Final Removal Action Engineering
Design Report
Willamette Cove Upland Facility
Portland, Oregon

Prepared for:
Port of Portland

May 18, 2015
1056-05
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1.0 Introduction

This report presents the basis for design of a removal action at the Willamette Cove Upland Facility (the Facility). The removal action is being performed as part of Voluntary Cleanup Agreement EC-NWR-00-26 (VCP Agreement) between the Port of Portland (Port), Metro, and the Oregon Department of Environmental Quality (DEQ). The Facility is defined in the DEQ Environmental Cleanup Site Information (ECSI) database as ECSI No. 2066.

The purpose of this report is to present the removal action design basis to support the separate drawings and specifications. The report covers the engineering basis for each element of the design and discusses the confirmation sampling and analysis.

2.0 Background

2.1 Site Description

The Facility is located along the northeast bank of the Willamette River in the St. Johns area of Portland, Oregon. Figure 1 shows the location of the Facility. The Facility is situated between River Miles 6 and 7 on the Willamette River and is mostly in Section 12 of Township 1 North, Range 1 West, Willamette Meridian. The Facility has been owned by Metro since 1996. Figure 2 provides a current plan of the Facility as well as the surrounding area. For purposes of describing the Facility, it has been divided into West, Central, and East Parcels as shown on Figure 2.

Extent of the Upland Facility. The Facility as defined in the VCP Agreement covers approximately 24 acres of upland area that is inland from the mean high water line (defined as 13.3 feet, NAVD88) to the Union Pacific Railroad (UPRR). The upland portion is approximately 3,000 feet long and varies from 110 to 700 feet in width. The cove is set in up to 800 feet from the main river channel.

Access. The Facility is accessible by vehicle from North Edgewater Street. A locked gate is present at the north end of North Edgewater Street one block south of its intersection with North Willamette Boulevard. Unimproved roadways are present on the Central and East Parcels but vehicle access is limited by concrete blocks/rubble at multiple locations.

Structures and Improvements. There are no structures on the Facility. Indications of previous structures include a large concrete foundation and a paved roadway in the eastern portion of the Facility, several smaller concrete structures or foundations, and structural piling within the cove and along the riverbank. Riprap is present along much of the riverbank.
Topography. The Facility is situated on a terrace created by historical filling. Overall, the topography of this terrace is flat, with an elevation ranging between 30 and 45 feet above mean sea level (msl; NAVD88). The southern portion of the West Parcel is slightly higher, at 50 to 55 feet msl. Berms and hummocks are occasionally present. The riverbank is generally a steep 20- to 30-foot slope down to the river. The river water elevation is typically less than 10 feet msl and is subject to a mean tidal range of about 2 feet.

The Burlington Northern Santa Fe (BNSF) railroad embankment along the southeast perimeter of Willamette Cove rises steeply about 50 feet above the cove. North of the property, across the UPRR tracks, is a naturally formed 120- to 150-foot-high bluff. By the Central and East Parcels, this bluff rises at approximately 5H:4V. Near the West Parcel, the slope is approximately 10H:3V.

Soil Conditions. The geology beneath the Facility consists of fill and alluvial deposits. Early maps of the area indicate the current upland portion of the facility 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 Facility likely varies from 20 to 30 feet; however, in places, it could be up to 60 feet (such as in a former log pond on the West Parcel filled in the early 1970s).

The fill and alluvial deposits 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 Facility consisted mostly of bricks, metal, and wood, with lesser amounts of glass, asphalt concrete, and Portland cement concrete.

Groundwater Conditions. Shallow groundwater at the Facility was measured in monitoring wells to range in depth from 23 to 37 feet below the ground surface (bgs). Groundwater levels are expected to seasonally fluctuate in response to both precipitation and river levels, with lower groundwater elevations expected during the summer and fall. The groundwater gradient beneath the Facility is anticipated to be toward the Willamette River.

Vegetation. The Facility vegetation includes a variety of native and non-native trees, shrubs, and grasses. The midstory trees include desirable native species such as madrone and Oregon white oak.

2.2 Prior Investigations and Studies

Since 1988, numerous investigations, assessments, and environmental actions have been performed at the Facility. Remedial investigation data are summarized and evaluated in the risk assessment and feasibility study (Formation, 2013 and 2014; Apex, 2014).
The risk assessments concluded that baseline risks exceed the acceptable risk levels for both ecological and human receptors at the Facility. The chemicals of concern (COCs) included metals, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and dioxins/furans. High-concentration hot spots are present in multiple locations.

Follow-up sampling to characterize the extent of dioxins/furans and to support removal action design was conducted in January through April 2014 (Apex, 2014a, 2014b, 2014c, and 2015).

A source control evaluation is underway for the Facility. A source control evaluation report (Apex, 2013) was submitted to the DEQ in February 2013. DEQ provided comments in a letter dated April 15, 2014. Based on the DEQ comments, the source control evaluation will be revised and incorporated into the revised Feasibility Study (FS).

A draft FS was prepared (Apex, 2014d) to evaluate and recommend a cleanup remedy for the Facility. The FS includes an evaluation of the feasibility of removal or treatment of hot spots. The hot spot evaluation concluded that removal of non-dioxin/furan hot spots is feasible. Based on a cost-benefit evaluation, it was concluded that removal of dioxin/furans is practicable to a remediation level of 1,000 ng/kg of dioxin/furan toxic equivalent (TEQ) concentration. The recommended remedy in the draft FS includes removal for off-site disposal of non-dioxin/furan hot spots and removal for off-site disposal dioxin/furan hot spots down to the remediation level of 1,000 ng/kg. Figure 3 shows the locations of hot spots and dioxin/furan TEQ concentrations exceeding 1,000 ng/kg.

2.3 Rationale and Scope of Removal Action

The upland and in-water areas of Willamette Cove are being evaluated for cleanup and other actions. Ongoing work or work under consideration includes the following.

- **Upland Remedial Action** – The upland area includes the majority of the land area and extends to the mean high water mark (approximately halfway from the top of the bank to the low river level). As discussed in the prior section, risk assessments have identified unacceptable risk, including hot spots of contamination, in upland surface soil. Because risk to aquatic receptors is being considered in the source control evaluation, the upland evaluation addressed only terrestrial receptors. A final remedy has not been selected but will likely include a combination of removal and capping. Removal will be targeted at hot spot areas present both landward from the top of bank and on the riverbank.

- **Riverbank Source Control** – The riverbank area being evaluated for source control extends from a short distance landward of the top of bank down to the mean high water mark. This area is entirely within the area evaluated for upland remedial action. As indicated above, a source control evaluation is underway. Based on work completed to date, it is apparent that riverbank soil has the potential for adverse effects on sediments. The specific areas that will require source control
action have not been finalized, but because the source control evaluation is based on protection of aquatic receptors, areas for source control may or may not overlap with upland hot spot areas targeted for removal.

- Sediment Remedial Action – The in-water evaluation extends riverward from the mean high water mark. Evaluation of in-water remedial actions for the Portland Harbor is underway. The record of decision for Portland Harbor is currently scheduled for 2017. Implementation of the in-water remedy will require many years after that. Specific plans for Willamette Cove are unknown but will likely include dredging and capping.

- Habitat Restoration – Willamette Cove is an undeveloped area that has been targeted for open space. Consequently, it is a prime area for constructing habitat improvements. Improvements in upland areas could include reducing the riverbank slope, removing invasive species, and planting native species. In-water improvements could include creation of shallow water habitat and improving the substrate on the river bottom.

Although each of these actions is addressing specific areas, many of the boundaries are artificial and the projects will have significant overlap. For example, source control actions would be conducted on the riverbank, but a habitat restoration project may include excavation of the riverbank to flatten the overall slope. Removal of riverbank material may obviate the need for source control actions. Additionally, the City of Portland has restrictions on actions near the top of bank as part of its Greenway program that include extensive planting requirements. Conducting removal actions along the top of bank would trigger these requirements, but subsequent source control actions or habitat restoration excavation could remove the new plantings. Finally, removal actions on the riverbank would require work within areas that normally require in-water work permits. Although these permits may be exempted under Superfund actions, substantive requirements such as habitat restoration, mitigation, work windows, and others would be imposed. Coordinating the in-water portion of bank actions with the in-water remedial actions would streamline the work, reducing redundant activities.

For these reasons, work on the riverbank cannot be practically conducted until there is a better understanding of proposed source control measures, habitat restoration, or in-water remedial action. However, in the interest of expediting the cleanup schedule, the Port is proposing to conduct a removal action targeting the hot spot and dioxin/furan excavations above the top of bank. Figure 4 shows the locations of the proposed excavation areas for this removal action.

### 3.0 Soil Excavation

#### 3.1 Performance Standards

Soil excavation will be implemented to address excavation and off-site disposal of non-dioxin high-concentration hot spots and soil with dioxin/furan concentrations above the remediation level. In addition, contingency planning is discussed for soil excavation in Section 3.9 below. Soil excavation will
meet the following performance standard: surface soil (depth range of 0 to 3 feet) with concentrations exceeding non-dioxin/furan high-concentration hot spot levels or the dioxin/furan remediation level will be excavated and disposed of off-site.

Madrone, Big Leaf Maple, and Oregon white oak trees will be protected during the removal action. Within the drip line of trees designated to be saved, excavation will be performed to the extent practicable while maintaining the health of the tree. A certified arborist will direct excavation within the drip line of designated trees to determine the extent of excavation.

3.2 Basis of Design

The design limits of excavation areas are primarily defined by soil data. In some cases, the limits may be defined by the Facility boundary or the top of the riverbank. Within the drip lines of trees to be saved, the vertical limits of excavation may be defined by the practicable limits of excavation while maintaining the health of the trees. Final limits will be defined by the design limits, refined with proposed confirmation samples.

3.3 Excavation and Backfill Design

3.3.1 Target Excavation Zone

As determined in the FS (Apex, 2014), the minimum target excavation zones are defined on sheets C-3 through C-6 of the design drawings. The final lateral and vertical extent of the soil excavations will be defined as follows.

- Lateral Extent – Sample locations with soil concentrations exceeding hot spot levels were mapped. Surface soil sampling was completed during design to better define the lateral extent of the hot spots. Based on that sampling, the minimum lateral extent is defined on the drawings. The lateral extent of excavation is limited by property lines and the Greenway setback (50 feet from the top of bank) or top of bank. For other boundaries, the final lateral extent of the excavation will be determined from existing data and/or confirmation sampling as described in Section 3.8.

- Vertical Extent – At most locations, data are available only from the upper 6 inches of soil. In the few locations where the vertical extent is defined by sample data, the concentrations in samples below a depth of 1 foot are typically below hot spot levels. Additionally, the vertical extent is confirmed to be deeper than 6 inches at only three locations in the removal area (TP-3 in Area 1, WCP-6 in Area 5, and TP-34 in Area 6; see drawing sheets C-3, C-5, and C-6 for sample

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2 The drawings show excavation areas 1, 2, 3, 5, and 6. Area 4 is a relatively small area that is located on the Greenway setback line and was therefore not included in the removal action.
locations). These facts, combined with the likely source of COCs being surface deposition related to historical activities, suggests that the hot spots in many locations may be limited to the upper few inches of soil. Therefore, the minimum excavation depth will be 6 inches. Final excavation depths will be determined from existing data and/or confirmation sampling as described in Section 3.8, or the practicable limits of excavation while maintaining the health of the trees.

3.3.2 Site Preparation

Access to excavation areas will be via unimproved roads on the Facility. The excavation subcontractor will improve the roads as needed for site access by grading and placement of rock. The roads may be needed for future work (additional remediation, source control actions, and/or habitat restoration) so will be left in place upon completion of the removal action.

Excluding areas where trees will be saved, each excavation area will be cleared of vegetation by close mowing grasses and shrubs and cutting trees. Invasive species, grasses, and herbaceous vegetation will be disposed of off-site. Woody vegetation may be stockpiled on-site. Roots or any other subsurface vegetation will be excavated and disposed of with the soil. Within the drip lines of trees to be saved, invasive species will be completely removed. Any other vegetation will be carefully mowed, protecting the trees from damage.

3.3.3 Soil Excavation

Soil will be excavated to the extent described in Section 3.3.1. Soil samples will be collected as necessary to confirm that soil with concentrations above hot spot levels is removed. Confirmation sampling is described in Section 3.8. Soil will be stored, handled, and removed according to the following.

- **Soil Excavation.** Excavated soil will be maintained within the limits of the excavation, stockpiled in accordance with this report, or placed immediately into a waiting truck. Within the drip lines of trees to be saved, excavation will be conducted under the supervision of an arborist using hand excavation, vacuum excavation, or similar techniques to minimize impacts to the trees. The arborist will determine the maximum depth of excavation to assure survival of the trees. Outside of trees to be saved, excavation will be conducted using typical construction equipment.

- **Stockpiling.** Stockpiling of excavated soil may be used at the discretion of the subcontractor. Soil to be stored will be placed in a covered and labeled roll-off box or in a lined and covered stockpile. Stockpiles will be maintained in a manner that prevents run-on, runoff, and erosion of the stockpiles. Stockpiles will be placed on plastic sheeting with a berm around the perimeter of the stockpile. The berm may be constructed by laying the bottom plastic over straw bales, Jersey Barriers, ecology blocks, or by other equivalent methods. When not active, stockpiles will be covered with plastic and secured with sand bags or equivalent.
• **Loading and Hauling.** Given that the hot spot soils will be transported through local neighborhoods to reach the disposal facility, the following protocols will be used during loading and hauling.
  
  o Trucks will be lined prior to filling.
  o During loading, care will be taken to minimize spillage of soil on the exterior of the trucks or clean ground surface.
  o Visible soil will be removed from the truck exterior prior to leaving the loading area.
  o If dry soil is present in the truck, the load will be wetted prior to departure.
  o The trucks will be tightly covered with a tarp prior to departing the Facility.
  o Trucks will not be allowed to leave the Facility if liquids are draining from the load.
  o Exiting trucks will pass through a wheel wash and rock construction entrance prior to leaving the Facility.
  o Trucks will be inspected prior to leaving the facility to verify the protocols noted above.
  o Excavated soil will be transported in accordance with appropriate Department of Transportation (DOT) regulations for solid or hazardous waste, as applicable.

• **Stormwater Management.** Stormwater at the Facility infiltrates into the ground. During normal conditions, it is expected that natural infiltration will be the primary method of stormwater management during construction. In the event of an unusual storm event, overland runoff may occur. In that event, overland flow will be directed away from excavation areas using shallow ditches, biobags, or silt fencing, or work will cease until conditions improve. Silt fencing (see Section 3.6.3) will prevent transport of sediment from work areas.

• **Waste Designation.** A waste designation evaluation was conducted for the soil targeted for excavation. There is no specific knowledge of the source of the impacts to soil, so there are no listed hazardous wastes present. To evaluate potential characteristic hazardous waste, six representative samples from the excavation areas were collected and analyzed for metals using the toxicity characteristic leaching procedure (TCLP; Apex, 2014b). The laboratory analytical results were less than the characteristic hazardous waste limits. Therefore, the excavated soil is not a hazardous waste. Site characterization and the TCLP sample results will be used to prepare a profile for acceptance of the soil waste. The profile and analytical results will be provided to the disposal facility for approval.

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2 There are no stormwater facilities draining the Facility. There is one active City of Portland Outfall located at Willamette Cove, but that outfall only transects the Facility and does not discharge water from the Facility. Based on multiple site visits, there are no substantive erosional features indicative of overland flow. Erosion features have been identified on and near the riverbank, but these features are related to river actions (e.g., erosion at the toe of slopes) or human activity (e.g., trails in sandy soil).
• **Estimated Quantities.** The total quantity of soil to be excavated for off-site disposal is estimated to range from 2,100 to 10,000 cubic yards (3,800 to 19,000 tons), corresponding to an average excavation depth of 6 inches to 2.5 feet, respectively. The final removal volume will be based on verification sampling.

### 3.3.4 Soil Disposal

The excavated soil will be disposed of in a solid waste landfill meeting Subtitle D design standards. Based on the waste designation evaluation in the prior section, no hazardous waste is expected to be generated.

### 3.3.5 Site Restoration

This removal action is implementing a portion of an overall upland remedial action. The final upland remedial action has not been selected, but is expected to include a combination of removal and capping. Because further remedial action will be conducted, site restoration for the removal action will consist of interim measures to stabilize the site pending completion of final remedial actions. In general, the interim measures will consist of grading the edges of excavations to create a smooth transition, and seeding disturbed areas to prevent erosion. Except near trees to be saved, neither imported fill or fill obtained on-site will be placed. Stormwater currently infiltrates on the site, so although this approach will create areas that may have temporary ponding, this water will infiltrate in the same manner that currently occurs at the site.

Except within the drip line of trees to be saved, the excavation areas will be graded using on-site materials to a smooth, gradual transition between different levels. Disturbed areas will be seeded with a native grass seed mix and covered with mulch from on-site vegetation or imported weed-free mulch. The grading and seeding will prevent erosion of remaining soils into the removal areas.

Within the drip line of designated trees, the excavation will be backfilled with topsoil imported from a commercial source. Prior to use of imported soil at the Facility, a representative sample of the import soil will be collected by Apex to confirm the soil meets the clean fill criteria of DEQ’s solid waste rules. The sample of import soil will be analyzed for the following:

- Dioxin/furans using EPA Method 8290;
- Polychlorinated biphenyls using EPA Method 8082;
- TAL (23) metals using EPA Method 6020 (mercury by EPA Method 7471);
- PAHs using EPA Method 8270 Selective Ion Monitoring (SIM);
- SVOCs using EPA Method 8270; and
- Pesticides using EPA Method 8081.
The results of the analytical laboratory sample analysis will be received and reviewed prior to use of the soil at the Facility.

### 3.4 Quality Assurance/Quality Control

Construction quality assurance/quality control (QA/QC) will consist of the following elements. Apex staff will be on-site full time observing the construction subcontractor to document these elements.

- **Erosion and Dust Control** – Erosion control will be inspected and reports prepared daily documenting the function of erosion control features including silt fences, wheel wash, and rock construction entrance. Use of dust control actions (e.g., water spraying) will be documented in field notes and with photographs.

- **Removal of Soil** – It will be verified that the following elements are consistent with design drawings/specifications: extent of excavation, on-site storage, and hauling of soil.
  - Excavation extent will be verified by existing data and/or confirmation sample collection and analysis (see Sections 3.3.1 and 3.8). Within the drip line of trees to be saved, excavation extent may be limited by the arborist. In that event, samples will be collected to document the remaining concentrations at the limits of the excavation.
  - The initial lateral extent of the excavation will be staked by the subcontractor using a licensed surveyor. Excavation depths will be measured in the field using construction survey equipment. The lateral extent will be confirmed after construction by a licensed surveyor. Additionally, the extent will be documented with GPS coordinates (using an off-set laser range finder for points beneath trees) and photographs. Excavation depths will be field verified with a tape measure.
  - Conformance of stockpiles to specifications will be documented with photographs and in the field notes.
  - Photographs will be taken to document that trucks are properly lined, covered, and cleaned prior to leaving the Facility.
  - Disposal tickets will be collected and provided in the final report documenting proper disposal of excavated material.

- **Restoration** – It will be verified that the following elements are consistent with design drawings/specifications: finish of surface.
  - Photographs will be taken to document that finished grades are smooth and gradual.
  - Photographs will be taken to document that disturbed areas are seeded and mulched.
3.5 Health and Safety

Soil excavation includes potentially hazardous activities that will be addressed by a health and safety plan. The activities addressed by the plan include:

- Physical hazards associated with excavation, loading, and hauling; and
- Direct contact with soil or inhalation of dust during excavation and sampling.

Apex will prepare a health and safety plan that governs Apex's oversight and sampling activities during construction. The subcontractor for excavation will be required to prepare a health and safety plan governing their on-site activities. Health and safety plans will be submitted to the DEQ.

3.6 Environmental Protection

3.6.1 Waste Streams

The work will generate waste streams. The following lists each waste stream together with a summary of how that waste stream will be handled.

- **Soil with COCs** – Excavation will generate soil containing various COCs. The soil will be disposed of in accordance with Section 3.3.4.
- **Decontamination Water** – Decontamination water will be generated during decontamination of construction equipment or sampling devices. The water will be collected in DOT-approved drums or equivalent and sampled for waste designation. Based on the waste designation, the water will be recycled or disposed of in an appropriate facility. Alternatively, small quantities of decontamination water may be added (without prior testing) to soil being disposed of in the landfill.

3.6.2 Emissions, Dust, and Spills

Excavation will require disturbance of soil using petroleum-fueled, hydraulically controlled equipment. The following best management practices will be implemented to reduce emissions, reduce potential environmental impacts, and control dust.

- Equipment will be well maintained.
- Where applicable, equipment will be required to use ultra-low-sulfur diesel.
- Equipment will not be allowed to idle when not in use.
- Refueling will not occur within 100 feet of surface water.
- Contractors will be required to maintain a spill kit for immediate response in the event of a release of fuel or hydraulic fluid.
• Dust control will be used as needed on disturbed areas with exposed soil. Dust control will include wetting of excavation areas and haul roads and covering or lightly wetting stockpiles, as needed. Dust control will be used to maintain a standard of no visible dust outside the work area and no visible dust in the breathing area of workers.

3.6.3 Erosion and Sedimentation

Excavation has the potential to cause erosion or sedimentation problems. There are no storm drains at the Facility. A silt fence will be installed on the river side for the entire length of the work area. In two areas with topographic lows near the river, a second silt fence will be installed to offer greater protection. Any soil stored on-site will be maintained as described in Section 3.3.3. A wheel wash and gravel pad will be constructed at the Facility exit to prevent tracking of soil onto paved streets.

3.7 Operations and Maintenance

There are no operations or maintenance associated with excavation.

3.8 Confirmation Sampling

Sample Locations. Soil confirmation samples will be collected at the locations described below. Figure 5 presents a schematic showing the locations of confirmation samples.

• Excavation Lateral – Except at excavation boundaries where future excavation is planned, the final lateral extent of the excavation will be determined based on confirmation sampling on the excavation perimeter. Sample stations will be established around the excavation perimeter at a spacing of not greater than 100 lineal feet and a minimum of one station per excavation wall. Previously collected samples may be used as confirmation samples in the event that the excavation is completed to a location that is nearer to the proposed confirmation sample than the nearest sample exceeding hot spot or remediation levels. Excavation will continue until confirmation sample concentrations are below hot spot or remediation levels.

• Excavation Vertical – The final vertical extent of the excavation will be determined based on confirmation sampling of the base of the excavation. Regardless, at a minimum, one sample will be collected for each 5,000 square feet (or portion thereof) of excavation area. Excavation will continue until confirmation sample concentrations are below hot spot or remediation levels.

Sampling Procedure. Confirmation samples will consist of results from prior sampling or samples collected after excavation (but prior to re-grading). Samples collected after excavation will be 5-point composites collected as shown on Figure 5. For excavation perimeter samples, the sample will be a surface sample (zero to six inches sample interval) collected at the edge of the excavation. For excavation base samples, the samples will be collected over a 6-inch depth interval beginning at the base of the excavation. Equal
aliquots will be obtained from each sub-sample location, placed into a stainless steel bowl, thoroughly mixed to a uniform texture and color, and the sample will be collected from the bowl.

**Chemical Analyses.** Confirmation samples will be analyzed for the chemical parameters listed below.

- Areas 1, 5, and 6: Priority pollutant metals by EPA Method 6020;
- Area 2: PAHs by EPA Method 8270 SIM and priority pollutant metals by EPA Method 6020;
- Area 3: Dioxins/furans by EPA Method 8290; chlorophenols by EPA Method 8270D; and priority pollutant metals by EPA Method 6020; and

### 3.9 Contingency Actions

The contaminated soil will be removed to the extent specified in Section 3.3.1. At that time, confirmation sampling will be conducted as summarized in Section 3.8. In the event that confirmation sampling indicates that hot spot or remediation levels have not been achieved, additional soil will be excavated and confirmation sampling will be repeated; except that, additional excavation will not be conducted at boundaries where future excavation is planned, property boundaries, or beyond limits established by the arborist.

### 3.10 Closeout

Closeout will consist of preparation of a report documenting completion of the removal action in accordance with the design documents.

### 3.11 Permitting

A grading permit will be obtained from the City of Portland (the permit will trigger a Greenway Review and requirements for tree preservation planning). A construction stormwater permit will be obtained from the DEQ.

### 3.12 Project Management, Schedule, and Reporting

**Project Team Members.** The following is an outline of the key roles involved with the project.

- Project Owner – Metro is the property owner and the Port and Metro are the parties for which the work is being completed.
- Project Consultant – Apex is the engineering consultant responsible for preparing the design, implementing the removal action, conducting confirmation sampling, and preparing project documentation.
- DEQ – DEQ is the oversight agency.
• Subcontractor – The removal action will be implemented by a subcontractor to Apex, to be selected through a competitive procurement process.

Schedule. A detailed schedule will be prepared after selection of the construction subcontractor.

Reporting. Reporting will include progress reports during construction and the construction documentation report. In addition to the ongoing quarterly progress reports to DEQ, progress reports will be submitted to DEQ via email during construction. Progress reports will be submitted as needed, generally on a weekly basis. The construction documentation report will describe the construction activities and present the results of quality assurance observations and confirmation sampling.
4.0 References


Facility Location Map
Removal Action Engineering Design Report
Willamette Cove Upland Facility
Portland, Oregon

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

January 2015
Legend:

- Mean High Water

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

- Sb: Antimony
- Cu: Copper
- Pb: Lead
- Hg: Mercury
- Zn: Zinc
- PAHs: Polycyclic Aromatic Hydrocarbons
- PCBs: Polychlorinated Biphenyls
- RT/PU: Recreational Trespasser/Park User
- CW: Construction Worker
- TT: Transient Trespasser

Central Parcel

- Hg
- Cu, Pb, Hg, PAHs, PCBs

East Parcel

- Cu, Pb, Hg
- RT/PU - Dioxins/Furans

West Parcel

- Cu, Pb, Sb
- PAHs, Hg
- RT/PU - PAHs

Estimated Limits of 1,000 ng/kg
Dioxin/Furan TEQ

Willamette Cove

- Cu, Pb, Sb, Zn

Proposed Excavation Areas

Removal Action Engineering Design Report
Willamette Cove Upland Facility
Portland, Oregon

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

5-Point Composite Sample

Composite Subsample

Excavation Perimeter

SECTION A-A'

Typical Confirmation Sample - Excavation Lateral
NOT TO SCALE

Area = 5,000 Square Feet

Collect One Sub-Sample Near Center of Each Quadrant

Collect One Sub-Sample Near Center of Area

Excavation Extent

Excavation Base

NOTE: Collect one 5-point composite sample for each 5,000 square feet of excavation area (or portion thereof).

SECTION B-B'

Typical Confirmation Sample - Excavation Vertical
NOT TO SCALE

Confirmation Sample Schematic
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Apex Companies, LLC
3015 SW First Avenue
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Project Number
1056-05

Figure
5