult to achieve contact with all contaminant mass, particularly in unsaturated soils. • Most suitable to removal of semi-volatile and inorganic contamination from excavated soil.	No - not effective for all site contaminant types or unsaturated soils.
	Solidification/ Stabilization	• Contaminants are physically bound or enclosed within a stabilized mass (solidification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization).	Yes
	Dehalogenation	• Reagents are added to soils contaminated with halogenated organics to remove halogen molecules. • Effective at detoxifying halogenated organic compounds in excavated soil. Not applicable to inorganics or non-halogenated compounds.	No - not effective for all site contaminant types.
	Incineration	• High temperatures are used to combust (in the presence of oxygen) organic constituents in hazardous wastes. • Effective at removing organic contaminants from excavated soil. Not applicable to inorganics (though can change the oxidative state).	No - not effective for all site contaminant types.
	Soil Washing	• Contaminants are separated from the excavated soil with wash-water augmented with additives to help remove organics. • Most suitable to removal of semi-volatile and inorganic contamination from excavated soil.	No - not effective for all site contaminant types.
	Solar Detoxification	• Contaminants are destroyed by photochemical and thermal reactions using ultraviolet energy in sunlight or artificial UV light. Usually involves application of catalyst agent. • Can be effective at treating a variety of organic compounds. Not applicable to inorganics.	No - not effective for all site contaminant types.
	Thermal Desorption/ Pyrolysis/ Hot Gas Decontamination	• Waste soils are heated to either volatilize (desorption and hot gas) or to anaerobically decompose (pyrolysis) organic contaminants. Off-gas is collected and treated. Effective at removing organic materials from excavated soil (particularly volatile organics). • Pyrolysis generally used for semi-volatiles or pesticide wastes. Not effective for inorganics.	No - not effective for all site contaminant types.
	Separation	• Separation techniques concentrate contaminated solids through physical, magnetic, and/or chemical means. These processes remove solid-phase contaminants from the soil matrix. • Can be effective at treating a variety of compounds.	Yes

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 10
Screening and Evaluation of Technologies
Willamette Cove Upland Site
Portland, Oregon

General Response Action/Technology	Description	Screening Criteria			Screening Comments
		Effectiveness	Implementability	Cost	
No Action					
No Action	No Action	Not effective in achieving RAOs.	Easy to implement.	No capital or O&M costs incurred.	Does not meet threshold criteria. Required to be included for comparison purposes.
Institutional Controls					
Deed Restrictions/ Soil Management Plan	Can prevent disturbance of any required soil cap or other engineering controls, address notification of Site hazards, and ensure proper controls are implemented during future Site activities. Protocols will be established for handling and managing contaminated soils during future Site work to protect workers, public health, and the environment.	Effective at regulating human direct contact, but is not effective at preventing erosion or ecological exposures, and does not address contaminant reduction. Soil management plan useful for addressing future interaction with impacted soils.	Deed restriction reasonably easy to complete. Soil management plan would need to be prepared and maintained in perpetuity.	Low costs associated with implementing soil management plan and deed restrictions.	Institutional controls are useful technologies to address risks during cleanup and to address residuals remaining after primary cleanup. Would be necessary for alternatives that maintain impacted soil on-site (such as capping). Generally only applicable to human receptors.
Monitoring	Laboratory analysis of soil samples.	Effective for documenting Site conditions to evaluate migration and current Site risks. Does not address contaminant reduction.	Moderately easy to implement. Repeat sampling events may be necessary for tracking progress of active treatment technologies, which would require multiple mobilizations.	Low to moderate costs for monitoring.	Applicable to document Site conditions and effectiveness of any treatment. Must be used in conjunction with other technologies. Would include regular inspections of implemented technology (such as capping) and erosion control.
Engineering Controls					
Access Restrictions	Use of fencing, signage, or other controls to limit access to impacted soils.	Effective at preventing human direct contact exposure to shallow impacted soil. Not effective at preventing erosion or ecological exposures.	Reasonably easy to implement for shallow soils. Would restrict use of property, but probably consistent with future site use. Access restrictions to site have been difficult for site in past.	Possible high short-term costs for implementing site access restrictions, but not anticipated to have long term high costs.	Applicable especially in interim prior to park development. Addresses only human receptors, therefore must be used in conjunction with other technologies. Effectiveness of site access restrictions would need to be demonstrated prior to implementation.
Containment					
Capping	Installation of an engineered cap (e.g., soil, asphalt, impermeable liner) over impacted soils. Soil caps may include various amendments (e.g., organic matter) to reduce bioavailability of contaminants. Armoring and/or vegetation can be used as a method of preventing erosion.	Effective at preventing direct contact with contaminated soils. Amendments can reduce uptake for contaminants. Does not address contaminant reduction but engineered cap can prevent erosion. Cap design can also be compatible with expected future site use.	Site is unimproved and installation of a cap would be reasonably easy. However, cap installation could eliminate existing habitat. Cap would need to be maintained in perpetuity. Cap design could be incorporated into land use design for anticipated future use.	Moderate to high construction cost for installation of cap. Low to moderate costs for ongoing maintenance of cap to maintain effectiveness.	Potentially applicable to the site to prevent direct contact. Thin caps with soil amendments applicable to reducing bioavailability. Specific technology used would have to be compatible with future expected use (e.g., expansive asphalt concrete cap is not applicable, but a soil cap with strategically placed paved trails may be).
Removal And Disposal					
Excavation	Excavation of some or all of the contaminated soil for subsequent treatment and/or disposal. Focused excavation may include only higher concentrations or "hot spot" soil. Site restoration could include backfill with treated soil, imported soil, or re-grading surface soil.	Effective for removing source material from site or consolidating soil under an on-site cap. Addresses direct exposure pathways and migration by reducing or controlling on-site contaminant mass.	Implementation involves conventional construction equipment and methods. Integration into land use plan would be feasible. Depending on extent of excavation, may eliminate existing habitat.	Moderate to high costs due to required soil volumes.	Applicable to the site.
Off-site Disposal	Off-site disposal of excavated soil at permitted disposal facility. Soils would require waste profiling and approval by the disposal facility.	Effective for containing contaminated soils and reducing risks associated with direct exposure.	Implementation involves transportation of contaminated soils. Non-soil wastes (rock and debris) may be separable to reduce disposal volume.	Moderate to high costs depending upon soil volumes and characterization.	Applicable to the site.
On-Site Consolidation	Consolidate excavated soil in an on-site, capped disposal area such as a berm along the rail line to reduce noise.	Effective by consolidating on-site soil in a controlled area to prevent exposure. Because the primary concern is direct contact, a soil cap would be effective.	Implementation involves conventional construction equipment and methods. Integration into land use plan would be feasible. Depending on extent of excavation, may eliminate existing habitat.	Moderate to high costs depending upon soil volumes.	Applicable to the site.

Please Refer To Notes At End Of Table.

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 10
Screening and Evaluation of Technologies
Willamette Cove Upland Site
Portland, Oregon

General Response Action/Technology	Description	Screening Criteria			Screening Comments
		Effectiveness	Implementability	Cost	
In Situ Biological Treatment					
Monitored Natural Attenuation	Using natural processes to reduce contaminant concentrations to acceptable levels. Process is closely monitored to verify exposures are acceptable prior to concentrations reaching acceptable levels.	Most effective with organic contaminants, but natural processes can change oxidative state of inorganics. Likely unable to effect change in unsaturated soils.	Easy to implement. Monitoring of unsaturated soil would require repeated intrusive sampling events. Implementation would likely be ineffective.	Moderate costs for monitoring.	Not retained because ineffective with Site contaminants and conditions (i.e., shallow unsaturated soil).
Phytoremediation	Phytoremediation is a process that uses plants to remove, transfer, stabilize, and destroy contaminants in soil or sediment.	Can be effective at removing a variety of organic and inorganic compounds from soil through plant uptake in vicinity of roots (rhizosphere).	Requires significant land area suitable for large plants. Contamination must be accessible to plant root zones. Likely not compatible with anticipated future site use because required plant management not consistent with natural park.	Low to moderate implementation cost.	Although potentially suitable for some of the Site contaminants of concern, not suitable for long-term intended site use as a park.
In Situ Physical/ Chemical/ Thermal Treatment					
Solidification/Stabilization/ Vitrification/Immobilizatioin	Contaminants are physically bound or enclosed within a stabilized mass (solidification and vitrification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization), or additives are uses to to reduce mobility or bioavailability of contaminants (immobilization). Could be directly applied/mixed with soil or applied as part of an active capping approach.	Potentially suitable to reducing mobility of and accessibility to site contaminants. Difficult to ensure complete enclosure of soil with in-situ process. Reduction of bioavailability of organic contaminants could be effective with use of (for example) carbon addition to soil.	Difficult to obtain full stabilization in-situ in heterogeneous subsurface by injection. Vitrification would require significant power supply. Finished product would not be compatible with anticipated future site use. Incorporation of additives into cap materials relatively simple.	High to very high implementation cost, except that incorporation of additives into cap material relatively inexpensive.	Immobilization to reduce bioavailability retained as potentially useful technology to combine with capping. Other process options not retained because less suitable to Site conditions and high cost.
Ex Situ Physical/ Chemical/ Thermal Treatment					
Solidification/ Stabilization	Contaminants are physically bound or enclosed within a stabilized mass (solidification), or chemical reactions are induced between the stabilizing agent and contaminants to reduce their mobility (stabilization).	Potentially suitable to reduce leaching of contaminants prior to disposal.	Could be used to solidify wet soil or stabilize inorganics if needed for acceptance of excavated soil at the disposal facility. Successfully used on prior removal action at the site.	Low to Moderate implementation cost.	Retained as potentially applicable to soil fraction of excavated soil if stabilization has benefit for disposal.
Separation	Separation techniques concentrate contaminated solids through physical, magnetic, and/or chemical means. These processes remove solid-phase contaminants from the soil matrix.	Effective for removal of solids with distinct physical characteristics (size, composition, etc.).	Commercial equipment available for separation by size (sieving) or for removing iron (magnetic removal).	Low to moderate cost.	May be potentially applicable for removal of rock fraction and debris from excavated soil prior to offsite disposal (reducing disposal volume). Not expected to directly separate contaminants.

Note:

1. **Shading indicates technology has been eliminated from consideration.**

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 11
Summary of Remedial Alternatives
Willamette Cove Upland
Portland, Oregon

Alternative	Description	High Concentration Soil			Soil Above Human Health Risk Levels			Soil Above Ecological Risk Levels			Native Trees Retained	Institutional Controls
		Remove	Consolidate	Cap	Remove	Consolidate	Cap	Remove	Consolidate	Cap		
Alternative 1 - No Action												
1 No Action	▪ No action will be taken.											
Alternative 2 - Cap												
2a Standard Cap	▪ A two-foot soil cap will be placed across the Site. ▪ All trees will be removed.			✓			✓			✓		✓
2b Amended Cap	▪ A one-foot cap amended with organic matter will be placed across the Site. ▪ Native trees will be retained.			✓			✓			✓	✓	✓
Alternative 3 - Excavation												
3a Standard Excavation with Off-Site Disposal	▪ Standard excavation will be used to remove all soil with concentrations above human health and ecological risk levels. ▪ Soil will be disposed of in an off-Site landfill. ▪ All trees will be removed.	✓			✓			✓				
3b Alternative Excavation with Off-Site Disposal	▪ Alternative excavation will be used to remove soil with concentrations above human health and ecological risk levels. ▪ Soil will be disposed of in an off-Site landfill. ▪ Native trees will be retained.	✓			✓			✓			✓	
3c Standard Excavation with On-Site Consolidation	▪ Standard excavation will be used to remove all soil with concentrations above human health and ecological risk levels. ▪ Soil will be placed in an on-Site consolidation area. The soil consolidation area will be capped with two-feet of soil. ▪ All trees will be removed.		✓			✓			✓			✓
3d Standard Excavation with Off-Site Disposal/On-Site Consolidation	▪ Standard excavation will be used to remove all soil with concentration above human health and ecological risk levels. ▪ Soil with high concentrations will be disposed of in an off-Site landfill. ▪ Remaining soil with concentrations above human health and ecological risk levels will be placed in an on-Site consolidation area. The soil consolidation area will be capped with two-feet of soil. ▪ All trees will be removed.	✓				✓			✓			✓
Alternative 4 - Focused Excavation with Cap												
4a Focused Standard Excavation with Off-Site Disposal and Cap	▪ Standard excavation will be used to remove soil with high concentrations. ▪ Soil with high concentrations will be disposed of in an off-Site landfill. ▪ A two-foot soil cap will be placed across the Site. ▪ All trees will be removed.	✓					✓			✓		✓
4b Focused Alternative Excavation with Off-Site Disposal and Amended Cap	▪ Alternative excavation will be used to remove soil with high concentrations. ▪ Soil with high concentrations will be disposed of in an off-Site landfill. ▪ A one-foot cap amended with organic matter will be placed across the Site. ▪ Native trees will be retained.	✓					✓			✓	✓	✓
4c Focused Alternative Excavation with Off-Site Disposal/On-Site Consolidation and Cap	▪ Alternative excavation will be used to remove soil with high concentrations. ▪ Soil with high concentrations will be disposed of in an off-Site landfill. ▪ Remaining soil with concentrations above human health risk levels will be placed in an on-Site consolidation area. The soil consolidation area will be capped with two-feet of soil. ▪ A one- to two-foot soil cap will be placed across remaining areas with soil concentrations above ecological risk levels. ▪ Native trees will be retained.	✓				✓				✓	✓	✓

Notes:

1. High Concentrations Soil is defined as soil with a dioxin TEQ concentrations above the removal action level and/or soil with concentrations above hot spot levels for analytes other than dioxin/furans.
2. Native Trees are defined as Madrone, big leaf maple, and Oregon white oak with a diameter greater than six inches at breast height.
3. Organic matter will consist of a high concentration carbon material such as activated carbon or biochar with a large surface area for sorption and immobilization of large organic molecules.
4. Standard excavation is defined as excavation with large equipment without the consideration to the size or type of vegetation removed.
5. Alternative excavation is defined as excavation with varying types of equipment and in consultation with an arborist as necessary to protect native trees.
6. Focused excavation is defined as excavation targeting soil above a defined threshold concentration. This can be combined with either standard or alternative excavation techniques.

Table 12
Estimated Cost - Alternative 2a: Standard Cap
Willamette Cove Upland
Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Pre-Construction				
Pre-Design Sampling, Surveying, Work Plan, Design, Permitting, Procurement/Contracting	15 %	$4,950,000	$742,500	Assume 15% of Direct Construction Cost
		Pre-Construction Subtotal	$743,000	
Direct Construction				
Mobilization	10 %	$3,599,644	$359,964	Assume 10% of Direct Construction Cost; includes contractor work plans
Site Prep				
Utility Locating	8 hr	$70 /hr	$560	Unit rate from recent subcontract
Access Road Improvements	1,420 sy	$23.66 /sy	$33,597	4-inch overlay (Means) along N Edgewater Ave
Erosion Control	4,500 lf	$1.07 /foot	$4,815	Means
Construction Entrance	1 LS	$1,500 /each	$1,500	25 x 60 rock construction entrance (per City req's)
Erosion Control Maintenance	5 months	$632 /month	$3,158	10% of Erosion Control and Construction Entrance
Dust Control	90 day	$280 /day	$25,200	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Survey Control	22.4 ac	$2,200 /ac	$49,326	Means
Site Clearing (forested)	10.7 ac	$9,700 /ac	$103,487	Means (cut and chip trees, close-cut stumps)
Site Clearing (unforested)	10.7 ac	$950 /ac	$10,135	Means (shrub/brush mowing)
Cap				
Demarcation Layer	87,830 sy	$2.05 /sy	$180,052	Means
Purchase/Deliver Gravel	0 ton	$22 /ton	$0	Means
Purchase/Deliver Cobbles	0 ton	$30 /ton	$0	Means
Purchase/Deliver Topsoil	93,685 ton	$23 /ton	$2,154,763	Means
Place and Compact	58,553 cy	$6.22 /cy	$364,202	Means
Cover/Topsoil				
Purchase/Deliver Topsoil	0 ton	$23 /ton	$0	Means
Purchase/Deliver Activated Carbon	0 lb	$1.00 /lb	$0	EPA, OSWER 9200.2-128FS, 2013; assume 1% by dry weight to supplement topsoil organics for 25% of area
Apply Amendment	0 lb	$0.25 /lb	$0	Professional judgment; could be direct application or blended
Place and Compact	0 cy	$6.22 /cy	$0	Means
Excavation				
Soil Excavation and Load (standard)	0 cy	$16 /cy	$0	Means
Soil Excavation and Load (alternative)	0 cy	$88 /cy	$0	Means - hand excavation around minor structures, normal soil
Chemical Analyses (TCLP metals)	0 each	$150 /each	$0	1 sample per 1000 tons; Unit rate from lab price list
Waste Profiling Data Package	0 hr	$125 /hr	$0	Soil data compilation and prepare waste profile forms
Transport Off-Site	0 ton	$10 /ton	$0	Means and professional judgement
Transport/Place On-Site	0 cy	$8.73 /cy	$0	Means
Disposal	0 ton	$30 /ton	$0	Quote from Waste Management for Hillsboro Landfill
Confirmation Soil Sampling and Chemical Analyses	0 each	$440 /each	$0	Assume one sample per 100 lineal feet of perimeter and one sample per 5000 sf bottom; analyze for total metals (20% of samples for PAHs and 10% of samples for dioxins and PCBs); Unit rate from lab price list
Site Restoration				
Site Grading	21.3 ac	$2,150 /ac	$45,876	Means
Re-Vegetation (forested)	0.0 ac	$43,500 /ac	$0	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Re-Vegetation (unforested)	21.3 ac	$20,000 /ac	$426,750	Means; hydroseeding, shrubs @ 6' spacing
Temporary Irrigation System	21.3 ac	$6,560 /ac	$139,974	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	$6,250 /month	$56,250	Water truck/driver (Means); purchase water from City
Construction Contingency	25 %	$3,959,608	$989,902	Percent of Direct Construction Cost (Incl. Mob.); From EPA guidance use 25% for cap focused alternatives; 30% for mixed alternatives; and 35% for excavation focused alternatives; includes both scope and bid contingency
		Direct Construction Subtotal	$4,950,000	
Indirect Construction Costs				
Contractor OH/Bonding/Insurance, Soil Management Plan/Institutional Controls, Construction Management, Engineering, Agency Oversight, Completion Reporting	25 %	$4,950,000	$1,237,500	Assume 25 percent of Direct Construction Cost
		Indirect Construction Subtotal	$1,238,000	
		Capital Cost Subtotal	$6,931,000	
Long-Term Costs (Net Present Value)				Assume net discount rate of 5% for present-worth calculations.
Cap Annual Inspections	30 yr	$5,800 /yr	$89,160	Inspection and report.
Cap Maintenance	30 yr	$26,990 /yr	$564,912	Assume 1% of cap installation cost annually
Plant Inspection and Replacement/Control	5 yr	$21,337 /yr	$99,130	Assume 5% of plant installation cost annually
Indirect Long-Term Costs (Project Management, Agency Oversight, Reporting)	30 yr	$10,826 /yr	$226,582	Assume 20% of Long-Term Costs annually
Contingency	25 %	$979,784	$244,946	Percent of Long-Term Costs; percentage same as construction
		Long-Term Subtotal (Net Present Value)	$1,225,000	
Total		Total	$8,156,000	

Notes:

1. Means - 2017 RS Means Online Cost Estimating

Table 13
Estimated Cost - Alternative 2b: Amended Cap
Willamette Cove Upland
Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Pre-Construction				
Pre-Design Sampling, Surveying, Work Plan, Design, Permitting, Procurement/Contracting	15 %	$3,641,000	$546,150	Assume 15% of Direct Construction Cost
		Pre-Construction Subtotal	$546,000	
Direct Construction				
Mobilization	10 %	$2,647,853	$264,785	Assume 10% of Direct Construction Cost; includes contractor work plans
Site Prep				
Utility Locating	8 hr	$70 /hr	$560	Unit rate from recent subcontract
Access Road Improvements	1,420 sy	$23.66 /sy	$33,597	4-inch overlay (Means) along N Edgewater Ave
Erosion Control	4,500 lf	$1.07 /foot	$4,815	Means
Construction Entrance	1 LS	$1,500 /each	$1,500	25 x 60 rock construction entrance (per City req's)
Erosion Control Maintenance	2 months	$632 /month	$1,263	10% of Erosion Control and Construction Entrance
Dust Control	30 day	$280 /day	$8,400	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Survey Control	22.4 ac	$2,200 /ac	$49,326	Means
Site Clearing (forested)	9.2 ac	$9,700 /ac	$89,641	Means (cut and chip trees, close-cut stumps)
Site Clearing (unforested)	11.8 ac	$950 /ac	$11,222	Means (shrub/brush mowing)
Cap				
Demarcation Layer	0 sy	$2.05 /sy	$0	Means
Purchase/Deliver Gravel	0 ton	$22 /ton	$0	Means
Purchase/Deliver Cobbles	0 ton	$30 /ton	$0	Means
Purchase/Deliver Topsoil	0 ton	$23 /ton	$0	Means
Place and Compact	0 cy	$6.22 /cy	$0	Means
Cover/Topsoil				
Purchase/Deliver Topsoil	46,110 ton	$23 /ton	$1,060,526	Means
Purchase/Deliver Activated Carbon	230,549 lb	$1.00 /lb	$230,549	EPA, OSWER 9200.2-128FS, 2013; assume 1% by dry weight to supplement topsoil organics for 25% of area
Apply Amendment	230,549 lb	$0.25 /lb	$57,637	Professional judgment; could be direct application or blended
Place and Compact	28,819 cy	$6.22 /cy	$179,252	Means
Excavation				
Soil Excavation and Load (standard)	0 cy	$16 /cy	$0	Means
Soil Excavation and Load (alternative)	0 cy	$88 /cy	$0	Means - hand excavation around minor structures, normal soil
Chemical Analyses (TCLP metals)	0 each	$150 /each	$0	1 sample per 1000 tons; Unit rate from lab price list
Waste Profiling Data Package	0 hr	$125 /hr	$0	Soil data compilation and prepare waste profile forms
Transport Off-Site	0 ton	$10 /ton	$0	Means and professional judgement
Transport/Place On-Site	0 cy	$8.73 /cy	$0	Means
Disposal	0 ton	$30 /ton	$0	Quote from Waste Management for Hillsboro Landfill
Confirmation Soil Sampling and Chemical Analyses	0 each	$440 /each	$0	Assume one sample per 100 lineal feet of perimeter and one sample per 5000 sf bottom; analyze for total metals (20% of samples for PAHs and 10% of samples for dioxins and PCBs); Unit rate from lab price list
Site Restoration				
Site Grading	21.3 ac	$2,150 /ac	$45,876	Means
Re-Vegetation (forested)	10.7 ac	$43,500 /ac	$464,090	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Re-Vegetation (unforested)	10.7 ac	$20,000 /ac	$213,375	Means; hydroseeding, shrubs @ 6' spacing
Temporary Irrigation System	21.3 ac	$6,560 /ac	$139,974	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	$6,250 /month	$56,250	Water truck/driver (Means); purchase water from City
Construction Contingency	25 %	$2,912,638	$728,160	Percent of Direct Construction Cost (Incl. Mob.); From EPA guidance use 25% for cap focused alternatives; 30% for mixed alternatives; and 35% for excavation focused alternatives; includes both scope and bid contingency
		Direct Construction Subtotal	$3,641,000	
Indirect Construction Costs				
Contractor OH/Bonding/Insurance, Soil Management Plan/Institutional Controls, Construction Management, Engineering, Agency Oversight, Completion Reporting	25 %	$3,641,000	$910,250	Assume 25 percent of Direct Construction Cost
		Indirect Construction Subtotal	$910,000	
		Capital Cost Subtotal	$5,097,000	
Long-Term Costs (Net Present Value)				Assume net discount rate of 5% for present-worth calculations.
Cap Annual Inspections	30 yr	$0 /yr	$0	Inspection and report.
Cap Maintenance	30 yr	$0 /yr	$0	Assume 1% of cap installation cost annually
Plant Inspection and Replacement/Control	5 yr	$33,873 /yr	$157,369	Assume 5% of plant installation cost annually
Indirect Long-Term Costs (Project Management, Agency Oversight, Reporting)	30 yr	$6,775 /yr	$141,795	Assume 20% of Long-Term Costs annually
Contingency	25 %	$299,165	$74,791	Percent of Long-Term Costs; percentage same as construction
		Long-Term Subtotal (Net Present Value)	$374,000	
Total		Total	$5,471,000	

Notes:

1. Means - 2017 RS Means Online Cost Estimating

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 14
Estimated Cost - Alternative 3a: Standard Excavation with Offsite Disposal
Willamette Cove Upland
Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Pre-Construction				
Pre-Design Sampling, Surveying, Work Plan, Design, Permitting, Procurement/Contracting	15 %	$7,866,000	$1,179,900	Assume 15% of Direct Construction Cost
		Pre-Construction Subtotal	$1,180,000	
Direct Construction				
Mobilization	10 %	$5,296,980	$529,698	Assume 10% of Direct Construction Cost; includes contractor work plans
Site Prep				
Utility Locating	8 hr	$70 /hr	$560	Unit rate from recent subcontract
Access Road Improvements	1,420 sy	$23.66 /sy	$33,597	4-inch overlay (Means) along N Edgewater Ave
Erosion Control	4,500 lf	$1.07 /foot	$4,815	Means
Construction Entrance	1 LS	$1,500 /each	$1,500	25 x 60 rock construction entrance (per City req's)
Erosion Control Maintenance	3 months	$632 /month	$1,895	10% of Erosion Control and Construction Entrance
Dust Control	50 day	$280 /day	$14,000	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Survey Control	22.4 ac	$2,200 /ac	$49,326	Means
Site Clearing (forested)	10.7 ac	$9,700 /ac	$103,487	Means (cut and chip trees, close-cut stumps)
Site Clearing (unforested)	10.7 ac	$950 /ac	$10,135	Means (shrub/brush mowing)
Cap				
Demarcation Layer	0 sy	$2.05 /sy	$0	Means
Purchase/Deliver Gravel	0 ton	$22 /ton	$0	Means
Purchase/Deliver Cobbles	0 ton	$30 /ton	$0	Means
Purchase/Deliver Topsoil	0 ton	$23 /ton	$0	Means
Place and Compact	0 cy	$6.22 /cy	$0	Means
Cover/Topsoil				
Purchase/Deliver Topsoil	0 ton	$23 /ton	$0	Means
Purchase/Deliver Activated Carbon	0 lb	$1.00 /lb	$0	EPA, OSWER 9200.2-128FS, 2013; assume 1% by dry weight to supplement topsoil organics for 25% of area
Apply Amendment	0 lb	$0.25 /lb	$0	Professional judgment; could be direct application or blended
Place and Compact	0 cy	$6.22 /cy	$0	Means
Excavation				
Soil Excavation and Load (standard)	48,232 cy	$16 /cy	$759,660	Means
Soil Excavation and Load (alternative)	0 cy	$88 /cy	$0	Means - hand excavation around minor structures, normal soil
Chemical Analyses (TCLP metals)	82 each	$150 /each	$12,300	1 sample per 1000 tons; Unit rate from lab price list
Waste Profiling Data Package	20 hr	$125 /hr	$2,500	Soil data compilation and prepare waste profile forms
Transport Off-Site	81,995 ton	$10 /ton	$819,950	Means and professional judgement
Transport/Place On-Site	0 cy	$8.73 /cy	$0	Means
Disposal	81,995 ton	$30 /ton	$2,459,850	Quote from Waste Management for Hillsboro Landfill
Confirmation Soil Sampling and Chemical Analyses	236 each	$440 /each	$103,840	Assume one sample per 100 lineal feet of perimeter and one sample per 5000 sf bottom; analyze for total metals (20% of samples for PAHs and 10% of samples for dioxins and PCBs); Unit rate from lab price list
Site Restoration				
Site Grading	21.3 ac	$2,150 /ac	$45,876	Means
Re-Vegetation (forested)	10.7 ac	$43,500 /ac	$464,090	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Re-Vegetation (unforested)	10.7 ac	$20,000 /ac	$213,375	Means; hydroseeding, shrubs @ 6' spacing
Temporary Irrigation System	21.3 ac	$6,560 /ac	$139,974	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	$6,250 /month	$56,250	Water truck/driver (Means); purchase water from City
Construction Contingency	35 %	$5,826,678	$2,039,337	Percent of Direct Construction Cost (Incl. Mob.); From EPA guidance use 25% for cap focused alternatives; 30% for mixed alternatives; and 35% for excavation focused alternatives; includes both scope and bid contingency
		Direct Construction Subtotal	$7,866,000	
Indirect Construction Costs				
Contractor OH/Bonding/Insurance, Soil Management Plan/Institutional Controls, Construction Management, Engineering, Agency Oversight, Completion Reporting	25 %	$7,866,000	$1,966,500	Assume 25 percent of Direct Construction Cost
		Indirect Construction Subtotal	$1,967,000	
		Capital Cost Subtotal	$11,013,000	
Long-Term Costs (Net Present Value)				Assume net discount rate of 5% for present-worth calculations.
Cap Annual Inspections	30 yr	$0 /yr	$0	Inspection and report.
Cap Maintenance	30 yr	$0 /yr	$0	Assume 1% of cap installation cost annually
Plant Inspection and Replacement/Control	5 yr	$33,873 /yr	$157,369	Assume 5% of plant installation cost annually
Indirect Long-Term Costs (Project Management, Agency Oversight, Reporting)	5 yr	$6,775 /yr	$31,474	Assume 20% of Long-Term Costs annually
Contingency	35 %	$188,843	$66,095	Percent of Long-Term Costs; percentage same as construction
		Long-Term Subtotal (Net Present Value)	$255,000	
Total		Total	$11,268,000	

Notes:

1. Means - 2017 RS Means Online Cost Estimating

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 15
Estimated Cost - Alternative 3b: Alternative Excavation with Offsite Disposal
Willamette Cove Upland
Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Pre-Construction				
Pre-Design Sampling, Surveying, Work Plan, Design, Permitting, Procurement/Contracting	15 %	$7,486,000	$1,122,900	Assume 15% of Direct Construction Cost
		Pre-Construction Subtotal	$1,123,000	
Direct Construction				
Mobilization	10 %	$5,040,899	$504,090	Assume 10% of Direct Construction Cost; includes contractor work plans
Site Prep				
Utility Locating	8 hr	$70 /hr	$560	Unit rate from recent subcontract
Access Road Improvements	1,420 sy	$23.66 /sy	$33,597	4-inch overlay (Means) along N Edgewater Ave
Erosion Control	4,500 lf	$1.07 /foot	$4,815	Means
Construction Entrance	1 LS	$1,500 /each	$1,500	25 x 60 rock construction entrance (per City req's)
Erosion Control Maintenance	3 months	$632 /month	$1,895	10% of Erosion Control and Construction Entrance
Dust Control	50 day	$280 /day	$14,000	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Survey Control	22.4 ac	$2,200 /ac	$49,326	Means
Site Clearing (forested)	9.2 ac	$9,700 /ac	$89,641	Means (cut and chip trees, close-cut stumps)
Site Clearing (unforested)	10.7 ac	$950 /ac	$10,135	Means (shrub/brush mowing)
Cap				
Demarcation Layer	0 sy	$2.05 /sy	$0	Means
Purchase/Deliver Gravel	0 ton	$22 /ton	$0	Means
Purchase/Deliver Cobbles	0 ton	$30 /ton	$0	Means
Purchase/Deliver Topsoil	0 ton	$23 /ton	$0	Means
Place and Compact	0 cy	$6.22 /cy	$0	Means
Cover/Topsoil				
Purchase/Deliver Topsoil	0 ton	$23 /ton	$0	Means
Purchase/Deliver Activated Carbon	0 lb	$1.00 /lb	$0	EPA, OSWER 9200.2-128FS, 2013; assume 1% by dry weight to supplement topsoil organics for 25% of area
Apply Amendment	0 lb	$0.25 /lb	$0	Professional judgment; could be direct application or blended
Place and Compact	0 cy	$6.22 /cy	$0	Means
Excavation				
Soil Excavation and Load (standard)	44,535 cy	$16 /cy	$701,420	Means
Soil Excavation and Load (alternative)	922 cy	$88 /cy	$81,174	Means - hand excavation around minor structures, normal soil
Chemical Analyses (TCLP metals)	78 each	$150 /each	$11,700	1 sample per 1000 tons; Unit rate from lab price list
Waste Profiling Data Package	20 hr	$125 /hr	$2,500	Soil data compilation and prepare waste profile forms
Transport Off-Site	77,277 ton	$10 /ton	$772,769	Means and professional judgement
Transport/Place On-Site	0 cy	$8.73 /cy	$0	Means
Disposal	77,277 ton	$30 /ton	$2,318,308	Quote from Waste Management for Hillsboro Landfill
Confirmation Soil Sampling and Chemical Analyses	233 each	$440 /each	$102,520	Assume one sample per 100 lineal feet of perimeter and one sample per 5000 sf bottom; analyze for total metals (20% of samples for PAHs and 10% of samples for dioxins and PCBs); Unit rate from lab price list
Site Restoration				
Site Grading	19.9 ac	$2,150 /ac	$42,807	Means
Re-Vegetation (forested)	9.2 ac	$43,500 /ac	$401,998	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Re-Vegetation (unforested)	10.7 ac	$20,000 /ac	$213,375	Means; hydroseeding, shrubs @ 6' spacing
Temporary Irrigation System	19.9 ac	$6,560 /ac	$130,610	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	$6,250 /month	$56,250	Water truck/driver (Means); purchase water from City
Construction Contingency	35 %	$5,544,989	$1,940,746	Percent of Direct Construction Cost (Incl. Mob.); From EPA guidance use 25% for cap focused alternatives; 30% for mixed alternatives; and 35% for excavation focused alternatives; includes both scope and bid contingency
		Direct Construction Subtotal	$7,486,000	
Indirect Construction Costs				
Contractor OH/Bonding/Insurance, Soil Management Plan/Institutional Controls, Construction Management, Engineering, Agency Oversight, Completion Reporting	25 %	$7,486,000	$1,871,500	Assume 25 percent of Direct Construction Cost
		Indirect Construction Subtotal	$1,872,000	
		Capital Cost Subtotal	$10,481,000	
Long-Term Costs (Net Present Value)				Assume net discount rate of 5% for present-worth calculations.
Cap Annual Inspections	30 yr	$0 /yr	$0	Inspection and report.
Cap Maintenance	30 yr	$0 /yr	$0	Assume 1% of cap installation cost annually
Plant Inspection and Replacement/Control	5 yr	$30,769 /yr	$142,946	Assume 5% of plant installation cost annually
Indirect Long-Term Costs (Project Management, Agency Oversight, Reporting)	5 yr	$6,154 /yr	$28,589	Assume 20% of Long-Term Costs annually
Contingency	35 %	$171,535	$60,037	Percent of Long-Term Costs; percentage same as construction
		Long-Term Subtotal (Net Present Value)	$232,000	
Total		Total	$10,713,000	

Notes:

1. Means - 2017 RS Means Online Cost Estimating

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 16
Estimated Cost - Alternative 3c: Standard Excavation with Onsite Consolidation
Willamette Cove Upland
Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Pre-Construction				
Pre-Design Sampling, Surveying, Work Plan, Design, Permitting, Procurement/Contracting	15 %	$6,748,000	$1,012,200	Assume 15% of Direct Construction Cost
		Pre-Construction Subtotal	$1,012,000	
Direct Construction				
Mobilization	10 %	$4,543,778	$454,378	Assume 10% of Direct Construction Cost; includes contractor work plans
Site Prep				
Utility Locating	8 hr	$70 /hr	$560	Unit rate from recent subcontract
Access Road Improvements	1,420 sy	$23.66 /sy	$33,597	4-inch overlay (Means) along N Edgewater Ave
Erosion Control	4,500 lf	$1.07 /foot	$4,815	Means
Construction Entrance	1 LS	$1,500 /each	$1,500	25 x 60 rock construction entrance (per City req's)
Erosion Control Maintenance	5 months	$632 /month	$3,158	10% of Erosion Control and Construction Entrance
Dust Control	90 day	$280 /day	$25,200	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Survey Control	22.4 ac	$2,200 /ac	$49,326	Means
Site Clearing (forested)	10.7 ac	$9,700 /ac	$103,487	Means (cut and chip trees, close-cut stumps)
Site Clearing (unforested)	10.7 ac	$950 /ac	$10,135	Means (shrub/brush mowing)
Cap				
Demarcation Layer	22,242 sy	$2.05 /sy	$45,597	Means
Purchase/Deliver Gravel	7,043 ton	$22 /ton	$154,955	Means
Purchase/Deliver Cobbles	21,130 ton	$30 /ton	$633,906	Means
Purchase/Deliver Topsoil	11,863 ton	$23 /ton	$272,839	Means
Place and Compact	22,242 cy	$6.22 /cy	$138,347	Means
Cover/Topsoil				
Purchase/Deliver Topsoil	37,441 ton	$23 /ton	$861,146	Means
Purchase/Deliver Activated Carbon	0 lb	$1.00 /lb	$0	EPA, OSWER 9200.2-128FS, 2013; assume 1% by dry weight to supplement topsoil organics for 25% of area
Apply Amendment	0 lb	$0.25 /lb	$0	Professional judgment; could be direct application or blended
Place and Compact	23,401 cy	$6.22 /cy	$145,552	Means
Excavation				
Soil Excavation and Load (standard)	42,356 cy	$16 /cy	$667,113	Means
Soil Excavation and Load (alternative)	0 cy	$88 /cy	$0	Means - hand excavation around minor structures, normal soil
Chemical Analyses (TCLP metals)	73 each	$150 /each	$10,950	1 sample per 1000 tons; Unit rate from lab price list
Waste Profiling Data Package	20 hr	$125 /hr	$2,500	Soil data compilation and prepare waste profile forms
Transport Off-Site	0 ton	$10 /ton	$0	Means and professional judgement
Transport/Place On-Site	42,356 cy	$8.73 /cy	$369,771	Means
Disposal	0 ton	$30 /ton	$0	Quote from Waste Management for Hillsboro Landfill
Confirmation Soil Sampling and Chemical Analyses	204 each	$440 /each	$89,760	Assume one sample per 100 lineal feet of perimeter and one sample per 5000 sf bottom; analyze for total metals (20% of samples for PAHs and 10% of samples for dioxins and PCBs); Unit rate from lab price list
Site Restoration				
Site Grading	21.3 ac	$2,150 /ac	$45,876	Means
Re-Vegetation (forested)	10.7 ac	$43,500 /ac	$464,090	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Re-Vegetation (unforested)	10.7 ac	$20,000 /ac	$213,375	Means; hydroseeding, shrubs @ 6' spacing
Temporary Irrigation System	21.3 ac	$6,560 /ac	$139,974	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	$6,250 /month	$56,250	Water truck/driver (Means); purchase water from City
Construction Contingency	35 %	$4,998,156	$1,749,355	Percent of Direct Construction Cost (Incl. Mobe.); From EPA guidance use 25% for cap focused alternatives; 30% for mixed alternatives; and 35% for excavation focused alternatives; includes both scope and bid contingency
		Direct Construction Subtotal	$6,748,000	
Indirect Construction Costs				
Contractor OH/Bonding/Insurance, Soil Management Plan/Institutional Controls, Construction Management, Engineering, Agency Oversight, Completion Reporting	25 %	$6,748,000	$1,687,000	Assume 25 percent of Direct Construction Cost
		Indirect Construction Subtotal	$1,687,000	
		Capital Cost Subtotal	$9,447,000	
Long-Term Costs (Net Present Value)				Assume net discount rate of 5% for present-worth calculations.
Cap Annual Inspections	30 yr	$4,800 /yr	$73,788	Inspection and report.
Cap Maintenance	30 yr	$12,456 /yr	$260,717	Assume 1% of cap installation cost annually
Plant Inspection and Replacement/Control	5 yr	$33,873 /yr	$157,369	Assume 5% of plant installation cost annually
Indirect Long-Term Costs (Project Management, Agency Oversight, Reporting)	30 yr	$10,226 /yr	$214,032	Assume 20% of Long-Term Costs annually
Contingency	35 %	$705,906	$247,067	Percent of Long-Term Costs; percentage same as construction
		Long-Term Subtotal (Net Present Value)	$953,000	
Total		Total	$10,400,000	

Notes:

1. Means - 2017 RS Means Online Cost Estimating

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 17
Estimated Cost - Alternative 3d: Standard Excavation with Offsite Disposal and Onsite Consolidation
Willamette Cove Upland
Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Pre-Construction				
Pre-Design Sampling, Surveying, Work Plan, Design, Permitting, Procurement/Contracting	15 %	$7,111,000	$1,066,650	Assume 15% of Direct Construction Cost
		Pre-Construction Subtotal	$1,067,000	
Direct Construction				
Mobilization	10 %	$4,788,480	$478,848	Assume 10% of Direct Construction Cost; includes contractor work plans
Site Prep				
Utility Locating	8 hr	$70 /hr	$560	Unit rate from recent subcontract
Access Road Improvements	1,420 sy	$23.66 /sy	$33,597	4-inch overlay (Means) along N Edgewater Ave
Erosion Control	4,500 lf	$1.07 /foot	$4,815	Means
Construction Entrance	1 LS	$1,500 /each	$1,500	25 x 60 rock construction entrance (per City req's)
Erosion Control Maintenance	5 months	$632 /month	$3,158	10% of Erosion Control and Construction Entrance
Dust Control	90 day	$280 /day	$25,200	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Survey Control	22.4 ac	$2,200 /ac	$49,326	Means
Site Clearing (forested)	10.7 ac	$9,700 /ac	$103,487	Means (cut and chip trees, close-cut stumps)
Site Clearing (unforested)	10.7 ac	$950 /ac	$10,135	Means (shrub/brush mowing)
Cap				
Demarcation Layer	22,242 sy	$2.05 /sy	$45,597	Means
Purchase/Deliver Gravel	7,043 ton	$22 /ton	$154,955	Means
Purchase/Deliver Cobbles	21,130 ton	$30 /ton	$633,906	Means
Purchase/Deliver Topsoil	11,863 ton	$23 /ton	$272,839	Means
Place and Compact	22,242 cy	$6.22 /cy	$138,347	Means
Cover/Topsoil				
Purchase/Deliver Topsoil	37,441 ton	$23 /ton	$861,146	Means
Purchase/Deliver Activated Carbon	0 lb	$1.00 /lb	$0	EPA, OSWER 9200.2-128FS, 2013; assume 1% by dry weight to supplement topsoil organics for 25% of area
Apply Amendment	0 lb	$0.25 /lb	$0	Professional judgment; could be direct application or blended
Place and Compact	23,401 cy	$6.22 /cy	$145,552	Means
Excavation				
Soil Excavation and Load (standard)	42,356 cy	$16 /cy	$667,113	Means
Soil Excavation and Load (alternative)	0 cy	$88 /cy	$0	Means - hand excavation around minor structures, normal soil
Chemical Analyses (TCLP metals)	73 each	$150 /each	$10,950	1 sample per 1000 tons; Unit rate from lab price list
Waste Profiling Data Package	20 hr	$125 /hr	$2,500	Soil data compilation and prepare waste profile forms
Transport Off-Site	7,019 ton	$10 /ton	$70,186	Means and professional judgement
Transport/Place On-Site	38,228 cy	$8.73 /cy	$333,729	Means
Disposal	7,019 ton	$30 /ton	$210,558	Quote from Waste Management for Hillsboro Landfill
Confirmation Soil Sampling and Chemical Analyses	204 each	$440 /each	$89,760	Assume one sample per 100 lineal feet of perimeter and one sample per 5000 sf bottom; analyze for total metals (20% of samples for PAHs and 10% of samples for dioxins and PCBs); Unit rate from lab price list
Site Restoration				
Site Grading	21.3 ac	$2,150 /ac	$45,876	Means
Re-Vegetation (forested)	10.7 ac	$43,500 /ac	$464,090	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Re-Vegetation (unforested)	10.7 ac	$20,000 /ac	$213,375	Means; hydroseeding, shrubs @ 6' spacing
Temporary Irrigation System	21.3 ac	$6,560 /ac	$139,974	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	$6,250 /month	$56,250	Water truck/driver (Means); purchase water from City
Construction Contingency	35 %	$5,267,328	$1,843,565	Percent of Direct Construction Cost (Incl. Mob.); From EPA guidance use 25% for cap focused alternatives; 30% for mixed alternatives; and 35% for excavation focused alternatives; includes both scope and bid contingency
		Direct Construction Subtotal	$7,111,000	
Indirect Construction Costs				
Contractor OH/Bonding/Insurance, Soil Management Plan/Institutional Controls, Construction Management, Engineering, Agency Oversight, Completion Reporting	25 %	$7,111,000	$1,777,750	Assume 25 percent of Direct Construction Cost
		Indirect Construction Subtotal	$1,778,000	
		Capital Cost Subtotal	$9,956,000	
Long-Term Costs (Net Present Value)				Assume net discount rate of 5% for present-worth calculations.
Cap Annual Inspections	30 yr	$4,800 /yr	$73,788	Inspection and report.
Cap Maintenance	30 yr	$12,456 /yr	$260,717	Assume 1% of cap installation cost annually
Plant Inspection and Replacement/Control	5 yr	$33,873 /yr	$157,369	Assume 5% of plant installation cost annually
Indirect Long-Term Costs (Project Management, Agency Oversight, Reporting)	30 yr	$10,226 /yr	$214,032	Assume 20% of Long-Term Costs annually
Contingency	35 %	$705,906	$247,067	Percent of Long-Term Costs; percentage same as construction
		Long-Term Subtotal (Net Present Value)	$953,000	
Total		Total	$10,909,000	

Notes:

1. Means - 2017 RS Means Online Cost Estimating

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 18
Estimated Cost - Alternative 4a: Focused Standard Excavation with Offsite Disposal and Cap
Willamette Cove Upland
Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Pre-Construction				
Pre-Design Sampling, Surveying, Work Plan, Design, Permitting, Procurement/Contracting	15 %	$5,813,000	$871,950	Assume 15% of Direct Construction Cost
		Pre-Construction Subtotal	$872,000	
Direct Construction				
Mobilization	10 %	$4,227,988	$422,799	Assume 10% of Direct Construction Cost; includes contractor work plans
Site Prep				
Utility Locating	8 hr	$70 /hr	$560	Unit rate from recent subcontract
Access Road Improvements	1,420 sy	$23.66 /sy	$33,597	4-inch overlay (Means) along N Edgewater Ave
Erosion Control	4,500 lf	$1.07 /foot	$4,815	Means
Construction Entrance	1 LS	$1,500 /each	$1,500	25 x 60 rock construction entrance (per City req's)
Erosion Control Maintenance	5 months	$632 /month	$3,158	10% of Erosion Control and Construction Entrance
Dust Control	90 day	$280 /day	$25,200	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Survey Control	22.4 ac	$2,200 /ac	$49,326	Means
Site Clearing (forested)	10.7 ac	$9,700 /ac	$103,487	Means (cut and chip trees, close-cut stumps)
Site Clearing (unforested)	10.7 ac	$950 /ac	$10,135	Means (shrub/brush mowing)
Cap				
Demarcation Layer	87,830 sy	$2.05 /sy	$180,052	Means
Purchase/Deliver Gravel	0 ton	$22 /ton	$0	Means
Purchase/Deliver Cobbles	0 ton	$30 /ton	$0	Means
Purchase/Deliver Topsoil	93,685 ton	$23 /ton	$2,154,763	Means
Place and Compact	58,553 cy	$6.22 /cy	$364,202	Means
Cover/Topsoil				
Purchase/Deliver Topsoil	0 ton	$23 /ton	$0	Means
Purchase/Deliver Activated Carbon	0 lb	$1.00 /lb	$0	EPA, OSWER 9200.2-128FS, 2013; assume 1% by dry weight to supplement topsoil organics for 25% of area
Apply Amendment	0 lb	$0.25 /lb	$0	Professional judgment; could be direct application or blended
Place and Compact	0 cy	$6.22 /cy	$0	Means
Excavation				
Soil Excavation and Load (standard)	4,129 cy	$16 /cy	$65,025	Means
Soil Excavation and Load (alternative)	0 cy	$88 /cy	$0	Means - hand excavation around minor structures, normal soil
Chemical Analyses (TCLP metals)	8 each	$150 /each	$1,200	1 sample per 1000 tons; Unit rate from lab price list
Waste Profiling Data Package	20 hr	$125 /hr	$2,500	Soil data compilation and prepare waste profile forms
Transport Off-Site	7,019 ton	$10 /ton	$70,186	Means and professional judgement
Transport/Place On-Site	0 cy	$8.73 /cy	$0	Means
Disposal	7,019 ton	$30 /ton	$210,558	Quote from Waste Management for Hillsboro Landfill
Confirmation Soil Sampling and Chemical Analyses	64 each	$440 /each	$28,160	Assume one sample per 100 lineal feet of perimeter and one sample per 5000 sf bottom; analyze for total metals (20% of samples for PAHs and 10% of samples for dioxins and PCBs); Unit rate from lab price list
Site Restoration				
Site Grading	21.3 ac	$2,150 /ac	$45,876	Means
Re-Vegetation (forested)	10.7 ac	$43,500 /ac	$464,090	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Re-Vegetation (unforested)	10.7 ac	$20,000 /ac	$213,375	Means; hydroseeding, shrubs @ 6' spacing
Temporary Irrigation System	21.3 ac	$6,560 /ac	$139,974	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	$6,250 /month	$56,250	Water truck/driver (Means); purchase water from City
Construction Contingency	25 %	$4,650,787	$1,162,697	Percent of Direct Construction Cost (Incl. Mob.); From EPA guidance use 25% for cap focused alternatives; 30% for mixed alternatives; and 35% for excavation focused alternatives; includes both scope and bid contingency
		Direct Construction Subtotal	$5,813,000	
Indirect Construction Costs				
Contractor OH/Bonding/Insurance, Soil Management Plan/Institutional Controls, Construction Management, Engineering, Agency Oversight, Completion Reporting	25 %	$5,813,000	$1,453,250	Assume 25 percent of Direct Construction Cost
		Indirect Construction Subtotal	$1,453,000	
		Capital Cost Subtotal	$8,138,000	
Long-Term Costs (Net Present Value)				Assume net discount rate of 5% for present-worth calculations.
Cap Annual Inspections	30 yr	$5,800 /yr	$89,160	Inspection and report.
Cap Maintenance	30 yr	$26,990 /yr	$564,912	Assume 1% of cap installation cost annually
Plant Inspection and Replacement/Control	5 yr	$33,873 /yr	$157,369	Assume 5% of plant installation cost annually
Indirect Long-Term Costs (Project Management, Agency Oversight, Reporting)	30 yr	$13,333 /yr	$279,057	Assume 20% of Long-Term Costs annually
Contingency	25 %	$1,090,499	$272,625	Percent of Long-Term Costs; percentage same as construction
		Long-Term Subtotal (Net Present Value)	$1,363,000	
Total		Total	$9,501,000	

Notes:

1. Means - 2017 RS Means Online Cost Estimating

Table 19
Estimated Cost - Alternative 4b: Focused Alternative Excavation with Offsite Disposal and Amended Cap
Willamette Cove Upland
Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Pre-Construction				
Pre-Design Sampling, Surveying, Work Plan, Design, Permitting, Procurement/Contracting	15 %	$4,050,000	$607,500	Assume 15% of Direct Construction Cost
		Pre-Construction Subtotal	$608,000	
Direct Construction				
Mobilization	10 %	$2,945,116	$294,512	Assume 10% of Direct Construction Cost; includes contractor work plans
Site Prep				
Utility Locating	8 hr	$70 /hr	$560	Unit rate from recent subcontract
Access Road Improvements	1,420 sy	$23.66 /sy	$33,597	4-inch overlay (Means) along N Edgewater Ave
Erosion Control	4,500 lf	$1.07 /foot	$4,815	Means
Construction Entrance	1 LS	$1,500 /each	$1,500	25 x 60 rock construction entrance (per City req's)
Erosion Control Maintenance	2 months	$632 /month	$1,263	10% of Erosion Control and Construction Entrance
Dust Control	30 day	$280 /day	$8,400	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Survey Control	22.4 ac	$2,200 /ac	$49,326	Means
Site Clearing (forested)	9.2 ac	$9,700 /ac	$89,641	Means (cut and chip trees, close-cut stumps)
Site Clearing (unforested)	10.7 ac	$950 /ac	$10,135	Means (shrub/brush mowing)
Cap				
Demarcation Layer	0 sy	$2.05 /sy	$0	Means
Purchase/Deliver Gravel	0 ton	$22 /ton	$0	Means
Purchase/Deliver Cobbles	0 ton	$30 /ton	$0	Means
Purchase/Deliver Topsoil	0 ton	$23 /ton	$0	Means
Place and Compact	0 cy	$6.22 /cy	$0	Means
Cover/Topsoil				
Purchase/Deliver Topsoil	45,996 ton	$23 /ton	$1,057,899	Means
Purchase/Deliver Activated Carbon	229,978 lb	$1.00 /lb	$229,978	EPA, OSWER 9200.2-128FS, 2013; assume 1% by dry weight to supplement topsoil organics for 25% of area
Apply Amendment	229,978 lb	$0.25 /lb	$57,495	Professional judgment; could be direct application or blended
Place and Compact	28,747 cy	$6.22 /cy	$178,808	Means
Excavation				
Soil Excavation and Load (standard)	3,986 cy	$16 /cy	$62,777	Means
Soil Excavation and Load (alternative)	71 cy	$88 /cy	$6,281	Means - hand excavation around minor structures, normal soil
Chemical Analyses (TCLP metals)	7 each	$150 /each	$1,050	1 sample per 1000 tons; Unit rate from lab price list
Waste Profiling Data Package	20 hr	$125 /hr	$2,500	Soil data compilation and prepare waste profile forms
Transport Off-Site	6,897 ton	$10 /ton	$68,973	Means and professional judgement
Transport/Place On-Site	0 cy	$8.73 /cy	$0	Means
Disposal	6,897 ton	$30 /ton	$206,918	Quote from Waste Management for Hillsboro Landfill
Confirmation Soil Sampling and Chemical Analyses	64 each	$440 /each	$28,160	Assume one sample per 100 lineal feet of perimeter and one sample per 5000 sf bottom; analyze for total metals (20% of samples for PAHs and 10% of samples for dioxins and PCBs); Unit rate from lab price list
Site Restoration				
Site Grading	19.9 ac	$2,150 /ac	$42,807	Means
Re-Vegetation (forested)	9.2 ac	$43,500 /ac	$401,998	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Re-Vegetation (unforested)	10.7 ac	$20,000 /ac	$213,375	Means; hydroseeding, shrubs @ 6' spacing
Temporary Irrigation System	19.9 ac	$6,560 /ac	$130,610	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	$6,250 /month	$56,250	Water truck/driver (Means); purchase water from City
Construction Contingency	25 %	$3,239,627	$809,907	Percent of Direct Construction Cost (Incl. Mob.); From EPA guidance use 25% for cap focused alternatives; 30% for mixed alternatives; and 35% for excavation focused alternatives; includes both scope and bid contingency
		Direct Construction Subtotal	$4,050,000	
Indirect Construction Costs				
Contractor OH/Bonding/Insurance, Soil Management Plan/Institutional Controls, Construction Management, Engineering, Agency Oversight, Completion Reporting	25 %	$4,050,000	$1,012,500	Assume 25 percent of Direct Construction Cost
		Indirect Construction Subtotal	$1,013,000	
		Capital Cost Subtotal	$5,671,000	
Long-Term Costs (Net Present Value)				Assume net discount rate of 5% for present-worth calculations.
Cap Annual Inspections	30 yr	$0 /yr	$0	Inspection and report.
Cap Maintenance	30 yr	$0 /yr	$0	Assume 1% of cap installation cost annually
Plant Inspection and Replacement/Control	5 yr	$30,769 /yr	$142,946	Assume 5% of plant installation cost annually
Indirect Long-Term Costs (Project Management, Agency Oversight, Reporting)	5 yr	$6,154 /yr	$28,589	Assume 20% of Long-Term Costs annually
Contingency	25 %	$171,535	$42,884	Percent of Long-Term Costs; percentage same as construction
		Long-Term Subtotal (Net Present Value)	$214,000	
Total		Total	$5,885,000	

Notes:

1. Means - 2017 RS Means Online Cost Estimating

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 20
Estimated Cost - Alternative 4c: Focused Alternative Excavation with Offsite Disposal, Onsite Consolidation, and Cap
Willamette Cove Upland
Portland, Oregon

Alternative Component	Units	Unit Cost	Extension	Notes
Capital				
Pre-Construction				
Pre-Design Sampling, Surveying, Work Plan, Design, Permitting, Procurement/Contracting	15 %	$5,822,000	$873,300	Assume 15% of Direct Construction Cost
		Pre-Construction Subtotal	$873,000	
Direct Construction				
Mobilization	10 %	$4,070,995	$407,100	Assume 10% of Direct Construction Cost; includes contractor work plans
Site Prep				
Utility Locating	8 hr	$70 /hr	$560	Unit rate from recent subcontract
Access Road Improvements	1,420 sy	$23.66 /sy	$33,597	4-inch overlay (Means) along N Edgewater Ave
Erosion Control	4,500 lf	$1.07 /foot	$4,815	Means
Construction Entrance	1 LS	$1,500 /each	$1,500	25 x 60 rock construction entrance (per City req's)
Erosion Control Maintenance	4 months	$632 /month	$2,526	10% of Erosion Control and Construction Entrance
Dust Control	70 day	$280 /day	$19,600	Water truck/driver (Means); purchase water from City (0.5 gal/sy/hr)
Survey Control	22.4 ac	$2,200 /ac	$49,326	Means
Site Clearing (forested)	9.2 ac	$9,700 /ac	$89,641	Means (cut and chip trees, close-cut stumps)
Site Clearing (unforested)	10.7 ac	$950 /ac	$10,135	Means (shrub/brush mowing)
Cap				
Demarcation Layer	12,858 sy	$2.05 /sy	$26,360	Means
Purchase/Deliver Gravel	4,072 ton	$22 /ton	$89,580	Means
Purchase/Deliver Cobbles	12,215 ton	$30 /ton	$366,464	Means
Purchase/Deliver Topsoil	6,858 ton	$23 /ton	$157,730	Means
Place and Compact	12,858 cy	$6.22 /cy	$79,979	Means
Cover/Topsoil				
Purchase/Deliver Topsoil	45,777 ton	$23 /ton	$1,052,879	Means
Purchase/Deliver Activated Carbon	0 lb	$1.00 /lb	$0	EPA, OSWER 9200.2-128FS, 2013; assume 1% by dry weight to supplement topsoil organics for 25% of area
Apply Amendment	0 lb	$0.25 /lb	$0	Professional judgment; could be direct application or blended
Place and Compact	28,611 cy	$6.22 /cy	$177,960	Means
Excavation				
Soil Excavation and Load (standard)	25,791 cy	$16 /cy	$406,209	Means
Soil Excavation and Load (alternative)	922 cy	$88 /cy	$81,174	Means - hand excavation around minor structures, normal soil
Chemical Analyses (TCLP metals)	46 each	$150 /each	$6,900	1 sample per 1000 tons; Unit rate from lab price list
Waste Profiling Data Package	20 hr	$125 /hr	$2,500	Soil data compilation and prepare waste profile forms
Transport Off-Site	6,897 ton	$10 /ton	$68,973	Means and professional judgement
Transport/Place On-Site	22,656 cy	$8.73 /cy	$197,789	Means
Disposal	6,897 ton	$30 /ton	$206,918	Quote from Waste Management for Hillsboro Landfill
Confirmation Soil Sampling and Chemical Analyses	211 each	$440 /each	$92,840	Assume one sample per 100 lineal feet of perimeter and one sample per 5000 sf bottom; analyze for total metals (20% of samples for PAHs and 10% of samples for dioxins and PCBs); Unit rate from lab price list
Site Restoration				
Site Grading	19.9 ac	$2,150 /ac	$42,807	Means
Re-Vegetation (forested)	9.2 ac	$43,500 /ac	$401,998	Means; hydroseeding, trees @ 20' spacing, shrubs @ 6' spacing
Re-Vegetation (unforested)	10.7 ac	$20,000 /ac	$213,375	Means; hydroseeding, shrubs @ 6' spacing
Temporary Irrigation System	19.9 ac	$6,560 /ac	$130,610	Temporary Drip System for trees and shrubs; cost from similar project
First Year of Irrigation	9 months	$6,250 /month	$56,250	Water truck/driver (Means); purchase water from City
Construction Contingency	30 %	$4,478,095	$1,343,428	Percent of Direct Construction Cost (Incl. Mob.); From EPA guidance use 25% for cap focused alternatives; 30% for mixed alternatives; and 35% for excavation focused alternatives; includes both scope and bid contingency
		Direct Construction Subtotal	$5,822,000	
Indirect Construction Costs				
Contractor OH/Bonding/Insurance, Soil Management Plan/Institutional Controls, Construction Management, Engineering, Agency Oversight, Completion Reporting	25 %	$5,822,000	$1,455,500	Assume 25 percent of Direct Construction Cost
		Indirect Construction Subtotal	$1,456,000	
		Capital Cost Subtotal	$8,151,000	
Long-Term Costs (Net Present Value)				Assume net discount rate of 5% for present-worth calculations.
Cap Annual Inspections	30 yr	$3,800 /yr	$58,415	Inspection and report.
Cap Maintenance	30 yr	$7,201 /yr	$150,722	Assume 1% of cap installation cost annually
Plant Inspection and Replacement/Control	5 yr	$30,769 /yr	$142,946	Assume 5% of plant installation cost annually
Indirect Long-Term Costs (Project Management, Agency Oversight, Reporting)	30 yr	$8,354 /yr	$174,851	Assume 20% of Long-Term Costs annually
Contingency	30 %	$526,934	$158,080	Percent of Long-Term Costs; percentage same as construction
		Long-Term Subtotal (Net Present Value)	$685,000	
Total		Total	$8,836,000	

Notes:

1. Means - 2017 RS Means Online Cost Estimating

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 21
Soil Alternative Evaluation Summary
Willamette Cove Upland Site
Portland, Oregon

Alternative	Protectiveness	Effectiveness	Long-Term Reliability	Implementability	Implementation Risk	Reasonableness of Cost	Ability to Treat Hot Spots
Alternative 1: No Action	Unacceptable	Rank: 10	Rank: 10	Rank: 1	Rank: 1	Rank: 1	Unacceptable
	Protectiveness requirements are not met because contaminants are left in place at concentrations that exceed risk levels.	- No action taken - Risks are not reduced or managed - Residual risk unacceptable	- No long-term reliability	- Easiest to implement	- No implementation risks	This alternative has no cost. Total Cost: $0	This alternative does not treat or remove soil above hot spot or risk levels.
Alternative 2a: Standard Cap - *REVISED*	Acceptable	Rank: 8	Rank: 8	Rank: 7	Rank: 8	Rank: 4	Poor
	Overall excellent protectiveness. Relies on long-term effectiveness and reliability through inspection, maintenance, and institutional controls.	- No removal - 2-Foot Cap in-place is effective - 6 months to construct	- All soil remains on-site - 2-foot cap - Cap maintenance - Engineering/institutional controls - Soil management plan	- Excavate and Place On-Site: 0 cy - Excavate and Dispose Off-Site: 0 cy - Import: 59,000 cy - Compatiable with riverbank/in-water cleanup	- Standard construction hazards - Removes native trees	Capital: $5,941,000 Long-Term (Present Worth): $980,000 Contingency: $1,235,000 Total: $8,156,000	Does not remove or treat hot spots.
Alternative 2b: Amended Cap	Acceptable	Rank: 9	Rank: 9	Rank: 2	Rank: 2	Rank: 2	Poor
	Protective. Relies on long-term effectiveness and reliability through inspection, maintenance, and institutional controls. Uncertainty in long-term reliability of cap.	- No soil removed - Soil capped in place - 1-Foot Cap with amendments has some uncertainty in effectiveness - Relies partially on access restrictions for human health; generally effective - 6 months to construct	- All soil remains on-site - 1-foot amended cap - Cap maintenance - Engineering/institutional controls - Soil management plan - Long-term effectiveness of cap uncertain	- Excavate and Place On-Site: 0 cy - Excavate and Dispose Off-Site: 0 cy - Import: 29,000 cy - Compatiable with riverbank/in-water cleanup	- Standard construction hazards - Saves native trees	Capital: $5,097,000 Long-Term (Present Worth): $374,000 Contingency: $803,000 Total: $5,471,000	Does not remove or treat hot spots.
Alternative 3a: Standard Excavation and Off-Site Disposal	Acceptable	Rank: 1	Rank: 1	Rank: 10	Rank: 10	Rank: 10	Excellent
	The excavation and off-site disposal of impacted soils is highly protective to human health and the environment. Overall protectiveness is better than capping alternatives because the performance of an off-site landfill is presumed to be more protective than on-site capping of materials.	- All soil removed off-site to landfill - 6 months to construct	- Off-site in controlled landfill	- Excavate and Place On-Site: 0 cy - Excavate and Dispose Off-Site: 49,000 cy - Import: 0 cy - Compatiable with riverbank/in-water cleanup	- Standard construction hazards - Removes native trees	Capital: $11,013,000 Long-Term (Present Worth): $255,000 Contingency: $2,105,000 Total: $11,268,000	This alternative removes hot spots within a reasonable time frame.
Alternative 3b: Alternative Excavation and Off-Site Disposal	Acceptable	Rank: 2	Rank: 3	Rank: 9	Rank: 5	Rank: 8	Good
	Same as Alternative 3a except that soil above risk levels may be left below the drip line of trees (up to 6% of total area)	- Most soil removed off-site to landfill - Some soil remains in tree drip line area (approx. 6% of total area) - 1-Foot cap of remaining soil is effective, but less so than thicker cap - 6 months to construct	- Most soil off-site in controlled landfill - Remaining soil has 1-foot cap - Cap maintenance - Engineering/institutional controls - Soil management plan	- Excavate and Place On-Site: 0 cy - - Excavate and Dispose Off-Site: 45,000 cy - Import: 0 cy - Compatiable with riverbank/in-water cleanup	- Standard construction hazards - Saves native trees	Capital: $10,481,000 Long-Term (Present Worth): $232,000 Contingency: $2,001,000 Total: $10,713,000	Removes a large portion of hot spots.
Alternative 3c: Standard Excavation and On-Site Consolidation	Acceptable	Rank: 4	Rank: 4	Rank: 5	Rank: 6	Rank: 7	Fair
	Same as Alternative 3a except for the operation of the on-Site landfill is less reliable than that of a commercial landfill.	- No removal - Soil consolidated prior to capping - 2-Foot Cap is effective - 6 months to construct	- All soil on-site in smaller footprint than Alt. 2 - 2-foot cap - Cap maintenance - Engineering/institutional controls - Soil management plan	- Excavate and Place On-Site: 43,000 cy - Excavate and Dispose Off-Site: 0 cy - Import: 46,000 cy - Compatiable with riverbank/in-water cleanup	- Standard construction hazards - Removes native trees	Capital: $9,447,000 Long-Term (Present Worth): $953,000 Contingency: $1,996,000 Total: $10,400,000	Does not remove or treat hot spots. Hot spots consolidated on-site beneath cap.
Alternative 3d: Standard Excavation with Off-Site Disposal and On-Site Consolidation	Acceptable	Rank: 3	Rank: 2	Rank: 6	Rank: 7	Rank: 9	Moderate
	Same as Alternative 3c except the removal of non-dioxin/furan hot spots makes this more protective.	- Higher concentration soil removed - Remaining soil consolidated prior to capping - 2-Foot Cap is effective - 6 months to construct	- Same as Alternative 3c except higher concentration soil removed to off-site landfill	- Excavate and Place On-Site: 38,000 cy - Excavate and Dispose Off-Site: 4,000 cy - Import: 46,000 cy - Compatiable with riverbank/in-water cleanup	- Standard construction hazards - Removes native trees	Capital: $9,956,000 Long-Term (Present Worth): $953,000 Contingency: $2,091,000 Total: $10,909,000	This alternative removes non-dioxin/furan hot spots within a reasonable time frame. Dioxin/furan hot spots consolidated on-site beneath cap.
Alternative 4a: Focused Standard Excavation and Offsite Disposal with Cap - *REVISED*	Acceptable	Rank: 6	Rank: 6	Rank: 8	Rank: 9	Rank: 6	Fair
	Same as Alternative 2a except removal of non-dioxin/furan hot spots makes this more protective.	- Higher concentration soil removed - Remaining soil capped in place - 2-Foot Cap is effective - 6 months to construct	- Same as Alternative 2a except higher concentration soil removed to off-site landfill	- Excavate and Place On-Site: 0 cy - Excavate and Dispose Off-Site: 4,000 cy - Import: 59,000 cy - Compatiable with riverbank/in-water cleanup	- Standard construction hazards - Removes native trees	Capital: $6,975,000 Long-Term (Present Worth): $1,090,000 Contingency: $1,436,000 Total: $9,501,000	This alternative removes non-dioxin/furan hot spots within a reasonable time frame. Dioxin/furan hot spots remain.
Alternative 4b: Focused Alternative Excavation with Offsite Disposal and Amended Cap	Acceptable	Rank: 7	Rank: 7	Rank: 3	Rank: 3	Rank: 3	Fair
	Same as Alternative 2b except the cap thickness is less, but the lesser thickness is off-set with the addition of the soil amendment.	- Most higher concentration soil removed - Remaining soil capped in place - 1-Foot Cap with amendments has some uncertainty in effectiveness - Relies partially on access restrictions for human health; generally effective - 6 months to construct	- Most higher concentration soil removed to off-site landfill - 1-foot amended cap - Cap maintenance - Engineering/institutional controls - Soil management plan	- Excavate and Place On-Site: 0 cy - Excavate and Dispose Off-Site: 4,000 cy - Import: 29,000 cy - Compatiable with riverbank/in-water cleanup	- Standard construction hazards - Saves native trees	Capital: $5,671,000 Long-Term (Present Worth): $214,000 Contingency: $853,000 Total: $5,885,000	This alternative removes non-dioxin/furan hot spots within a reasonable time frame. Dioxin/furan hot spots remain.
Alternative 4c: Focused Alternative Excavation with Off-Site Disposal/On-Site Consolidation and Cap	Acceptable	Rank: 4	Rank: 4	Rank: 4	Rank: 4	Rank: 5	Moderate
	Overall very good protectiveness. Most higher concentration soil removed. Human health soil and remaining hot spot soil consolidated and capped. Remaining area capped. Relies on long-term effectiveness and reliability through inspection, maintenance, and institutional controls.	- Most higher concentration soil removed - Remaining hot spot soil and soil above human health risk levels consolidated prior to 2-foot cap - Remaining soil with 1-Foot Cap is effective - Access restrictions for human health generally effective - 6 months to construct	- Higher concentration soil in controlled landfill - Soil above hot spot and human health risk levels consolidated and capped providing greater reliability than just capping - 1-foot cap on remaining lower risk soil - Cap maintenance - Engineering/institutional controls - Soil management plan	- Excavate and Place On-Site: 23,000 cy - Excavate and Dispose Off-Site: 4,000 cy - Import: 41,000 cy - Compatiable with riverbank/in-water cleanup	- Standard construction hazards - Saves native trees	Capital: $8,151,000 Long-Term (Present Worth): $685,000 Contingency: $1,502,000 Total: $8,836,000	This alternative removes non-dioxin/furan hot spots within a reasonable time frame. Dioxin/furan hot spots consolidated on-site beneath a cap.

Table adapted from Revised Feasibility Study and Source Control Evaluation

Table 22
Comparative Evaluation of Alternatives
Willamette Cove Upland Site
Portland, Oregon

Release Area Alternative	Protective	Balancing Factors: Effectiveness 1	2a	2b	3a	3b	3c	3d	4a	4b	4c	Long-Term 1	2a	2b	3a	3b	3c	3d	4a	4b	4c	Implementability 1	2a	2b	3a	3b	3c	3d	4a	4b	4c	Implementation Risk 1	2a	2b	3a	3b	3c	3d	4a	4b	4c	Reasonableness of Cost 1	2a	2b	3a	3b	3c	3d	4a	4b	4c	Score	Rank
1 No Action	No		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-		+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	--	NA
2a Standard Cap	Yes	+		+	-	-	-	-	-	-	-	+		+	-	-	-	-	-	-	-	-		-	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	+	-	-	+	+	+	+	+	-	+	-15	8
2b Amended Cap	Yes	+	-		-	-	-	-	-	-	-	+	-		-	-	-	-	-	-	-	-	+		+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	+	-	+		+	+	+	+	+	+	+	7	3
3a Standard Excavation with Off-Site Disposal	Yes	+	+	+		+	+	+	+	+	+	+	+	+		+	+	+	+	+	+	-	-	-		+	+	+	+	+	+	-	-	-		-	-	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-9	7
3b Alternative Excavation with Off-Site Disposal	Yes	+	+	+	-		+	+	+	+	+	+	+	+	-		+	-	+	+	+	-	-	-	+		-	-	-	-	-	-	+	-	+		+	+	+	-	-	-	-	-	-		-	-	-	+		-	+	-	-	-	1	4
3c Standard Excavation with On-Site Consolidation	Yes	+	+	+	-	-		-	+	+	0	+	+	+	-	-		-	+	+	0	-	+	-	+	+		+	+	-	-	-	+	-	+	-	-	-	+	+	-	-	-	-	-	-		-	-	-	+	+		+	-	-	-	1	4
3d Standard Excavation with Off-Site Disposal and On-Site Consolidation	Yes	+	+	+	-	-	+		+	+	+	+	+	+	-	+	+		+	+	+	-	+	-	+	+	-		+	-	-	-	+	-	+	-	-		+	-	-	-	-	-		-	-	-	+	-	-		-	-	-	1	4
4a Focused Standard Excavation with Off-Site Disposal and Standard Cap	Yes	+	+	+	-	-	-	-		+	-	+	+	+	-	-	-	-		+	-	-	-	-	+	+	-	-		-	-	-	-	+	-	-	-			-	-	-	+	-	-	-			-	-	-	+	+	+	+		-	-	-15	8
4b Focused Alternative Excavation with Off-Site Disposal and Amended Cap	Yes	+	+	+	-	-	-	-	-		-	+	+	+	-	-	-	-	-		-	-	+	-	+	+	+	+	+		+	-	+	-	+	+	+	+	+			+	-	+	+	+	+	+	+		+	9	2
4c Focused Alternative Excavation with Off-Site Disposal/On-Site Consolidation and Cap	Yes	+	+	+	-	-	0	-	+	+		+	+	+	-	-	0	-	+	+		-	+	-	+	+	+	+	+	-		-	+	-	+	+	+	+	+	-		-	-	-	+	+	+	+	+	-		11	1

Notes:

+ = The alternative is favored over the compared alternative (score=1)

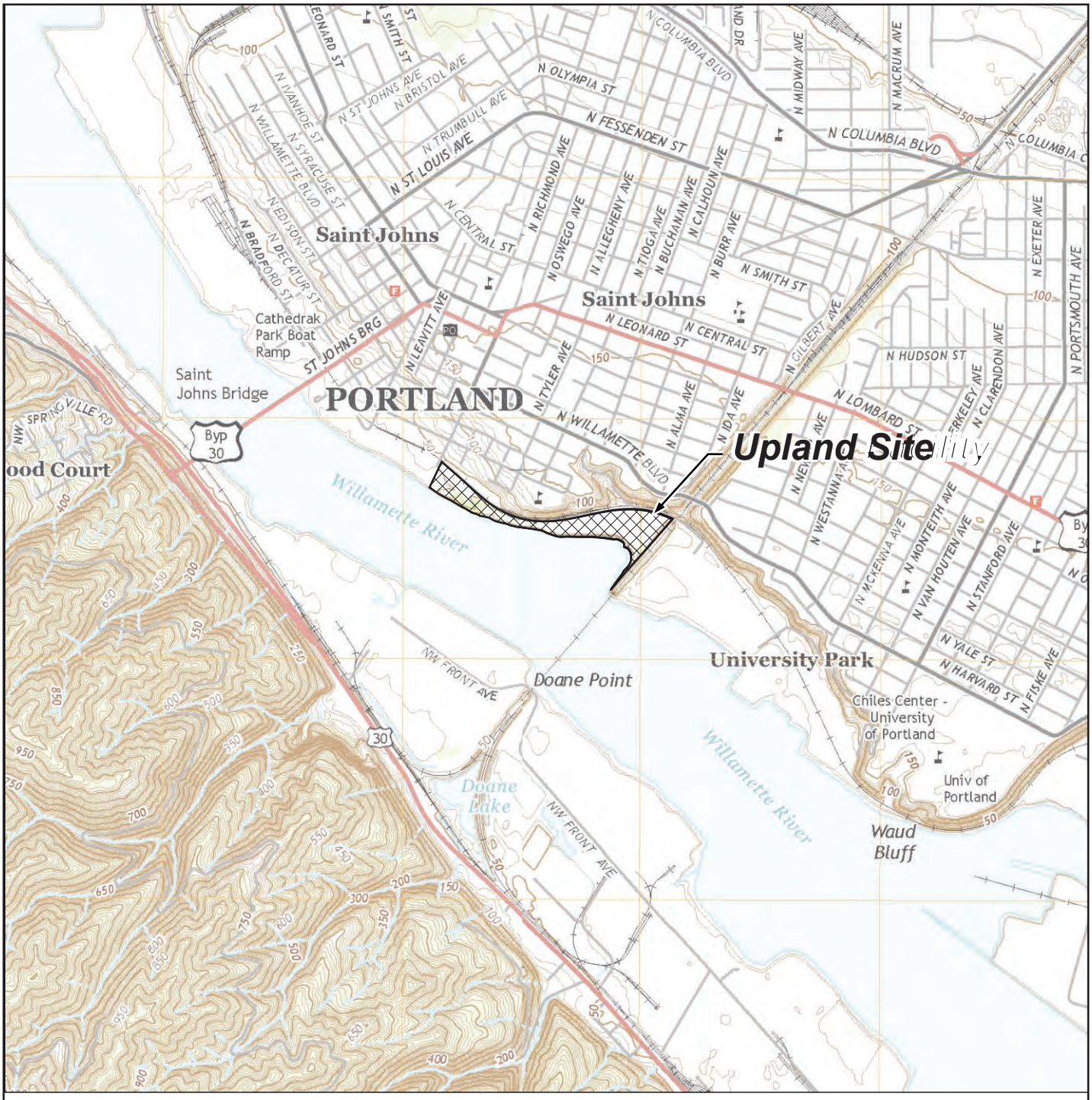
0 = The alternative is equal with the compared alternative (score=0)

- = The alternative is less favorable than the compared alternative (score=-1)

na = Not protective, therefore not ranked

Alternative	Compared Against:									
Alternative 1		2a	2b	3a	3b	3c	3d	4a	4b	4c
Alternative 2a	1		2b	3a	3b	3c	3d	4a	4b	4c
Alternative 2b	1	2a		3a	3b	3c	3d	4a	4b	4c
Alternative 3a	1	2a	2b		3b	3c	3d	4a	4b	4c
Alternative 3b	1	2a	2b	3a		3c	3d	4a	4b	4c
Alternative 3c	1	2a	2b	3a	3b		3d	4a	4b	4c
Alternative 3d	1	2a	2b	3a	3b	3c		4a	4b	4c
Alternative 4a	1	2a	2b	3a	3b	3c	3d		4b	4c
Alternative 4b	1	2a	2b	3a	3b	3c	3d	4a		4c
Alternative 4c	1	2a	2b	3a	3b	3c	3d	4a	4b	

Table adapted from Revised Feasibility Study and Source Control Evaluation



Note: Base map prepared from USGS 7.5-minute quadrangles of Linnton and Portland, OR, dated 2014 as provided by USGS.gov.

0 2,000 4,000

Approximate Scale in Feet

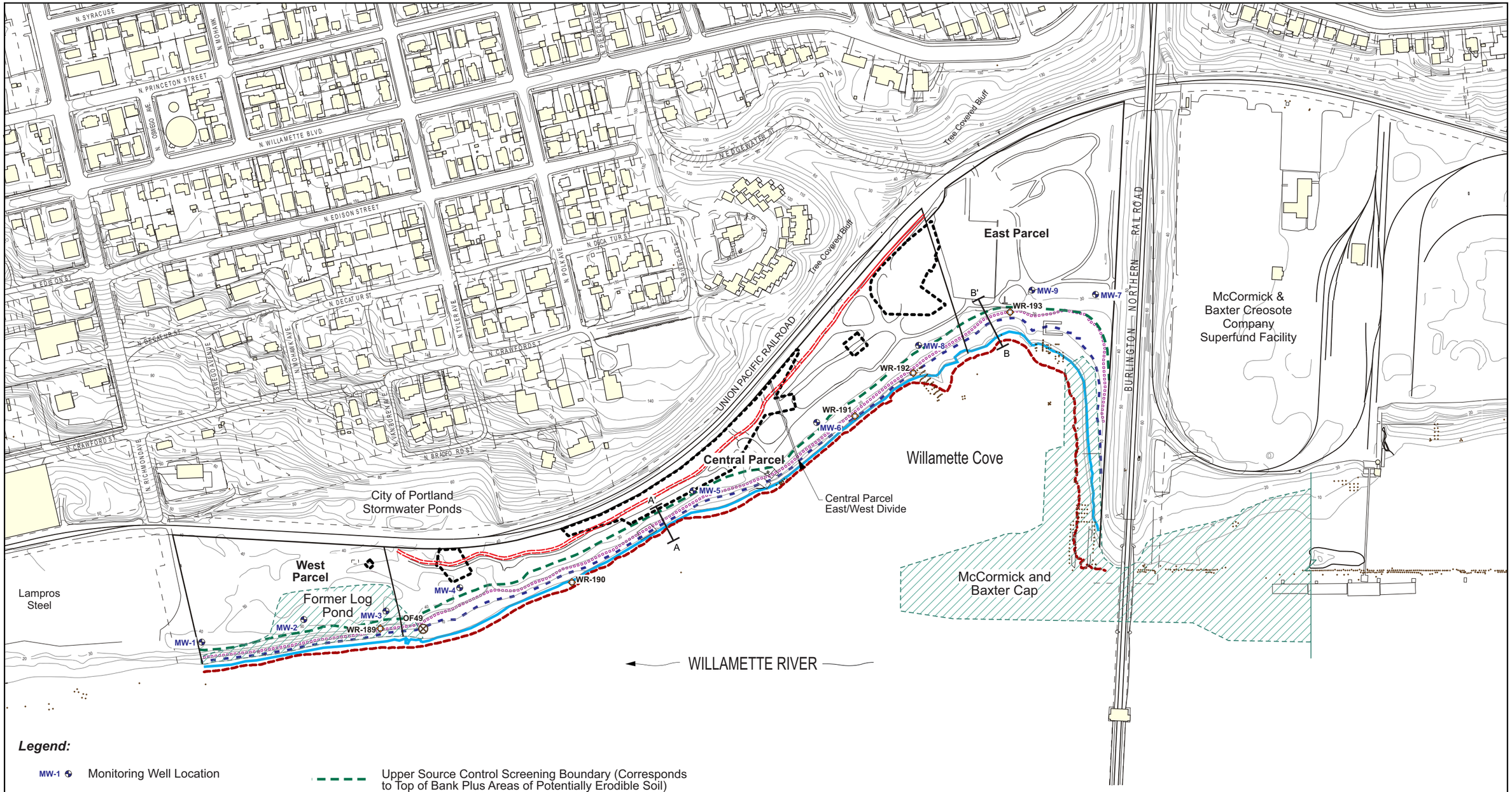
N

Site Location Map

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
	March 2020	1



Legend:

- MW-1 — Monitoring Well Location
- OF49 — City of Portland Outfall
- WR-189 — Potential Historical Outfall (Inactive)
- 2008 and 2015 Removal Action Area
- Proposed Bike Path
- A' — A Cross-Section Location (See Figure 3)
- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary (Corresponds to -2 Columbia River Datum; 3.2NAVD88)

0 300 600

Approximate Scale in Feet

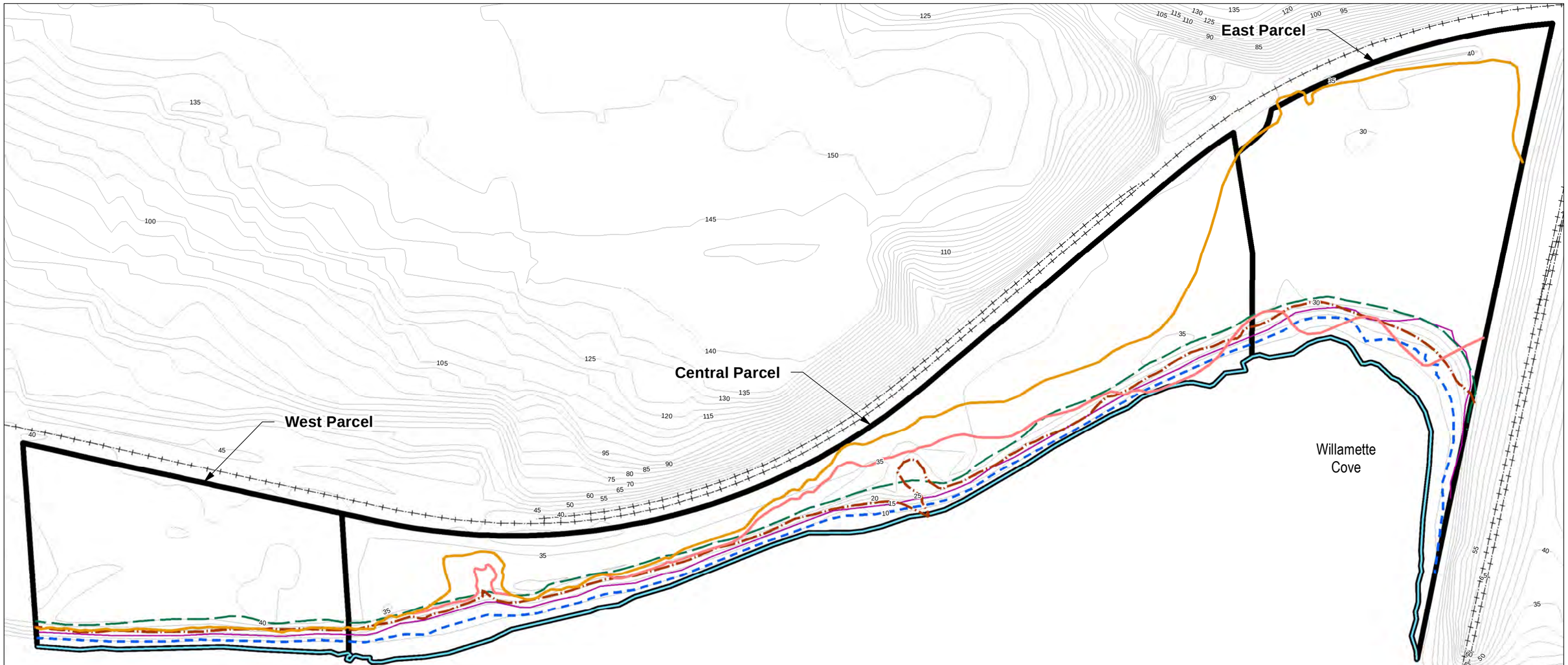
Source: Base map prepared from an electronic file provided by Hart Crowser.

Site Map

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2020		2



Legend:

- Parcel Boundary
- 500-Year Floodplain (37NAVD88)
- 100-Year Floodplain (32NAVD88)
- 1996 Flood Inundation
- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)

0 200 400

Approximate Scale in Feet

N

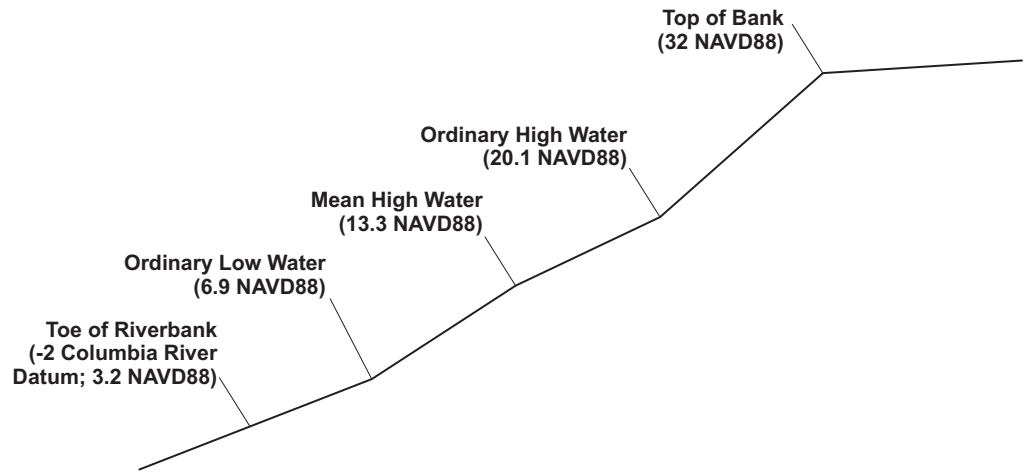
Site Elevation and Floodplain Map

Willamette Cove Upland
Portland, Oregon

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser.
Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

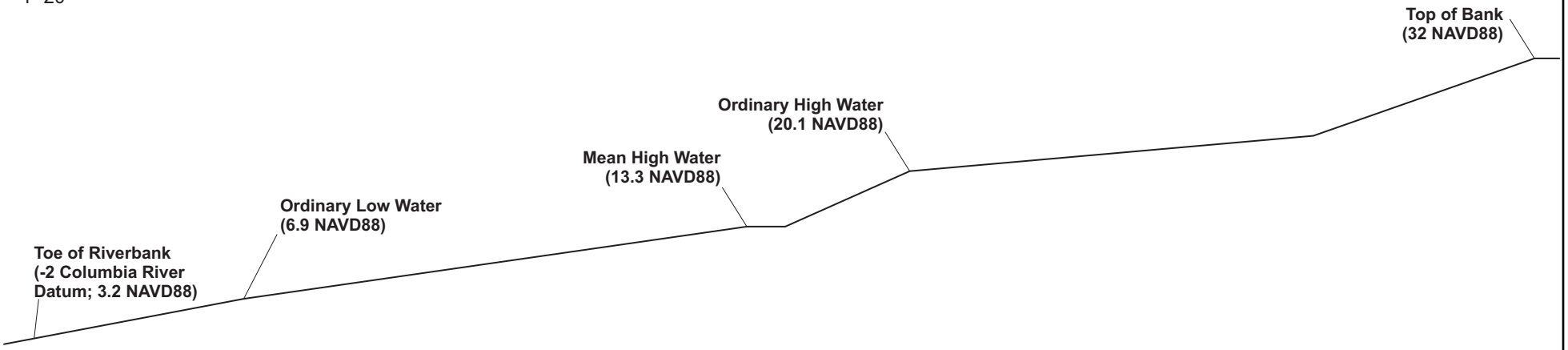
Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure 3
March 2020		



A-A' Central Parcel

1" 20'



B-B' East Parcel/Inner Cove

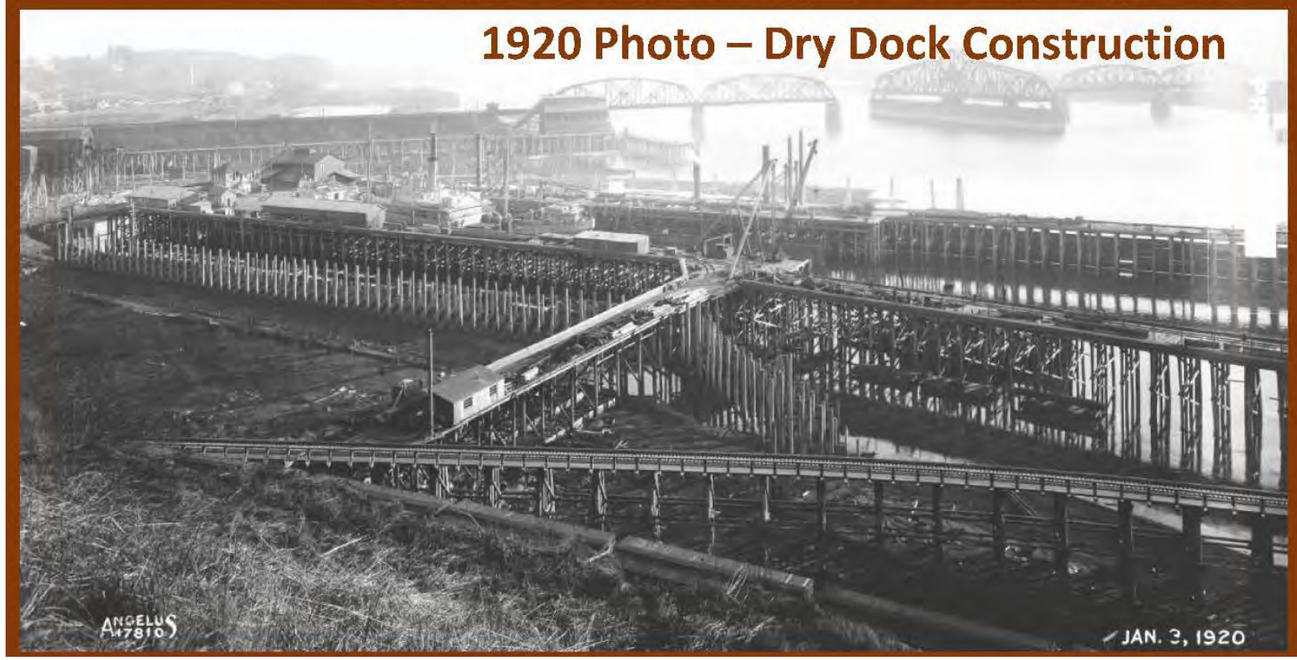
1" 20'

Bankline Cross-Sections

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2020		4



Historical Site Photos

Willamette Cove Upland Site

Apex Companies, LLC 3015 SW First Avenue Portland, Oregon 97201	Project Number	1056-10	Figure 5
	March 2019		

East Parcel

Central Parcel

West Parcel

Willamette Cove

B-1
B-2
TB-1W
B-3
B-4
B-5
B-6
B-7
B-8
B-9
B-10
B-11
B-12
B-13
B-14
B-15
B-16
B-17
B-18
B-19
B-20
B-21
B-23
B-25
B-26
B-27
B-28
B-29
B-30
TB-2W
TB-3W
TB-4W
DP-1
DP-2
DP-3
DP-4
DP-5
HA-4
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-35S
SE/E-1
SE/E-2
SE/E-3
SE/E-4
SE/E-5
SE/E-6
SE/E-7
SE/E-8
SE/E-9
SE/E-10
SE/E-11
SE/E-12
SE/E-13
SE/E-14
SE/E-17
SE/E-19
WC-4
WC-5
WC-6
WC-7
WC-8
TRENCH 2
TRENCH 4

←Willamette River

Legend:

- Monitoring Well
- Grab Sample
- Parcel Boundary
- Removal Action
- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum (3.2NAVD88)

0 200 400

Approximate Scale in Feet

N

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser.
Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

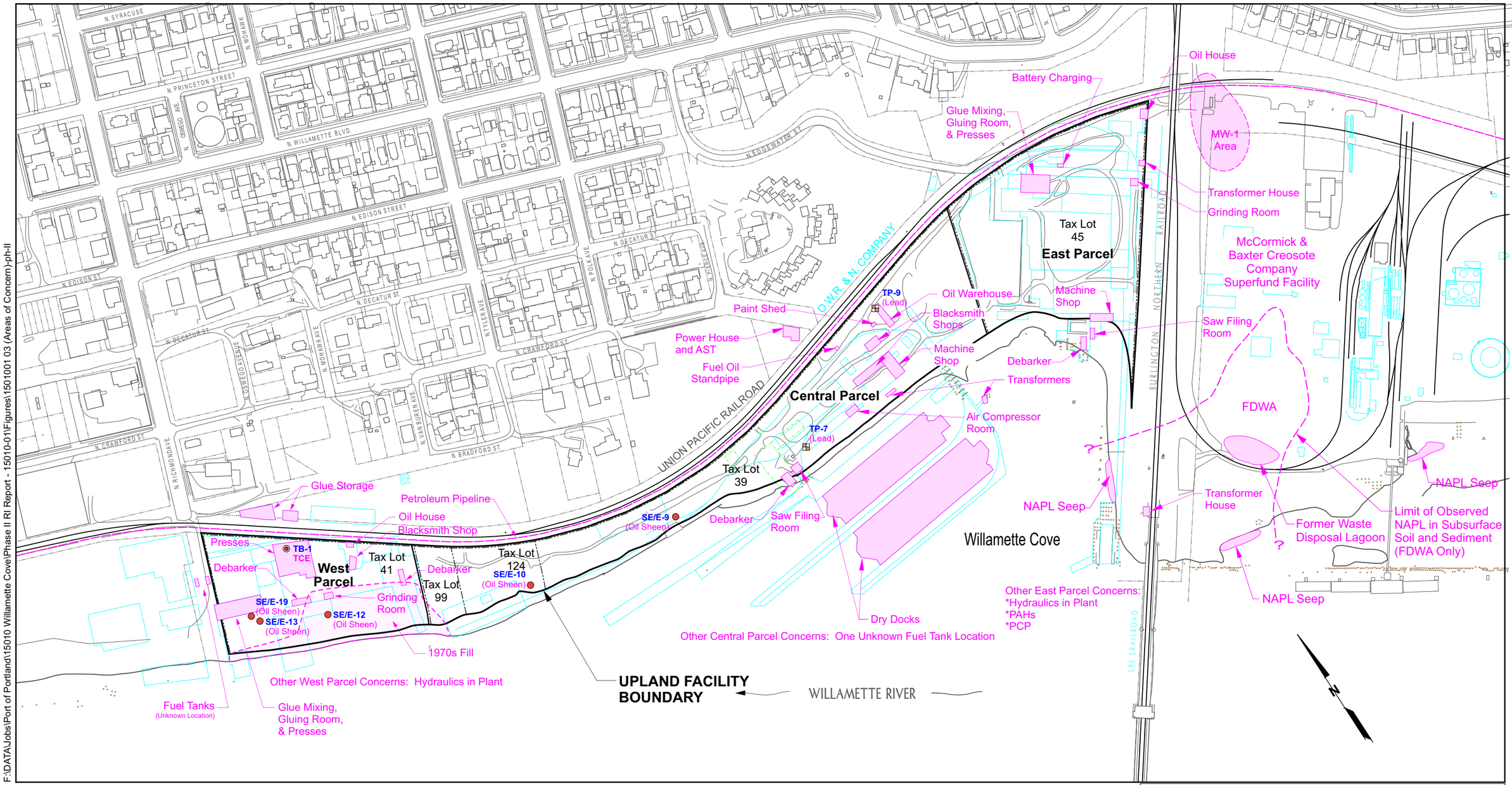
Groundwater Sample Locations

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
March 2020		6

F:\DATA\Jobs\Port of Portland\15010 Willamette Cove\Phase II RI Report - 15010-01\Figures\1501001 03 (Areas of Concern)-ph-II



Note: Base map prepared from an electronic file provided by the City of Portland.

Legend:

- SE/E-12 Soil Boring (EMCON, 1989)
- TP-7 Test Pit (EMCON, 1989)
- TB-1 Soil Boring (EMCON, 1996)
- Area of Potential Concern
- Building
- Railroad Tracks
- Former Site Features (~ 1950)
- Scritsmier Company Sawmill (~ 1960)

0 300 600

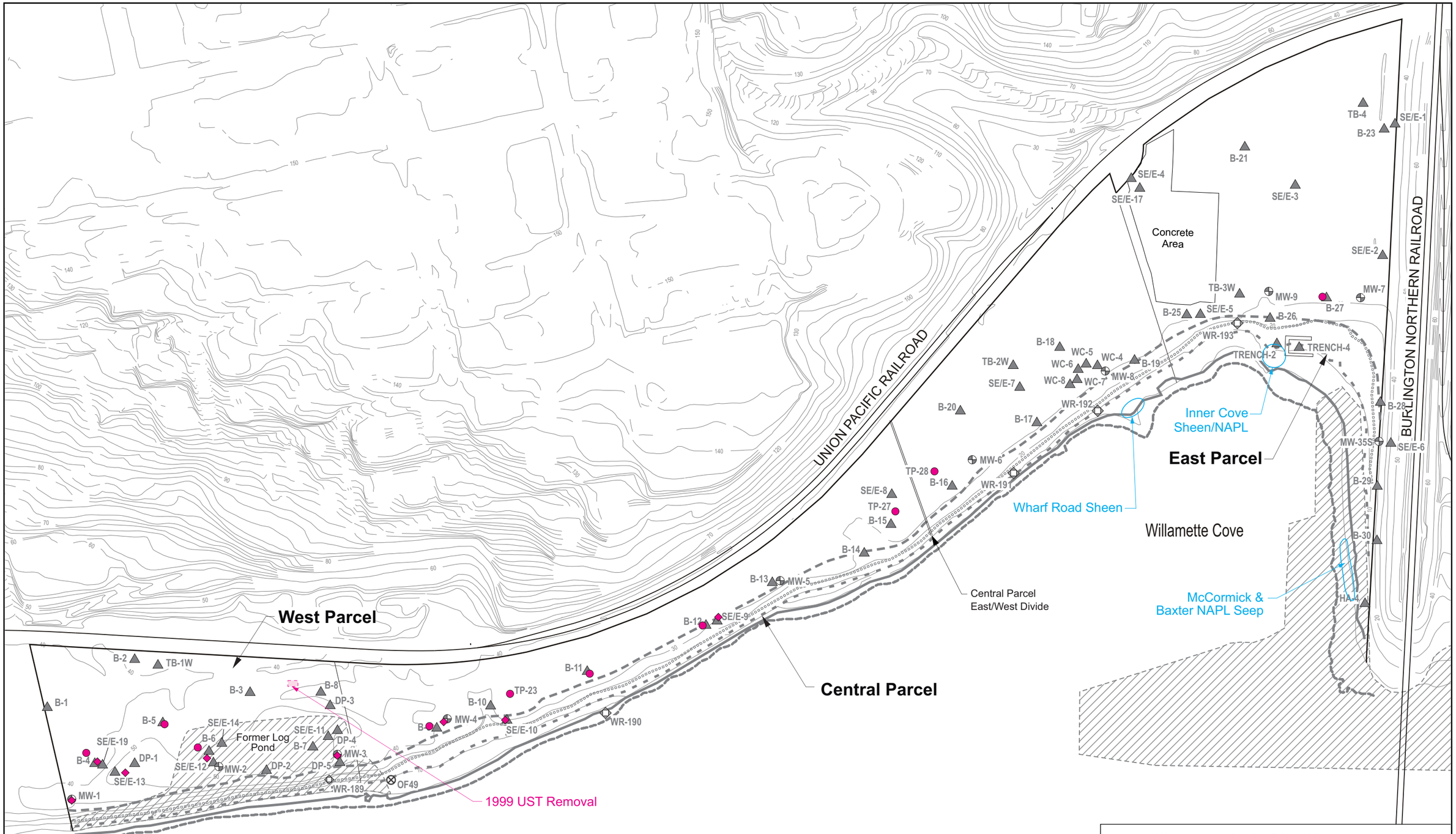
Approximate Scale in Feet

Historical Site Features

Willamette Cove Upland Site

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10	Figure
February 2020		7



Legend:

- Monitoring Well Location
- Grab Groundwater Sample Location
- City of Portland Outfall
- Potential Historical Outfall (Inactive)
- Sheen Observed in Upland Groundwater
- Sheen Observed in Upland Soil
- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum (3.2NAVD88)

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

Sheen and NAPL Observations

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
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Portland, Oregon 97201

Project Number	1056-10	Figure
March 2020		8

East Parcel

Central Parcel

West Parcel

UNION PACIFIC RAILROAD

Willamette Cove

BNSF RAILWAY

←Willamette River

Legend:

- Discrete Sample Location
- Sample Locations Removed During 2008/2015 Soil Removal Actions
- Parcel Boundary
- Removal Action Area
- Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)

0 200 400

Approximate Scale in Feet

N

Soil Investigations - Discrete

Willamette Cove Upland Site

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

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Project Number	1056-10	Figure
March 2019		9

East Parcel

Central Parcel

West Parcel

UNION PACIFIC RAILROAD

BNSF RAILWAY

Willamette Cove

←Willamette River

Legend:

- Composite Sample Location
- Center of Entire or Significant Portion of Sample Location Removed During 2008/2015 Soil Removal Actions
- Parcel Boundary
- Removal Action Area
- Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)

0 200 400

Approximate Scale in Feet

N

Soil Investigations - Composite

Willamette Cove Upland Site

Basemap prepared using spatial data from Metro (2010-2017), Apex, Formation Environmental, and Hart Crowser. Coordinate System: NAD83 HARN StatePlane Oregon North FIPS 3601 (Intl Feet).

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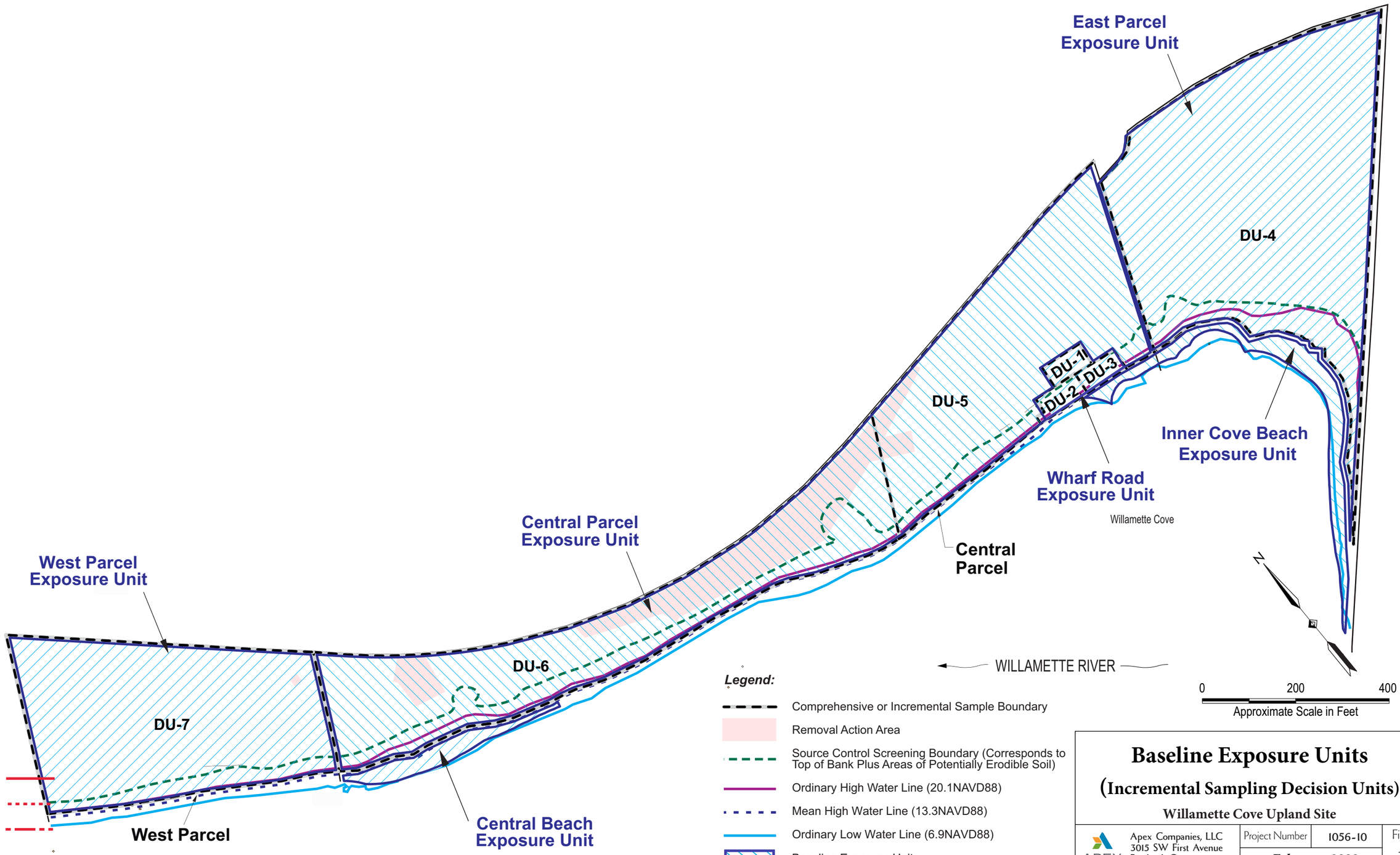
Project Number 1056-10

March 2019

Figure 10



Note: Base map prepared from an electronic file provided by Hart Crowser.

Baseline Exposure Units

(Incremental Sampling Decision Units)

Willamette Cove Upland Site

Apex Companies, LLC
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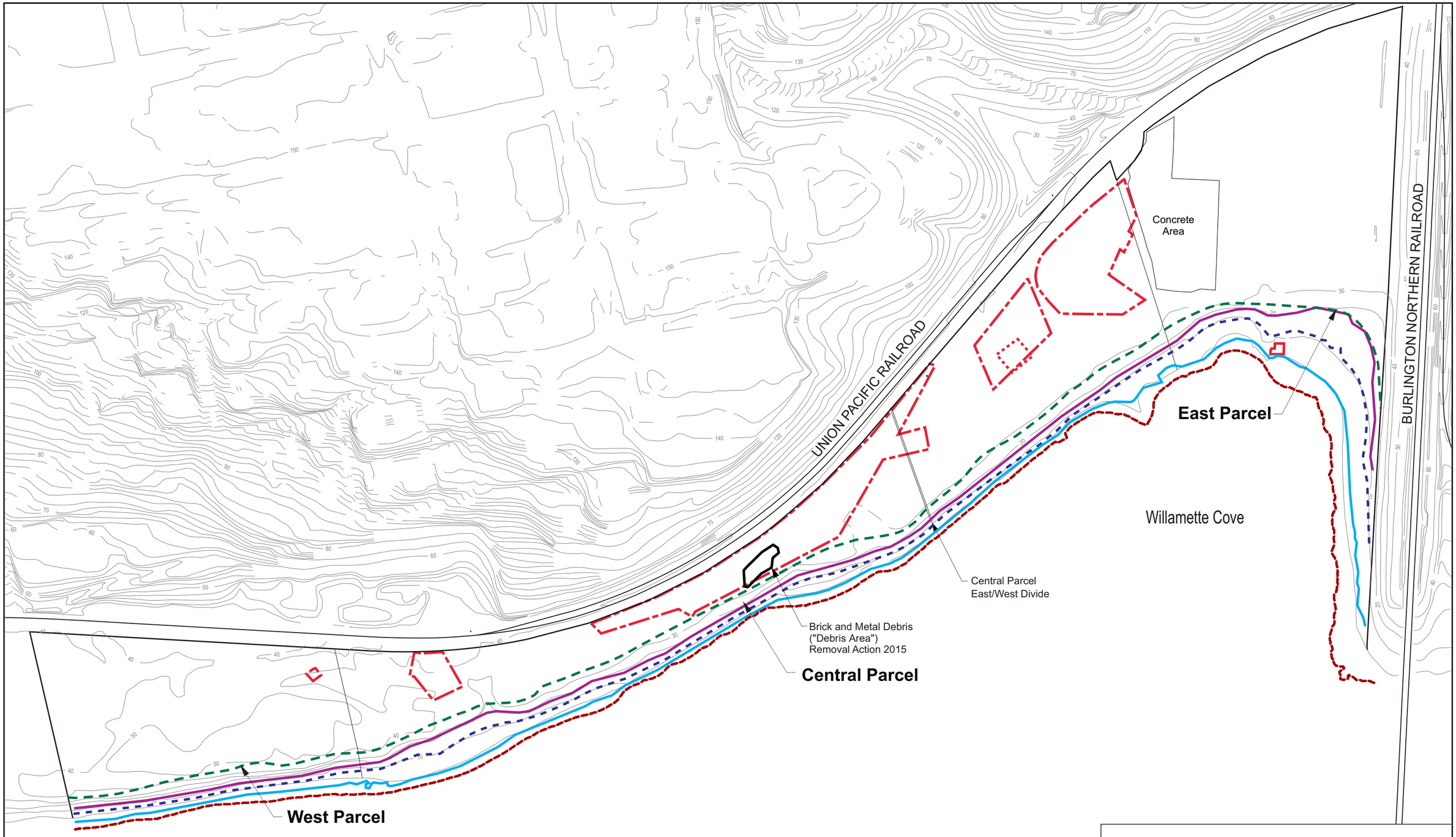
Portland, Oregon 97201

Project Number	1056-10	Figure
February 2020		11



Legend:

- 2004 Removal Area
- 2008 Removal Area
- 2015 Removal Area
- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

Removal Actions Map

Willamette Cove Upland Site

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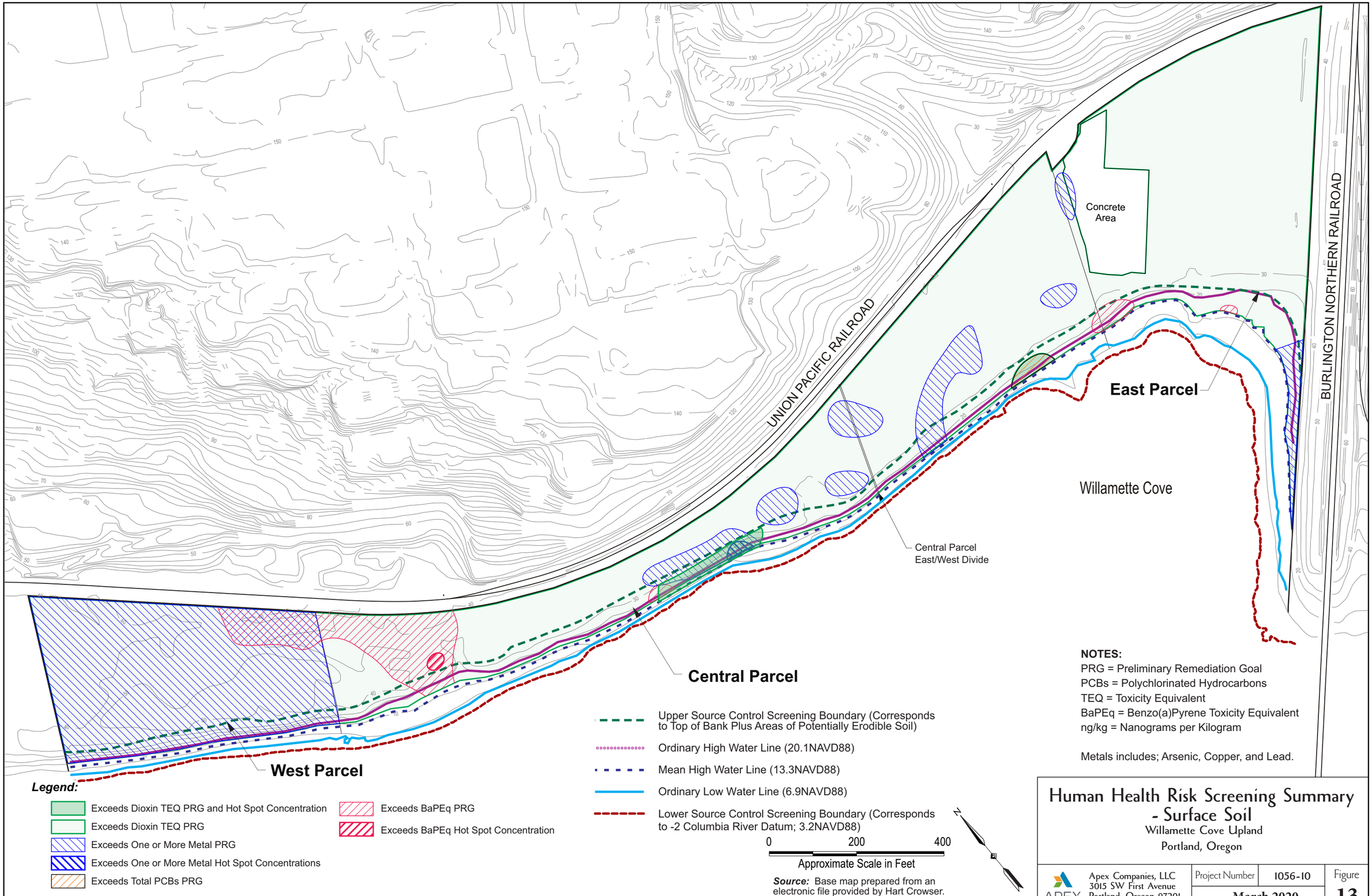
Project Number	1056-10
February 2020	

Figure **12**



Source: Base map prepared from an electronic file provided by Hart Crowser.

NOTES:
PRG = Preliminary Remediation Goal
PCBs = Polychlorinated Hydrocarbons
TEQ = Toxicity Equivalent
BaPEq = Benzo(a)Pyrene Toxicity Equivalent
ng/kg = Nanograms per Kilogram

Metals includes; Arsenic, Copper, and Lead.

Human Health Risk Screening Summary - Surface Soil

Willamette Cove Upland
Portland, Oregon

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Portland, Oregon 97201

Project Number	1056-10	Figure
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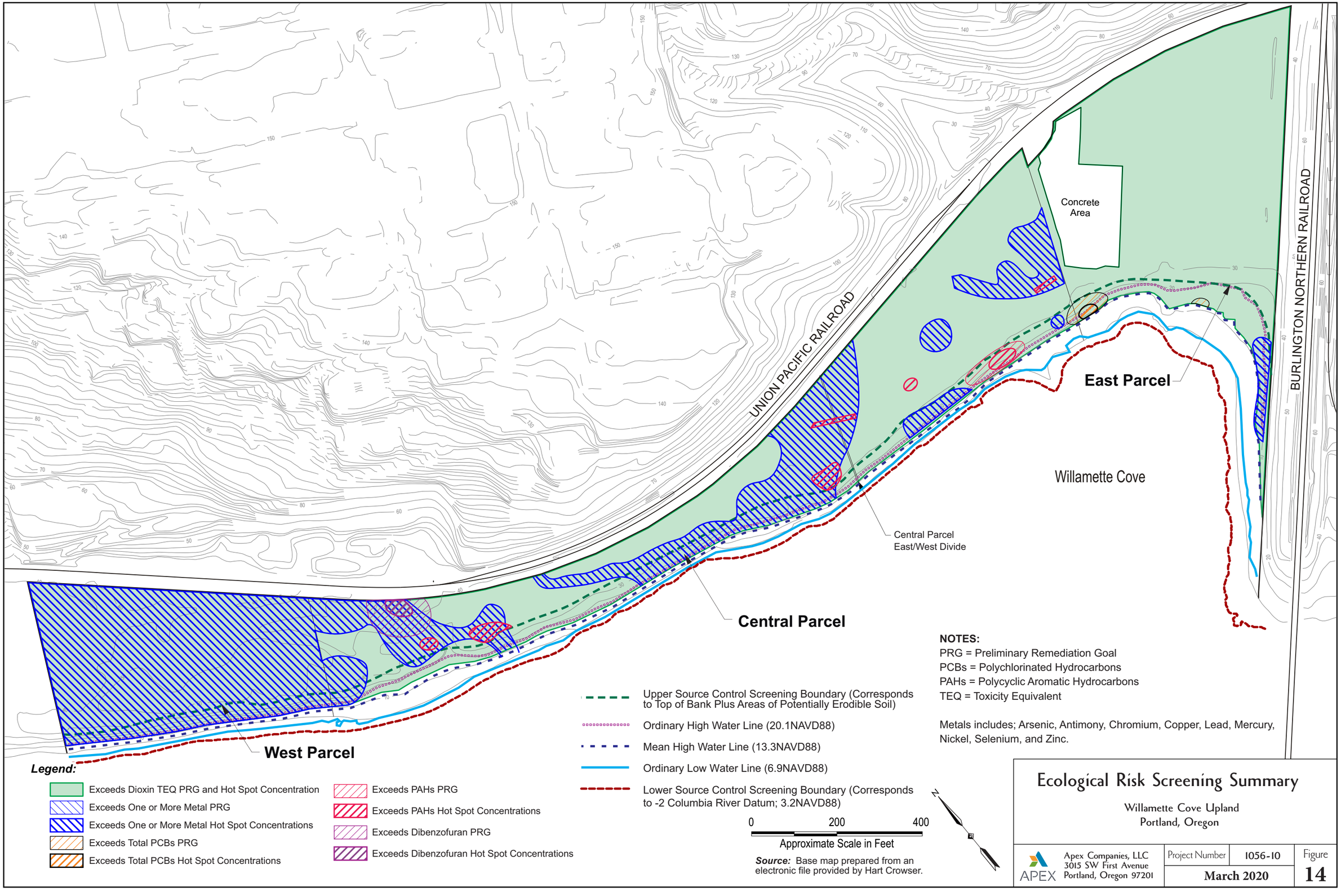

NOTES:
PRG = Preliminary Remediation Goal
PCBs = Polychlorinated Hydrocarbons
PAHs = Polycyclic Aromatic Hydrocarbons
TEQ = Toxicity Equivalent

Metals includes; Arsenic, Antimony, Chromium, Copper, Lead, Mercury, Nickel, Selenium, and Zinc.

Ecological Risk Screening Summary

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
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Portland, Oregon 97201

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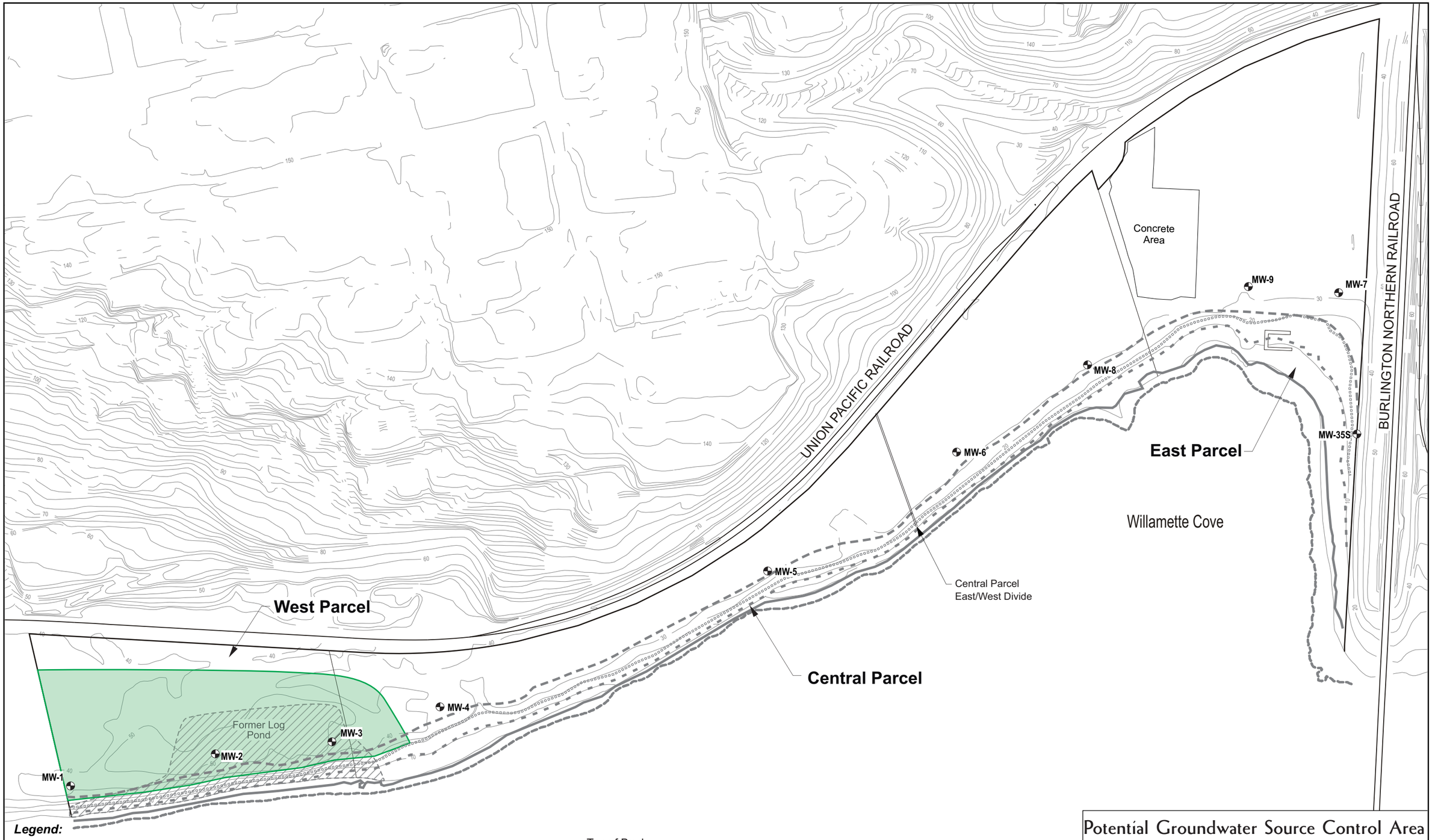
Figure 14



Legend:

- Monitoring Well Location
- Potential Groundwater Source Control Area

  Contaminants of Concern: Arsenic, TPH - Diesel (C10 - C12 Aliphatic), Pentachlorophenol, PAHs (cPAHs, 2-Methylnaphthalene), 4,4'-Dichlorodiphenyldichloroethane, Total Polychlorinated Biphenyls, and Dioxins/Furans.
- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum (3.2NAVD88)

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

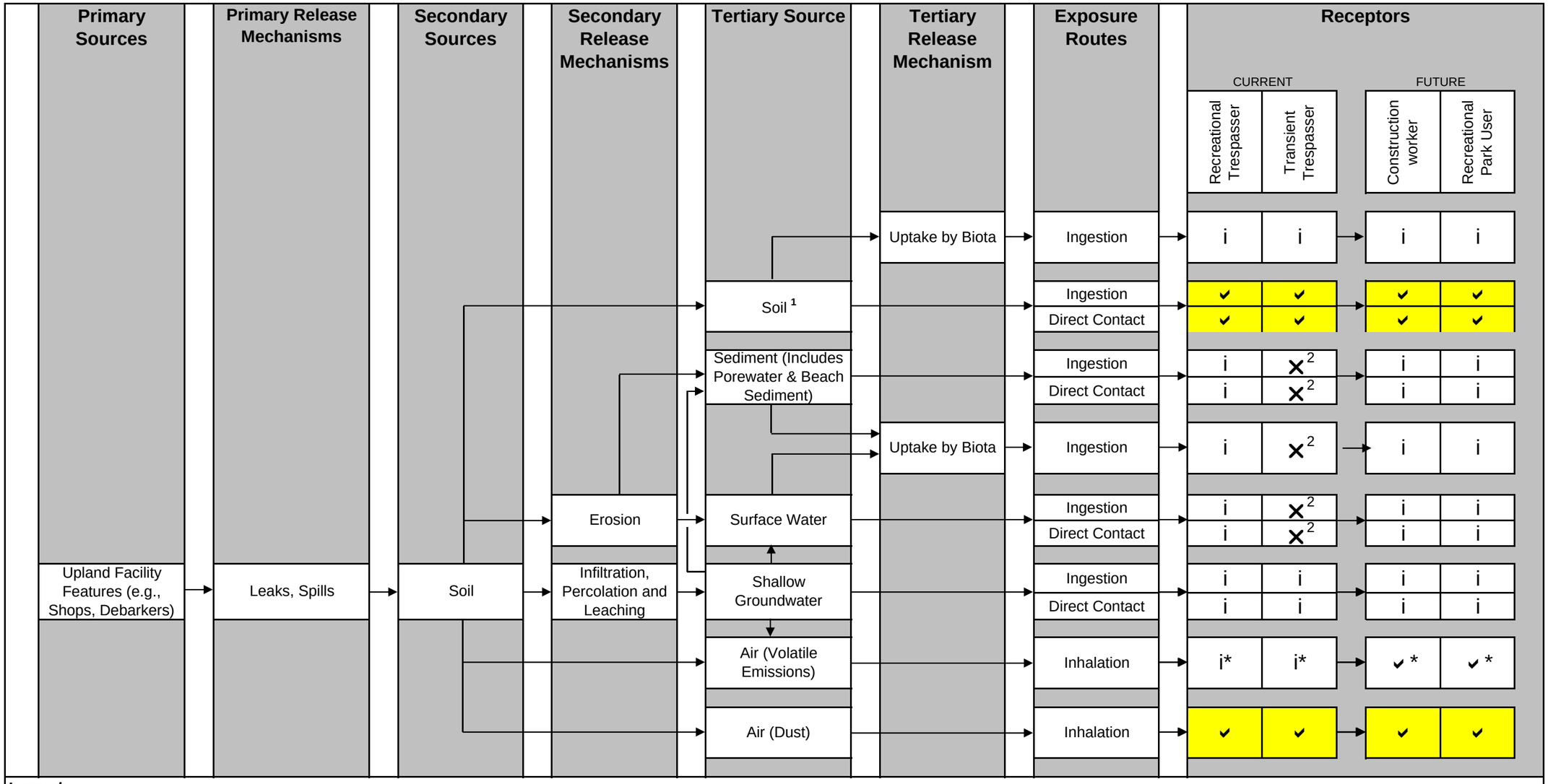
Potential Groundwater Source Control Area

Willamette Cove Upland Facility
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number	1056-10
March 2020	

Figure **15**



Legend:

i Incomplete Pathway for Willamette Cove Upland Facility Residual Risk Assessment

✔ Potentially Complete Exposure Pathway Evaluated in Willamette Cove Upland Facility Residual Risk Assessment

✔ * Potentially Complete Exposure Pathway Evaluated in Willamette Cove Upland Facility Baseline Risk Assessment; will not be further evaluated in Residual Risk Assessment

✕ Potentially Complete Exposure Pathway Evaluated in Portland Harbor RI/FS

[1] A source control evaluation will be submitted under separate cover and will include evaluation of pathways related specifically to potentially erodable riverbank soil.

[2] There is no exposure to surface water, groundwater, or sediment on the Upland Facility; direct and indirect exposure of human receptors to media associated with the Willamette River (including biota) will be evaluated in the Portland Harbor RI/FS and via the source control evaluation (submitted under separate cover).

* Potentially complete exposure to volatiles in outdoor air (from soil or shallow groundwater) was evaluated in the Willamette Cove Baseline Human Health Risk Assessment. There was no indication of unacceptable risk from inhalation of volatiles from soil or groundwater in either indoor or outdoor settings.

Yellow highlights indicate pathways that are assessed in the Willamette Cove Upland Facility Residual Risk Assessment.

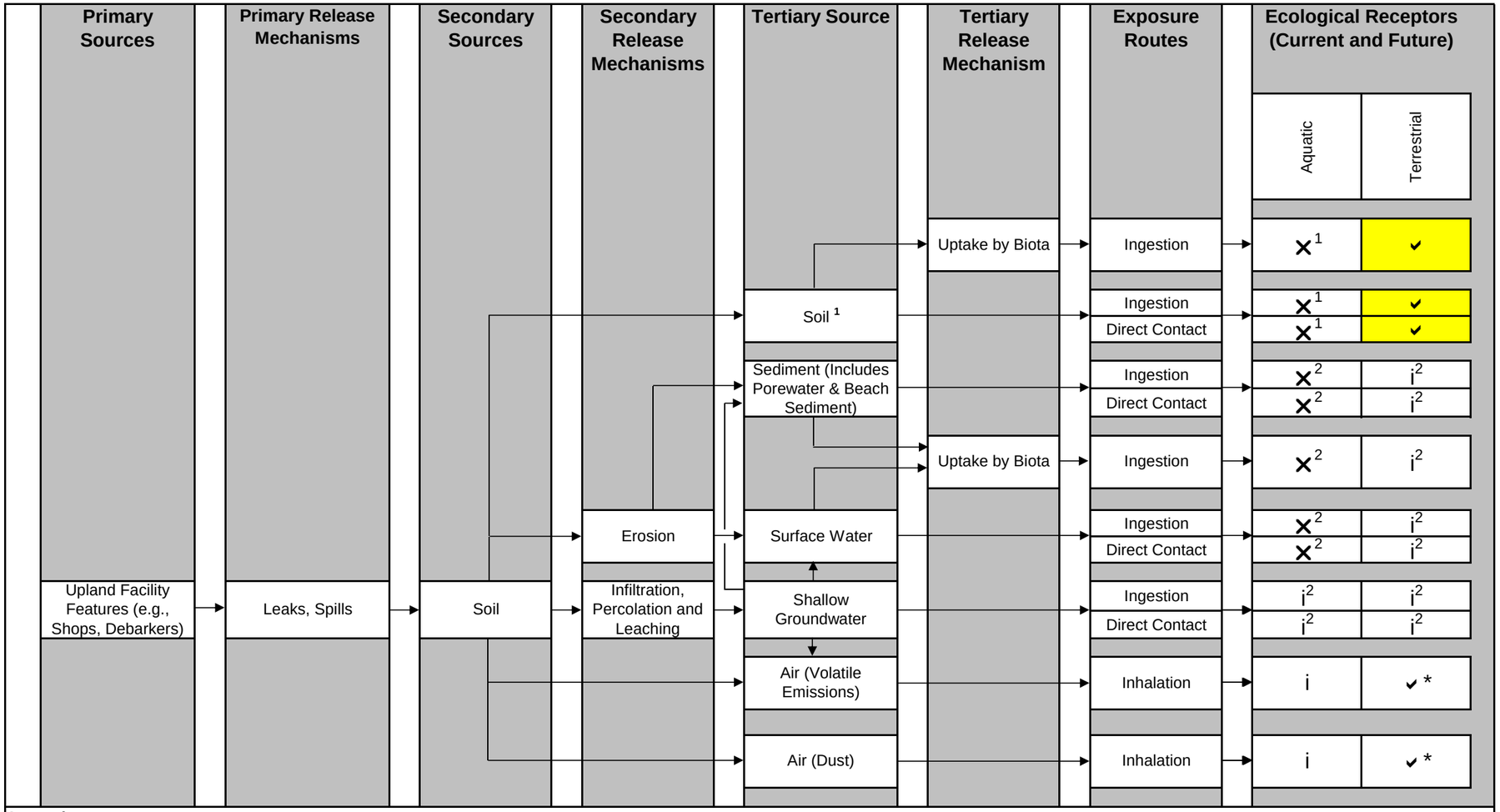
WILLAMETTE COVE UPLAND SITE

PORT OF PORTLAND, OREGON

Figure 16

Conceptual Site Model of Human Health Exposure Pathways

FORMATION ENVIRONMENTAL



Legend:

i Incomplete Pathway for Willamette Cove Upland Facility Residual Risk Assessment

✔ Potentially Complete Exposure Pathway Evaluated in Willamette Cove Upland Facility Residual Risk Assessment

✔ * Potentially Complete Exposure Pathway, but not evaluated quantitatively in the Willamette Cove Upland Facility Residual Risk Assessment.

✕ Potentially Complete Exposure Pathway Evaluated in Portland Harbor RI/FS and/or source control evaluation

Willamette Cove Upland Facility Boundary is defined by the Mean High Water Mark (MHWM). The West Parcel, Central Parcel, and East Parcel Upland Exposure Units (EUs) are bounded by the MHWM on the riverward side of the parcels. The Inner Cove Beach EU and the Central Beach EU are below the MHWM, and are not within the Facility Boundary, but are included in this residual risk assessment as requested by DEQ.

[1] Soils include upland, riverbank, and beach soils as defined for each Exposure Unit. Evaluation of pathways related to potentially erodable riverbank soil are evaluated in the Portland Harbor RI/FS and via the source control evaluation (submitted under separate cover).

[2] There is no exposure to surface water, groundwater, or sediment on the Upland Facility; direct and indirect exposure of ecological receptors to media associated with the Willamette River (including biota) are evaluated in the Portland Harbor RI/FS and via the source control evaluation (submitted under separate cover).

* Potentially complete exposure to volatiles in outdoor air (from soil or shallow groundwater) was evaluated in the Willamette Cove Baseline Human Health Risk Assessment. There was no indication of unacceptable risk from inhalation of volatiles from soil or groundwater in either indoor or outdoor settings.

Yellow highlights indicate pathways that are assessed in the Willamette Cove Upland Facility Residual Risk Assessment.

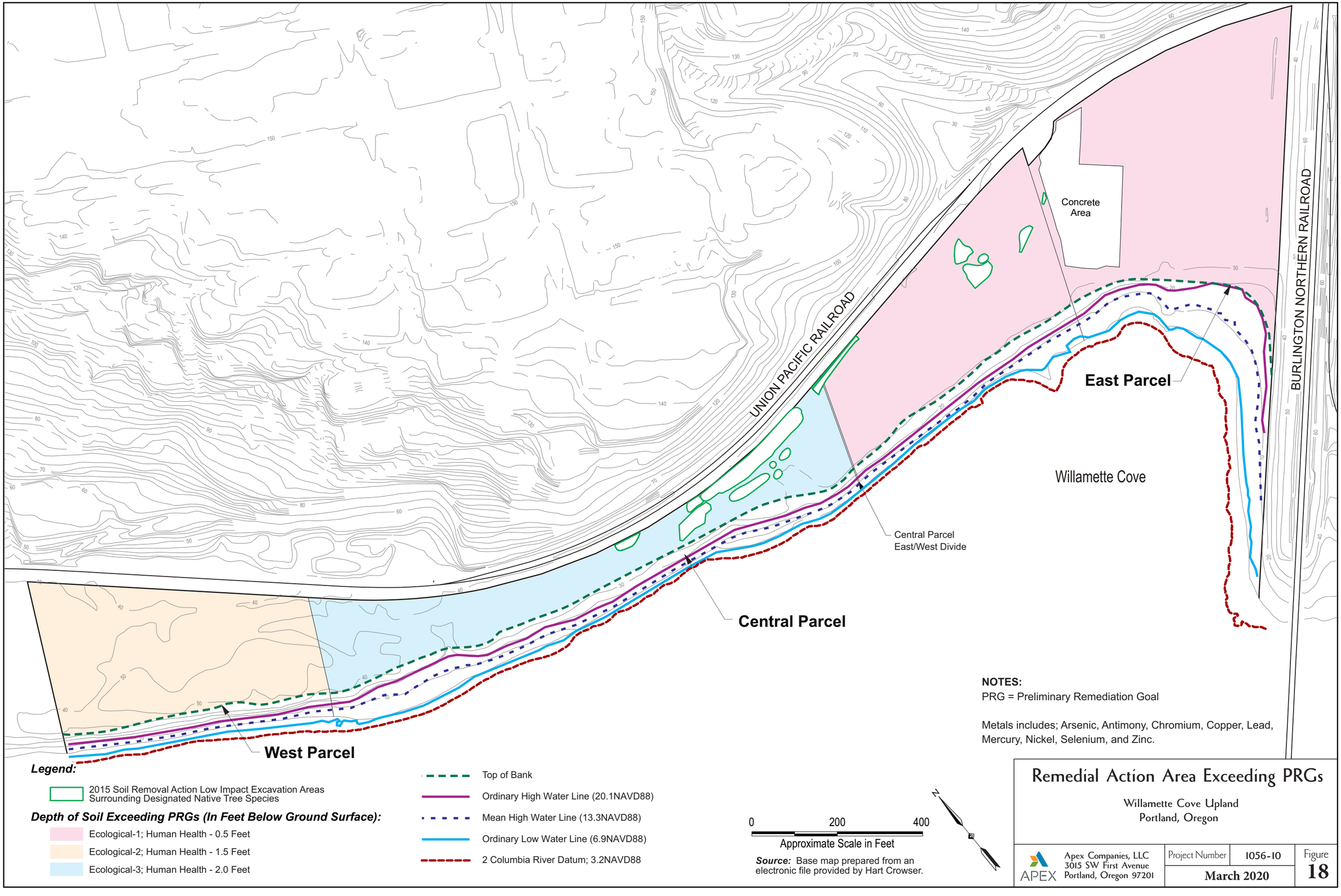
WILLAMETTE COVE UPLAND SITE

PORT OF PORTLAND, OREGON

Figure 17

Conceptual Site Model of Ecological Exposure Pathways

FORMATION ENVIRONMENTAL



Legend:

2015 Soil Removal Action Low Impact Excavation Areas Surrounding Designated Native Tree Species

Depth of Soil Exceeding PRGs (In Feet Below Ground Surface):

- Ecological-1; Human Health - 0.5 Feet
- Ecological-2; Human Health - 1.5 Feet
- Ecological-3; Human Health - 2.0 Feet

- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- 2 Columbia River Datum; 3.2NAVD88

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

NOTES:

PRG = Preliminary Remediation Goal

Metals includes; Arsenic, Antimony, Chromium, Copper, Lead, Mercury, Nickel, Selenium, and Zinc.

Remedial Action Area Exceeding PRGs

Willamette Cove Upland
Portland, Oregon

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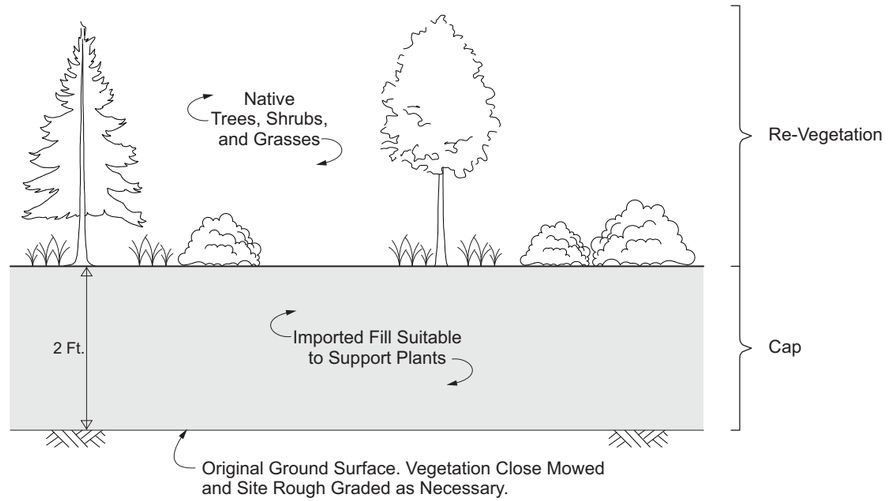
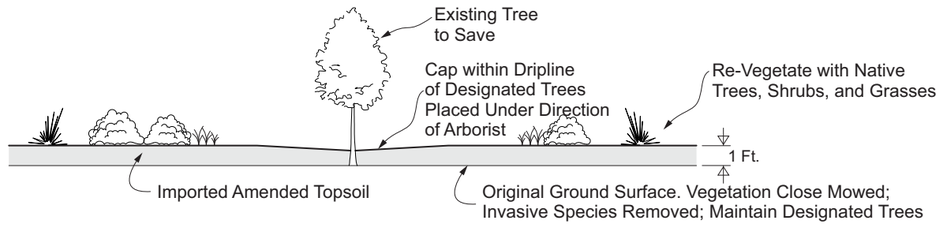
Project Number	1056-10
March 2020	

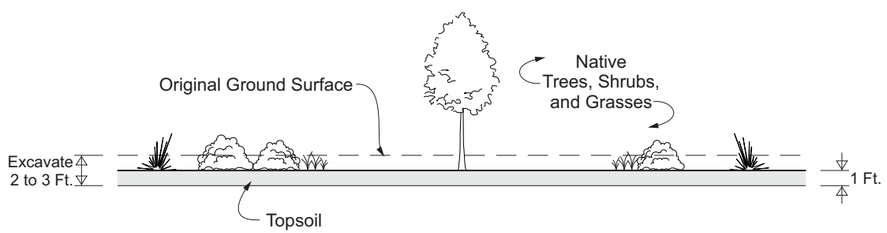
Figure **18**



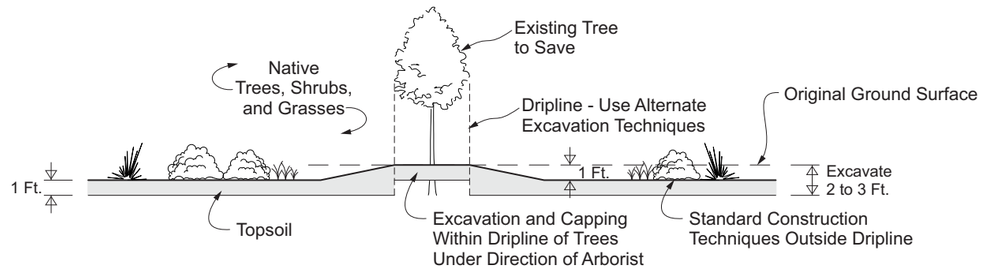
A Standard Cap Detail
Not To Scale



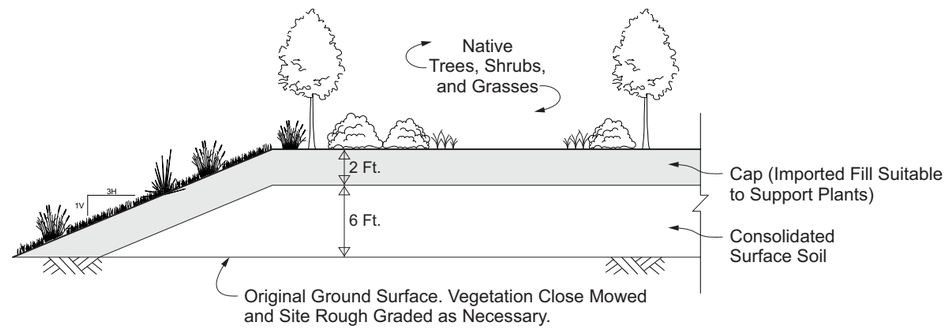
B Amended Cap Detail
Not To Scale



C Standard Excavation Detail
Not To Scale



D Alternative Excavation Detail
Not To Scale



E Soil Consolidation Area Detail
Not To Scale

Typical Cross-Sections

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
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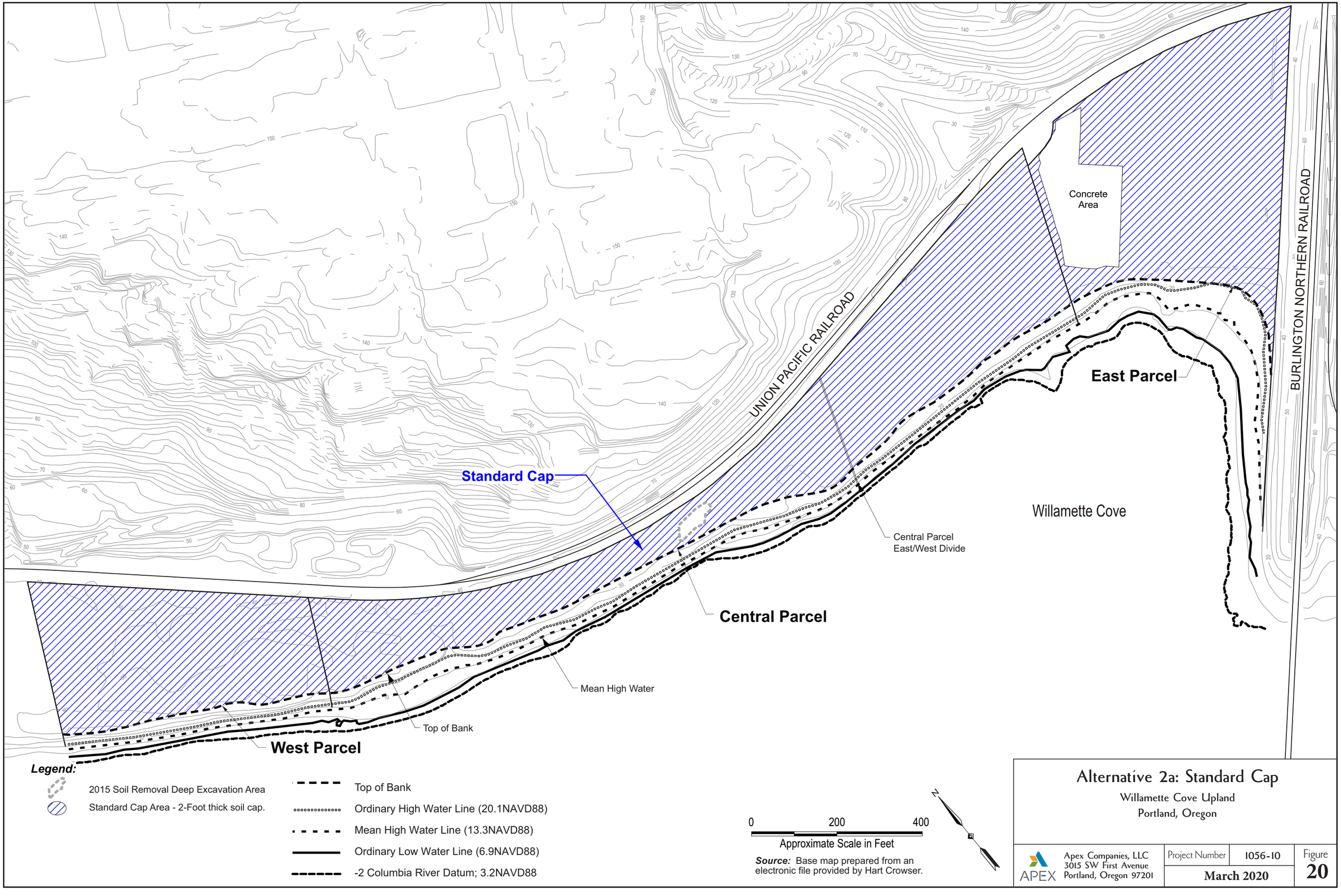
Figure 19



Legend:

- 2015 Soil Removal Deep Excavation Area
- Standard Cap Area - 2-Foot thick soil cap.
- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum; 3.2NAVD88

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

Alternative 2a: Standard Cap

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
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Portland, Oregon 97201

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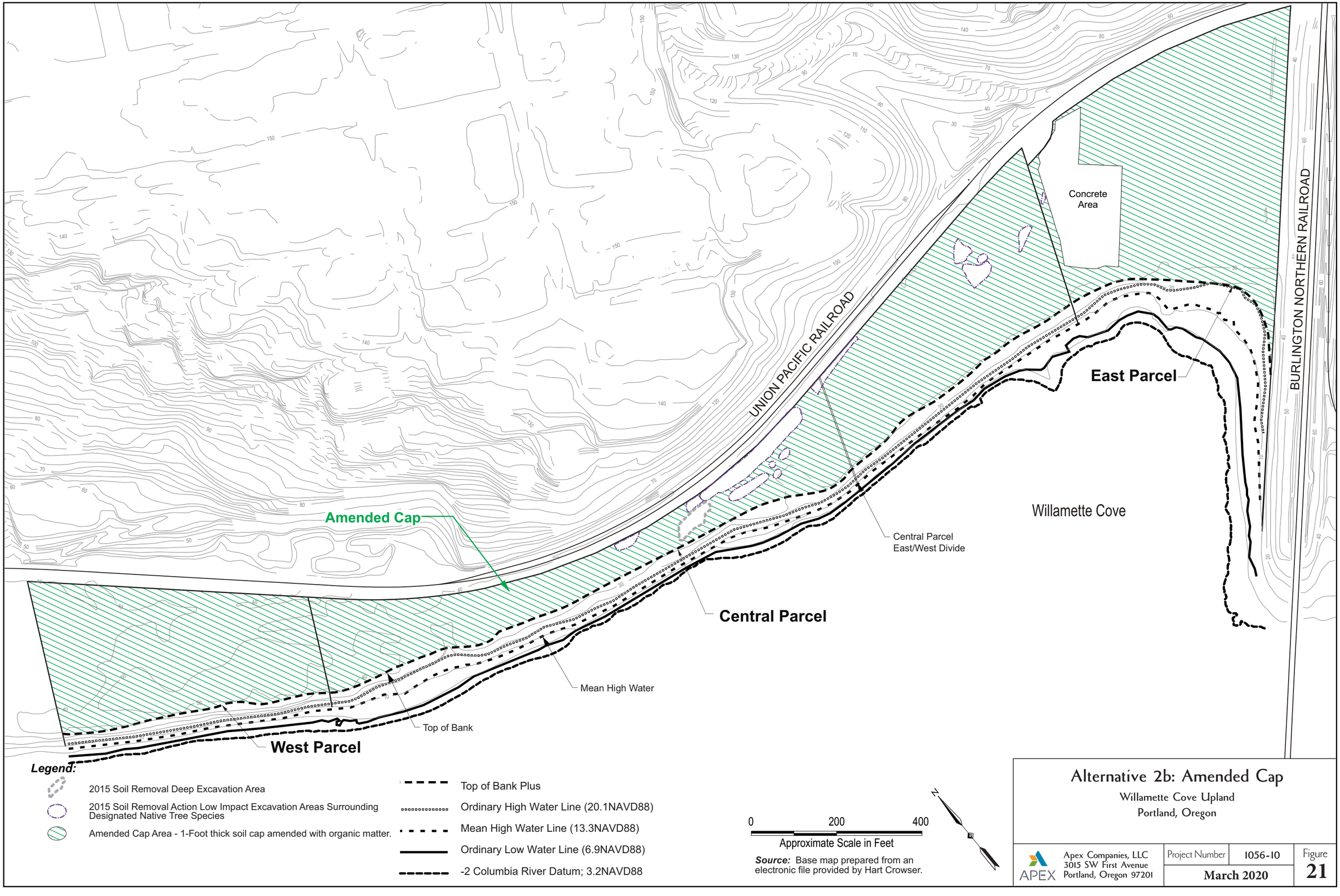
Figure **20**



Legend:

- 2015 Soil Removal Deep Excavation Area
- 2015 Soil Removal Action Low Impact Excavation Areas Surrounding Designated Native Tree Species
- Amended Cap Area - 1-Foot thick soil cap amended with organic matter.
- Top of Bank Plus
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum; 3.2NAVD88

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

Alternative 2b: Amended Cap

Willamette Cove Upland
Portland, Oregon

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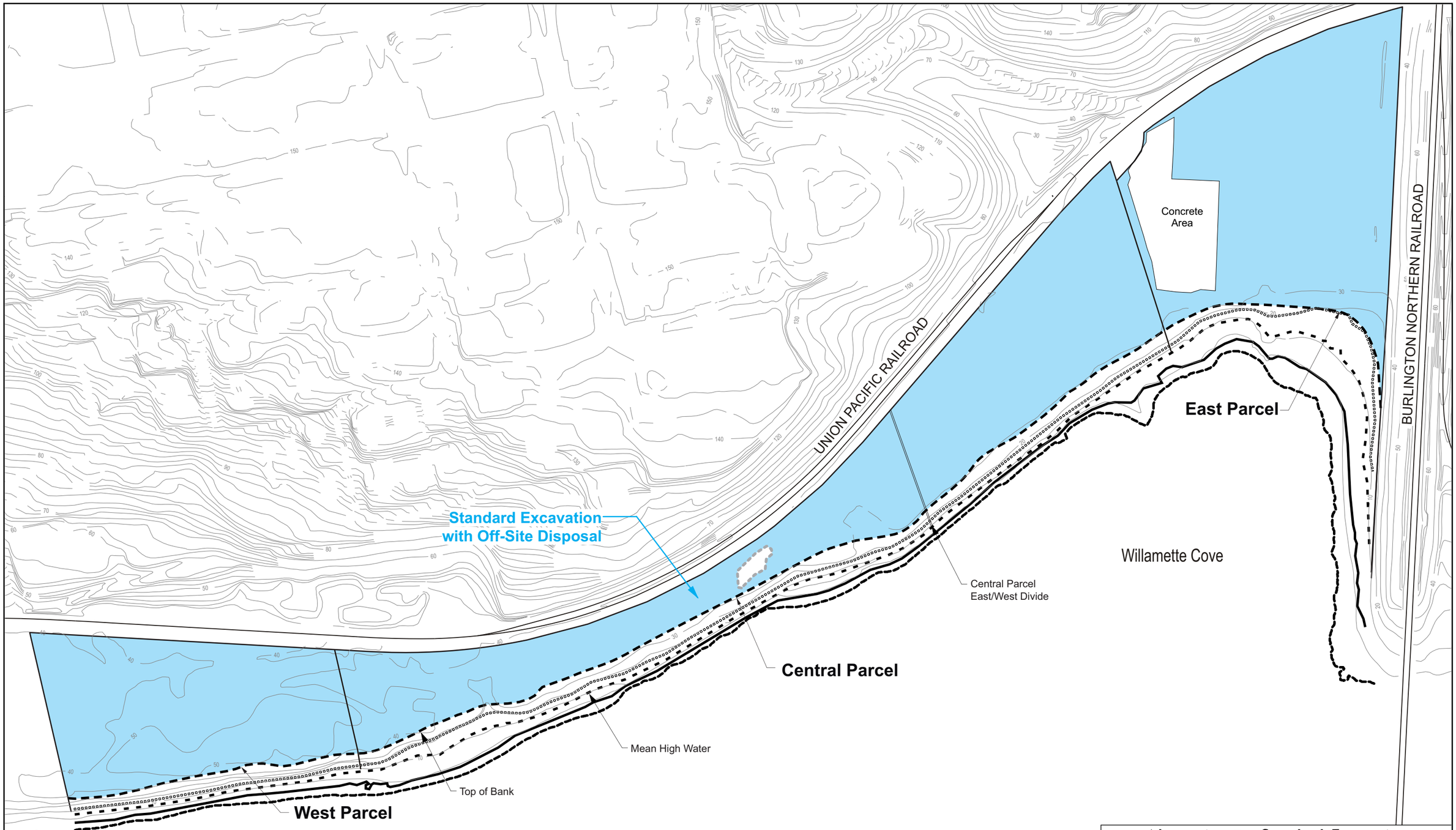

Legend:

- 2015 Soil Removal Deep Excavation Area
- Standard Excavation Area - All soil above human health and ecological risk levels excavated and taken off-site.
- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum; 3.2NAVD88

Note: Standard excavation area is approximate. Actual area will be determined by confirmation sampling conducted during remedial action.

0 200 400

Approximate Scale in Feet

N

Source: Base map prepared from an electronic file provided by Hart Crowser.

Alternative 3a: Standard Excavation with Off-Site Disposal

Willamette Cove Upland
Portland, Oregon

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Portland, Oregon 97201

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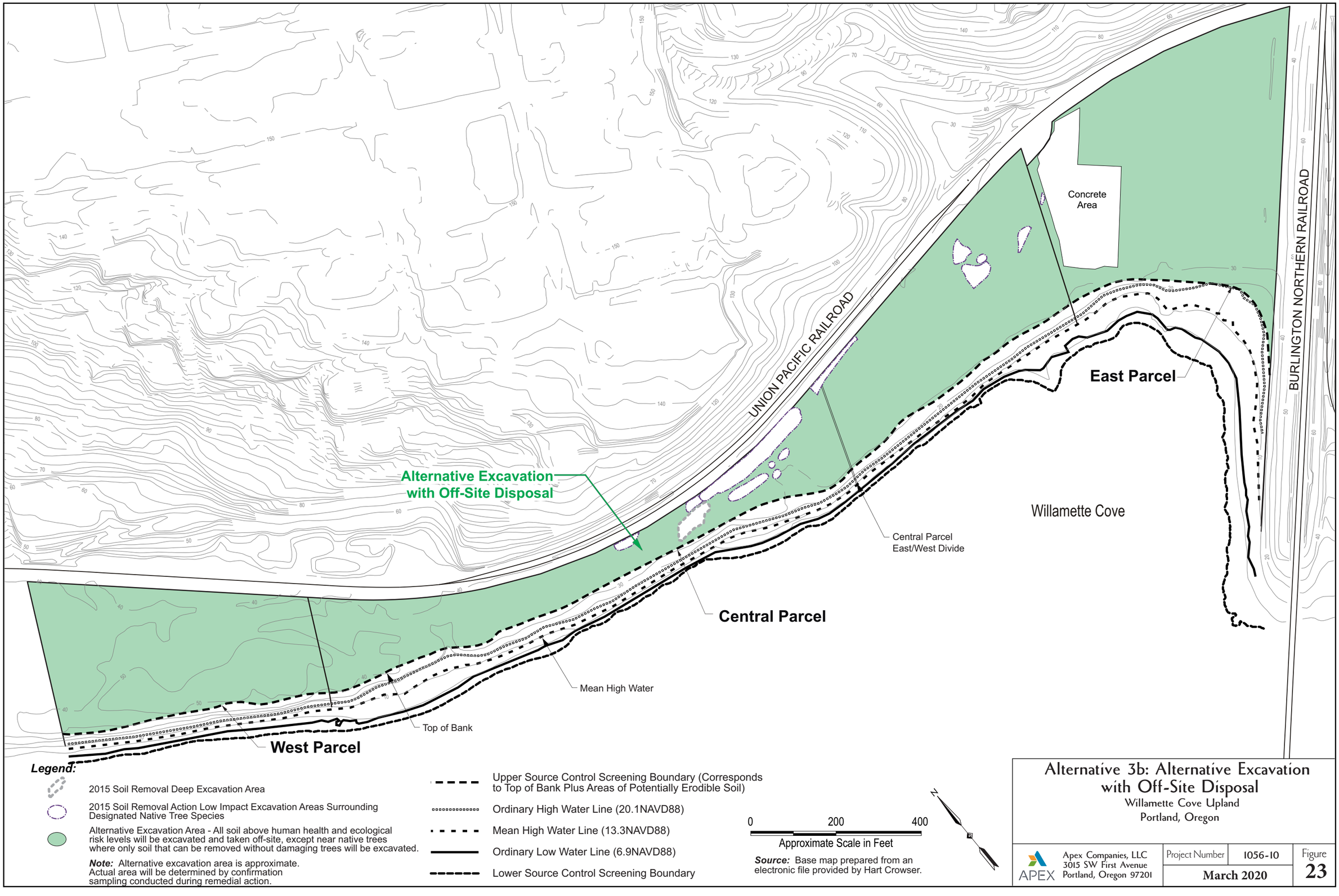
Figure 22



Legend:

- 2015 Soil Removal Deep Excavation Area
- 2015 Soil Removal Action Low Impact Excavation Areas Surrounding Designated Native Tree Species
- Alternative Excavation Area - All soil above human health and ecological risk levels will be excavated and taken off-site, except near native trees where only soil that can be removed without damaging trees will be excavated.

Note: Alternative excavation area is approximate. Actual area will be determined by confirmation sampling conducted during remedial action.

- Upper Source Control Screening Boundary (Corresponds to Top of Bank Plus Areas of Potentially Erodible Soil)
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- Lower Source Control Screening Boundary

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

Alternative 3b: Alternative Excavation with Off-Site Disposal

Willamette Cove Upland
Portland, Oregon

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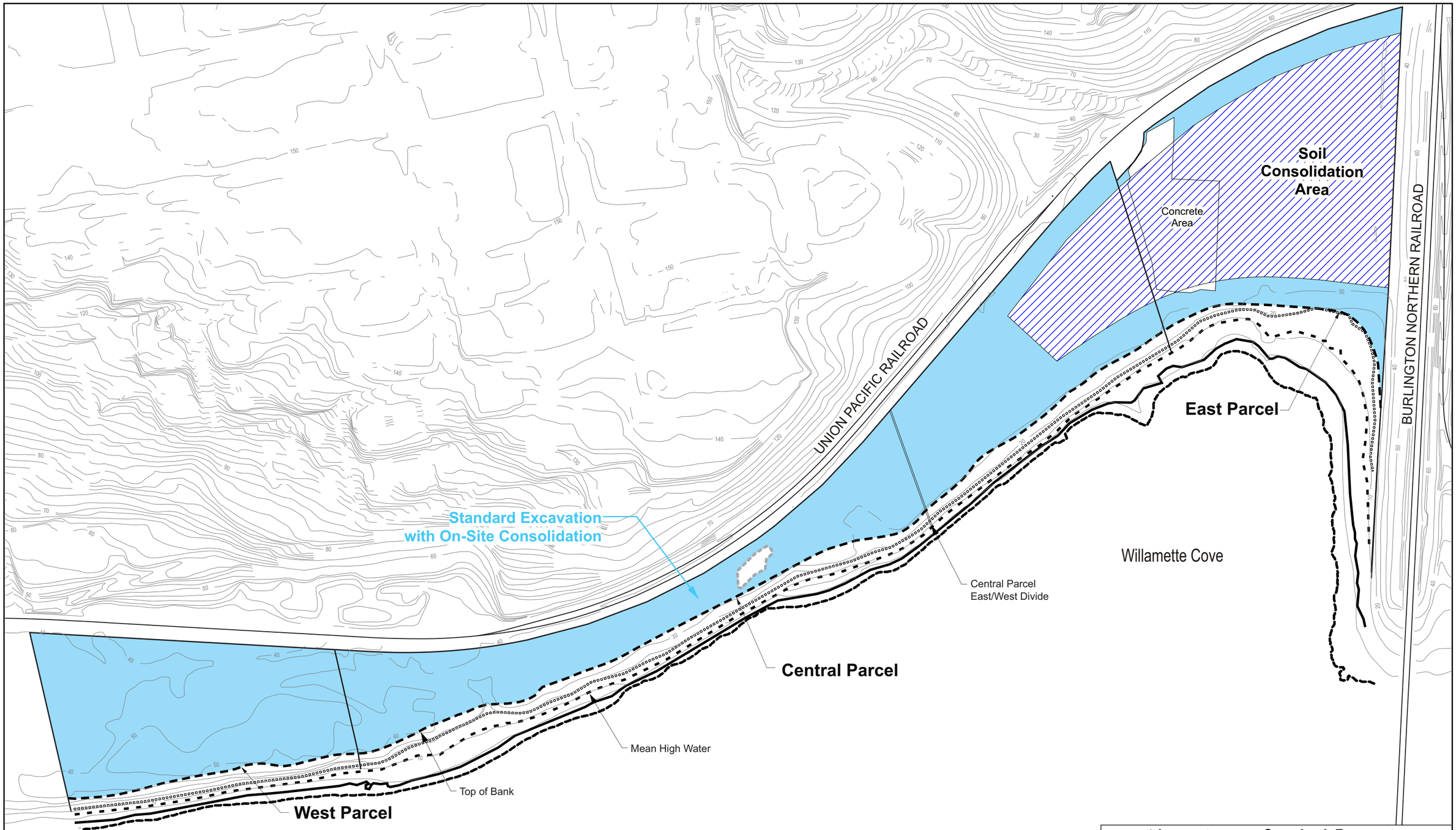
Portland, Oregon 97201

Project Number 1056-10

March 2020

Figure **23**



Legend:

- 2015 Soil Removal Deep Excavation Area
- Standard Cap Area - 2-Foot thick soil cap.
- Standard Excavation Area - All soil above human health and ecological risk levels excavated and placed in soil consolidation area.

Note: Standard excavation and soil consolidation areas are approximate. Actual areas will be determined by confirmation sampling conducted during remedial action.

- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88) -2
- Columbia River Datum; 3.2NAVD88

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

Alternative 3c: Standard Excavation with On-Site Consolidation

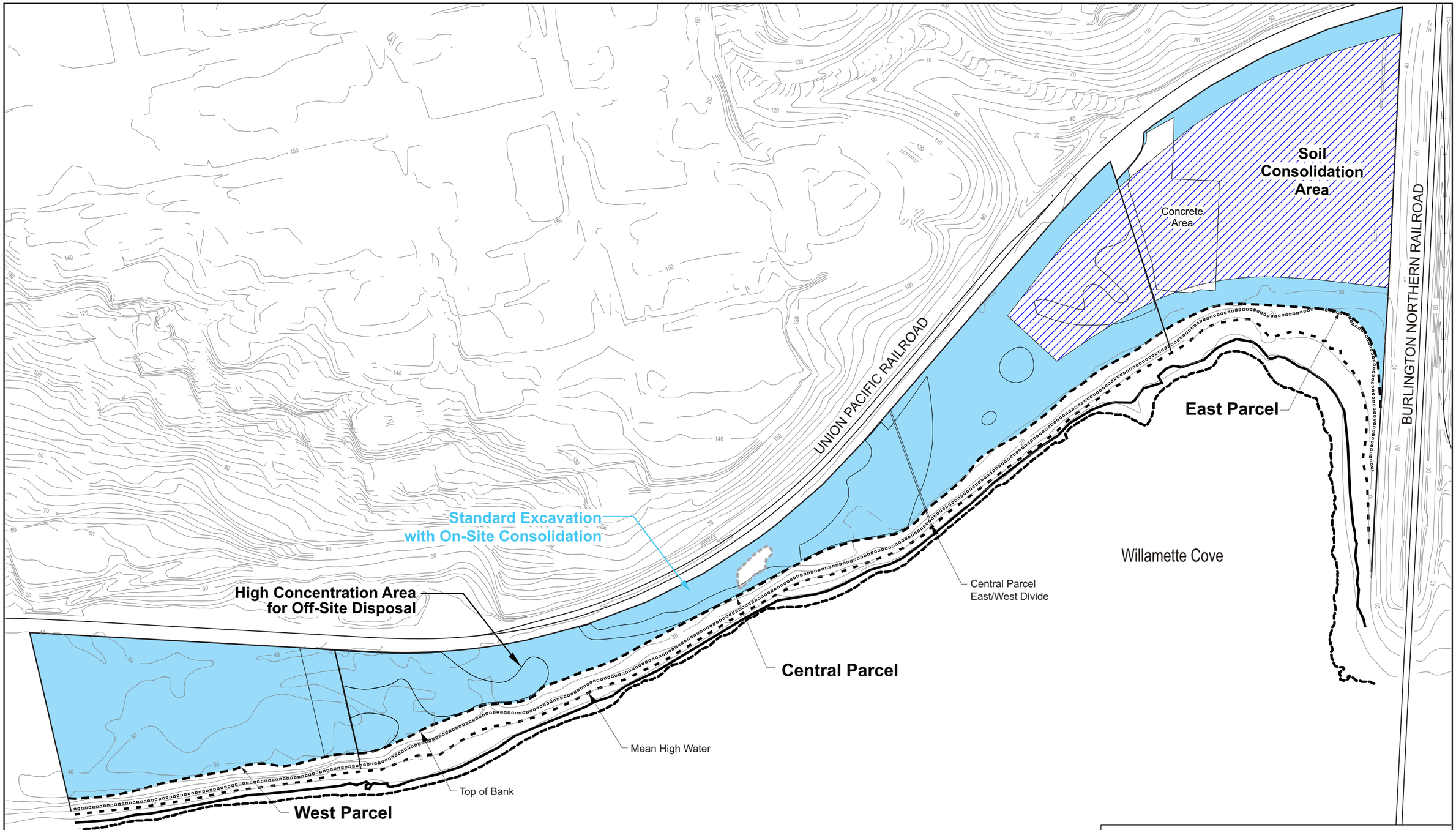
Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

Project Number 1056-10

March 2020

Figure **24**



Legend:

- 2015 Soil Removal Deep Excavation Area
- Standard Cap Area - 2-Foot thick soil cap.
- Standard Excavation Area - High concentration soil excavated and taken off-site. Remaining soil above human health and ecological risk levels excavated and placed in soil consolidation area.

Note: High concentration, standard excavation, and soil consolidation areas are approximate. Actual areas will be determined by confirmation sampling conducted during remedial action.

- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum; 3.2NAVD88

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

Alternative 3d: Standard Excavation with Off-Site Disposal/On-Site Consolidation

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

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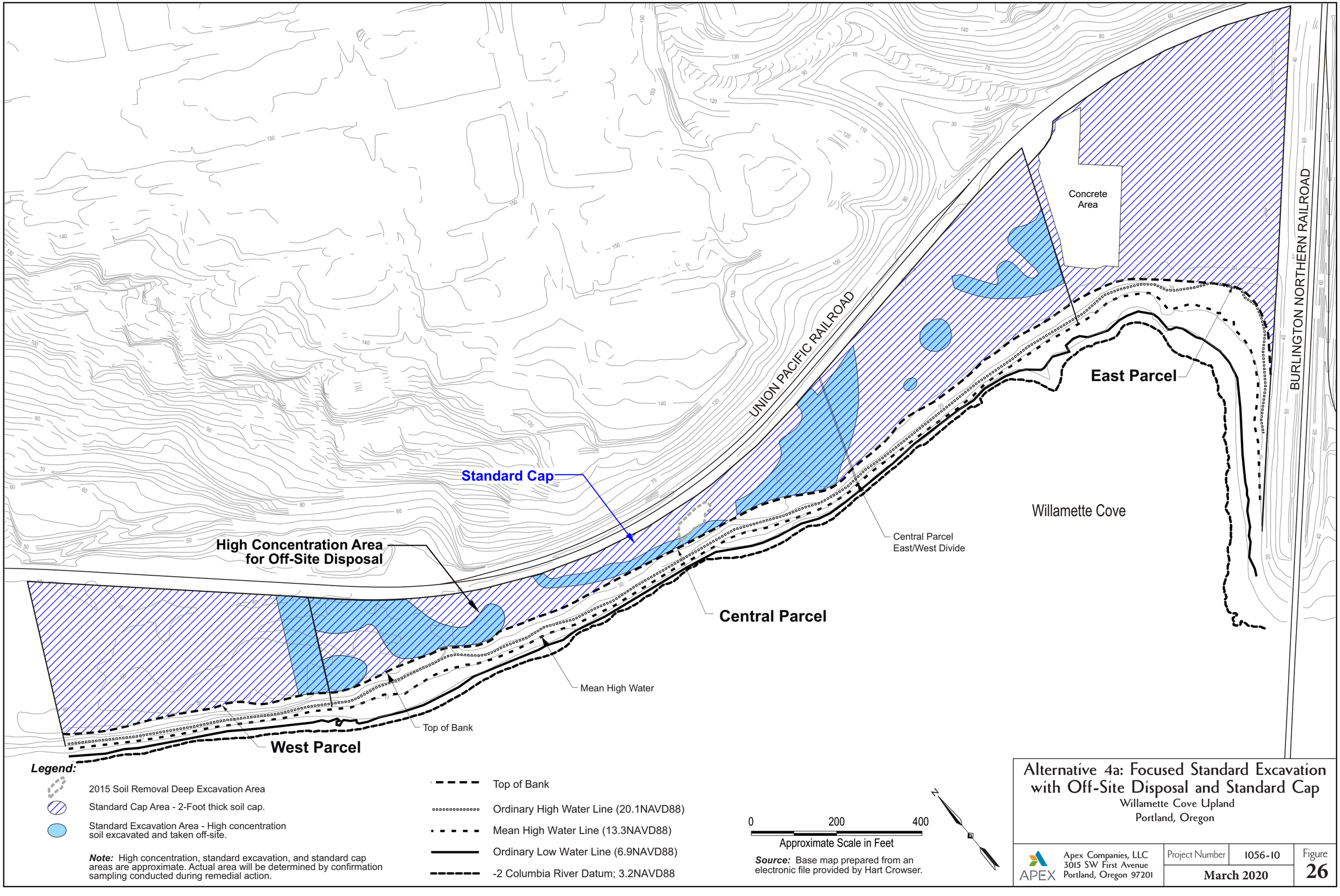

Legend:

- 2015 Soil Removal Deep Excavation Area
- Standard Cap Area - 2-Foot thick soil cap.
- Standard Excavation Area - High concentration soil excavated and taken off-site.

Note: High concentration, standard excavation, and standard cap areas are approximate. Actual area will be determined by confirmation sampling conducted during remedial action.

- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum; 3.2NAVD88

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

Alternative 4a: Focused Standard Excavation with Off-Site Disposal and Standard Cap

Willamette Cove Upland
Portland, Oregon

Apex Companies, LLC
3015 SW First Avenue
Portland, Oregon 97201

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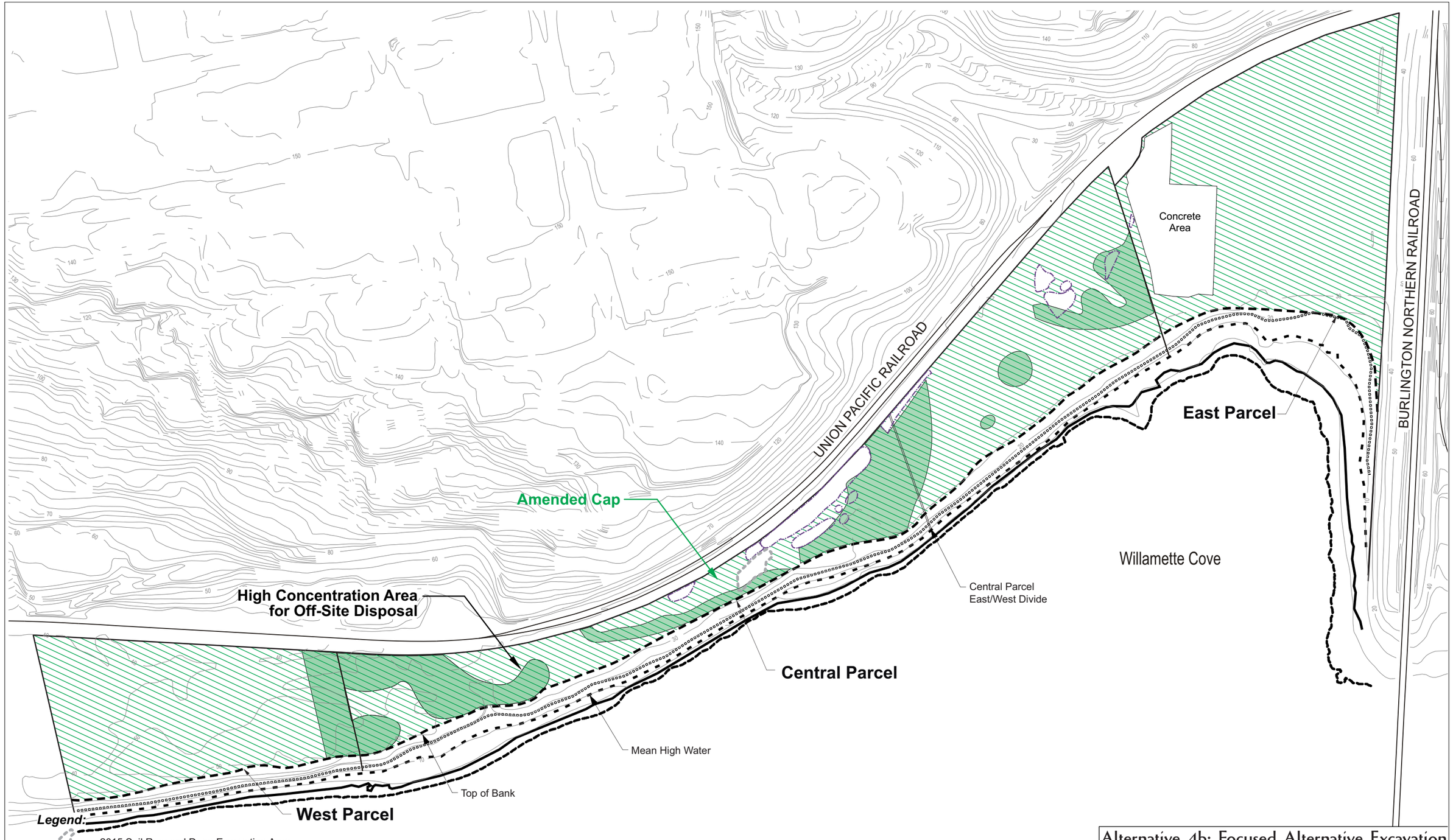
Figure **26**



Legend:

- 2015 Soil Removal Deep Excavation Area
- 2015 Soil Removal Action Low Impact Excavation Areas Surrounding Designated Native Tree Species
- Amended Cap Area - 1-Foot thick soil cap amended with organic matter.
- Alternative Excavation Area - All high concentration soil excavated and taken off-site, except near native trees where only soil that can be removed without damaging trees will be excavated.

Note: High concentration and alternative excavation areas are approximate. Actual areas will be determined by confirmation sampling conducted during remedial action.

- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum; 3.2NAVD88

0 200 400

Approximate Scale in Feet

Source: Base map prepared from an electronic file provided by Hart Crowser.

Alternative 4b: Focused Alternative Excavation with Off-Site Disposal and Amended Cap

Willamette Cove Upland
Portland, Oregon

APEX
Apex Companies, LLC
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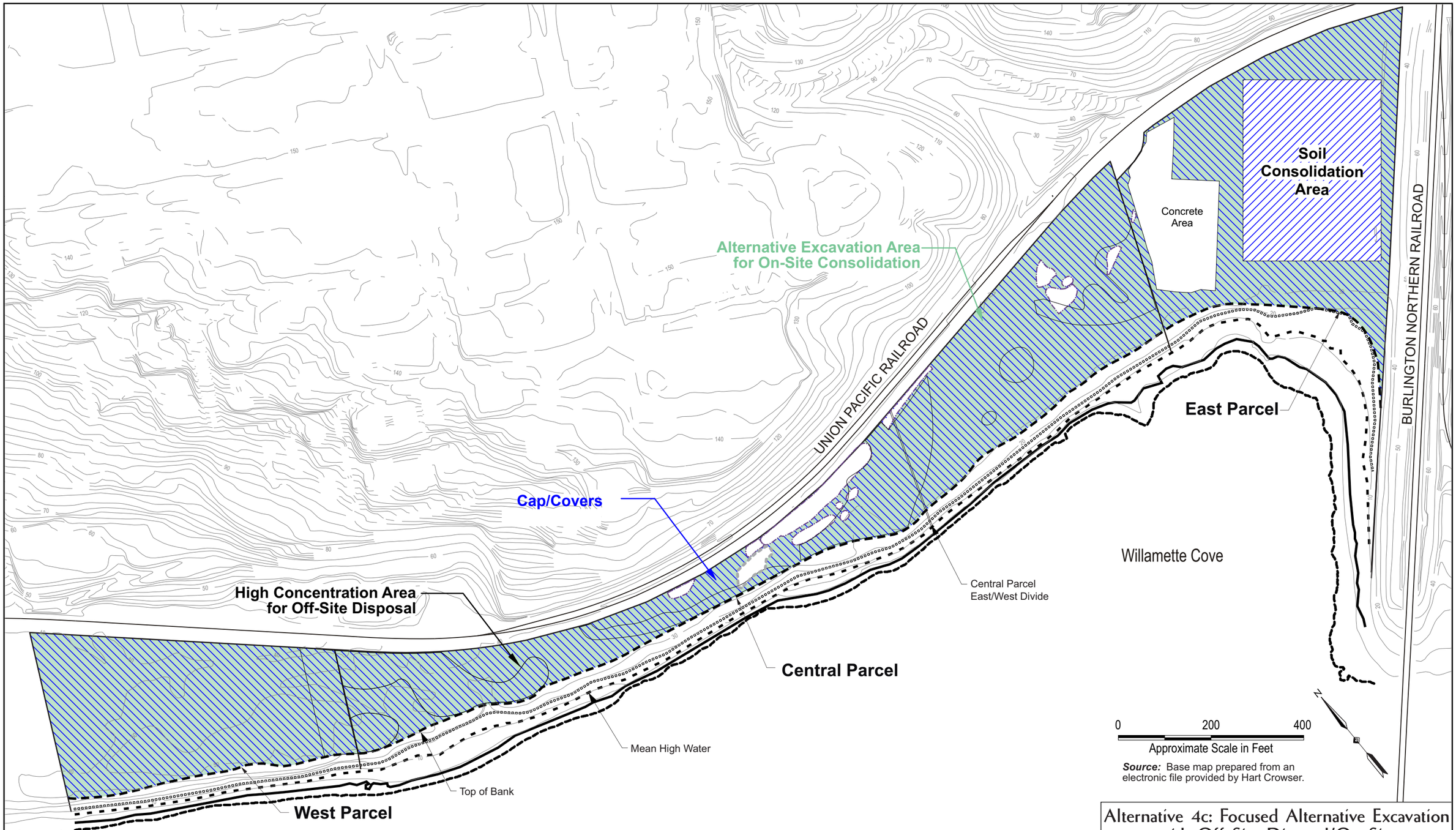
Portland, Oregon 97201

Project Number 1056-10

March 2020

Figure **27**



Source: Base map prepared from an electronic file provided by Hart Crowser.

Legend:

- 2015 Soil Removal Deep Excavation Area
- 2015 Soil Removal Action Low Impact Excavation Areas Surrounding Designated Native Tree Species
- Standard Cap Area - 2-Foot thick soil cap.

Note: High concentration, alternative excavation, standard cap, and soil consolidation areas are approximate. Actual areas will be determined by confirmation sampling conducted during remedial action.

- Cover/Cap Area - One- to 3-foot thick soil cap over areas where soil concentrations exceed ecological risk levels.
- Alternative Excavation Area - All high concentration soil excavated and taken off-site, all soil above human health risk levels placed in soil consolidation area, except near native trees where only soil that can be removed without damaging trees will be excavated.

- Top of Bank
- Ordinary High Water Line (20.1NAVD88)
- Mean High Water Line (13.3NAVD88)
- Ordinary Low Water Line (6.9NAVD88)
- -2 Columbia River Datum; 3.2NAVD88

Alternative 4c: Focused Alternative Excavation with Off-Site Disposal/On-Site Consolidation and Cap

Willamette Cove Upland Facility
Portland, Oregon

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Figure 28