



Based on the January 14, 2011 conference call with USEPA and NMFS, the Port is further evaluating two mitigation opportunities. One is 0.39 acres of enhancement on the Swan Island South shoreline, which is adjacent to a City of Portland (City) property being considered for additional habitat enhancement; and the second is the purchase of credits at a mitigation bank being developed by Wildlands, Inc. (Wildlands) on Sauvie Island.

## **CONCEPTUAL MITIGATION PLAN AND PRELIMINARY FEASIBILITY ANALYSES**

Based on the results of preliminary feasibility analyses, the Port has narrowed the potential mitigation project on Port property to the Swan Island South site previously identified in the February 22, 2011 Mitigation General Description memorandum.

### **SWAN ISLAND SOUTH SITE**

The Port is considering enhancing 0.39 acres at Swan Island South (Figure 1). The existing conditions at the Swan Island South site include a riprap slope along the shoreline bank. Along the shoreline bank, there are scattered areas among the riprap slope with soil and native and non-native vegetation. The riprap extends to approximately elevation +15 feet NGVD. Below this elevation, there is existing shallow-water habitat in good condition. This shallow water habitat has a gentle slope (approximately 10 horizontal to 1 vertical [10H:1V]) and sandy substrate. The waterward limits of the proposed enhancement project would, therefore, be approximately elevation +15 feet NGVD (waterward extent of riprap). A public greenway path is located along the top of bank and defines the upland project limit.

Enhancement activities would include the removal of riprap within the ACM and along the shoreline bank. Minor grading would maximize the potential for additional shallow water habitat within the project footprint. Subsequent to the removal of riprap, a native vegetation community would be established (see Figures 2 and 3).

The proposed mitigation at the Swan Island South site includes 0.22 acres of enhancement within the ACM and 0.17 acres of enhancement above OHW. Various species of native willows, as well as other native vegetation appropriate for the dynamic shoreline environment, would be planted within the ACM area to provide overhanging cover. The following is a potential planting list for the ACM:

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- Red-osier dogwood (*Cornus sericea*)
- Columbia River willow (*Salix fluviatilis*)
- Hooker willow (*Salix hookeriana*)
- Scouler willow (*Salix scouleriana*)

Above the ACM, a proposed mixed riparian community would be planted to create a layered canopy of diverse native trees and shrubs to provide additional habitat value. The following list is an example of native plants that would be planted in the riparian areas:

- Grand fir (*Abies grandis*)
- Big leaf maple (*Acer macrophyllum*)
- Red alder (*Alnus rubra*)
- Serviceberry (*Amelanchier alnifolia*)
- Oregon ash (*Fraxinus latifolia*)
- Tall Oregon grape (*Mahonia aquifolium*)
- Pacific ninebark (*Physocarpus capitatus*)
- Swordfern (*Polystichum munitum*)
- Black cottonwood (*Populus balsamifera sp. trichnocarpa*)
- Douglas fir (*Pseudotsuga menziesii*)
- Red flowering currant (*Ribes sanguineum*)
- Bitter cherry (*Prunus emarginata*)
- Snowberry (*Symphoricarpos albus*)

The shoreline bank along the entire project would be stabilized using a log edge with anchored large woody debris, amended soils, biodegradable geotextiles, and, once established, plantings with developed root structures. The enhancement project would integrate into the existing shallow water habitat that is in good condition to provide a holistic shoreline habitat community.

The potential project includes substrate and riparian enhancements above the ACM. Extending the project adjacent to the targeted habitat zone (OLW to OHW) allows the project design to expand in scope by allowing for more appropriate grades and including additional riparian areas with overhanging native vegetation. These improvements will, in turn, provide improved habitat value for the targeted zone. Additionally, the development

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of a project at Swan Island South site would include administrative/legal controls to prevent future development from occurring. Currently, the site is zoned mixed use employment (including the emphasis on industrial and industrial-related uses).

The Port and the City are continuing to work cooperatively on an opportunity to create an expanded mitigation project. The larger project could include similar enhancements described above along the entire shoreline of the Port's parcel and adjacent City parcel shown on Figure 1. An expanded enhancement area would increase the ecological benefit of the 0.39 acre area by itself.

### **Swan Island South Site—Summary of Feasibility Analyses**

The Port has completed preliminary feasibility analyses for the Swan Island South site including a hydrodynamic wave run-up assessment; flood containment review; review of known site conditions and potential for contaminated soil, sediment, or groundwater; and coordination with the Oregon Department of State Lands (DSL) to identify issues that would prevent further consideration of the site as a potential mitigation site. Further detail on these analyses is provided in the following subsections.

#### ***Hydrodynamic Wave Run-up Assessment***

A hydrodynamic wave run-up assessment was completed for the 0.39-acre Swan Island South potential mitigation site to determine the potential for erosion due to the removal of riprap at the site. Previous work completed for the Terminal 4 Phase I Removal Action project at the Wheeler Bay mitigation site were used to identify key elevations based on the river stage frequency analysis, as follows:

- The median river elevation is +6.7 feet NGVD
- The 90th percentile river elevation is just over +8.5 feet NGVD
- The 99.9th percentile river elevation is approximately +15 feet NGVD

Wave energy and subsequent wave run-up from boat wakes is a dominate cause of erosion on the Willamette River. Therefore, a wave run-up analysis was calculated using elevation +8.5 feet NGVD. Assuming a vessel-wake design wave of 3.4 feet and 4.4 seconds, the wave run-up elevation for a 10H:1V vertical slope is approximately 2.5 feet. Based on the Wheeler Bay

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key elevations, this wave run-up would reach elevation +11.0 feet NGVD, well below the existing waterward extent of riprap. The hydrodynamic wave run-up assessment indicates that the removal of riprap is not expected to result in substantial erosion at the Swan Island South site. A more involved hydrodynamic assessment is planned to confirm these results. Existing driftwood along the shoreline is another mechanism that could lead to erosion during high water events. The design of the log edge with anchored large woody debris will protect the shoreline slope until the vegetation is mature enough to stabilize the slope, including providing protection during high water events.

The erosion that occurred at Wheeler Bay is not expected to occur at the Swan Island South site due to the existing configuration of the beach, shoreline slopes, and the proposed design concept. At Swan Island South, there is a beach with a gradual slope (approximately 10H:1V) transitioning to a 3H:1V slope from +15 feet NGVD to the top of bank. The wave run-up associated with a 10H:1V slope is smaller (2.5 feet) than the wave run-up associated with a 3H:1V slope (6 feet), characteristic of Wheeler Bay. In Wheeler Bay, it was observed that areas showing the greatest erosion corresponded with the steepest slope at the water line (visual observation) and least amount of exposed beach. Where the slope appeared to be more gradual, and thus more beach was exposed, little to no erosion had occurred. Another factor at Wheeler Bay that added to the erosion during the high water event was the presence of driftwood. There is also driftwood present along the Swan Island South shoreline. As such, the log edge with anchored large woody debris design concept has been included to protect the shoreline area from erosion due to driftwood collisions during high water events.

### ***Flood Containment Review***

The top of bank will likely not change at the Swan Island South site, and it is not anticipated that a significant net gain of material will be added to the site. Therefore, flood containment is not expected to substantially change with the potential mitigation option.

### ***Review of Known Site Conditions and Potential for Contaminated Soil, Sediment, or Groundwater***

The Oregon Department of Environmental Quality (ODEQ) maintains a database, called the Environmental Cleanup Site Information (ECSI) database, which identifies sites that are

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known to, or are likely to be, contaminated with hazardous substances. The Swan Island South site is not specifically identified as a site that has known or potential contamination from hazardous substances within the ECSI database (ODEQ 2011). As such, there is no known or suspected contaminated media on this site.

### ***Coordination with Oregon Department of State Lands***

The Port has met with DSL to coordinate the potential for a mitigation project on the Swan Island South site given that DSL owns the land below the OHW elevation. DSL is willing to work with the Port to further consider a mitigation project to be implemented on the DSL portion of the land.

### **COORDINATION WITH WILDLANDS, ALDER CREEK SITE**

As mentioned previously, the Port is evaluating the potential to buy credits from Wildlands at the Alder Creek site, on the southern end of Sauvie Island. The project concept for Alder Creek involves approximately 27 acres and would include creation of a variety of new shallow water and riparian habitats.

Wildlands is in the process of purchasing the land and working with the Portland Harbor Natural Resource Trustees on an implementation plan for the proposed project. Wildlands anticipates completing the land ownership transaction by early summer 2011 and developing the project during the 2012 in-water work window. The Port is currently in discussions with Wildlands related to this option.

### **NEXT STEPS**

- The Port will continue coordination with the City and Wildlands on the potential options identified in this memorandum.
  - The Port will provide USEPA and NMFS a Final Conceptual Plan Memorandum that will focus on the selected mitigation project on July 30, 2011.
  - 45 days after USEPA/NMFS provide feedback on the Final Conceptual Plan Memorandum, the Port will provide a revised Draft Mitigation Work Plan to USEPA/NMFS.
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## REFERENCES

National Marine Fisheries Service (NMFS). 2008. Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the U.S. Environmental Protection Agency and Port of Portland Terminal 4 Superfund Phase I of the Removal Action, Willamette River (HUC 17090012), Multnomah County, Oregon. NMFS Number 2007/08174, July 22, 2008.

Oregon Department of Environmental Quality (ODEQ), 2011. Environmental Cleanup Site Information (ECSI) database. Accessed online on March 1, 2011 at <http://www.deq.state.or.us/lq/ECSI/ecsi.htm>.

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# FIGURES

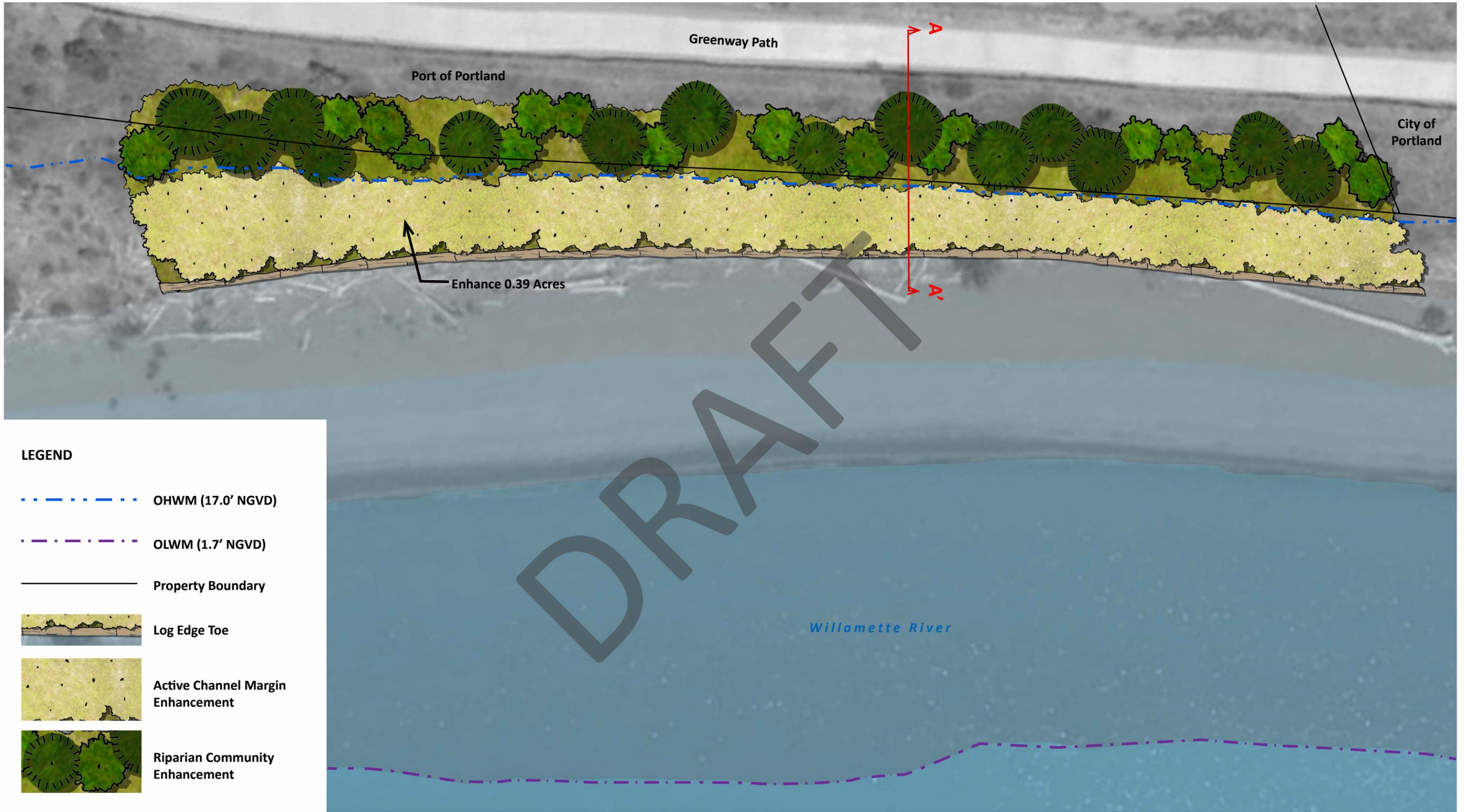
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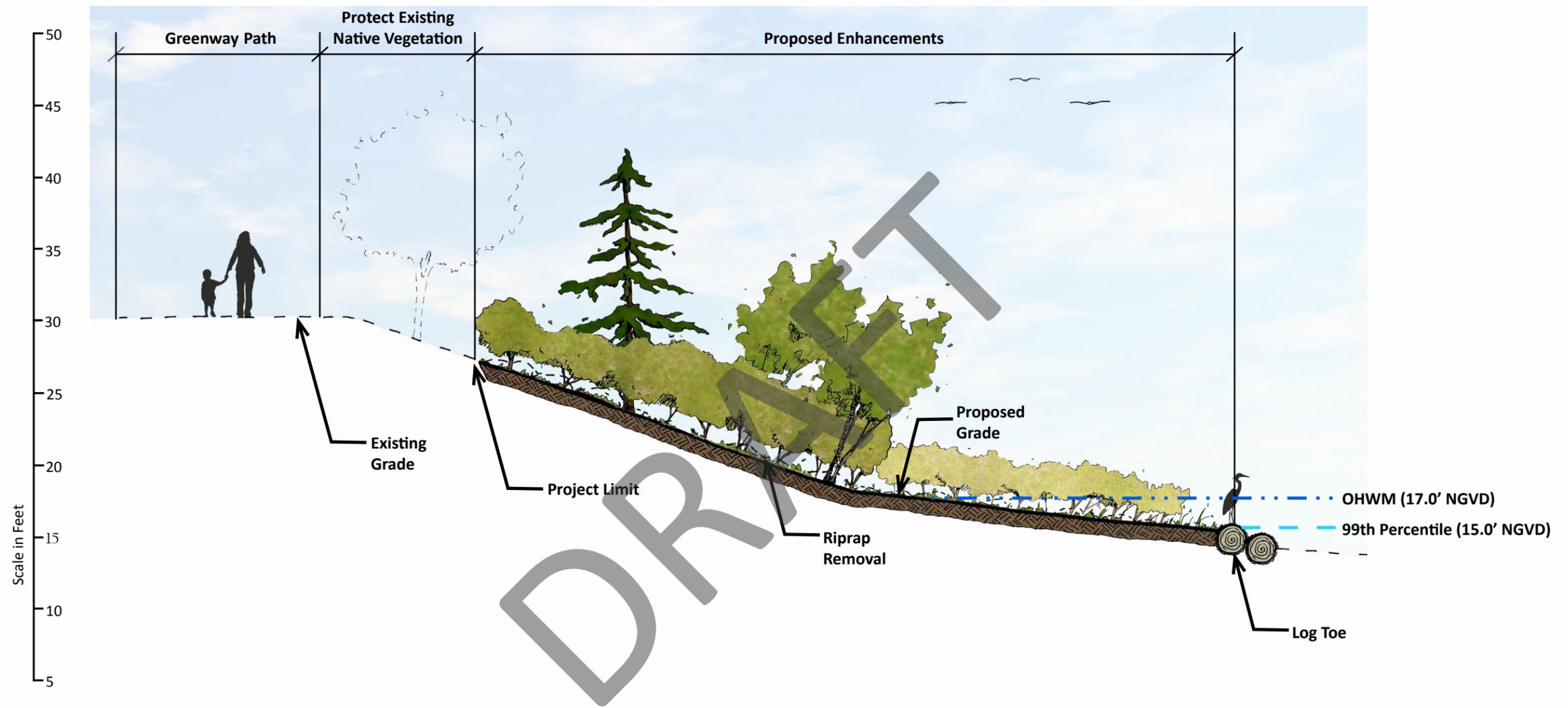


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**Figure 1**  
Proposed Mitigation Plan: Swan Island South Terminal 4 Phase I Removal Action Mitigation  
Port of Portland

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