

Attachment ES-1

Summary of Mitigation Measures Required by Regulation or Proposed by Applicant

This table is a summary of mitigation measures identified by the Applicant in its Preliminary Draft Environmental Impact Statement (PDEIS); for brevity, the text of some of these measures may have been summarized. Underlined measures were not specifically identified in Chapter 3 of the DEIS as mitigation for potential Facility impacts. Some of these measures may have been included elsewhere in the DEIS, however their mitigation value was not identified. To the extent not already included, the EIS should specifically address all mitigation inherent in project design as presented in various sections of Chapter 4 of the PDEIS.

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
Earth Resources	<p>Soil Erosion (Construction/Decommissioning)</p> <ul style="list-style-type: none"> • Implementation of erosion and sedimentation BMPs (Facility, Construction, 3.1-20) • Control construction activities to limit area of exposed soil (Facility, Construction, 3.1-20) • Surround disturbed areas with stabilized soil berms or sand bags to prevent migration of eroded materials to other areas (Facility, Construction, 3.1-21) • Install temporary ditches, sediment fences, and silt traps (Facility, Construction, 3.1-21) • Install permanent erosion control as necessary upon completion of construction activities, including on-site stormwater collection systems (Facility, Construction, 3.1-21 and 22) • <u>Use individual excavations for equipment foundations</u>, following completion of foundations, fill, compact, and final grade the site (Facility, during construction, 3.1-21; note that DEIS omits "use individual excavations, but includes fill, compact, and final grade following completion of foundations.") • <u>Use, City, County and State BMPs to minimize temporary erosion, long-term erosion, and sedimentation.</u> • Design erosion control facilities to capture stormwater directly from hardscape to limit erosion (Facility, Construction, 3.1-22) • Design industrial yards and landscape areas to either infiltrate or use flow dispersion to avoid concentration of runoff that contributes to erosion (Facility, Construction, 3.1-22) • Incorporate BMPs from the 2012 Stormwater Management Manual for Western Washington for erosion and sediment control (Facility, Operation, 3.1-22) • Stabilize exposed surfaces in accordance with Facility NPDES construction stormwater permit and final construction plan requirements (Facility, Construction, 3.1-21) • Collect and convey stormwater from new impervious surfaces using systems that avoid contact of stormwater with bare soil (Facility, Construction, 3.1-21) • Incorporate BMPs from the stormwater manual addressing soil erosion and sediment control for industrial yard areas (Facility, Construction, 3.1-22) <p>Ash Fall (Construction/Operations/Decommissioning)</p> <ul style="list-style-type: none"> • Implement Construction/Operations Emergency Plan (Facility, Operation, 3.1-27) <p>Seismic Activity (Construction/Operations/Decommissioning)</p> <ul style="list-style-type: none"> • <u>Implement a Construction Emergency Plan to address actions and responses related to seismic activities</u> • <u>Implement Operations Emergency Plan</u> • Implement ground improvements to minimize ground movement and mitigate liquefaction-induced settlement and lateral spreading deformations. Use improvements, such as <ul style="list-style-type: none"> • Vibro replacement • Dry soil mixing • Wet soil mixing • Jet grouting

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Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
	<ul style="list-style-type: none"> • Wick drains • Driven piles • Spread footings (Facility, Operation, 3.1-26) • Determine final ground improvement methods during design refinements and document in construction plans submitted to EFSEC for review¹. • Design structures to applicable seismic and building codes, including the following: <ul style="list-style-type: none"> • Upland Facilities – Meet design criteria of IBC 2012 as amended by City and State and ASCE 7, and API standards (Facility, Operation, 3.1-25) • Dock Modifications – Meet design criteria of IBC 2012 as amended by City and State and additional applicable industry standards for mooring and berthing design, seismic design, and structural load combinations (Facility, Operation, 3.1-23) • <u>Implement an Operations Emergency Plan to address actions and responses to site emergencies included those related to seismic events.</u> <p>Topography Modification (Construction/Operations/Decommissioning)</p> <ul style="list-style-type: none"> • <u>Fill, grade, and excavate areas per final construction plans submitted to EFSEC</u>
Air Quality	<p>Emissions (Construction/Operations/Decommissioning)</p> <ul style="list-style-type: none"> • Implement BMPs, including dust control and diesel emission control measures, consistent with Washington Associated General Contractors Brochure, "<i>Guide to Handling Dust from Construction Projects</i>", including: <ul style="list-style-type: none"> • Proper maintenance of off-road mobile equipment • Use off-road mobile equipment that meets applicable emission standards • Encourage carpool and trip reduction strategies for construction workers • Minimize construction truck and other vehicle idling time • Spray exposed soil with water or other suppressant to reduce windblown emissions • Pave or gravel staging areas • Use appropriate methods to control dust from trucks transporting materials • Rock exits or provide wheel washers to reduce particulate matter carried off site by vehicles • Cover dirt/gravel/debris piles to reduce dust and wind-blown debris (Facility, Construction, 3.2-12) • <u>Comply with all Federal and State air quality emissions control standards, including New Source Performance Standards and National Emissions Standards for Hazardous Materials and required air quality permitting</u>
Water Resources	<p>Surface Water</p> <p><i>Construction Mitigation</i></p> <p><u>Use management techniques to reduce the discharge of contaminated stormwater runoff would be implemented on site prior to beginning construction activities.</u></p> <ul style="list-style-type: none"> • <u>Establish stormwater monitoring and maintenance programs to ensure compliance of erosion control practices.</u> • Implement a site-specific erosion control plan and SWPPP during construction. SWPPP to meet NPDES permit requirements and include provisions for permanent stormwater management. (Facility, Construction, 3.3-41, 3.3-42) • <u>Implement site-specific BMPs selected from the Stormwater Management Manual for Western Washington and meet the following water quality criteria:</u> <ul style="list-style-type: none"> • <u>Chapter 173-200 WAC</u> • <u>Chapter 173-201A WAC</u>

¹ Subsequent to submittal of the PDEIS to EFSEC, the Applicant submitted more detailed ground improvement designs. These are not further summarized here. However, the EIS should identify that the intent of ground improvements is to mitigate impacts of seismic activity to the Facility in compliance with State-adopted building codes.

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
	<ul style="list-style-type: none"> • <u>Chapter 173-204 WAC</u> • Monitor installation and removal of temporary piles (Facility, Construction 3.3-41) • Modify construction methods as needed to protect surface water quality (Facility, Construction, 3.3-41) • Sequence and control construction activities to limit potential erosion and sediment transport (Facility, Construction, 3.3-41) • Limit ground disturbing activities to necessary construction areas (Facility, Construction, 3.3-41) • Implement interim surface protection measures, including dust control, straw matting, and erosion control blankets would be used as required to prevent erosion (Facility, Construction, 3.3-41) • <u>Complete final surface restoration as soon as possible after an area's final disturbance</u> • Design sediment control measures based on 10-year design storm (Facility, Construction, 3.3-41) • <u>Design water quality measures (other than sediment removal) on a 6-month, 24-hour design storm</u> • <u>Emphasize erosion control over sediment control to eliminate the source of stormwater contamination</u> • <u>During construction, direct the EPC contractor to implement an environmental protection program for construction-related activities that complies with specific site conditions</u> • <u>Implement a construction SPCC Plan per 40 CFR 112 to address management of materials identified previously that could impact conditions at the Site. The SPCC Plan would include a listing of responsible personnel, spill reporting procedures, project and site information, pre-existing contamination at the Site, potential spill sources, spill prevention and response training, spill report form(s), plan approval, and SPCC Plan acknowledgement forms (to be signed by all project personnel).</u> • <u>Implement management techniques to reduce the discharge of contaminated runoff before beginning construction</u> • <u>Establish monitoring and maintenance programs for oversight and compliance of erosion control practices</u>
	<p><i>Operations Mitigation</i></p> <ul style="list-style-type: none"> • Implement operational and structural source control BMPs (Facility, Operation, 3.3-47) • To the maximum extent possible, protect and segregate stormwater from contact with industrial activity and crude product (Facility, Operation 3.3-47) • <u>Implement secondary structural containment measures to supplement the structural source control BMPs</u> • Conduct maintenance, including equipment and parts wash, in a covered portion of the rail unloading building. Pump wastewater to the secondary containment tanks. (Facility, Operations, 3.3-47) • Design spill containment measures along the pipeline alignment (Area 500) to comply with 40 CFR 112.7 by providing secondary containment, inspections, and contingency planning. Install spill control devices along the pipeline alignment on existing stormwater inlets to contain small oil leaks or spills. (Facility, Operation, 3.3-49) • Supplement structural source control BMPs with containment drip pans and other containment. (Facility, Operation, Table 3.3-17) <u>The referenced BMPs are from Volume IV of the Stormwater Management Manual for Western Washington. A comprehensive site-specific SPCC Plan would be developed in accordance with 40 CFR 112.</u> • Design parking and access areas with a combination of catch basin filters and filter vaults to treat stormwater runoff. (Facility, Operation, 3.3-47 [note that BMP in DEIS text applies to entire site]) • Conduct maintenance, including equipment and parts wash, in a covered portion of the rail unloading building. Pump all wastewater produced to the secondary containment tanks. (Facility, Operation, 3.3-46) • In accordance with the permitted levels of the downstream system, discharge stormwater meeting established water quality benchmarks consistent with the Industrial Stormwater General Permit (Facility, Operation, 3.3-46)

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	<ul style="list-style-type: none"> • Discharge to existing Columbia River outfalls through existing man-made conveyance pipelines. Note: the project would be categorically exempt from the flow control provisions of Appendix I-E of the Management Manual for Western Washington. • <u>Implement a planning and preparedness actions required by state and federal regulations to prevent, contain, and respond to inadvertent releases that could impact surface water, including but not limited to:</u> <ul style="list-style-type: none"> • <u>An operations SPCC Plan, prepared under 40 CFR 112 and WAC 173-180, Part F</u> • <u>A safe and effective threshold determination report, prepared under WAC 173-180-224</u> • <u>A pre-loading transfer plan according to WAC 173-180-230</u> • <u>A Facility operations manual in compliance with WAC 173-180 400 to -435</u> • <u>An oil transfer training program in compliance with WAC 173-180, Part E</u> • <u>A certification program in compliance with WAC 173-180, Part E</u> • <u>A spill contingency plan in compliance with WAC 173-182, 40 CFR 112, Subpart D and 33 CFR 154, Subpart F</u> • <u>Prepare coordinated plans to meet all applicable local, state, and federal requirements</u> <p><i>Decommissioning Mitigation</i> Note: <u>Impacts to surface water associated with decommissioning of the Facility are anticipated to be similar to those related to construction activities described above and involving similar mitigation.</u> Additional mitigation measures are as follows.</p> <ul style="list-style-type: none"> • Dock pipelines and appurtenant removal — Contain hydrocarbon residuals within existing pipelines during removal. Removal of the residuals would be completed and crude handling elements tested to determine applicable disposal options. (Facility, Operation, 3.3-51 and 52) • Other containment systems —Contaminants may accumulate in secondary containment systems during site operations. Clean structures and dispose possible contaminates legally off site. Conduct demolition and extraction of remaining contaminated structures to ensure residues do not enter soil or groundwater. (Facility, Operation, 3.3-51)
	<p>Groundwater <i>Construction/Operations/Decommissioning Mitigation</i></p> <ul style="list-style-type: none"> • <u>Implement a SPCC Plan and an SWPPP to establish procedures to prevent and control the impact of spills on the natural environment.</u> • <u>During final design, identify potential contaminants in the soil and address in the plans and specifications to establish procedures to minimize the potential for groundwater impacts, including the following:</u> <ul style="list-style-type: none"> • Restrictions on work in portions of the site, • Minimize/controlling grading to prevent ponding water that would promote leaching, • Use of temporary covers over disturbed areas, and controlling tracking of contaminants from one portion of the Site to another. (Facility, Construction, 3.3-43) • As part of the Contaminated Materials Management identify construction activities that could potentially impede monitoring and access of groundwater through existing water supply wells if access is necessary for ongoing remediation activities. (Facility, Construction, 3.3-43) • <u>Implement an operational SPCC Plan and an SWPPP to establish procedures to prevent and control the impact of spills on the natural environment.</u> • <u>Provide secondary containment systems under storage tanks and in buried transfer piping to capture leaks, preventing discharges directly into the soil, which could impact groundwater. Incorporate in the site design monitoring and control systems to allow early detection of a release when containment and remediation can be most effective.</u> • <u>During construction, construct structures, slabs, or other containment systems on top of ground improvement systems, which would cut off these pathways.</u> • <u>Limit the potential for the discharge of contaminants to the groundwater due to surface water infiltration through development of surface water control infrastructure and the implementation of water quality control protocol</u>

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
	<ul style="list-style-type: none"> • During decommissioning of tank, pipelines, equipment, and other containment systems develop a Site Inspection and Sampling Plan prior to decommissioning to identify areas where contaminants could be trapped. Inspect and sample to identify potential handling and disposal requirements. (Facility, Decommissioning, 3.3-51) • <u>Sample and remediate subsurface soils as necessary following the removal of tanks and containment structures housing hazardous materials and crude oil.</u> • <u>Evaluate the need for surface controls, based on the proposed decommissioning plan, of ground improvement systems, that if left exposed provide a conduit for surface contaminants into lower portions of the formation.</u>
	<p>Floodplains (<i>Construction/Operations/Decommissioning</i>)</p> <ul style="list-style-type: none"> • Cease construction activities if a flood event is predicted and move, to the extent possible, hazardous materials and equipment from the site to above the 500-year floodplain (Facility, Construction, 3.3-45) • <u>Within Area 200, use below-grade watertight trenches to eliminate inundation concerns during the 100-year flood or from seasonal shallow groundwater.</u> • Elevate the pipeline route aboveground within the 100-year floodplain (Facility, Construction, 3.3-45) • Locate improvements to Berths 13 and 14 in Area 400 with deck elevations above the 100-year floodplain to withstand forces imposed by flooding conditions (Facility, Operation, 3.3-50) • Locate structures in Area 400 so that the floor is at least 1 foot above the base flood elevation and anchored to resist movement and designed with utilities and other connections to withstand flood events consistent with the requirements of VMC 20.740.120 Frequently Flooded Areas. (Facility, Operations, 3.3-50) • <u>Design the facility to maintain integrity in worst-case flood conditions.</u> • <u>Contain any crude oil spill, including minor leaks and drips, and promptly clean affected surfaces limiting the amount of any residue that could commingle with flood waters inundating the rail drip pans, containment piping, and below-grade trenches.</u> • <u>Monitor the rate of flood water rise and suspend threatened operations prior to a flood event exceeding the 100-year or 500-year stage</u> • Conduct decommissioning activities outside of the 100-year floodplain. (Facility, Decommissioning, 3.3-52) • <u>Implement erosion control practices designed for construction during decommissioning processes.</u> • Demobilize hazardous material and equipment from the site and relocate above the 500-year floodplain during decommissioning processes. (Facility, Decommissioning, 3.3-52)
	<p>Wetlands (<i>Construction/Operations/Decommissioning</i>)</p> <ul style="list-style-type: none"> • Construction would only occur within the marked construction boundaries at the proposed Facility site. (Facility, Construction, 3.3-46). • Implement an SPCC Plan that defines specific BMPs to minimize potential leaks and spills from construction equipment and related impacts to wetlands. BMPs to include: <ul style="list-style-type: none"> • Inspecting construction equipment daily to ensure that there are no leaks of hydraulic fluids, fuel, lubricants, or other petroleum products • Locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas, including wetlands and regulated wetland buffers. (Facility, Construction, 3.3-46) • Install drains to reduce the risk of water and/or air moving laterally underground during the installation of vibro replacement stone columns. (Facility, Construction, 3.3-46) • Conduct daily visual inspections of wetlands during installation of vibro replacement. Temporarily suspend installation activities until counteractive measures (i.e., additional wick drains) can be installed if there is any observation of lateral movement of water or air. (Facility, Construction, 3.3-46)

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	<ul style="list-style-type: none"> • Provide stormwater treatment to a level that is consistent with or exceeds existing treatment at the site to ensure that off-site wetlands are not adversely affected by operational stormwater (Facility, Operations, 3.3-50 and 51) • Design the tank farm containment provisions to handle 110 percent of the volume of the largest tank and a 100 year, 24-hour rain event. (Facility, Operations, Table 3.3-17). • Design the rail unloading area to include containment rail drip pans, <u>pumps, and containment sump tanks, of sufficient size to contain and store the entire volume of a single rail car staged within the unloading building.</u> (Facility, Operations, Table 3.3-17) • <u>Implement spill prevention, containment and response BMPs</u> • Implement BMPs for potential leaks and spills during decommissioning processes similar to those used during construction (Facility, Decommissioning, 3.3-51) • <u>Conduct decommissioning processes only within marked construction boundaries.</u>
Terrestrial Vegetation (Vegetation)	<p><i>Construction Mitigation</i></p> <ul style="list-style-type: none"> • <u>Implement a SPCC Plan that would define specific BMPs to minimize the potential for leaks and spills and the extent of damage from any unavoidable leaks or spills, including daily inspection of construction equipment leaks of hydraulic fluids, fuel, lubricants, or other petroleum products, and locating temporary material and equipment staging areas above the OHWM of the waterbodies and outside environmentally sensitive areas.</u> • Adhere to the requirements of VMC 20.770 and plant a minimum of 30 tree units per acre for undeveloped sites, and, based on a development area of 10,550 square feet, plant a minimum of eight tree units in other areas of the Facility. (Facility, Construction, 3.4-12) (Note: VMC 20.770.070(B)(4) allows trees planted in landscaped islands and other areas to meet the tree density requirements. The project includes a Landscaping Plan in Area 200 that calls for the planting of buffer landscape trees and parking lot trees that would exceed the eight tree units required for the project under VMC 20.770. The planted trees would be deciduous and planted at a minimum of 2-inch caliper. These landscaped areas would provide wildlife habitat typical in an urban environment, including perching and foraging opportunities for migratory birds. In total, about 2.21 acres of planted areas would be completed.) (Facility, Construction, 3.4-12). • Implement BMPs during construction to minimize the spread and establishment of noxious weeds, including the following: <ul style="list-style-type: none"> • Wash equipment and vehicles before entering/leaving the proposed Facility location • Restrict construction activities to the area needed to work effectively to limit the ground disturbance and prevent the spread of noxious weed species • Use weed-free straw, hydromulch, or similar ground cover for temporary erosion control during construction (Facility, Construction, 3.4-12) <p><i>Operations and Maintenance Mitigation</i></p> <ul style="list-style-type: none"> • <u>Provide on-site stormwater treatment facilities for water quality and quantity that are designed to handle a 6-month, 24-hour event.</u> • Contain stormwater discharges within the proposed Facility location and direct to existing systems at Terminals 4 and 5. (Facility, Operation, 3.4-14) • Use operational spill plans for appropriate response and cleanup procedures, including the handling of vegetation that would be affected by spills. (Facility, Operation, 3.4-14). • <u>Minimize maintenance-related impacts to vegetation by limiting activities to the Facility location, i.e., tracks, pipeline corridors, and tank farm.</u> • <u>Conduct maintenance activities using methods and products consistent with local, state, and federal regulations. Vegetation maintenance would not occur outside the proposed Facility location.</u>
Terrestrial Wildlife (Wildlife)	<p>Terrestrial Habitats</p> <p><i>Construction Mitigation</i></p> <ul style="list-style-type: none"> • <u>Design stormwater treatment facilities to capture and treat water on site prior to discharging it to existing conveyance.</u>

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
	<ul style="list-style-type: none"> • <u>Implement the SPCC Plan with BMPs during construction, which minimize the potential for leaks, spills and reduce the extent of damage if a spill or leak occurs, including:</u> <ul style="list-style-type: none"> • Daily inspection of construction equipment for leaks (Facility, Construction, 3.5-27) • <u>Locating temporary material and equipment staging areas above the OHWM of the waterbody and outside environmentally sensitive areas.</u> • <u>Locate lighting to be directional and aimed away from sensitive habitats to the extent possible to minimize night light and glare.</u> • <u>Provide 1.13 acres of compensatory habitat mitigation, including:</u> Install urban landscaping (approx. 2.21 acres), including trees and shrubs in Areas 200 and 300 (Facility, Construction, 3.5-25) • Implement a MMMP developed for vibratory installation and removal of temporary piles, and upland impact pile driving to minimize the exposure of marine mammals to temporarily increased underwater noise levels. (Facility, Construction, 3.6-44)
	<p>Aquatic Habitat Construction Mitigation</p> <ul style="list-style-type: none"> • Conduct all in-water construction activities between of November 1 to February 28. (Facility, Construction, 3.6-37; note that DEIS recommends September 1 to January 15) • Use design modifications to the existing dock that only require temporary support pilings - no new permanent piles would be installed in the Columbia River, and no new structures would be constructed. (Facility, Construction, 3.6-38, 3.6-40) • Remove 15 piles from the river to mitigate for temporary support piling. (Facility, Construction 3.6-38) • Design new overwater construction with grated walkways or open truss configurations to maximize light penetration below the structure. (Facility, Operations, 3.6-46 and 3.6-47) • Implement a MMMP developed for vibratory installation and removal of temporary piles, and upland impact pile driving to minimize the exposure of marine mammals to temporarily increased underwater noise levels. (Facility, Construction, 3.6-44) • Stop construction activities if marine mammals are observed in the project vicinity during these activities. Resume construction when observers no longer detect the presence of marine mammals in the vicinity (Facility, Construction, 3.6-43) • <u>Implement standard BMPs for construction in, over and near water, including:</u> <ul style="list-style-type: none"> • <u>Work barges would not be allowed to ground out on the river bottom during construction.</u> • <u>Check construction vessels and equipment for leaks and/or other problems that could result in discharge of petroleum-based products or other material into the Columbia River.</u> • <u>Do not dispose of or abandon excess or waste materials generated during construction waterward of the OHWM or allow to enter waters of the state. Dispose of waste materials in an appropriate landfill.</u> • <u>Store demolition and construction materials where wave action or upland runoff cannot cause materials to enter surface waters.</u> • <u>Keep oil-absorbent materials on site to be used in the event of an inadvertent release or if any fuels, lubricants, or other oil-based product is observed in the water during construction.</u> • <u>Use grating on all walkway surfaces between the docks and the dolphins to allow light penetration.</u> • <u>Anti-perch pile caps would be added to the tops of any exposed piles to prevent perching of piscivorous birds.</u> • <u>Complete project construction in compliance with Washington State Water Quality Standards (WAC 173-201A) including:</u> <ul style="list-style-type: none"> • <u>No petroleum products, fresh cement, lime, concrete, chemicals, or other toxic or deleterious materials would be allowed to enter surface waters.</u> • <u>There would be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.</u>

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
	<ul style="list-style-type: none"> • <u>Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. would be checked regularly for leaks, and materials would be maintained and stored properly to prevent inadvertent releases.</u> • Implement a SPCC Plan with BMPs during construction, which minimize the potential for leaks, spills and reduce the extent of damage if a spill or leak occurs. (Facility, Construction, 3.6-42) • <u>Take corrective actions, including those listed below, in the event of any release of oil, fuel, or chemicals from construction vessels, equipment, or materials into the water:</u> <ul style="list-style-type: none"> • <u>Begin cleanup efforts immediately and complete in accordance with all local, state, and federal regulations, taking precedence over normal work. Cleanup includes proper disposal of any inadvertently released material and used cleanup material.</u> • <u>Assess the cause of the inadvertent release and take appropriate action to prevent further incidents or environmental damage.</u> • <u>Report inadvertent releases to Ecology's Southwest Regional Spill Response Office at 360-407-6300.</u> • <u>Pile removal BMPs would include the following:</u> <ul style="list-style-type: none"> • <u>Work below OHWM would only occur during the in-water work window.</u> • <u>The piles would be dislodged with a vibratory hammer, when possible.</u> • <u>The piles would be removed in a single, slow, and continuous motion to minimize sediment disturbance and turbidity in the water column.</u> • If a pile is unable to be removed with the vibratory hammer, it would be cut or pushed in the sediment consistent with agency-approved BMPs. (Facility, Construction, 3.6-37) • <u>Removed piles and associated sediments (if any) would be contained on a barge. If piles are placed directly on the barge and not in a container, the storage area would consist of a row of hay or straw bales, filter fabric, or similar material placed around the perimeter of the storage area.</u> • <u>Pile installation BMPs would include the following:</u> <ul style="list-style-type: none"> • <u>In-water pile driving would be limited to temporary steel piles. The vibratory hammer method would be used to drive temporary steel piles to minimize noise levels. (Facility, Construction, 3.6-40)</u> • <u>Overwater concrete BMPs would include the following:</u> <ul style="list-style-type: none"> • <u>Wet concrete would not come into contact with surface waters.</u> • <u>Forms for any concrete structure would be constructed to prevent leaching of wet concrete.</u> • <u>Concrete process water would not enter waters of the United States. Any process water/contact water would be routed to a contained area for treatment and disposal.</u>
	<p>Terrestrial and Aquatic Habitats <i>Operations and Maintenance Mitigation</i></p> <ul style="list-style-type: none"> • <u>Provide on-site stormwater treatment facilities for water quality and quantity that are designed to handle a 6-month, 24-hour event.</u> • <u>Contain stormwater discharges within the proposed Facility location and direct to existing systems at Terminals 4 and 5.</u> • <u>Use operational spill plans for appropriate response and cleanup procedures, including the handling of vegetation that would be affected by spills.</u> • <u>Minimize maintenance-related impacts to wildlife habitat by limiting activities to the Facility location, i.e., tracks, pipeline corridors, and tank farm.</u> • <u>Conduct maintenance activities using methods and products consistent with local, state, and federal regulations. Vegetation maintenance would not occur outside the proposed Facility location.</u> • <u>Use directional lighting in areas adjacent to sensitive wildlife habitats, including the north side of Area 300 to ensure lights are not pointed in the CRWMB and Area 400 to minimize the amount of light in aquatic habitats.</u>

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
Aquatic Species (Fisheries)	<p>Construction Mitigation</p> <ul style="list-style-type: none"> • Design modifications to the existing dock to result in light penetration, no new permanent piling, <u>no net increase in overwater structure</u>, the removal of 15 piles and no new impacts to fish habitat. • <u>Implement BMPs for construction, including:</u> • <u>Work barges would not be allowed to ground out on the river bottom during construction.</u> • <u>Check construction vessels and equipment for leaks and/or other problems that could result in discharge of petroleum-based products or other material into the Columbia River.</u> • <u>Do not dispose or abandon excess or waste materials generated during construction waterward of the OHWM or allow to enter waters of the state. Dispose of waste materials in an appropriate landfill.</u> • <u>Store demolition and construction materials where wave action or upland runoff cannot cause materials to enter surface waters.</u> • <u>Keep oil-absorbent materials on site to be used in the event of an inadvertent release or if any fuels, lubricants, or other oil-based product is observed in the water during construction.</u> • <u>Use grating on all walkway surfaces between the docks and the dolphins to allow light penetration.</u> • <u>Add anti-perch pile caps to the tops of any exposed piles to prevent perching of piscivorous birds.</u> • Limit in-water pile driving to temporary steel piles. Use a vibratory hammer method to drive temporary steel piles to minimize noise levels. (Facility, Construction, 3.6-37) • Remove piles with a vibratory hammer when possible. (Facility, Construction, 3.6-37) • <u>Remove piles in a single, slow, and continuous motion to minimize sediment disturbance and turbidity in the water column.</u> • If a pile is unable to be removed with the vibratory hammer, cut or push it into the sediment consistent with agency-approved BMPs. (Facility, Construction, 3.6-37) <p>Temporary Water Quality Impact Mitigation</p> <ul style="list-style-type: none"> • Implement a SPCC Plan with specific BMPs to minimize the potential for leaks, spills and the extent of damage from any unavoidable leaks or spills. (Facility, Construction, 3.6-42) • <u>Implement standard BMPs, including:</u> • <u>Complete project construction in compliance with Washington State Water Quality Standards (WAC 173-201A), including:</u> <ul style="list-style-type: none"> • <u>No petroleum products, fresh cement, lime, concrete, chemicals, or other toxic or deleterious materials would be allowed to enter surface waters.</u> • <u>No discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.</u> • <u>Check fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. regularly for leaks, and maintain and store materials properly to prevent inadvertent releases.</u> • <u>Maintain applicable spill response equipment and material designated in the construction SPCC Plan at the job site.</u> • <u>Take corrective actions, including those listed below, in the event of any release of oil, fuel, or chemicals from construction vessels, equipment, or materials into the water.</u> • <u>In the event of an inadvertent release of fuels, lubricants, or other materials during construction, containment and begin cleanup efforts immediately and complete in an expeditious manner, in accordance with all local, state, and federal regulations, and taking precedence over normal work.</u> • <u>Cleanup would include proper disposal of any inadvertently released material and used cleanup material.</u> • <u>The cause of the inadvertent release would be assessed and appropriate action would be taken to prevent further incidents or environmental damage.</u> • <u>Report inadvertent releases to Ecology's Southwest Regional Spill Response Office at 360-407-6300.</u> • <u>Implement overwater concrete BMPs, including:</u> <ul style="list-style-type: none"> • <u>Wet concrete would not come into contact with surface waters.</u>

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
	<ul style="list-style-type: none"> • <u>Forms for any concrete structure would be constructed to prevent leaching of wet concrete.</u> • <u>Concrete process water would not enter waters of the United States. Any process water/contact water would be routed to a contained area for treatment and disposal.</u> • <u>Conduct all in-water temporary pile installation and removal between November 1 to February 28 (Facility, Construction, 3.6-37; note that DEIS recommends September 1 to January 15)</u> <p><i>Temporary Noise Construction Mitigation</i></p> <ul style="list-style-type: none"> • <u>Use vibratory methods for all in-water removal and installation of temporary piles. (Facility, Construction, 3.6-40)</u> • <u>Conduct pile installation above the OHWM of the Columbia River.</u> <p><i>Operations Mitigation</i></p> <ul style="list-style-type: none"> • <u>Provide stormwater treatment to a level that is consistent with the discharge permits applicable to the Facility</u> • <u>Implement a SPCC Plan, which defines specific BMPs to minimize the potential for leaks, spills and the extent of damage from any unavoidable leaks or spills and would outline responsive actions in the event of a release, and notification and reporting procedures.</u> • <u>Implement standard operational BMPs, including:</u> <ul style="list-style-type: none"> • <u>Location of crude oil unloading areas that ensure oil never comes into contact with unprotected ground surfaces that could runoff to aquatic systems. Use containment pans and berms would be used to capture unanticipated leaks.</u> • <u>Construct transfer piping such that crude oil exposure to the ambient atmosphere is minimized. Design the transfer pipelines in conformance with applicable industry standards.</u> • <u>Equip transfer pipelines and the associated pumping systems with flow and pressure sensors to identify out of the ordinary operating conditions that could be the result of a pipeline or pump failure and potential risk of crude oil discharge.</u>
	<p><i>Temporary Water Quality Impact Mitigation</i></p> <ul style="list-style-type: none"> • <u>Implement a SPCC Plan with specific BMPs to minimize the potential for leaks, spills and the extent of damage from any unavoidable leaks or spills. (Facility, Construction, 3.6-42)</u> • <u>Implement standard BMPs, including:</u> • <u>Complete project construction in compliance with Washington State Water Quality Standards (WAC 173-201A) including:</u> <ul style="list-style-type: none"> • <u>No petroleum products, fresh cement, lime, concrete, chemicals, or other toxic or deleterious materials would be allowed to enter surface waters.</u> • <u>No discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for reentry into surface waters.</u> • <u>Check fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. regularly for leaks, and maintain and store materials properly to prevent inadvertent releases.</u> • <u>Maintain applicable spill response equipment and material designated in the construction SPCC Plan at the job site.</u> • <u>Take corrective actions, including those listed below, in the event of any release of oil, fuel, or chemicals from construction vessels, equipment, or materials into the water.</u> • <u>In the event of an inadvertent release of fuels, lubricants, or other materials during construction, containment and begin cleanup efforts immediately and complete in an expeditious manner, in accordance with all local, state, and federal regulations, and taking precedence over normal work.</u> • <u>Cleanup would include proper disposal of any inadvertently released material and used cleanup material.</u> • <u>The cause of the inadvertent release would be assessed and appropriate action would be taken to prevent further incidents or environmental damage.</u> • <u>Report inadvertent releases to Ecology's Southwest Regional Spill Response Office at 360-407-6300.</u> • <u>Implement overwater concrete BMPs, including:</u>

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
	<ul style="list-style-type: none"> • <u>Wet concrete would not come into contact with surface waters.</u> • <u>Forms for any concrete structure would be constructed to prevent leaching of wet concrete.</u> • <u>Concrete process water would not enter waters of the United States. Any process water/contact water would be routed to a contained area for treatment and disposal.</u> • Conduct all in-water temporary pile installation and removal between November 1 to February 28 (Facility, Construction, 3.6-37; note that DEIS recommends September 1 to January 15) <p><i>Temporary Noise Construction Mitigation</i></p> <ul style="list-style-type: none"> • Use vibratory methods for all in-water removal and installation of temporary piles. (Facility, Construction, 3.6-40) • <u>Conduct pile installation above the OHWM of the Columbia River.</u> <p><i>Operations Mitigation</i></p> <ul style="list-style-type: none"> • <u>Provide stormwater treatment to a level that is consistent with the discharge permits applicable to the Facility</u> • <u>Implement a SPCC Plan, which defines specific BMPs to minimize the potential for leaks, spills and the extent of damage from any unavoidable leaks or spills and would outline responsive actions in the event of a release, and notification and reporting procedures.</u> • <u>Implement standard operational BMPs, including:</u> <ul style="list-style-type: none"> • <u>Location of crude oil unloading areas that ensure oil never comes into contact with unprotected ground surfaces that could runoff to aquatic systems. Use containment pans and berms would be used to capture unanticipated leaks.</u> • <u>Construct transfer piping such that crude oil exposure to the ambient atmosphere is minimized. Design the transfer pipelines in conformance with applicable industry standards.</u> • <u>Equip transfer pipelines and the associated pumping systems with flow and pressure sensors to identify out of the ordinary operating conditions that could be the result of a pipeline or pump failure and potential risk of crude oil discharge.</u> • <u>Equip transfer pipelines with valves at the exit of and entry to the unloading area, the storage area, and the marine vessel loading area. These valves would include 30-second shut-offs to stop the flow of product should anomalous flow and pressure conditions related to a product spill occur, or in response to operations personnel triggering the shutoff.</u> • <u>Install transfer piping aboveground when possible to facilitate inspections and maintenance. Where road or rail crossings occur, house the piping in underground steel casings or raised aboveground using standard check for spillover clearances. Design and install pipelines at each railroad, highway, or road crossing and to withstand the dynamic forces exerted by anticipated traffic or rail loads.</u> • <u>Coat and cathodically protect transfer pipelines to prevent corrosion.</u> • <u>Install sections of transfer pipelines constructed underground so that they are not in electrical contact with any metallic structures. This requirement would not preclude the use of electrical bonding to facilitate the application of cathodic protection. Tests would be carried out to determine the presence of stray currents and protective measures provided when stray currents are present.</u> • <u>Equip transfer pipelines with leak detection systems meeting regulatory standards.</u> • <u>Equip the trestle at Berth 13 with piping and hoses to transfer the crude oil from the transfer pipeline system to the receiving marine vessel. In accordance with 33 CFR § 154.530, a facility transferring oil or hazardous materials to or from a vessel with a capacity equal to or greater than 250 bbl must have fixed catchments, curbing, or other fixed means for small discharge containment of materials at the hose handling and loading arm area, each hose connection manifold area, and under each hose connection that would be coupled or uncoupled as part of the transfer operation. For the Facility, it is anticipated that the hose diameter would be between 6 and 12 inches, requiring that discharge containment capacity must be at least three bbl.</u> • <u>Construct a catchment and sump at Berth 13, at or below the deck level of sufficient capacity to hold the small discharge containment in addition to stormwater that may fall in the catchment area. The containment would be discharged within 1 hour of completion of any transfer by pumping into the return line.</u>

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
	<ul style="list-style-type: none"> • <u>Use design elements to prevent discharges of oil during conveyance, including:</u> <ul style="list-style-type: none"> • <u>Design hoses and their supporting equipment to meet the applicable hose protection requirements of WAC 173-180 Part B and 33 CFR 156.</u> • <u>Design vessel mooring systems to meet the applicable requirements of 40 CFR 156.</u> • <u>Prepare and implement the following plans to comply with state and federal requirements:</u> <ul style="list-style-type: none"> • <u>Operations SPCC Plan, prepared under 40 CFR 112 and WAC 173-180, Part F</u> • <u>Safe and effective threshold determination report, prepared under WAC 173 180 224</u> • <u>Pre-loading Transfer Plan according to WAC 173-180-230</u> • <u>Facility operations manual in compliance with WAC 173-180 400 to -435</u> • <u>Oil transfer training program in compliance with WAC 173-180, Part E</u> • <u>Certification program in compliance with WAC 173-180, Part E</u> • <u>Spill Contingency Plan in compliance with WAC 173-182, 40 CFR 112, Subpart D and 33 CFR 154, Subpart F</u> <p><i>Decommissioning Mitigation</i></p> <ul style="list-style-type: none"> • Implement erosion control and pollution prevention BMPs during decommissioning to minimize potential adverse impacts to fish and fish habitat as a result of decommissioning activities. (Facility Decommissioning, 3.6-50)
Energy and Natural Resources	<p><i>Construction/Operations Mitigation</i></p> <ul style="list-style-type: none"> • Recycle construction waste when possible. (Facility, Construction, 3.15-10) • <u>Coordinate carpooling between construction workers to reduce vehicle emissions</u> • <u>Implement BMPs that include conservation measures for nonrenewable resources, such as water, fuel, and electricity, including the following measures when cost-effective:</u> <ul style="list-style-type: none"> • Install high-efficiency electrical fixtures, appliances, and light bulbs in the support/administrative building (Facility, Operation, 3.7-6) • Install light-emitting diode light bulbs throughout the Facility (Facility, Operation, 3.7-6) • <u>Use low-water flush toilets in the support/administrative building</u> • <u>Coordinate carpooling among operations workers</u> • <u>Recycle waste office paper and aluminum</u> • <u>Send used oils, lubricants, and greases to facilities where they can be recycled when possible</u> • Use vehicles that comply with current fuel consumption and emission standards (Facility, Operation, 3.7-6) • <u>Construct buildings compliant with the 2012 Washington State Energy Code (or current version at the time the project is permitted).</u>
Environmental Health	<p><i>Construction Mitigation</i></p> <ul style="list-style-type: none"> • <u>Environmental Protection Plan (PDEIS Section 14.16.3.1, Page 4-309)</u> • <u>Construction SPCC (Facility, Construction, 3.8-10)</u> • <u>Pre-operational commissioning (Page 4-310)</u> • <u>Potentially flammable liquids and gases would be stored in accordance with local, state, and federal requirements (PDEIS Page 4-310)</u> • <u>Construction Fire Prevention and Response Plan (P. 4-310)</u> <p><i>Mitigation/Actions related to existing contamination: (PDEIS P. 313-314)</i></p> <ul style="list-style-type: none"> • <u>Prepare a Contaminated Materials Management Plan</u> • Vanexco/Rod Mill Cap – reconstruct cap (Facility, Construction, 3.8-8). • Shoreline Restrictive Covenant Areas – Test excess materials and dispose of properly, use clean fill for backfill. (Facility, Construction, 3.8-8). • <u>Areas that are disturbed or removed as part of final construction would be covered with at least 1 foot of clean soil fill to prevent a future direct contact hazard. Where asphalt (road) is laid, it would substitute for 1 foot of clean fill to prevent a future direction contact hazard.</u>

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
	<ul style="list-style-type: none"> • Soils that are excavated would either be direct loaded or stockpiled, sampled and analyzed for PAHs and total petroleum hydrocarbons and other parameters based on the anticipated contaminants, and disposed of offsite, or reused onsite in accordance with applicable regulations and covenant restrictions. (Facility, Construction, 3.8-8). • <u>Standard dust control measures such as spraying exposed soil surfaces with water would be employed during construction to prevent the release of airborne particulates.</u> • <u>Equipment employed in the shoreline restrictive covenant area would be decontaminated at a location to be specified in the contractor's Decontamination Plan.</u> • Construction works would employ appropriate health and safety measures during the handling of contaminated soils. (Facility, Construction, 3.8-10) <p><i>Operations (PDEIS Section 4.16.3.2, pages 4-315 to 4-316)</i></p> <ul style="list-style-type: none"> • <u>Mitigation inherent in project design in accordance with applicable regulations and standard industry practices</u> • <u>Containment measures in the event a release does occur</u> • <u>Institutional controls including training and operational and maintenance procedures</u>
Noise	<p><i>Mitigation: (PDEIS, page 4-137)</i></p> <ul style="list-style-type: none"> • Construction: The Applicant would, to the greatest extent feasible, schedule noisy construction activities to the hours identified in VMC 20.935.030(4) (i.e., between 7:00 a.m. and 8:00 p.m.). (Facility, Construction, 3.12-22) If outdoor construction is required outside of these hours, the Applicant would consult with the City, notify EFSEC in advance, and not conduct the work until EFSEC has reviewed and approved the planned activities. • Operations: The model-calculated sound levels indicate that the Facility would comply with the WAC noise limits at all nearby receiving properties. Therefore, no noise mitigation is proposed. (Facility, Operation, 3.9-17 and 3.9-19) • As provided to EFSEC, noise monitoring is included in the Vancouver Energy Construction Wildlife Monitoring Plan (12 June 2015). (Facility, Operation, 3.5-34)
Land and Shoreline Use	<p><i>Mitigation Measures</i></p> <ul style="list-style-type: none"> • No direct or indirect impacts to existing land uses that would require mitigation have been identified. Therefore, no mitigation measures are proposed. (Facility, Operation, 3.10.-12)
Visual Resources	<p><i>Mitigation Measures</i></p> <ul style="list-style-type: none"> • During the construction period, mitigation measures would include provisions for conducting major construction activities during daylight hours to avoid light and glare on adjacent communities. At night, lights would be directed towards the Facility location and be limited to the minimum wattage required for safety and operations. (Facility, Construction, 3.11-10) • During the operational period, developed elements of the proposed Facility location, including all building features except for storage tanks, would be painted with earth tones. The storage tanks would be painted with non-reflective paint to reduce surface glare from direct sunlight during the day, and area lighting and headlights at night. Impacts from spillover and glare on adjacent lands from area lighting at the location would be reduced by incorporating covered, directional lighting. (Facility, Operation, 3.11-14) Moreover, the incorporation of screening requirements for industrial facilities under existing municipal code Section 20.925.070 would serve to further reduce visual impacts to adjacent lands and roadways (Facility, Operation, 3.11-10, 3.11-11) <u>from any new open storage facilities that would be maintained as part of the proposed Facility.</u> As a result of these measures, adverse impacts on visual resources and aesthetics occurring during the operational lifetime of the Facility would not be significant. (Facility, Operation, 3.11-10, 3.11-11, 3.11-12, 3.11-14)
Recreation	<p><i>Mitigation Measures</i></p> <ul style="list-style-type: none"> • Parks and recreational facilities are not anticipated to be impacted by the construction and operation of the proposed Facility. It is expected that no additional mitigation measures would be necessary during construction or operation of the proposed Facility. (Facility, Operation and Construction, 3.12-22, 3.12-23)

Environmental Resource	PDEIS/Other Applicant Documents Mitigation required by regulation, guidance, industry standard, etc.
Historic and Cultural Resources	<p>Construction Mitigation</p> <ul style="list-style-type: none"> • Because of the possibility of encountering intact soils beneath the fill in some areas of the study area, and because the study area has been included in previous surveys, if project construction reaches the depth of intact native soils, archaeological monitoring would be conducted if soils are excavated to the surface. (Facility, Construction, 3.13-15, 3.13-16) • In the event of an unanticipated discovery during construction activities, the Cultural Resources Inadvertent Discovery Plan (Flint 2015) would be followed (Facility, Construction, 3.13-6)
Transportation	<p>Mitigation Measures (PDEIS, page 4-269)</p> <ul style="list-style-type: none"> • To address existing transportation safety, the Applicant should coordinate with the Port and City to post a 25 mph speed limit on Old Lower River Road south of State Route 501, where no posted speed signs exist. • Based on a review of existing turn movement patterns, existing intersection configuration, and the Manual on Uniform Traffic Control Devices, the Applicant should coordinate with the Port and WSDOT to post a YIELD sign to control the channelized northbound right-turn maneuver from Old Lower River Road onto State Route 501. A YIELD sign is appropriate given that northbound right-turn drivers have sufficient sight distance to make a decision to enter and merge with the highway traffic stream, and the ability to enter the highway without stopping reduces the time and distance drivers need to fully merge into the through lane, benefiting both side street and highway traffic. • The Applicant should coordinate with the Port and City to reconfigure traffic control devices at the Old Lower River Road/Old Alcoa Facility Access Road intersection. • The Applicant should coordinate with the Port to add texturing/coloring treatments to the striped crosswalk on the private access approach to NW Lower River Road (State Route 501), between the Farwest Steel operation and the proposed storage tank area. This treatment is intended to enhance the safety of bicyclists and pedestrians using this crosswalk as part of the adjacent multi-use path. • <u>The Applicant would coordinate Facility design activities with the Port and future Terminal 5 tenants to ensure that the location of Facility-related tracks does not interfere with the rail operations of other Terminal 5 users.</u> • For construction impacts, the Applicant would ensure that barge movements at the berths are conducted outside of the Columbia River navigation channel (Facility, Construction, 3.14-21).
Public Services and Utilities	<p>Mitigation Measures (PDEIS, page 4-214)</p> <p>The proposed Facility is not expected to generate utility demand that exceeds the capacity of existing utility systems, therefore, no mitigation would be necessary for utilities impacts. (Facility, Operations, 3.15-10, 3.15-12)</p>
Socioeconomics	<p>Mitigation Measures</p> <p>Based on the above discussion, there would be no adverse impacts to population, housing, or economics. Therefore, it is expected that no mitigation measures would be necessary.</p>
Environmental Health	<p>Third-Party Fire and Emergency Response Studies (PDEIS, page 4-332)</p> <ul style="list-style-type: none"> • The Applicant has funded two third-party studies to be conducted for the Vancouver Fire Department to assess the Vancouver Fire Department's preparation and capabilities for responding to fire and other emergencies at the Facility (Vancouver Fire Department 2014a, b)... The study would recommend measures and estimated costs to mitigate any impacts in excess of those risks that currently exist and are due to the proposed Facility or related transportation systems and that may have an effect on the fire department's ability to provide emergency services, addressing existing and proposed pre-emergency plans, tactics and strategies, training, equipment, and other necessary resources². • Occupational Safety – compliance with Health and Safety Regulation (PDEIS, page 4-333)

² The two separate studies funded by the Applicant were merged into a single study by EFSEC's fire protection review consultant following submittal of the PDEIS to EFSEC.

Notes

1 The Notice of Construction permit is required for installation of a new source of air pollution or for modification of an existing source of air pollution.

Acronyms/Abbreviations

bbl = barrel/barrels

BMP = best management practice

City = City of Vancouver

CRWMB = Columbia River Wetland Mitigation Bank

Ecology = Washington State Department of Ecology

EFSEC = Energy Facility Site Evaluation Council

EPC = engineering, procurement, construction

GHG = greenhouse gas

IBC = International Building Code

LED = light-emitting diode

MMMP = Marine Mammal Monitoring Plan

NPDES = National Pollutant Discharge Elimination System

OHWM = ordinary high water mark

PAHs = polynuclear aromatic hydrocarbons

Port = Port of Vancouver

SPCC = spill prevention control and countermeasures

SWPPP = stormwater pollution prevention plan

WSDOT = Washington State Department of Transportation