REQUEST FOR AN INCIDENTAL HARASSMENT AUTHORIZATION UNDER THE MARINE MAMMAL PROTECTION ACT

Port of Kalama
Kalama Manufacturing and Marine Export Facility

Project #A15.0032.00
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1 SUMMARY OF THE REQUEST

This request has been prepared for the Port of Kalama (Port) in support of the construction of a marine terminal associated with the development of the Kalama Manufacturing and Export Facility project. Pursuant to Section 101(a)(5) (A-D) of the Marine Mammal Protection Act of 1972 (MMPA), as amended (16 U.S.C 1371 (a)(5)), the Port requests that the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) issue an incidental harassment authorization (IHA) for incidental take of harbor seal (*Phoca vitulina* ssp. *richardsi*), California sea lion (*Zalophus californianus*), and Steller sea lion (*Eumatopius jubatus*) during activities conducted during the construction of the project in the Columbia River near Kalama, Washington.

Northwest Innovation Works LLC (NWIW) and the Port of Kalama (Port) propose to design and construct the Kalama Manufacturing and Marine Export Facility (the project) to manufacture and export methanol on approximately 100 acres on the Columbia River at the Port's North Port site (the proposed action) (see Figure A-1 for a map of the location; all figures are located in Appendix A). The proposed project will consist of a methanol production facility; accessory support and infrastructure facilities located in upland areas; and a new marine terminal located on the Columbia River. The proposed project also includes compensatory mitigation activities. The marine terminal will include the construction of a new dock that will require work (pile driving and dredging) below the ordinary high water mark (OHWM) of the Columbia River (defined by the US Army Corps of Engineers [USACE] at 11.6 feet Columbia River Datum [CRD] at Columbia River Mile [RM] 72).

Three marine mammal species have known distribution ranges that include the portion of the Columbia River in which construction activities will occur. These are harbor seal, California sea lion, and Steller sea lion. Temporarily elevated terrestrial and underwater noise during vibratory and impact pile driving has the potential to result in take in the form of Level B harassment (behavioral disruption) of marine mammals that may be present during construction. Level A harassment (harassment resulting in injury or direct mortality) is not anticipated to occur as a result of the proposed action, as the marine mammal monitoring plan (see Appendix B) will ensure that no marine mammals will be exposed to terrestrial or underwater noise levels above the injury threshold established by NMFS.

2 DESCRIPTION OF THE ACTIVITY

A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.[1]

2.1 Introduction

The project will require work in waters that support marine mammal species. The MMPA prohibits the taking of marine mammals, defined as "harass, hunt, capture or kill, or attempt to harass, hunt, capture or kill," except under certain situations. Section 101 (a)(5)(D) allows the issuance of an incidental harassment authorization (IHA) provided an activity will have negligible impacts to marine mammals and will not affect subsistence uses of marine mammals adversely. This project's timing, duration, and specific types of activities (primarily underwater noise associated with pile installation) could result in the incidental harassment of marine mammals protected under the MMPA. The project, therefore, requests an IHA for incidental take because of behavioral disruption of three marine mammal species that may occur in the project vicinity during construction: Steller sea lion, California sea lion, and harbor seal.

2.2 Project Purpose and Need

The objective of the proposed project is to construct and operate a manufacturing facility to produce methanol from natural gas using technology that produces less air pollution and greenhouse gas (GHG) emissions than methanol production using coal. This "greener" methanol will be exported to global markets by oceangoing vessel.

Global demand for methanol is high for use as a feedstock for olefin, a component in the manufacturing of many everyday items. Recent forecasts predict an increase in worldwide demand for methanol from 60 million metric tonnes (MMT) in 2013 to 190 MMT in 2023. Currently coal is widely used for methanol production.

The project will provide economic benefit to the region, create jobs, improve access to recreational resources and thus meets the Port's mission, and produce methanol using a technology that will produce less air pollution and greenhouse gas (GHG) emissions than methanol production using coal. The project will therefore meet the Port's mission to "induce capital investment in an environmentally responsible manner to create jobs and to enhance public recreational opportunities".

2.3 Project Setting and Land Use

The proposed project will be located at the Port's North Port site at 222 West Kalama River Road in unincorporated Cowlitz County, Washington (Figure A-1). (All graphics are located in Appendix A.) The North Port site is located at approximately RM 72 along the east bank of the Columbia River and both BNSF tracks and Interstate 5 (I-5) lie

[1] The italicized material throughout this document specifies the content of an IHA request and is drawn from the NOAA Fisheries website, http://www.nmfs.noaa.gov/pr/permits/incidental.htm.

immediately to the east. The approximately 100-acre project site is located in portions of Section 31, Township 7 North, Range 1 West, and Sections 25 and 36, Township 7 North, Range 2 West Willamette Meridian. The project site consists of portions of tax parcels 63302, 63304, 63305, 60822, 60831, 63301, and WH2500003.

The site is bounded on the west by the Columbia River; to the east by Tradewinds Road, the Air Liquide industrial facility, and the Port's industrial wastewater treatment plant; to the north by Port property primarily used for open space, recreation, and mitigation; and to the south by the existing Steelscape manufacturing facility (Figure A-2).

On average, this reach of the Columbia River is approximately 2,000 feet wide and between 40 and 50 feet deep. Water depth adjacent to the shore and extending out approximately 200 feet at the project site is generally less than 5 feet. The depth of the river increases to 35 feet within 350 feet of the shore. Water depth beyond 350 feet from shore generally ranges from 45 to 55 feet. The river is near sea level and is tidally influenced, with a typical daily tidal range of 6 to 7 feet. Although influenced by the tides, the saltwater wedge at the mouth of the river does not extend to the project site; the upriver extent of the saltwater wedge is Cathlamet Bay, located roughly 40 miles downstream of the project area (McConnell et al. 1981). In addition to the influence of the tides, the water elevation is also affected by seasonal runoff and by releases from Bonneville Dam. River discharge at Kalama is not currently recorded; however, the US Geological Survey (USGS) did record discharge between 1965 and 1970. During that period, discharge tended to be lowest in fall, winter and early spring (110,000 to 160,000 cubic feet per second [cfs]) and highest in summer (200,000 to 400,000 cfs). Currently, the USGS does not have a gage in the river downstream of Bonneville Dam. The Kalama River, a major tributary, enters the Columbia River approximately 1700 to 1800 feet south of the project site.

2.4 General Project Description

The proposed project is designed to produce up to 10,000 metric tonnes per day of AA-grade methanol from natural gas. The proposed manufacturing facility will have two production lines, each with a production capacity of 5,000 metric tonnes per day. The project site and infrastructure will be developed initially to accommodate both production lines. The anticipated yearly production at full capacity is approximately 3.6 million metric tonnes of methanol. The methanol will be stored in non-pressurized aboveground storage tanks with a total capacity of approximately 200,000 metric tonnes surrounded by a containment area. Methanol will be transferred by pipeline from the storage area to a deep draft marine terminal to be constructed by the Port on the Columbia River.

The proposed project will receive natural gas from the Kalama Lateral Pipeline project (the proposed pipeline) to be constructed by Northwest Pipeline GP (Northwest Pipeline). The proposed pipeline is a separate project (33 CFR § 330.2(i)), proposed by Northwest Pipeline, and is under the jurisdiction of the Federal Energy Regulatory

Commission (FERC)(FERC Docket # CP 15-8). Under the pipeline project, Northwest Pipeline proposes to permit, construct, and operate a 3.1-mile, 24-inch diameter natural gas pipeline to provide 320,000 dekatherms per day of natural gas transportation service to the proposed project. Information on the project is contained in the Environmental Assessment prepared by FERC for the project and available on the FERC Docket.

In order to provide electric service to the proposed project, it is expected that Cowlitz PUD will upgrade an existing transmission line from its existing Kalama Industrial Substation to the project site by installing new lines on existing towers within the existing transmission line corridor. New equipment (e.g., 115 kV breakers and switches) would be installed at the Kalama Industrial Substation within the existing footprint of that facility. Cowlitz PUD also has indicated that it may construct a short transmission line (approximately 750 feet) between the Kalama Industrial Substation and an existing 115 kV transmission line on the east side of Interstate 5 (I-5) to provide redundant supply to the substation. This short line would cross I-5, Hendrickson Drive and the railroad and would require installation of new poles. The new lines and improvements to the Kalama Industrial Substation would constitute a related action on the part of the Cowlitz PUD. Cowlitz PUD would acquire any necessary environmental permits for this related action.

2.5 Specific Project Activities

The proposed action includes both upland and marine components (Figure A-3 through Figure A-8). While this document focuses on the construction of the marine structures, as it is the component with the potential to affect marine mammals, the upland portions of the project are described briefly below.

2.5.1 Major Project Components

Overall, the proposed project will include the following major components:

- **Methanol production components:**
  - Two methanol production lines
  - Interconnecting facilities including piping, product pipelines, electrical and control systems
  - Eight finished product storage tanks within a containment area and additional tanks (rework tanks and shift tanks) for storing raw methanol during the manufacturing process
  - Cooling towers for industrial process water cooling
  - Steam boilers
  - Two air separation units (ASUs) to provide oxygen for the secondary reforming process.
  - Flare system for the disposal of flammable gases during startup, shutdown and malfunctions
- **Power generation facility**
- **Fire suppression infrastructure and risk management**

- **Water supply and treatment components:**
  - Process water supply wells, treatment system, storage tanks and distribution network
  - Industrial process water treatment and disposal system
  - Stormwater treatment, infiltration pond and disposal system
- **Support buildings and accessory facilities**
  - Security gate houses, laboratory, control rooms, warehouses and other buildings and enclosures
  - Lay-down areas for construction activities, plant maintenance, and spare part storage
  - Electrical substation
  - Natural gas meter station and transfer equipment
  - Emergency generators
- **Site access ways and public recreation access.**
- **Marine terminal including a single berth and a dock with methanol loading equipment**
- **Compensatory mitigation activities**

The proposed project's methanol production activities will generate demand for natural gas and water. Natural gas will be supplied by Northwest Pipeline which will permit, construct, and operate the Kalama lateral pipeline between its mainline and the project site. The project to install the Kalama lateral pipeline will consist of approximately 3.1 miles of 24-inch diameter pipeline, metering facilities, and miscellaneous appurtenances extending from the mainline of Northwest Pipeline to the proposed project. As noted previously, this pipeline is the subject of a separate permitting process through FERC.

2.5.2 Methanol Production Components

2.5.2.1 Methanol Production Lines

The proposed project will include two methanol production lines. A methanol production line is a series of equipment that handles each step of the methanol production process. Each methanol production line will produce 5,000 metric tonnes per day of AA-grade methanol from natural gas feedstock. These production lines will consist of reforming, methanol synthesis and distillation elements. The production lines will occupy approximately 14 acres of the project site (See Figure 3).

2.5.2.2 Methanol Storage Tanks

Storage tanks will be required for methanol storage during various steps in the production process. All storage tanks will be erected in the field. The project will require 2 rework tanks, 4 "shift" tanks, and 8 bulk product storage tanks (See Figure 3). The rework tanks will hold raw methanol during the production process and will be approximately 82 feet in diameter and 58 feet in height holding up to 2,275,000 gallons. Shift tanks will hold refined methanol for testing prior to discharge to the storage tanks. Shift tanks will be approximately 60 feet in diameter and 50 feet in height holding approximately 1,000,000 gallons.

After final production steps are completed, methanol will be pumped to one of eight bulk product storage tanks prior to be being loaded onto vessels. The bulk product storage tanks will be approximately 105 feet in height and 145 feet in diameter, with a maximum storage capacity of 9,400,000 gallons (approximately 26,000 tonnes). The total storage capacity on site will be 200,000 metric tonnes when accounting for operation limits on the tank capacity. The bulk product storage tanks include an external fixed roof and internal floating roof and would be capped with inert nitrogen gas (a "nitrogen blanket) to keep the oxygen level in the individual tanks to a level below that required for combustion. A piping system will convey methanol from the bulk product storage tanks to the loading arms at the proposed marine terminal.

The bulk product storage tanks will be encompassed by a containment berm or wall approximately seven feet in height. The containment area will be designed with a capacity at least equal to 110 percent of the volume of the largest tank plus precipitation from a 24-hour, 100-year storm event, and will be lined with an impervious membrane to prevent any spills from leaving the containment area via the ground. Stormwater (and/or spills) collected in the containment area will gravity-drain to the berm area sump. The water will be tested and directed to the stormwater infiltration system if found to be of acceptable quality. The sump water will be disposed off-site at an appropriate commercial disposal facility in the event of a spill, or if found to have unacceptable quality.

2.5.2.3 Cooling Towers

Waste heat from the methanol production process will be managed through cooling towers. The cooling towers will also provide cooling water to various heat exchangers used within the methanol production process. Two cooling towers consisting of five cells each will be installed for the methanol manufacturing facility (one for each production line). The cooling towers will have mechanical draft (fans located on the air outlet of the cooling towers) and countercurrent flow (in which air enters at the bottom and exits at the top, and warm cooling water enters at the top and exits at the bottom). The cooling towers will be approximately 290 feet long, 110 feet wide, and 40 feet tall. Blowdown from the cooling towers will be discharged as described below.

2.5.2.4 Steam Boilers

The proposed methanol manufacturing facility will include steam boilers fired by natural gas from the pipeline and purged gas from the methanol synthesis unit. The boilers will produce steam for use in the methanol production process.

2.5.2.5 Air Separation Units

Two ASUs (one for each production line) will be constructed to produce oxygen for use in the reforming process, nitrogen for use in the plant process and to inert equipment during repair and maintenance activities (e.g., to provide inert nitrogen gas for the product storage tanks). The ASUs use a low temperature process to separate various

gases from the air. Air from the atmosphere will be drawn into the plant, purified, and then separated into its various elements. The ASUs will consist of an air intake and filter, compressors, washing towers, sieves, distillation element and tanks.

2.5.2.6 Flare System

A flare system will be used for safe disposal of combustible gases during process upset or an emergency shut down situation, and during the normal start-up and shut-down of the production process. The flare will be approximately 245 feet in height. The flare will be enclosed and a visible flame would not be present except during the events described above.

2.5.3 Power Generation Facility

The project will meet its electric power demands using a combination of grid electric power and on-site power generation. It is expected that new power lines will be installed on existing poles to the project site and a new substation will be constructed within the project site.

The project will supplement grid electric power with an on-site 125-megawatt (MW) power generation facility. The power generation facility will consist of two natural gas-fired combustion turbines and one steam turbine. Natural gas mixed with air combusts in the gas turbine to generate electricity, and the exhaust gas from each combustion turbine will be used to generate high pressure steam to produce power through a steam turbine. The exhaust stacks will be the tallest element of the power generation facility and will be approximately 90 feet tall.

Waste heat from the power generation facility will be managed through cooling towers. One cooling tower with two cells will be installed for the power generation facility. This will be located adjacent to the cooling towers installed for the methanol production process.

2.5.4 Fire Suppression Infrastructure and Risk Management

The proposed project's operations and risk management system will meet or exceed local, state, and federal codes and regulations in order to minimize the risk of fire, leak, personal injury, and other health and safety impacts. The project proponent will develop a written emergency response plan, which will be reviewed and approved by local and state agencies before operations begin. The proposed project will include full emergency response capabilities to respond to all incidents within the methanol manufacturing facility or on the proposed marine terminal.

The proposed project will include a fire station to house the on-site fire brigade to respond to emergencies at the facility as well as an emergency response vehicle. The proposed project will also include an emergency alarm system with alarm boxes located throughout the facility.

In addition to the on-site fire brigade, the proposed project will include a comprehensive fire suppression system including: 1) a fixed-foam system for fire suppression; 2) portable foam generators; 3) fire water system; 4) deluge system; and 5) fire extinguishers.

2.5.5 Water Supply and Treatment Components
2.5.6 Water Supply and Treatment

Water will be needed during both construction and operations. For construction, the following major water uses are anticipated to be:

- General site use and dust control
- Ground improvements, and
- Hydrostatic testing of pipelines and tanks.

The proposed project will require water for process uses as well as for domestic uses (e.g., drinking, sanitation, showers, etc.). Process water will be provided by a collector well (Ranney well) to be constructed by the Port near the Columbia River shoreline. The well will be constructed under Groundwater Permit No. G2-30283 issued by the Washington State Department of Ecology (Ecology). The groundwater permit allows the use of up to 10,640 acre feet[2] and 6,600 gallons per minute (gpm) of water for various uses, including industrial activities. It is estimated that the proposed project will use approximately 3.6 to 7.2 million gallons per day (mgd) of process water, or approximately 8,000 acre feet or 5,000 gpm. The collector well will also be equipped with a back-up natural gas run generator, for periodic, short-term use.

The process water system will consist of a 22-foot-wide (inside diameter) collector well approximately 100 feet in depth, and a 2,200-square foot pump station facility. The pump station will be equipped with a total of three 4.5 mgd pumps (200 hp), to provide a firm capacity of 9 mgd (one in standby). The pump station will be able to support additional pumps if they are needed to satisfy future demand. A redundant process water supply would be provided by three existing backup wells operated by the Port.

The pump station will convey raw water to the water treatment supply tanks via pipeline. The pipeline will be provided with a blow off valve for flushing that will be discharged to an infiltration basin near the point of discharge. The infiltration basin could also be used to manage overflow and draining the water supply tank. Stormwater from the pump station facility will be captured and routed to an infiltration basin immediately north of the new pump station. This infiltration basin will also receive blow off from the pump station during pump start up as required.

[2] An acre foot contains approximately 325,851 gallons of water.

Raw water delivered to the methanol manufacturing facility will be treated prior to use in methanol production. The initial stage of raw water treatment will be precipitation softening using a cold-lime softener (CLS). Precipitation softening processes are used to reduce raw water hardness, alkalinity, silica and other constituents including the iron and manganese. Water from the CLS will be used for cooling tower make-up water and a portion will be routed to a combined Reverse Osmosis and Electro Deionization (RO-EDI) system. The RO-EDI system will produce high purity feed water necessary for the auxiliary boilers, power generation plant, and methanol production process.

Potable water for domestic uses (e.g., drinking water, sanitation, showers and other general uses) will be supplied from a connection to the City of Kalama water system. Alternatively, the proposed project may receive potable water from the Port of Kalama's water supply system rather than the City of Kalama. Water treatment would be provided on-site if potable water is supplied by the Port.

The volume of water withdrawn from groundwater will be insubstantial relative to the flows in the Columbia River; flows in the tidal portions of the river typically range between 110,000 and 400,000 cfs (http://waterdata.usgs.gov/wa/nwis/). (The average discharge of the Columbia River at its mouth is approximately 265,000 cfs [Kammerer 1990]). The approximately 5,000 gpm that the project will use represents approximately 11.14 cfs, which is less than 0.01% of even the lowest anticipated flows in the river. Ranney wells pull water out of deep alluvium in the river bottom, avoiding any possibility of impinging or entraining fish.

2.5.7 Wastewater Treatment and Disposal

Sources of wastewater from the proposed project include domestic and process wastewater streams. Domestic wastewater will be generated from the restrooms, on-site wash basins, and breakrooms. Industrial process wastewater includes reject streams from raw water treatment and polishing, treated discharge from the methanol production process, and blow down from on-site cooling, power generation, and boiler systems. Discharges from the site will be routed through and discharged only from the cooling towers. Other waste streams on-site will be treated and re-used on-site or discharged to the cooling tower for make-up water. The proposed project will require an individual industrial National Pollutant Discharge Elimination System (NPDES) permit for discharges of cooling tower blowdown to the Columbia River. Domestic wastewater from the proposed project will be discharged to the existing Port of Kalama Wastewater Treatment Plant. The treatment plant discharges through a common outfall shared with the Steelscape facility to the Columbia River pursuant to an NPDES permit held by the Port of Kalama.

The cooling towers will discharge wastewater to the firewater pond for temporary storage and to maintain sufficient fire water. Discharges from the firewater pond will be treated for temperature through a heat exchanger to a maximum discharge temperature

of 20-degrees Celsius prior to discharge to the Columbia River through the Port of Kalama's existing outfall.

The methanol production process will produce a process wastewater stream of approximately 35 gpm that would be recycled and reused on-site. This process wastewater stream will be treated with a membrane bio-reactor (MBR). The MBR will be an aerobic biological treatment with ultrafiltration. Discharges from the MBR will be directed to the RO/EDI for re-use on-site.

Wastewater generated by auxiliary boilers and/or the on-site power generation consist of condensate that will be discharged to the RO/EDI and/or the cooling towers for re-use. The cooling towers will re-use the water for a specified number of cycles prior to discharge of the blowdown. Blowdown from the cooling towers is anticipated to be less than 400 gpm and will be discharged directly to the fire pond, as described above.

2.5.8 Stormwater Treatment

Stormwater from the proposed methanol manufacturing facility will be segregated into two streams depending on the potential for contact with industrial activities. Stormwater from areas of the project site which are physically separated from the production process and from on-site paved areas will be directed to an infiltration facility for discharge. Stormwater from the production process areas of the facility will be directed to a first flush pond for treatment. The first flush pond will discharge to the infiltration facility.

Stormwater from the first flush pond may be re-used on-site as raw water. Stormwater re-use from the first flush pond will be treated through a coalescing plate oil-water separator and a granulated activated carbon filter prior to discharge into the CLS for re-use. The first flush pond and infiltration facility will be sized to manage stormwater on-site consistent with Cowlitz County and state standards. The infiltration pond will be sized to infiltrate the 100-year, 24-hour rainfall event.

Detailed spill prevention, control and countermeasures including isolation valves and monitoring requirements will be implemented across the site in accordance with applicable requirements.

An existing weir and outfall used for the USACE dredging project will be removed as part of the project. The weir will be left in place during dredge material placement, if placement occurs at the site, and will then be removed.

Stormwater generated from site access roadways outside of the methanol manufacturing facility will be directed to roadside ditches and shallow containment to infiltrate.

Stormwater from the existing Steelscape dock and the proposed new dock will be collected and conveyed to a pumping station located at the transition from the platform

to the access trestle. All pumped flows will be conveyed upland to water quality swale for infiltration.

Water quality storm flows from the dock will discharge to an oil/water separator prior to discharge to a water quality swale, designed in accordance with Ecology criteria. After passing through the swale, the runoff will be directed to a newly constructed infiltration ditch located upland. The proposed infiltration ditch will be approximately 495 feet long with a bottom width of 12 feet and depth of 5 feet. Flows exceeding the water quality storm flow rate will bypass the oil/water separator and water quality swale and be discharged to the infiltration area. This infiltration ditch will also accommodate stormwater flows from the existing North Port dock and yard area, as well as the new collector well pump house and surrounding area. Stormwater from these areas are currently directed to an infiltration ditch that will be replaced as described above.

Any accidental spills from pipelines on the dock will be captured on the dock surface and collected by the stormwater system. Valving will be installed on the storm conveyance pipes so that the spill could be diverted to a separate pumping system that will convey the contaminated water back to the proposed methanol manufacturing facility for treatment and reuse.

2.5.9 Support Buildings and Accessory Facilities

The proposed methanol manufacturing facility will include several support buildings and accessory facilities. These buildings and facilities include a control building and laboratory, motor control center units (MCC), security gate house, electrical substation, a natural gas meter station and transfer equipment, and an emergency diesel generator. The project proponent will have office space in the Port or elsewhere for administrative offices associated with the proposed methanol manufacturing facility.

The control building and MCCs will house control centers for facility operations. The laboratory will be used to test the finished methanol product for purity. The control center and laboratory will be housed together in a building that will be approximately 6,400 square feet. The MCC controls will be approximately 14,000 square feet.

A small security gate house will be located at the entrance to the proposed methanol manufacturing facility. Warehouse and maintenance buildings will be constructed to house maintenance equipment and vehicles

A natural gas meter station and transfer equipment will be constructed to receive natural gas from the pipeline and stabilize the flow rate and pressure of the gas. The proposed methanol manufacturing facility will also include a diesel-fired emergency generator for use during power outages.

2.5.10 Site Access

The proposed project will develop and improve roadways around the project site to provide access to the proposed methanol manufacturing facility, improve recreational access for the public, and provide emergency access to the site. Access to the proposed methanol manufacturing facility will be provided from Tradewinds Road in the northeast portion of the project site. None of these access improvements will require filling or directly disturbing waters of the United States or state waters.

The proposed project will include three primary road improvements: (1) improving Tradewinds Road along the north side of the project site; (2) creating a new roadway connecting Eastwind Road to Tradewinds Road; and (3) improving an existing gravel roadway along the south side of the project site.

The proposed project will improve recreational access to the Columbia River and the areas north of the project site by improving Tradewinds Road and creating a new parking area near the Columbia River. Access to this parking area will be provided by Tradewinds Road along the north boundary of the project site. Tradewinds Road will be improved by the Port by extending the paving 3,400 feet from the intersection with Eastwind Road. The improved road will be 24 feet in width and consist of two 12-foot travel lanes and be approximately 3,400 feet in length.

Tradewinds Road connects with Kalama River Road, which is a County-owned roadway with a 35-mile per hour (mph) speed limit. It crosses over the BNSF rail corridor and connects to I-5 approximately a quarter-mile east of the project site. I-5 is Washington's main north-south highway and extends from Canada to Mexico. At this location, I-5 consists of three travel lanes in each direction with a posted speed limit of 70 mph.

Eastwind Road is located within the footprint of the proposed project and that portion of the road will be abandoned. The Port will construct a connection from Eastwind Road to Tradewinds Road south of the proposed project to maintain access to the existing Air Liquide facility and the Port's wastewater treatment plant. The new road will be approximately 720 feet long and 24 feet wide with two 12-foot travel lanes.

Access along the southern boundary of the project site will be provided by a westbound extension of Eastwind Road. This road will extend from the existing southern terminus of Eastwind Road west to the existing warehouse (to be converted to the proposed project's fire station) by improving an existing gravel road. The road will be approximately 1,400 feet long and 24 feet wide with two 12-foot travel lanes.

All three new and/or improved roadways will be designed consistent with the Cowlitz County Rural Low Volume Access standard. Construction of the roadways will require subgrade excavation and surface compaction, base and top course placement and compaction, and asphalt surfacing. The improvements to Tradewinds Road and the connection from Eastwind Road to Tradewinds Road will also require cuts and fills.

Stormwater on the roadways improved outside of the project site boundary will flow to roadside ditches and shallow containment to infiltrate. Stormwater generated from the roads within the project will be directed to the proposed project's stormwater system.

2.5.11 Recreation Access

The Port currently allows informal recreation access to portions of the Port that are not fenced for security purposes. Recreation use is focused on the sandy beach along the Columbia River and informal trails located north of the project site. The Port intends to allow continued access to these areas, consistent with project and federal security requirements, and will develop a formal parking area at the end of Tradewinds Road at the Columbia River as part of the proposed project. The area will provide parking for approximately 21 vehicles and allow recreational users to park and access the beach, river, and informal trails. The parking and other improvements will not require filling or directly disturbing waters of the United States or state waters.

2.5.12 In-Water and Overwater Project Elements

2.5.12.1 Dock Construction

The proposed marine terminal will be located on the western portion of the project site at approximately RM 72 and will consist of a single berth to accommodate the oceangoing tankers that will transport methanol to destination ports. The marine terminal will include a dock, a berth, loading equipment, utilities, and a stormwater system. These components are designed to support the necessary product transfer equipment and safely moor the vessels that may call on the proposed project (see Figure A-4). The marine terminal will provide sufficient clearances from the existing North Port dock and space that will be required for vessel maneuvering during berthing and departure.

The marine terminal would be designed to load methanol onto oceangoing vessels that can handle methanol as a cargo. Vessels would arrive at the terminal from the Pacific Ocean via the Columbia River navigation channel. As noted above, the dock would be designed to accommodate vessels ranging in size from 45,000 DWT to 127,000 DWT, which would include vessels measuring from approximately 600 feet to 900 feet in length and 106 feet to 152 feet in width.

The typical speed of the types of vessels that would serve the proposed project is 15 knots in the ocean and 10 knots in the Columbia River. Vessels would be piloted across the Columbia River Bar and up the river to the terminal as required by state and federal regulations. Assist tugs would help vessels arriving at and leaving the berth. Based on the typical vessel size and production of the plant, an estimated 3 to 6 ships per month or 36 to 72 ships per year would use the berth for loading and unloading methanol. Additional ships may use the berth for other cargo loading and unloading, for vessel supply operations, as a lay berth, for short- and long-term vessel moorage, and for topside vessel maintenance activities.

The dock structure will consist of an access trestle extending from the shoreline to provide vehicle, equipment, and emergency access to the dock. The trestle will be 34 feet wide and approximately 365 feet long. From the access trestle, the berth face of the dock will extend approximately 530 sf downstream, and will consist of an approximately 100-foot by 54-foot transition platform, a 370-foot by 36-foot berth trestle, and a 104-foot by 112-foot turning platform (see Figure 4). The dock will be supported by precast 24-inch octagonal concrete piles supporting cast-in-place (CIP) concrete pile caps and precast, prestressed, haunched concrete deck panels. The dock will total approximately 44,943 square feet and include 320 concrete piles and 16 steel pipe piles. The bottom of the superstructure (deck, pile caps, etc.) will be located above the ordinary high water mark (OHWM).

For vessel mooring, two 15-foot by 15-foot breasting dolphins will be constructed near the center of the berth trestle. Steel plates will bridge the short distance between the dock and dolphins. Each breasting dolphin will consist of seven, 24-inch precast, prestressed concrete battered3 piles supporting a cast-in-place concrete pile cap with mooring bollards.

Four 15-foot by 15-foot mooring dolphins will be constructed (2 upstream and 2 downstream of the platforms) for securing bow and/or stern lines. Each mooring dolphin will consist of twelve, 24-inch diameter precast 24-inch octagonal diameter concrete piles supporting a cast-in-place concrete pile cap. The dolphins will be equipped with mooring bollards and electric capstans. Access to the mooring dolphins will be provided from the platform by trussed walkways with open grating surfaces. The walkways will be 3 feet wide with a combined length of 375 feet and will be supported by four 18-inch diameter steel pipe piles.

The fender system will consist of 9-foot by 9-foot ultra-high molecular weight polyethylene (UHMW-PE) face panels with a super cone fender unit and two 12-inch diameter steel pipe fender piles. Below the fender panels, the fender piles will have 18-inch-diameter high-density polyethylene sleeves. Fender units will be placed on the dock face, two upstream and two downstream, and on the two breasting dolphins.

A small building will be constructed on a corner of the turning platform. The building will function as a shelter from the weather and a small lunch area for the dockworkers and as a place to store tools and supplies. Electricity and communication services will be provided to the shelter but no water or sewer services will be provided.

A second small building will be constructed at the center of the dock, adjacent to the loading arms. The building will be used as an operations shack for the loading arms. Electricity and communications services will be provided to the shelter but no water or sewer services would be provided.

[3] "battered" piles are installed at an angle to vertical as opposed to plumb piles which are installed vertically

As described above, stormwater from the dock will be collected and conveyed to upland treatment and infiltration swale. The stormwater system will also accommodate stormwater from the existing North Port dock, which is currently infiltrated in an upland swale that will be removed for the development.

Since pile layout is conceptual, a 10 percent contingency has been added for the estimated number of concrete piles. This will accommodate potential revisions to the pile layout and configuration as the structural design is finalized. The project may also require the installation of temporary piles during construction. Temporary piles are typically steel pipe or h-piles and will be driven with a vibratory hammer. These are placed and removed as necessary during the pile driving and overwater construction process.

With the addition of the contingency, the proposed terminal will require the installation of approximately 320, 24-inch concrete piles; 12, 12-inch steel pipe piles; and 4, 18-inch steel pipe piles.

- A total of approximately 1,079 square feet of new benthic impact will be associated with new pile footprints. In addition, the proposed terminal itself will result in a total of approximately 44,943 square feet of new solid overwater coverage.
- With the single exception of a portion of the access trestle, the design of the terminal locates the platforms, dolphins, and structures in water deeper than 20 feet below OHWM (11.6 feet CRD). This placement of the structure in deeper water minimizes the effects to aquatic habitats. Approximately 34,018 square feet of the total new overwater coverage, and approximately 906 square feet of new benthic impact associated with new pile footprints, will be located in water deeper than 20 feet below OHWM.
- Approximately 10,925 square feet of new overwater coverage associated with the access trestle, and a total of approximately 173 square feet of new benthic impact associated with new pile footprints for the access trestle, will occur in and over shallow water habitat (water shallower than 20 feet below OHWM). The requirements for vehicle access and safety dictate the design and configuration of the access trestle. The trestle has been designed to be the minimum width necessary to perform its function. The trestle is by necessity a solid structure, due to equipment and vehicle loads and the need to capture stormwater, and will not be grated.

Table 1 summarizes the unavoidable aquatic habitat impacts that the proposed project will represent.

Table 1. Aquatic Habitat Impacts Summary

Shoreline Location Description	Area of Overwater Coverage		Number of Piles			Area of Pile Footprint (sf)
	Solid	Grated	24-inch Concrete	12-inch Steel	18-inch Steel	
Shallow Water (USACE OHWM elevation [11.6 CRD] to 20 feet below USACE OHWM)						
Access Trestle	10,925	N/A	52	-	-	173
Subtotal	10,925	N/A	52	-	-	173
Deep Water (deeper than 20 feet below USACE OHWM)						
Access Trestle	1,450	N/A	9	-	-	30
Transition Platform	5,400	N/A	41	-	-	136
Berth Trestle	13,470	N/A	58	-	-	192
Turning Platform	11,648	N/A	68	-	-	225
Fender System	N/A	N/A	-	12	-	11
Breasting Dolphins (2)	450	N/A	14	-	-	46
Mooring Dolphins (4)	800	N/A	48	-	-	159
Grated walkways	N/A	1,588	-	-	4	7
Subtotal	34,018	1,588	290	12	4	806
10% Contingency for Concrete Piles*	N/A	N/A	30	N/A	N/A	100
Total In-/Over-Water	**44,943**	**1,588**	**320**	**12**	**4**	**1,079**

*pile layout is conceptual. A 10% contingency has been included (for concrete piles) for purposes of permitting review.

2.5.12.2 Berth Dredging

The existing berth serving the Port's North Port Terminal will be extended downstream to accommodate vessel activities at the new dock. The extended berth area will be deepened to -48 feet Columbia River datum (CRD) with a 2-foot overdredge allowance consistent with the existing berth. The berth will extend at an angle from the edge of the Columbia River navigation channel to the berthing line at the face of the proposed dock. The footprint of the expanded berth will be approximately 18 acres, of which approximately 16 acres will require dredging to achieve the berth depth. Figure A-5 shows a map of the proposed berth and area to be dredged. Existing water depths in the proposed berth area vary from -50 feet CRD to -39 feet CRD. The total volume to be dredged the first year is approximately 126,000 cubic yards (cy). The dock and berth arrangement and design were developed in coordination with the Columbia River Pilots.

Sediment characterization for dredged material placement suitability was conducted in February 2015. Characterization of sediments in the aquatic area was performed in accordance with the USACE Portland Sediment Evaluation Team (PSET) and its interim final guidelines, Regional Sediment Evaluation Framework, for the Lower Columbia River Management Area. A dredge material characterization was completed and submitted to PSET. Results indicate that the sediment samples did not exceed the sediment quality guidelines and, as such, the material proposed for dredging and placement will be suitable for placement at any of the existing Port placement sites (including in-water and upland placement sites) and on the upland portion of the project site.

Dredged material will be placed upland at the project site to provide material for construction or for other uses, or it may be placed at existing authorized in-water and upland placement sites. The existing authorized (NWP-1994-462-1) in-water placement locations include: 1) flow lane placement to restore sediment at a deep scour hole associated with a pile dike at RM 77.48 located on the Oregon side of the river; 2) flow lane placement to restore sediment at a deep scour hole associated with a pile dike at RM 75.63 located on the Washington side of the river; 3) beach nourishment at the Port's shoreline park (Louis Rasmussen Park) at RM 76; and 4) the Ross Island Sand and Gravel disposal site in Portland, Oregon. The anticipated upland placement sites include the South Port site located north of the CHS/TEMCO grain terminal at approximately RM 77 and the project site. Additional in-water and upland sites may be identified and permitted for dredge material placement for general Port maintenance dredging needs in the future.

Maintenance dredging will likely be required to maintain the berth to the permitted depth. This activity will occur in the same manner as used for the establishment of the berth. The volumes and frequency of maintenance dredging events will vary based on the needs of the facility and the rate of shoaling. It is estimated that an average of 27,000 cy of sediment could be deposited yearly. Maintenance dredging will be permitted separately as part of the Port of Kalama's maintenance dredging program.

2.5.12.3 Aquatic and Riparian Habitat Mitigation

The Applicant has incorporated mitigation activities as part of the proposed action. The Applicant proposes three categories of activity: 1) pile removal; 2) engineered log jam (ELJ) installation; and 3) riparian and wetland buffer habitat restoration.

Pile Removal: The Applicant will remove a portion of a row of existing timber piles now located in the freshwater intertidal backwater channel portion of the project site on Port property. The structure is a former trestle, and these piles may be treated with creosote. Piles are estimated to range between 12 and 14 inches in diameter at the mudline. A total of approximately 157 piles will be removed from the structure (Figure 12). There is a second timber pile structure in the backwater, which was previously proposed for removal. This structure is a USACE-owned pile dike, and will not be removed.

The proposed pile removal will restore a minimum of 123 square feet of benthic habitat, within an area approximately 2.05 acres in size. These piles, in their current configuration, affect the movement of water and sediment into and out of approximately 13 acres of this backwater area (CHE 2015). The removal of the piles will facilitate sediment transport and seasonal flushing of this backwater area, which will help improve water quality and maintain this area as an off-channel refuge for juvenile salmonids in the long term. Coast and Harbor Engineering has analyzed the hydraulic implications of removing these piles, and determined that the proposed pile removal activities will not have any measurable or significant effect on the navigation channel (CHE 2015).

ELJ Installation: In addition to the proposed pile removals, the applicant will install eight ELJs within the nearshore habitat along the Columbia River shoreline adjacent to the site. ELJs are a restoration and mitigation method that helps build high quality fish habitat, develops scour pools, and provides complex cover.

Each ELJ will measure approximately 20 x 20 feet and be composed of large-diameter untreated logs, logs with rootwads attached, small wood debris, and boulders (Figure A-4). Logs generally will have a minimum diameter of 20-inches and be 20 feet long. They will be anchored to untreated wood piles driven a minimum of 20 feet into the river stream bed and will be fastened to the piles by drilling holes in the wood and inserting 1-inch through-bolts for attaching chains to secure the wood to the piles. The structures will be installed at or near the mean lower low water mark, so that the structures are regularly inundated. The logs that comprise the structure will be further bolted together to create a complex crib structure with 2- to 3-inch interstitial spaces. These spaces may be filled with smaller wood debris and/or boulders to enhance structural complexity and capture free-floating wood from the Columbia River.

These large wood structures will increase complex in-stream and overhead cover with interstitial spaces that will allow juvenile and adult salmonids to evade predation by marine mammals, birds, and fish. Each ELJ will be a minimum of approximately 400 square feet in size, and the eight structures will represent a total of 3,200 square feet of new large woody material, installed along approximately 800 linear feet of Columbia River shoreline in a reach of the river that is lacking nearshore habitat structure and woody debris. The ELJs will provide natural, cover, refuge, and foraging opportunities for outmigrating juvenile salmonids.

ELJs are a commonly employed restoration technique on the Lower Columbia River and elsewhere to improve nearshore aquatic habitat function and complexity. A recently permitted project for a new spud barge approximately 8 miles upstream of the project site installed 4 similar ELJ structures as compensatory mitigation. The four structures were installed to offset approximately 160,000 sf of new overwater coverage (a ratio of one structure to 40,000 sf of new overwater coverage). The 8 ELJs proposed for this

project will offset overwater coverage at a ratio of one structure to approximately 5,618 sf of overwater coverage.

Riparian Restoration and Wetland Buffer Enhancement: The Applicant also proposes to conduct riparian enhancement and invasive species management within an area approximately 1.41 acres in size along approximately 700 linear feet of the Columbia River shoreline at the site to further enhance riparian and shoreline habitat at the site. The applicant also proposes to enhance approximately 0.58 acres of wetland buffer at the north end of the site to offset unavoidable wetland buffer impacts. The riparian and wetland buffer habitats will be enhanced by removing invasive species and installing native trees and shrubs that are common to this reach of the Columbia River shoreline and adjacent wetlands. Native plantings proposed for the riparian restoration include black cottonwood and a mix of native willow species including Columbia River willow (*Salix fluviatilis*), Pacific willow (*Salix lasiandra*), and Sitka willow *(Salix sitchensis*). Portions of the wetland buffer will be planted with black cottonwood. Invasive species management at the site will target locally common and aggressive invasive weed species, primarily Scotch broom and Himalayan blackberry (*Rubus armeniacus*). The restoration sites will be monitored and maintained for 5 years to document proper site establishment.

2.6 Construction Methods

Proposed in-water work will be conducted only during the in-water work window that is ultimately approved for this project. The currently published in-water work window for this reach of the Columbia River is 1 November–28 February. However, regulatory agencies, including the USACE, Washington Department of Fish and Wildlife (WDFW), US Fish and Wildlife Service (USFWS), and NMFS, have recently suggested making modifications to the window to take into account the best available science and to address newly listed species. The following work windows are proposed for this project, as explained further below:

- Pile installation will be conducted between 1 September and 31 January
- Dredging will be conducted between 1 August and 31 December
- ELJ installation will be conducted between 1 August and 31 December
- Pile removal may be conducted year-round
- Work conducted below the OHWM, but outside the wetted perimeter of the river (in the dry) may be conducted year-round

These work windows are necessary to accommodate the construction schedule, while simultaneously being cognizant of avoiding biologically sensitive time periods for given activities. One of the driving timing considerations is the need to conduct all or most berth dredging prior to pile installation. The proposed dredging window is designed to begin early enough in the season to allow pile driving activities to begin on schedule, while avoiding the bulk of the peak juvenile salmonid outmigration in the spring/summer, and the peak run timing for Pacific eulachon in the late winter/early

spring. An early pile installation window will minimize the need for pile installation to be extended into the late winter/early spring timeframe. The project proposes to use impact driven concrete structural piles (rather than steel), which are not known to result in injurious levels of underwater noise. For this reason, an early start to the pile installation window will not result in adverse effects to any fish or other aquatic species. ELJ installation could be conducted during late summer, fall, or early winter, to accommodate the range of times when Columbia River water levels could be low, to allow for improved access to the shoreline, and to minimize disturbance to the aquatic environment. Pile removal activities, and work conducted below the OHWM, but outside the wetted perimeter of the river (i.e. in the dry) are not expected to result in significant impacts to aquatic species or resources, and as such these activities could be conducted year-round.

Construction crews and methods will be influenced by weather, timing, and available equipment as well as this timeframe.

The proposed project would be developed in one or two phases. The construction duration would be approximately 26 to 48 months depending on whether it is built in one or two phases. Construction is expected to begin in mid-2016 and be completed as early as mid-2018 and as late as mid-2020.

It has been estimated in permit applications for the project that pile installation (including installation of temporary piles) will be completed over approximately 120 days (not necessarily consecutive) during the 2016–2017 and/or 2017-2018 in-water work windows. However a more conservative estimate for purposes of estimating potential marine mammal harassment must include the potential for pile installation to proceed more slowly than anticipated. Since the pile driving work window is 5 months long (approximately 153 days), and since pile installation activity could potentially occur on each day of the pile installation window, it is estimated that the project could require up to 153 days in the 2016-2017 work window. Pile installation will be completed in the 2017-2018 pile driving window, and could potentially require up to an additional 153 days in the 2017-2018 window. Pile installation will be conducted during standard daylight working hours, roughly 8 to 10 hours a day.

2.6.1 Mobilization

During this task, the contractor will mobilize labor and equipment to the site. Most of the activities are for water based equipment that will be mobilized and operated from a barge. Depending on the activity 2 to 4 barges will be needed.

2.6.2 Pile Installation

New piles will include 12- and 18-inch diameter hollow steel piles and 24-inch pre-cast octagonal concrete piles. Piles will be installed using vibratory and/or impact hammers (depending upon pile type, as described below), most likely operated from a barge. Piles will most likely be transported to the site and stored on site on a work barge. The

contractor's water-based equipment will be a barge-mounted crane with pile-driving equipment and a materials barge with piles. At times, a second barge-mounted crane may be on site with an additional materials barge.

Concrete piles will be installed with an impact hammer. A bubble curtain will not be used during impact driving of concrete piles, as impact installation of concrete piles does not generate underwater sound pressure levels that are injurious to marine mammals. A conservative estimate is that up to a maximum of 6 to 8 piles will be impact-driven per day, with an estimated maximum of approximately 1,025 strikes per pile. Based on these estimates, it is assumed that up to approximately 8,200 strikes per day might be necessary to impact-drive concrete piles to their final tip elevation. Actual pile driving rates will vary, and a typical day will involve fewer piles and fewer strikes.

It is anticipated that all steel piles will be driven with a vibratory hammer, and that it will not be necessary to impact drive or impact proof any of the steel piles. If it does become necessary to impact-drive steel piles, a bubble curtain or similarly effective noise attenuation device will be employed to reduce the potential for effects from temporarily elevated underwater noise levels.

In addition, the project may require the installation of temporary piles during construction. Temporary piles are typically steel pipe or h-piles and will be driven with a vibratory hammer. These are placed and removed as necessary during the pile driving and overwater construction process.

All pile installation will be conducted during the in-water work window that is ultimately approved for this project. (This request assumes a window of 1 September through 31 January for pile installation.)

2.6.3 Overwater Construction

Overwater construction activities include those that are waterward of the OHWM mark, but that are conducted above the OHWM elevation. They include the installation of pile caps, decking, fenders, and associated overwater structures. These overwater structures will include a combination of cast-in place and precast concrete structures, grated steel walkways, and associated structures such as rails, fenders, bollards, etc. Similarly, there may be a need to conduct construction activities below the OHWM elevation, but under dry conditions (outside the wetted perimeter of the river).

Overwater activities and activities conducted in the dry below OHWM will be conducted according to the best management practices (BMPs) established for the project which will minimize any potential for impacts to water quality such as spills or release of construction debris into the waters at the site. These activities will therefore not be limited to an in-water work window.

Once the piles have been driven, temporary falsework will be built for the cast in place concrete pile caps. Watertight formwork will be built on the falsework, and the steel reinforcing cage for the pile cap will be constructed. The falsework and formwork may extend below the OHWM but likely will be above the actual water level at the time of construction.

After the cage has been completed and side forms have been placed, the concrete will be cast and allowed to cure; then falsework and formwork will be removed. Most of this work will be accomplished using water-based equipment. Concrete will be delivered to the site by ready-mix trucks and placed by pump or crane-supported bucket. Casting concrete for pile caps, even if forms extend below the OHWM elevation, will not be restricted to an in-water work window.

Following the pile cap installation the pre-cast or combination of pre-cast/cast in place deck panels will be installed. If cast in place construction is required will be similar to that for the pile caps. If pre-cast, the deck panels will be brought to the site by truck or barge in a completed from and placed by crane. They will be made continuous over the pile caps with welded connections and grouted in place. Their placement will be followed by a second stage cast in place pile cap poured to deck level. This will be followed by the cast in place deck topping that will form the dock surface.

Surface features such as loading arms, pipe racks, fenders, and bollards will be installed; they will be manufactured off site, arrive at the site by land or water, and be installed with a crane.

2.6.4 Aquatic Habitat Mitigation Construction

Aquatic habitat mitigation construction activities will most likely be conducted using cranes and similar equipment operated from one or more barges temporarily located within the backwater area. Because water depths are relatively shallow in the backwater area where pile removal will be conducted, equipment access to this area may be limited. A small barge will most likely be floated in on a high tide, grounding out if necessary as waters recede. Benthic habitats and native plant communities are not expected to be affected by the barge, as substrates are silt-dominated, and vegetation consists primarily of reed canarygrass. If necessary, disturbed areas will be restored to their original or an improved condition after pile removal is complete.

The piles most likely will be removed by direct pulling. A vibratory hammer may also be used if necessary, and this request assumes that either method could be used.

Small equipment operated from a barge will be used to construct the ELJs. Anchor piling will be installed either by a vibratory hammer, or will be pushed directly into the substrate with crane-mounted equipment. This request assumes that either method could be used. Logs and debris will be placed using crane-mounted equipment, or similar. Aquatic mitigation construction activities, including vibratory timber pile

removal and installation of timber anchor piling outside of the wetted perimeter of the river, and would not generate levels of noise that would harass of marine mammals.

2.6.5 Dredging

Dredging is a temporary construction activity, conducted in deep water, which would be expected to have only minor, localized, and temporary effects. No dredging would be conducted in shallow water habitats, and no shallow water habitat would be converted to deep water.

Dredging operations maybe completed using either hydraulic or mechanical (clamshell) dredging methods. A hydraulic dredge uses a cutter head on the end of an arm that is buried typically 3 to 6 feet deep in the river bottom and swings in a 250- to 300- foot arc in front of the dredge. Dredge material is sucked up through the cutter head and the pipes, and deposited via pipeline to the placement areas. The hydraulic dredge will also be used for placement of dredge material in the flow-lane, as beach nourishment, or at approved upland sites.

A mechanical dredge removes material by scooping it up with a bucket. Mechanical dredges include clamshell, dragline, and backhoe dredges. Mechanical dredging is performed using a bucket operated from a crane or derrick that is mounted on a barge or operated from shore. Sediment from the bucket is usually placed directly in an upland area or on a scow or bottom dump (split) barge. In-water placement of the material occurs through opening the bottom doors or splitting the barge. The process of splitting will be tightly controlled to minimize turbidity and the spread of material outside the placement area.

Upland placement will likely be completed through the use of a hydraulic pipeline. In this method, dredged material is pumped as a slurry through a pipeline that floats on the water using pontoons, is submerged, or runs across dry land. Dredged material transported by hydraulic pipeline to an upland management site must be dewatered prior to final placement or rehandling. In this case, dewatering generally will be accomplished using settling ponds or overland flow. Settling ponds are sized based on the settling characteristics of the dredged material and the rate of dredging. Water from the sediments will be either infiltrated to the ground or will be discharged to the river through weirs already constructed at the disposal sites.

Several BMPs and conservation measures will be implemented to minimize environmental impacts during dredging, and these are described in the following sections.

2.6.6 Manufacturing Facility Construction

2.6.6.1 Ground Improvements

At this point in the design process, a range of design measures are being considered that will address the seismic hazards of the project site and meet code performance

requirements. These measures may include a ground improvement program that could be implemented to improve the existing subsurface soils and reduce the risk of ground movement during an earthquake.

Ground improvement measures may include:

- **Vibro-replacement (stone columns)** is a ground improvement technique that can densify relatively clean granular soils using a vibratory probe. This method of ground improvement could be used to reduce the potential of project site soils for liquefaction, lateral spreading, and seismic settlement during an earthquake. The probe is vibrated and jetted into the ground until it reaches the bottom of the improvement zone. Stone aggregate is added to the void created by the probe after reaching the bottom of the treatment zone. The aggregate is densified by lowering the probe into the aggregate in small lifts until reaching the ground surface, creating columns of compacted aggregate. Stone columns can also be used in silty soil; however, in these soils, the stone columns are installed in a tighter configuration and act more as reinforcement elements rather than to densify the adjacent ground.
- **Soil mixing and jet grouting** are ground improvement methods that mix cement into the in- situ soils to create columns of soil with improved strength and stiffness. This method of ground improvement could be used to provide foundation support and limit seismic settlement of structures or to reduce lateral spreading to tolerable levels. During soil mixing, wet or dry cement is mixed with the in situ soils by a mechanical paddle that is advanced similar to a drill. The diameter of the soil-cement column depends on the diameter of the paddle. Jet grouting makes soil/cement columns by injecting cement grout through high-velocity grout jets. The jets erode the in situ soil and mix it with cement and sometimes with air and water. Jet grouting can be used to construct improved soil/cement columns or columns can be overlapped to create continuous panels.
  Lateral spreading is often addressed by constructing a zone, or buttress, of improved soil along the riverbank (above the OHWM) that will not liquefy. The buttress would be of sufficient width, extent, and depth to maintain stability following ground shaking and minimize or prevent lateral displacements toward the river of the upland portion of the site behind the buttress.
- **Driven piles** could be installed to develop foundation capacity below the depths at which liquefaction-induced settlement is a concern. With this measure, structures within the proposed project would be able to resist compressive, uplift, and lateral loads.

Ongoing design and analysis will determine the final configuration and specific locations of the ground improvements to be installed, and the improvement techniques may be refined as the design progresses.

2.6.6.2 Collector Well

Process water will be supplied by a collector well to be constructed by the Port. The well will be located on the Columbia River shoreline north of the proposed dock and trestle. The collector well consists of a mechanically excavated central concrete caisson that extends below the ground surface to penetrate the zone of water-saturated rock, sand, and gravel that serves as the water source. From this central caisson well, screens extend laterally outward in a radial pattern to collect the groundwater and direct it to the caisson where is collected and pumped to the treatment source.

Construction will begin with preparation of the site including construction of a gravel access road and site preparation such as vegetation removal, grubbing, grading of the work site and potential test boring. The central caisson will be constructed of interlocking steel or concrete sections that will be constructed from the surface down in lifts beginning with the bottom of the well. The first lift will consist of a cutting edge for establishing the excavation. After the construction of the first lift, at the surface a crane with a clamshell excavator will remove material from inside the lift allowing the cutting edge to lower into the earth. As the well is excavated, additional lifts will be added and additional material excavated until the well reached the planned depth. All removed soils will be taken off site or, if suitable, used for fill in other locations on the site.

When the caisson reaches the designed well depth, estimated to be approximately 106 feet below the existing ground surface, a floor will be installed inside the caisson to seal the inside of the caisson from the river and the surrounding aquifer, and will provide a solid concrete floor at the bottom of the Collector Well and a base from which to install the infiltration laterals. Once the floor has set, a pump will be used to dewater the caisson to allow installation of the laterals. The water will be piped and discharged to an existing stormwater swale on the property.

200-foot infiltration laterals will be installed through the caisson, at approximately 98 feet below the exiting ground surface, and into the water-bearing formations using a hydraulic jacking tool. This tool uses hydraulic pressure to push the lateral sections into the formation using the beveled end of the first section of pipe to establish the hole. Once the laterals are established, the remaining equipment will be installed using typical construction techniques to finish the well and pump station

Parking for maintenance vehicles will be provided adjacent to the well structure. The water system will require potable water and electrical service, as well as an emergency natural gas generator. Natural gas will be extended within West Kalama River Road south of the Steelscape facility to the well structure. Water will be extended from an existing line located to the south. Electrical services will be provided from east of the project site and will be installed underground.

The facility will be designed to handle six pumps. The initial phase will install only three pumps to handle the initial water demands of the facility. Additional pumps may be installed in the future along with facilities to handle treatment.

2.6.6.3 Temporary Crane Pad and Barge Access

It is expected that some components of the facility (e.g., boilers, ASUs, water treatment, substation, and motor control centers) will be assembled off-site and transported to the project site via barge. These modules may be offloaded from the existing Steelscape dock, may be offloaded directly from the barges using a temporary crane, or may be offloaded across temporary falsework. A temporary concrete crane pad will be constructed on an upland portion of the site for offloading materials/equipment from barges. The temporary crane pad will be located in an area outside of riparian buffers and outside of the 100-year floodplain at the site (Figure 3).

Modules will be delivered to the site in self-anchoring barges, which would anchor offshore using spuds or similar temporary anchors. Barges will anchor off-shore, and will not ground out on the beach. Barges will typically only be anchored in place for approximately 1-2 days, as material is being unloaded. Once offloaded, the equipment/modules will be moved into place and erected on the site. The temporary concrete pad will be demolished and the temporary crane removed prior to project completion.

3 DATES, DURATION, AND REGION OF ACTIVITY

The date(s) and duration of such activity and the specific geographical region where it will occur.

3.1 Dates and Duration

Proposed in-water work will be conducted only during the in-water work window that is ultimately approved for this project. The currently published in-water work window for this reach of the Columbia River is 1 November – 28 February. However, regulatory agencies, including the USACE, WDFW, USFWS, and NMFS, have recently suggested making modifications to the window to take into account the best available science and to address newly listed species. The following work windows are proposed for this project, as explained further below:

- Pile installation will be conducted between 1 September and 31 January
- Dredging will be conducted between 1 August and 31 December
- ELJ installation will be conducted between 1 August and 31 December
- Pile removal may be conducted year-round
- Work conducted below the OHWM, but outside the wetted perimeter of the river (in the dry) may be conducted year-round

It has been estimated in permit applications for the project that pile installation (including installation of temporary piles) will be completed over approximately 120

days (not necessarily consecutive) during the 2016–2017 and/or 2017-2018 in-water work windows. However a more conservative estimate for purposes of estimating potential marine mammal harassment must include the potential for pile installation to proceed more slowly than anticipated. Since the pile driving work window is 5 months long (approximately 153 days), and since pile installation activity could potentially occur on each day of the pile installation window, it is estimated that the project could require up to 153 days in the 2016-2017 work window. Pile installation will be completed in the 2017-2018 pile driving window, and could potentially require up to an additional 153 days in the 2017-2018 window. Pile installation will be conducted during standard daylight working hours, roughly 8 to 10 hours a day.

3.2 Region of Activity

The project will be conducted on the Port's North Port Marine Industrial Park site, which is located at 222 West Kalama River Road in unincorporated Cowlitz County, Washington (see Figure A-1). The North Port site is located at approximately RM 72 along the east bank of the Columbia River, and is designated for heavy industrial use by the County. The project site is approximately 100 acres in size and is located in portions of Sections 31 and 36, Township 7 North, Range 2 West Willamette Meridian. The project site consists of portions of tax parcels 63302, 63304, 63305, 60822, 60831, 63301, and WH2500003, including areas of pile removal activities that are proposed for mitigation as part of the project. The shoreline is within the Lower Columbia/Clatskanie Hydrologic Unit Code (HUC # 17080003). The site and vicinity are identified on Figure A-1.

4 AFFECTED SPECIES AND NUMBERS IN THE AREA

The marine mammal species that may occur within the activity area and their distribution.

The three marine mammal species, subspecies, or DPS with known distribution ranges that include the portion of the Columbia River in which construction activities will occur are listed in Table 2 and are addressed in this IHA request.

Table 2. Marine Mammal Species Addressed in this IHA Request

Species Name		ESA Listing Status	Stock
Common Name	**Scientific Name**		
Harbor Seal	(*Phoca vitulina* ssp. *richardsi*)	Not listed	OR/WA coast stock
California Sea Lion	(*Zalophus californianus*)	Not listed	US stock
Steller Sea Lion	(*Eumatopius jubatus*)	Not listed	Eastern DPS

All of the marine mammals addressed in this document are pinniped species, which use the portion of the Columbia River within the action area as a seasonal corridor for foraging. The USACE has monitored pinniped presence and salmonid predation at

Bonneville Dam (RM 146) since 2002, and the most recently published preliminary data from this monitoring comes from weekly status reports published in 2015 (van der Leeuw et al, 2015). This document is the primary source of data regarding pinniped presence, numbers, and run timing within the action area. Additional primary sources of data include WDFW's Atlas of Seal and Sea Lion Haulout Sites in Washington (Jeffries et al. 2000).

Preliminary data from the USACE (van der Leeuw et al, 2015) indicates that California sea lion and Steller sea lion presence in the Columbia River was much higher than usual in 2015. The average daily abundance of pinnipeds recorded at the dam was over twice as high as numbers reported in any year since 2010.

Pinniped abundance was variable in 2015. An average of 12 pinnipeds were observed at the dam per day in January, 8 per day in February, 22 per day in March, 78 per day in April, and 56 per day in May (van der Leeuw et al, 2015). The maximum number of pinnipeds present on one day was 116 (on April 22), which was a new record number at the dam. The former single day record was 71 pinnipeds set in 2010, and this single day record from 2010 was surpassed on 15 separate days in 2015 (van der Leeuw et al, 2015).

In its 2000 atlas of seal and sea lion haulout sites, WDFW did not identify any significant sea lion haulout sites upstream of the Cowlitz River on the Columbia River, so the numbers of California and Steller sea lions recorded at the dam are presumed to be a close approximation of the numbers of individuals that may be present within the action area.

In 2013, no harbor seals were observed at Bonneville Dam, but in previous years, they have occasionally been observed (Stansell et al. 2013). Harbor seals, however, are observed more frequently in the portion of the lower Columbia River that is within the action area for the project.

4.1 Steller Sea Lion

The numbers of Steller sea lions documented at Bonneville Dam has increased relatively steadily between 2002 and 2015, with the exception of a slight decline in numbers in 2014 (van der Leeuw et al, 2015). In 2015, an estimated 54 unique Steller sea lions were documented at the dam. The maximum number of Steller sea lions observed on one day was 69 (on April 22), which was a new record number at the dam. The former single day record was 53, which was set in 2010. The single day record from 2010 was surpassed on 5 separate days in 2015.

There are no documented Steller sea lion haulouts within the action area, so any individuals present during construction or operation of the facility will be expected to be moving upstream or downstream through the action area (to and from feeding areas at Bonneville Dam).

4.2 California Sea Lion

Historically, California sea lions have been the most frequently observed pinniped species at Bonneville Dam (Stansell et al. 2013). In 2015, an estimated 190 individually branded California sea lions were recorded, an increase from the 56 individuals recorded in 2013. The first California sea lion of the 2015 season was observed at the dam on February 9. The maximum number of California sea lions observed on one day was 70 (on May 13), which was a new record at the dam. The former single day record was 52, set in 2007. The single day record from 2007 was surpassed on 12 separate days in 2015.

WDFW's atlas of seal and sea lion haulout sites (Jeffries et al. 2000) identifies shoals near the confluence of the Cowlitz and Columbia rivers (approximately 3.5 miles downstream of the project area), and log rafts in Carroll's Channel in the northern end of Cottonwood Island (approximately 3 miles downstream) as documented haulouts for California sea lion.

There are no documented California sea lion haulouts within the action area, however, and California sea lions are not known to haulout within the action area, so any individuals present during the construction or operation of the facility will be expected to be moving upstream or downstream through the action area (to and from feeding areas at Bonneville Dam).

4.3 Harbor Seal

Harbor seals reside year-round in the Columbia River, and they are observed frequently in the vicinity of the action area. They are non-migratory, but they do exhibit seasonal movement upriver to follow winter and spring runs of Pacific eulachon and outmigrating juvenile salmon. Within the action area, they tend to congregate to feed at the mouths of tributary rivers, including the Cowlitz and Kalama rivers, during the winter months. There have been occasional anecdotal reports of year-round resident harbor seals near the mouths of the Kalama and Cowlitz rivers.

WDFW's atlas of seal and sea lion haulout sites (Jeffries et al. 2000) identifies shoals near the confluence of the Cowlitz and Columbia rivers approximately 3.5 miles downstream as a documented haulout for harbor seals. There are no documented harbor seal haulouts within the action area, and harbor seals are not known to haulout within the action area. However, harbor seals have been observed congregating in the area during winter months, near the mouth of the Kalama River in particular. These individuals are most likely primarily congregating to feed on the eulachon runs during the late winter months.

5 STATUS AND DISTRIBUTION OF AFFECTED SPECIES OR STOCKS

A description of the status of the affected species or stocks of marine mammals likely to be affected by such activities.

5.1 Steller Sea Lion

Steller sea lions range along the North Pacific Rim from northern Japan to California, with centers of abundance and distribution in the Gulf of Alaska and Aleutian Islands, respectively. Two separate stocks or DPS of Steller sea lions have been recognized within US waters: an eastern US stock, which includes animals east of Cape Suckling, Alaska, and a western US stock, which includes animals at and west of that location (Allen and Angliss 2014). The Steller sea lion stock that migrates in the Columbia River is part of the Eastern DPS. The Eastern DPS of Steller sea lion was de-listed and removed from the federal endangered species list on November 4, 2013 (78 FR 66140).

Eastern DPS Steller sea lion are not known to migrate, but individuals disperse widely outside the breeding season (late May–early July), thus potentially intermixing with animals from other areas. Despite the wide-ranging movements of juveniles and adult males in particular, exchange between rookeries by breeding adult females and males (other than between adjoining rookeries) appears low, although males have a higher tendency to disperse than females (Allen and Angliss 2014). Habitat requirements include islands or isolated shoreline areas for breeding and undisturbed water for feeding.

The current best population estimate for the entire Eastern DPS is 57,966, with the US portion of this stock representing approximately 34,485 animals (Allen and Angliss 2014).

5.2 California Sea Lion

California sea lion on the West Coast are divided into three stocks, based on the locations of breeding concentrations on islands located in southern California, western Baja California, and the Gulf of California. These three geographic regions are used to separate this subspecies into three stocks: 1) the US stock, which begins at the US/Mexico border and extends northward into Canada; 2) the western Baja California stock, which extends from the US/Mexico border to the southern tip of the Baja California peninsula; and 3) the Gulf of California stock, which includes the Gulf of California from the southern tip of the Baja California peninsula and across to the mainland and extends to southern Mexico (Caretta et al. 2013).

California sea lions in the US are not listed as “endangered” or “threatened” under the Endangered Species Act (ESA) or as “depleted” under the MMPA. California sea lions are not considered a “strategic” stock under the MMPA because total human-caused mortality is less than the potential biological removal (PBR) of 9,200 individuals (Caretta et al. 2013). The total fishery mortality and serious injury rate (337 animals/year) for this stock is less than 10 percent of the calculated PBR and, therefore, is considered to be insignificant and approaching a zero mortality and serious injury rate (Caretta et al. 2013).

5.3 Harbor Seal

NMFS defines seven "stocks" of harbor seals throughout the United States, with three recognized along the West Coast: 1) the Washington inland stock; 2) the Oregon/Washington coastal stock; and 3) the California stock. The stock that is present in the Columbia River is the Oregon/Washington coastal stock.

The current best population estimate for the Oregon/Washington coastal stock is 16,165 (Caretta et al. 2013). Data from 1999 indicated that, of these animals, approximately 5,735 (approximately one-third of the total population) were found occurring along the Oregon Coast and the Columbia River (Caretta et al. 2013).

According to the most recent status report published by NMFS (Caretta et al. 2013), harbor seals in the Oregon/Washington coastal stock are not considered to be "depleted" under the MMPA nor are they listed as "threatened" or "endangered" under the ESA. The minimum level of human-caused mortality and serious injury is estimated at 10.6 harbor seals per year. NMFS reports that a PBR cannot be calculated for this stock because there is no current abundance estimate. Human-caused mortality relative to PBR is unknown, but it is considered to be small relative to the stock size. Therefore, the Oregon/Washington Coast stock of harbor seals is not classified as a "strategic" stock under the MMPA (Caretta et al. 2013).

6 TYPE OF INCIDENTAL TAKE AUTHORIZATION REQUESTED

The type of incidental taking authorization that is being requested (i.e., takes by harassment only, takes by harassment, injury and/or death), and the method of incidental taking.

The MMPA prohibits the "take" of marine mammals unless the take is exempted or authorized. The MMPA defines (50 CFR, Part 216, Subpart A, Section 216.3-Definitions) take as "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal." The MMPA further defines ''harassment'' as:

> *… any act of pursuit, torment, or annoyance which (Level A Harassment) has the potential to injure a marine mammal or marine mammal stock in the wild; or, (Level B Harassment) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering….*[4]

6.1 Take Authorization Request

Under Section 101 (a)(5)(D) of the MMPA, the project requests an IHA for takes by behavioral harassment (Level B harassment) during pile driving operations associated with dock construction during the 2016–2017 and/or 2017-2018 in water work periods. The project requests an IHA for incidental take of marine mammals described within

[4] NOAA Fisheries Office of Protected Resources website, http://www.nmfs.noaa.gov/pr/glossary.htm#h

this application for one year, commencing on September 1, 2016. The Port will request an annual renewal of the IHA until pile driving associated with the project is completed, if more than one in-water work window is required. At this time, the Port is not requesting a multiyear Letter of Authorization (LOA) because the activities described are not expected to rise to the level of injury, which would require an LOA.

6.2 Method of Incidental Taking

Temporarily elevated underwater and terrestrial noise during vibratory and impact pile driving has the potential to result in Level B harassment of marine mammals that may be present during construction.

Level A harassment (harassment resulting in injury or direct mortality) is not anticipated to occur as a result of the proposed action, as no Level A harassment threshold has been established for terrestrial noise, and the marine mammal monitoring plan (see Appendix B) will ensure that no marine mammals will be exposed to levels of underwater noise above the injury threshold established by NMFS. Table 3 and Table 4 show the disturbance and injury thresholds that NMFS has established for underwater and terrestrial noise for Level A and B takes.

Table 3. Underwater Injury and Disturbance Threshold Decibel Levels for Marine Mammals

Criterion	Criterion Definition	Threshold*
Level A Harassment	PTS (injury) conservatively based on TTS**	190 dB RMS for pinnipeds 180 dB RMS for cetaceans
Level B Harassment	Behavioral disruption for impulsive noise (e.g., impact pile driving)	160 dB RMS
Level B Harassment	Behavioral disruption for non-pulse noise (e.g., vibratory pile driving, drilling)	120*** dB RMS

*All decibel levels referenced to 1 micropascal (re: 1 μPa). Note all thresholds are based on root mean square (RMS) levels

** PTS=Permanent Threshold Shift; TTS=Temporary Threshold Shift

***The 120 dB threshold may be adjusted slightly if background noise levels are at or above this level.

Table 4. Terrestrial Injury and Disturbance Threshold Decibel Levels for Pinnipeds

Criterion	Criterion Definition	Threshold*
Level A Harassment	PTS (injury) conservatively based on TTS**	None established
Level B Harassment	Behavioral disruption for harbor seals	90 dB RMS
Level B Harassment	Behavioral disruption for non-harbor seal pinnipeds	100 dB RMS

*All decibel levels referenced to 20 micropascal2 (re: 20 μPa). Note all thresholds are based on RMS levels.

** PTS=Permanent Threshold Shift; TTS=Temporary Threshold Shift

6.2.1 Underwater Noise

6.2.1.1 Underwater Noise Attenuation

The zone of influence for underwater noise has been determined using the practical spreading loss model. This model, currently recognized by both USFWS and NMFS as the best method to determine underwater noise attenuation rates, assumes a 4.5-decibel (dB) reduction per doubling of distance (Washington State Department of Transportation [WSDOT] 2014).

The practical spreading loss model (see above) uses the following equation to model underwater noise attenuation:

$$\mathbf{TL = 15 \log(R1/R2) + \alpha R}$$

Solving this equation for R1, calculates the distance at which project noise would attenuate to the established threshold distances:

$$\mathbf{R1 = (10^{(TL/15)})(R2)}$$

The variables are defined as follows:

- TL = Transmission loss (known noise level -- threshold noise level)
    - In this case, the following anticipated noise levels were used (CALTRANS 2012).
        - 24-inch concrete pile (impact): 176 dB RMS
        - 18-inch steel (vibratory): 170 dB RMS
        - 18-inch steel (impact): 194 dB RMS (before attenuation)
- R1 = The distance at which noise attenuates
- R2 = Range of the known noise level (10 m [33 ft] in this case)
- αR = Linear absorption rate (WSDOT currently recommends that this factor not be used for modeling purposes, so it was not included in the analysis.)

The following equations show the modeled threshold distances:

- Concrete Pile Installation (Impact)
    - 190 dB RMS = (10([176-190]/15))(10) = 1 m (4 ft)
    - 180 dB RMS = (10([176-180]/15))(10) = 5 m (18 ft)
    - 160 dB RMS = (10([176-160]/15))(10) = 117 m (382 ft)
- Steel Pile Installation (Vibratory)
    - 190 dB RMS = (10([170-190]/15))(10) = <1 m (2 ft)
    - 180 dB RMS = (10([170-180]/15))(10) = 2 m (7 ft)
    - 160 dB RMS = (10([170-160]/15))(10) = 46 m (152 ft)
    - 120 dB RMS = (10([170-120]/15))(10) = 70,665 m (21,544 ft)
- Steel Pile Installation (Impact)
    - 190 dB RMS = (10([194-190]/15))(10) = 18 m (61 ft)
    - 180 dB RMS = (10([194-180]/15))(10) = 86 m (281 ft)

- 160 dB RMS = (10([194-160]/15))(10) = 1,848 m (6,061 ft)

6.2.1.2 Concrete Piles

The 190 dB RMS Level A harassment (injury) threshold for underwater noise for pinniped species could be exceeded at a distance of up to 4 feet (1 m) during impact driving of concrete piles. Additionally, the 160 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped species could be exceeded at a distance of up to 382 feet (117 m) during impact driving of concrete piles.

The distance to the underwater Level A harassment threshold for pinnipeds (the 190 dB isopleth) (4 feet [1 m]) will be monitored during impact driving of concrete piles according to the protocol identified in the marine mammal monitoring plan described in Appendix B. The area within the 190 dB isopleth will be maintained as an injury protection zone, where impact pile driving will be shut down immediately if any marine mammals entered. This will effectively eliminate the possibility of any marine mammal being exposed to Level A harassment.

The distance to the Level B harassment threshold during impact driving of concrete piles (the 160 dB RMS isopleth) (382 feet [117 m]) will be monitored during impact pile driving according to the protocol described in the monitoring plan. This monitoring will be conducted by the same observer monitoring the Level A harassment zone. Marine mammal presence within this zone, if any, will be monitored, but impact pile driving activity will not be stopped if marine mammals were found to be present. Any marine mammal documented within this zone during impact pile driving will constitute a Level B take, and will be recorded and reported as such.

6.2.1.3 Steel Piles

Steel piles are expected to be installed solely with a vibratory hammer, and are not expected to require impact pile installation. If any impact installation or proofing of steel piles is required, a bubble curtain will be implemented.

The 190 dB RMS Level A harassment (injury) threshold for underwater noise for pinniped species could be exceeded at a distance of up to 61 feet (18 m) during impact driving of steel piles. Additionally, the 160 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped species could be exceeded at a distance of up to 6,061 feet (1,848 m) during impact driving of steel piles. If any impact installation of steel piles is required, the area within 61 feet of the dock will be monitored and maintained as an injury protection zone, where impact pile driving will be shut down immediately if any marine mammals entered. This will effectively eliminate the possibility of any marine mammal being exposed to Level A harassment.

During vibratory installation of steel piles, the 120 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped species could theoretically be exceeded at a distance of over 13 miles (21,544 m), although the extent of actual sound

propagation will be limited to the area identified in Figure A-9, due to the shape and configuration of the river in the vicinity.

The distance to the Level B harassment threshold during vibratory driving of steel piles (120 dB RMS isopleth) (the full extent of the action area) will be monitored intermittently, according to the protocol described in the monitoring plan. Marine mammal presence within this zone, if any, will be monitored, but vibratory pile driving activity will not be stopped if marine mammals were found to be present. Any marine mammal documented within this zone during vibratory pile driving will constitute a Level B take, and will be recorded and reported as such. The 120 dB RMS isopleth will be monitored by a minimum of two observers, every five days of vibratory pile driving, to estimate the number of individuals present within the Level B harassment area, for purposes of reporting.

6.2.2 Terrestrial Noise

While there are no documented marine mammal haulout areas in the action area, and no habitat that is suitable for hauling out within the distances at which the terrestrial Level B harassment thresholds could be exceeded, pinnipeds are partially terrestrial species and can be affected by terrestrial noise, even while swimming.

The loudest piece of equipment to be used at the site is an impact pile driver, which produces peak terrestrial noise levels of approximately 110 dBpeak (Washington State Department of Transportation 2014). Vibratory pile drivers produce terrestrial noise levels of approximately 101 dBpeak (Washington State Department of Transportation 2014). A terrestrial noise attenuation analysis was performed using the practical spreading loss (PSL) model (Washington State Department of Transportation 2014). Using this model, and assuming hard-site conditions (because of open water conditions in the portion of the action area where marine mammals could be present), terrestrial noise during pile driving was calculated to attenuate to:

- below the 90 dB RMS Level B threshold for harbor seals at a distance of approximately 317 feet (96 m) during impact driving and up to 273 feet (83 m) during vibratory pile driving; and
- below the 100 dB RMS Level B threshold for non-harbor seal pinnipeds at a distance of up to 126 feet (38 m) during impact driving and up to 58 feet (17 m) during vibratory pile driving.

All of these distances within which Level B terrestrial noise levels could be exceeded are within the distances that will be monitored for underwater noise. Since no pinniped haulout sites or habitat occur within the action area, no pinnipeds are expected to haulout within the action area. As a result, any marine mammals that enter the area in which Level B terrestrial noise levels could be exceeded will be in an aquatic environment, and will be recorded as a Level B take resulting from underwater noise.

No additional takes are anticipated as a result of temporarily elevated terrestrial noise levels.

7 NUMBER OF MARINE MAMMALS THAT MAY BE AFFECTED

By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in Section 5, and the number of times such takings by each type of taking are likely to occur.

7.1 Steller Sea Lion

Steller sea lion do not breed or bear their young anywhere within the Columbia River system. The eastern stock of Steller sea lions breeds in rookeries located in southeast Alaska, British Columbia, Oregon, and California; there are no rookeries located in Washington (Stansell et al. 2013). There are no documented seal or sea lion haulouts within the action area, so the only Steller sea lions expected to be present within the action area will be adult males and females traveling to and from Bonneville Dam.

Prior to 2002, Steller sea lions were sighted infrequently at Bonneville Dam, with fewer than 10 individuals recorded in most years. However, since 2008, the numbers of Steller sea lions documented at the dam have increased steadily. In 2010, 75 individual Steller sea lions were identified, at an average rate of less than 12.6 individuals per day (between January 1 and May 31). In 2015, an average of 12 pinnipeds were observed at the dam per day in January (van der Leeuw 2015). While no specific data exists regarding the number of trips up and down river each individual sea lion makes, it is assumed that, on average, each individual sea lion makes one round trip during the spring migration.

All pile driving will occur between 1 September and 31 January, which will avoid the April and May peak of the run. Steller sea presence at the dam in January and February represents approximately one-third of the total run in a given year (Stansell et al. 2013).

Using the numbers presented above, it has been estimated that during the pile installation activities in January, up to 12 individual Steller sea lions per day could be exposed to Level B harassment. Since January has up to 31 days on which potential pile driving activity could occur, this will represent up to 372 individual takes of Steller sea lion in the 2016-2017 work window that would be covered by this IHA. However, the actual number of takes would likely be less. Individuals taken will be expected to be a mix of solitary adult males and females. Juvenile sea lions will not be expected to be exposed, as there are no documented breeding rookeries within the area that could potentially be exposed to noise levels above the Level B harassment threshold.

7.2 California Sea Lion

As with Steller sea lion, California sea lions do not breed or bear their young anywhere in the Columbia River system and their nearest documented breeding ground is on the islands off the coast of southern California (Caretta et al. 2013). There are no

documented California sea lion haulouts within the action area, so the only California sea lions expected to be present within the action area will be adult males and females traveling to and from Bonneville Dam.

As discussed previously, historically (until about 2008) California sea lions were the most frequently observed pinniped species at Bonneville Dam (Stansell et al. 2013). Between 2008 and 2014, however, the number of California sea lions observed at the dam declined. In 2015, however, an estimated 190 individually branded California sea lions were recorded. This is in contrast to the 56 unique individuals identified in 2013.

Typically the run timing for California sea lions has begun later in the year than the run for Steller sea lions. The first California sea lion observed at the dam in 2015 was observed on February 9. For this reason, the bulk of the California sea lion run would be expected to occur outside of the pile driving window. However a number of factors could cause the run to appear earlier for later. In addition, any estimate of anticipated run size must take into account the increased California sea lion presence at the dam in 2015. For this reason, in order to make a conservative assessment, the anticipated take estimate is based on the average daily abundance of up to 12 pinnipeds per day reported at the dam in 2015. Using this number, it is estimated that up to 372 California sea lions could be exposed to Level B harassment in the 2016-2017 work window that would be covered by this IHA.. However, the actual number of anticipated takes could be less. Individuals taken will be expected to be a mix of solitary adult males and females. Juvenile sea lions will not be expected to be exposed, as there are no documented breeding rookeries within the area that could potentially be exposed to noise levels above the Level B harassment threshold.

7.3 Harbor Seal

While some harbor seal breeding and birthing activity does occur in the Columbia River estuary (Jeffries 1985), this activity is limited to the lower estuary, approximately 70 miles downstream, and no breeding or pupping activity is documented within the action area. For this reason, the only harbor seals expected to be present within the action area during pile driving activities will be adult males and females.

As discussed in section 4.3, harbor seals are at Bonneville Dam only infrequently (Stansell et al. 2013). However, harbor seals reside year-round in the Columbia River, and they are observed frequently in the vicinity of the action area. During the winter, they tend to congregate to feed at the mouths of tributary rivers, including the Cowlitz and Kalama rivers. There have been occasional anecdotal reports of year-round resident harbor seals near the mouths of those rivers.

In the absence of site-specific data regarding the potential numbers of harbor seals, making a conservative estimate based on anecdotal evidence becomes necessary. Such an assessment estimates that up to 10 harbor seals could be present within the action area on any given day of pile driving. These animals could be moving through the

action area to the mouth of the Cowlitz River or Kalama River, although they could remain in the action area for several days, or could travel back and forth between the two river mouths, passing through the action area multiple times.

Given this estimate, during the 153 days of pile driving that could potentially occur during the 2016-2017 in-water work window, it is possible that up to 1,530 Level B harassments of harbor seals could occur. This a worst-case estimate, however, and the actual number of takes will be expected to be fewer. Individuals taken will be expected to be a mix of solitary adult males and females. Juvenile harbor seals will not be expected to be exposed, as there are no documented breeding rookeries within the area that could potentially be exposed to noise levels above the Level B harassment threshold.

8 ANTICIPATED IMPACT ON SPECIES OR STOCKS

The anticipated impact of the activity upon the species or stock of marine mammals….

The construction and operation of the project have the potential to result in a range of potential effects to marine mammals including construction noise, water and air quality effects, and direct habitat impacts associated with the construction of the project. Of these potential effects, underwater and terrestrial noise from impact and vibratory pile driving could result in Level B take of marine mammals, and this is the subject of this IHA request. A more detailed effects analysis follows.

8.1 Underwater Noise

As discussed in section 6.2.1, underwater noise during pile installation may exceed the established injury and disturbance thresholds for marine mammals. Because there is a chance that marine mammals may be present in the action area, the modeled injury threshold exceedance areas will be monitored during pile installation according to the monitoring plan (Appendix B).

The distances to the injury threshold for pinnipeds (190 dBRMS) will be monitored during pile driving according to the protocol identified in the marine mammal monitoring plan (Appendix B). The area within the 190 dB isopleth will be maintained as an injury protection zone, in which impact pile driving will be shut down immediately if any marine mammal enters, thus avoiding the possibility of any marine mammal being exposed to Level A harassment.

The distances to the disturbance thresholds for impact driving (the 160 dBRMS isopleth) and vibratory driving (120 dBRMS isopleth) will also be monitored during pile driving activities according to the monitoring plan (Appendix B). Marine mammal presence within these zones, if any, will be monitored, but pile driving activity will not be stopped if marine mammals are present. Any marine mammal documented within the 160 dB isopleth during impact driving, or the 120 dB isopleth during vibratory driving, could be exposed to underwater noise levels that will be defined as disturbance.

Disturbance from temporary exposure to levels of underwater noise above the disturbance threshold is expected to be limited to minor behavioral modifications such as dispersion from, or more rapid migration through, the action area. Long-term, permanent effects, such as long-term avoidance of action area or any direct injury or mortality, are not anticipated.

8.2 Terrestrial Noise

As discussed in section 6.2.2, temporarily elevated terrestrial noise levels during pile installation also have the potential to exceed the established disturbance thresholds for marine mammals within certain portions of the action area. No injury threshold has been established for terrestrial noise for pinnipeds.

The results of the terrestrial noise attenuation analysis indicate that terrestrial noise during pile driving is expected to attenuate to below the 90 dB RMS Level B threshold for harbor seals at a distance of approximately 317 feet (96 m) during impact driving and up to 273 feet (83 m) during vibratory pile driving. Terrestrial noise during pile driving is expected to attenuate to below the 100 dB RMS Level B threshold for non-harbor seal pinnipeds at a distance of up to 126 feet (38 m) during impact driving and up to 58 feet (17 m) during vibratory pile driving.

Because these distances are entirely within the area that will be maintained as a marine mammal buffer area, no marine mammals will be exposed to any terrestrial noise levels above the established Level B harassment threshold. As a result, marine mammals that could be present within the action area are not expected to be affected significantly by terrestrial noise.

The effects to any pinnipeds within the portion of the action area where terrestrial noise levels were temporarily elevated will be limited to temporarily altered feeding or migratory behavior such as dispersion from, or more rapid migration through, the action area. Long-term, permanent effects, such as long-term avoidance of the action area or any direct injury or mortality, are not anticipated.

8.3 Water Quality

Increased levels of sedimentation and turbidity can result from any sediment-disturbing activities. The proposed pile driving, dredging, and material placement activities associated with the proposed project could disturb sediments and increase turbidity temporarily within the vicinity of the dock. Increased levels of sedimentation and turbidity could have temporary negative impacts on habitat marine mammals and, if any marine mammals are present within the action area during the time of construction, could affect them directly.

Natural currents and flow patterns in the lower Columbia River routinely disturb sediments. Flow volumes and currents are affected by precipitation as well as upstream water management at dams. High volume flow events can result in hydraulic forces that

re-suspend benthic sediments, temporarily elevating turbidity locally. Any temporary increase in turbidity as a result of the proposed action is not anticipated to measurably exceed levels caused by these normal, ordinary periodic increases. Additionally, the volume of flow through the action area will help minimize the intensity and duration of any temporary episodic increases in sediment suspension or turbidity.

Marine mammals are not expected to be affected significantly by any localized, minimal, and temporary water quality impairments that could result during pile installation or removal activities or during dredging. Marine mammals transiting the action area are accustomed to periodically elevated turbidity conditions that are the natural condition of the river. Any potential effects will be minimized by adherence to the BMPs described in section 12.2 of this document.

9 ANTICIPATED IMPACT ON SUBSISTENCE

The anticipated impact of the activity on the availability of the species or stocks of marine mammals for subsistence uses.

There are no subsistence hunting grounds within the action area, and the marine mammals described in this document are not hunted for subsistence uses. Therefore, the proposed action will have no impact on subsistence.

10 ANTICIPATED IMPACT ON HABITAT

The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat.

While habitat and species impacts have been minimized to the extent practicable, certain aspects of the project have the potential to result in unavoidable impacts to aquatic and/or terrestrial habitat, and these in turn could affect marine mammals. Impacts to marine mammal habitat as a result of the proposed action will be limited to temporary water quality impacts from localized increased turbidity during construction, and direct habitat impacts resulting from overwater shading and substrate disturbance. These are not expected to affect marine mammal habitat within the action area significantly, and are not expected to result in any disturbance of marine mammals that would rise to the level of harassment or take as defined under the MMPA.

10.1 Water Quality

Turbidity occurs when suspended organic and inorganic particles in the water column scatter light waves and reduce the light available to underwater environments.

Pile removal and installation may increase turbidity resulting from suspended sediments temporarily. Any increases will be temporary, localized, and minimal. All project construction will be in compliance with Washington water quality standards under Washington Administrative Code (WAC) 173 201A 200(1)(e)(i), which allow

temporary exceedances of turbidity up to 300 feet (91 m) downstream from areas during pile removal and installation.

Increases in turbidity will be well within state water quality standards for temporary construction exceedances. The risk of unintentional discharges of machinery fluids will be managed through adherence to standard BMPs. Potential construction effects on habitat from reduction in water quality will be localized and temporary, and are anticipated to have little effect on marine mammals.

10.2 Direct Habitat Impacts

10.2.1 New Overwater Structure

The project will result in a total of approximately 44,943 square feet of new solid overwater coverage associated with the construction of the new terminal. Overwater coverage in shallow water and nearshore habitat can affect primary productivity, and affect aquatic habitat suitability, which could in turn affect marine mammal prey species including salmonids. As stated previously, the terminal has been designed such that the majority of this structure is located in water deeper than 20 feet below OHWM, to minimize impacts to sensitive shallow water habitat, where the effects of overwater shading are more pronounced. Of the total new aquatic habitat impact, approximately 10,925 square feet of overwater coverage will be located in water shallower than 20 feet below OHWM.

The project also will result in approximately 1,588 square feet of new grated overwater coverage associated with a walkway to the proposed mooring dolphins. However, the grating, and the position of these walkways over deep water, will avoid impacts to primary productivity or other aquatic habitat functions.

The new terminal will not represent a barrier to migration or passage for marine mammals, as the river is approximately 2,000 feet wide at the project site, and marine mammals currently migrate through the action area unimpeded.

10.2.2 Benthic Habitat Impacts

In total, the proposed terminal will require the installation of approximately 320, 24-inch concrete piles and 10, 12-inch steel pipe piles, as well as 4, 18-inch steel pipe piles. This installation will represent a total of approximately 1,079 square feet of new benthic impact associated with new pile footprints and will represent a permanent impact to benthic habitat.

Benthic habitat impacts have the potential to affect prey species for marine mammals, including salmonids, negatively. However, the relatively small quantity of proposed benthic habitat impact, and the mitigation measures proposed in section 12, will minimize the potential effects to marine mammal prey species to the point that they are not expected to have any measurable effect on any marine mammal species.

The project also will result in temporary impacts to approximately 16.2 acres of benthic habitat as a result of initial dredging of the expanded berth. However, these temporary impacts are not expected to significantly affect benthic habitat function, and no compensatory mitigation is proposed for temporary effects to benthic habitats associated with berth dredging.

Table 5. Aquatic Impacts Summary

Shoreline Location Description	Area of Overwater Coverage		Number of Piles			Area of Pile Footprint (sf)
	Solid (sf)	Grated (sf)	24-inch Concrete	12-inch Steel	18-inch Steel	
Shallow Water (USACE OHWM elevation [11.6 CRD] to 20 feet below USACE OHWM)						
Access Trestle	10,925	N/A	52	-	-	173
Subtotal	10,925	N/A	52	-	-	173
Deep Water (deeper than 20 feet below USACE OHWM)						
Access Trestle	1,450	N/A	9	-	-	30
Transition Platform	5,400	N/A	41	-	-	136
Berth Trestle	13,470	N/A	58	-	-	192
Turning Platform	11,648	N/A	68	-	-	225
Fender System	N/A	N/A	-	12	-	11
Breasting Dolphins (2)	450	N/A	14	-	-	46
Mooring Dolphins (4)	800	N/A	48	-	-	159
Grated Walkways	N/A	1,588	-	-	4	7
Subtotal	34,018	1,588	290	12	4	806
10% Contingency for Concrete Piles*	N/A	N/A	30	N/A	N/A	100
Total In-/Overwater	44,943	1,588	320	12	4	1,079

11 ANTICIPATED IMPACT OF LOSS OR MODIFICATION OF HABITAT

The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.

The aquatic and terrestrial/riparian habitat impacts that will occur as a result of the project will not be expected to affect marine mammals significantly.

Temporary water quality impairment during pile driving and dredging is expected to be localized and episodic, and is not anticipated to measurably exceed levels caused by normal, natural processes present in the system. Additionally, the volume of flow through the action area will help minimize the intensity and duration of any temporary episodic increases in sediment suspension or turbidity.

New overwater shading, whether the nearshore shading or the shading by the overwater structure in deep water habitat, is not expected to affect marine mammals

significantly. Overwater shading is not known to reduce habitat suitability for marine mammals, and the structure does not represent a barrier to migration. Pinnipeds are not expected to use the structure, or to be affected by the increase in overwater shading. Marine mammals use the action area primarily as a seasonal corridor during foraging trips between the Columbia River estuary, upstream tributaries, and Bonneville Dam.

Pile installation will result in a relatively small amount of permanent benthic habitat impact (from the pile footprints). This is not expected to reduce habitat suitability within the action area for marine mammals. Direct habitat impacts will be minimized and mitigated with the implementation of the project's proposed mitigation measures and BMPs (see section 12).

Benthic habitats also will be temporarily disturbed during berth dredging. Dredging and material placement activities have the potential to result in short-term impacts to these benthic organisms and their habitat, but these temporary impacts are not expected to affect habitat suitability for marine mammals. The USFWS biological opinion for the Lower Columbia River Channel Improvement Project indicates that benthic habitats recolonize from dredging activities rapidly (US Fish and Wildlife Service 2002). In addition, natural tidal and hydraulic processes routinely disturb benthic habitats, and marine mammals that use this reach of the river are accustomed to these habitat conditions.

Nor are riparian and terrestrial habitat impacts expected to result in any measurable or significant impacts to marine mammals. Most of the terrestrial project impacts will be to sparsely vegetated dredge material that provides little function to the aquatic habitats used by marine mammals. Very little functioning riparian habitat will be affected by the project, and the project avoids nearly all of the riparian habitat at the site.

The entirety of the site is located where dredge material has been placed through previously permitted activities. A public access road isolates the site from the wetlands and riparian habitats to its north. Similarly, the toe of the dredge material along the shoreline isolates the site from the Columbia River and shoreline habitat. However, a portion of the project will be conducted on portions of this former dredge material placement area that are below the 100-year floodplain. For this reason, these portions of the site that are below the 100-year floodplain and also within 150 feet of the OHWM likely do provide some limited riparian function.

In total, the project will result in direct permanent impacts to approximately 33,627square feet (0.77 acre) of riparian buffer. This includes approximately 2,425 sf (0.06 acre) associated with the construction of the dock trestle, approximately 27,874 sf (0.64 acre) associated with the construction of the improved recreational access, and approximately 3,328 sf (0.08 acre) associated with an infiltration pond at the north end of the site. This impact to riparian buffer may have an unquantifiable effect on aquatic habitat function for marine mammals, but any riparian habitat impacts will be

minimized and mitigated through the implementation of the project's proposed mitigation measures and BMPs (see section 12).

The habitat impacts that will result from the proposed action will not result in any measurable or significant adverse effects on the marine mammal populations discussed in this document.

12 MITIGATION MEASURES

The availability and feasibility (economic and technological), methods, and manner of conducting such activity or means of effecting the least practicable impact upon affected species or stock, their habitat, and of their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

The project has implemented several impact avoidance and minimization measures and has adopted a list of BMPs to reduce, eliminate, or minimize the effects of the project to aquatic and terrestrial habitats, and sensitive fish and wildlife species that use these habitats, including marine mammals. These minimization measures and BMPs are described below.

12.1 Impact Avoidance and Minimization Measures

The project proposes a number of impact avoidance and minimization measures to avoid and minimize the potential for adverse environmental effects. General impact avoidance and minimization measures include those listed in the following sections.

12.1.1 Marine Terminal

The project has been designed to avoid and minimize impacts to aquatic resources to the greatest extent practicable. The size and configuration of the structures have been kept to the minimum necessary to support their needed functions. In addition, the terminal has been designed such that (with the exception of the access trestle) the platforms, dolphins, and structures associated with the terminal will be located in water deeper than 20 feet below OHWM (11.6 feet CRD). This will minimize the effects to aquatic habitats by minimizing structure in and over shallow water habitats and placing the vessels away from shallow water reducing impacts from vessel operations such as scour from prop and thrusters. The Columbia River is a constitutionally designated area of commerce and the dock will be located in an existing harbor area and adjacent to the federal navigation channel. Ship traffic associated with the project will result in a minor increase in vessel traffic (an estimated 3 to 6 ships per month) and will be within historical levels. In addition, walkways will be grated to further minimize shading and stormwater will be collected and infiltrated upland reducing the potential for pollutants to reach surface waters. Furthermore, the access trestle abutments have been designed and configured to eliminate the need for shoreline armoring along the riverbank.

The dock design uses pre-cast concrete piles, rather than steel pipe piles, as structural support piles, which minimizes the potential for acoustic effects associated with impact

pile driving. The steel piles for walkway supports and fender systems will be installed with a vibratory hammer, and are not expected to require impact proofing. If impact proofing is required a bubble curtain will be employed. Stormwater from the dock will be collected and conveyed to upland treatment and infiltration swale. The stormwater system will also accommodate stormwater from the existing Northport dock which is currently infiltrated in an upland swale that will be removed for the development.

The proposed berth extension has been sited entirely in deep water habitat, adjacent to an existing deep water berth. Existing water depths in the proposed berth area vary from -50 feet CRD to -39 feet CRD. Locating the berth only in existing deep water, adjacent to an existing deep water berth minimizes the effects that would otherwise be associated with constructing a new berth elsewhere. No shallow water habitat would be affected by the berth extension.

12.1.2 Upland Facility

The upland facility has been designed to avoid and minimize impacts to all aquatic resources to the greatest extent practicable. The upland portion of the facility has been designed to entirely avoid disturbing wetlands, and would be constructed on a site that has little substantial vegetation, has been slated for industrial development for years and has been used as a dredge material placement site.

Several projects were previously proposed for the site, and nearly all of them would have resulted in greater habitat impacts than the current proposal. Several potential projects would have required the construction of a rail loop track that in turn would have required filling a portion of the high quality forested backwater wetland area to the north of the project site. The site is well suited for an export facility. The proposed project has been developed within the envelope of previously developed areas at the site, and will not result in any impacts to the forested backwater wetland to the north.

Stormwater from impervious surfaces associated with the proposed project will be infiltrated through on-site stormwater pond(s).

12.2 Best Management Practices

The project has implemented the following BMPs to minimize the extent of any effects to marine mammals or the aquatic environment.

12.2.1 General BMPs

General BMPs include those listed below.

- In-water work will be conducted only during the in-water work window that is ultimately approved for this project.
- Project construction will be completed in compliance with Washington State Water Quality Standards (WAC 173-201A), including those listed below.
    - Petroleum products, fresh cement, lime, concrete, chemicals, or other toxic or deleterious materials will not be allowed to enter surface waters.
    - There will be no discharge of oil, fuels, or chemicals to surface waters, or onto land where there is a potential for re-entry into surface waters.
    - Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc., will be checked regularly for leaks, and materials will be maintained and stored properly to prevent spills.
- A spill prevention, control, and countermeasures (SPCC) plan will be prepared by the contractor and used during all demolition and construction operations. A copy of the plan with any updates will be maintained at the work site.
    - The SPCC plan will outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The plan also will outline management elements such as personnel responsibilities, project site security, site inspections, and training.
    - The SPCC plan will outline the measures to prevent the release or spread of hazardous materials found on site or encountered during construction but not identified in contract documents including any hazardous materials that are stored, used, or generated on site during construction activities. These items include, but are not limited to, gasoline, diesel fuel, oils, and chemicals.
- Applicable spill response equipment and material designated in the SPCC plan will be maintained at the job site.

12.2.2 Overwater Work BMPs

Typical construction BMPs for working in, over, and near water will be applied; these include activities such as the following.

- Checking equipment for leaks and other problems that could result in the discharge of petroleum-based products or other material into waters of the Columbia River.
- Corrective actions will be taken in the event of any discharge of oil, fuel, or chemicals into the water. These actions will include:
    - Beginning containment and cleanup efforts immediately upon discovery of the spill and completing them in an expeditious manner in accordance with all applicable local, state, and federal regulations. Spill response will take precedence over normal work. Cleanup will include proper disposal of any spilled material and used cleanup material.

    - Ascertaining the cause of the spill and taking appropriate actions to prevent further incidents and environmental damage.
    - Reporting spills to Ecology's Northwest Regional Spill Response Office at (425) 649-7000.
- Excess or waste materials will not be disposed of or abandoned waterward of OHW or allowed to enter waters of the state. Waste materials will be disposed of in an appropriate manner consistent with applicable local, state, and federal regulations.
- Demolition and construction materials will not be stored where wave action or upland runoff can cause materials to enter surface waters.
- Oil-absorbent materials will be present on site for use in the event of a spill or if any oil product is observed in the water.

12.2.3 Pile Installation BMPs

Pile installation BMPS to be applied will include the following.

- A vibratory hammer will be used to drive steel piles to minimize underwater and terrestrial noise levels.
- If steel piles require impact installation or proofing, a bubble curtain will be used.
- If steel piles require impact installation or proofing, the contractor will be required to use a soft start. Soft start for impact drivers requires that contractors provide an initial set of three strikes at reduced energy, followed by a thirty-second waiting period, then two subsequent reduced energy strike sets.
- Soft start shall be implemented at the start of each day's pile driving and at any time following cessation of pile driving for a period of thirty minutes or longer.
- Soft start for impact drivers will be implemented at any time following cessation of impact driving for a period of thirty minutes or longer.
- Marine mammal monitoring will be conducted during pile installation activities (See Appendix B) to minimize impacts to marine mammals.

12.2.4 Overwater Concrete Placement Minimization and BMPs

On-site concrete placement will follow appropriate BMPs that include the following.

- Wet concrete will not come into contact with surface waters.
- Forms for any concrete structure will be constructed to prevent leakage of wet concrete.
- Concrete process water will not be allowed to enter the river. Any process water/contact water will be routed to a contained area for treatment and will be disposed of at an upland location.

12.2.5 Dredging BMPs

- Dredging will be conducted during the in-water work window that is ultimately approved for this project.
- Dredging will be conducted to prevent impingement of juvenile salmonids by dredging equipment or clamshell or hydraulic dredge. Regular observation of

sediment aboard the barge or at the placement areas will be conducted. If impingement occurs, clamshell operations will be adjusted (slowed) or modified to increase the opportunity for juveniles to avoid the bucket and/or suction head. The hydraulic dredge will be lowered deeper into the sand to reduce water entrainment.

- Construction activities will be conducted in compliance with Surface Water Quality Standards for Washington (173-201A WAC) or other conditions as specified in the water quality certification and/or construction stormwater permit.
- Appropriate BMPs will be employed to minimize sediment loss and turbidity generation during dredging. BMPs may include, but are not limited to, the following:
    - Smooth closure of the bucket when at the bottom;
    - No stockpiling of dredged material on the riverbed;
    - Maintaining suction head of hydraulic dredge in the river bed to the extent practicable;
    - Using a buffer plate or other means to reduce flow energy of the hydraulic dredge at the placement area; and
    - Other conditions as specified in the water quality certification.
- Enhanced BMPs may also be implemented and may include, but are not limited to, the following:
    - Slowing the velocity (i.e., cycle time) of the ascending loaded clamshell bucket through the water column;
    - Pausing the dredge bucket near the bottom while descending, and near the water line while ascending; and
    - Placing filter material over the barge scuppers to clear return water.
- If sediment is placed on a barge for delivery to the placement area, no spill of sediment from the barge will be allowed. The barge will be managed such that the dredged sediment load does not exceed the capacity of the barge. The load will be placed in the barge to maintain an even keel and avoid listing. Hay bales and/or filter fabric may be placed over the barge scuppers to help filter suspended sediment from the barge effluent, if needed, based on sediment testing results.

- Dredging operations will be conducted in a manner that does not impede the ability for marine mammals to move through the action area (dredging equipment will not fully span the river).

12.2.6 Dredge Material Placement BMPs

The following BMPs and conservation measures will be implemented to minimize environmental impacts during dredged material transport and placement:

- The contractor will be required to use a tightly sealing bucket and to monitor for spillage during transfer operations.
- Visual water quality monitoring and, if necessary, follow-up measurements will be conducted around the barge at the removal and upland transfer area to confirm that material is not being released.

- Sediment that is dredged by hydraulic dredge and placed in-water by hydraulic pipeline will be discharged at the riverbed to the extent practicable to minimize turbidity in the water column.
- Material used as beach nourishment will be placed within the limits of the boundaries and below OHWM.
- To prevent fish stranding, the slope for beach nourishment will be 3:1 horizontal to vertical (33 percent) without any swales.
- Sediment placement will use methods that minimize sediment loss and turbidity to the maximum extent possible.
- The placement activities will be monitored visually to ensure placed sediment is contained inside of the specified boundaries.
- Enhanced BMPs may be implemented to control sediment migration and turbidity and may include the following:
    - Selective sediment placement at areas with low dispersion;
    - Lowering the discharge pipeline toward the bottom elevation;
    - Placing sediment to build confinement dikes followed by placing the sediment into them; and
    - Installing a silt curtain or similar equipment where appropriate.
- If upland stockpiling of dredged material becomes necessary, BMPs will be employed as appropriate to control runoff and erosion. Such BMPs may include: 1) installing silt fences, hay bales, and/or containment berms; 2) managing runoff and elutriate water; and 3) routine inspection of the stockpile areas to verify that BMPs are functioning properly.

13 ARCTIC SUBSISTENCE USES, PLAN OF COOPERATION

Where the proposed activity would take place in or near a traditional arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for arctic subsistence uses, the applicant must submit a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence use.

The proposed action will take place in and adjacent to the Columbia River in Kalama, Washington. No activities will take place in or near a traditional Arctic hunting place.

14 MONITORING AND REPORTING PLAN

The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on the population of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s), including migration and other habitat uses, such as feeding.

The project has developed a marine mammal monitoring and reporting plan which will be implemented to ensure that no marine mammals will be exposed to Level A harassment, and to document and quantify the number of Level B takes during pile driving activity associated with the project. The monitoring plan is included as Appendix B of this document.

15 COORDINATING RESEARCH TO REDUCE AND EVALUATE INCIDENTAL TAKE

Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

The data recorded during marine mammal monitoring activities will be provided to NMFS in the monitoring reports. These reports will provide useful information regarding the density, run timing, migratory behavior, and behavioral response to construction activities of the marine mammals discussed in this document. The monitoring data collected will inform permit applicants and regulatory staff and assist the evaluation of the potential effects of future projects of similar scope on the lower Columbia River.

16 CONCLUSION

For the reasons described in this document, the project has determined that the effects of the proposed action have the potential to result in Level B harassment of relatively small numbers of harbor seals, California sea lions, and Steller sea lions. The project has implemented impact minimization measures, including noise attenuation measures, in-water work timing restrictions, and a marine mammal monitoring plan, to avoid potential for Level A harassment.

While the Level B harassment has the potential to result in minor behavioral effects to any marine mammals present during pile driving activities, based on the analysis presented in this document, the Port concludes that these temporary effects will have a negligible effect on the stocks of marine mammals described in this document or their habitats.

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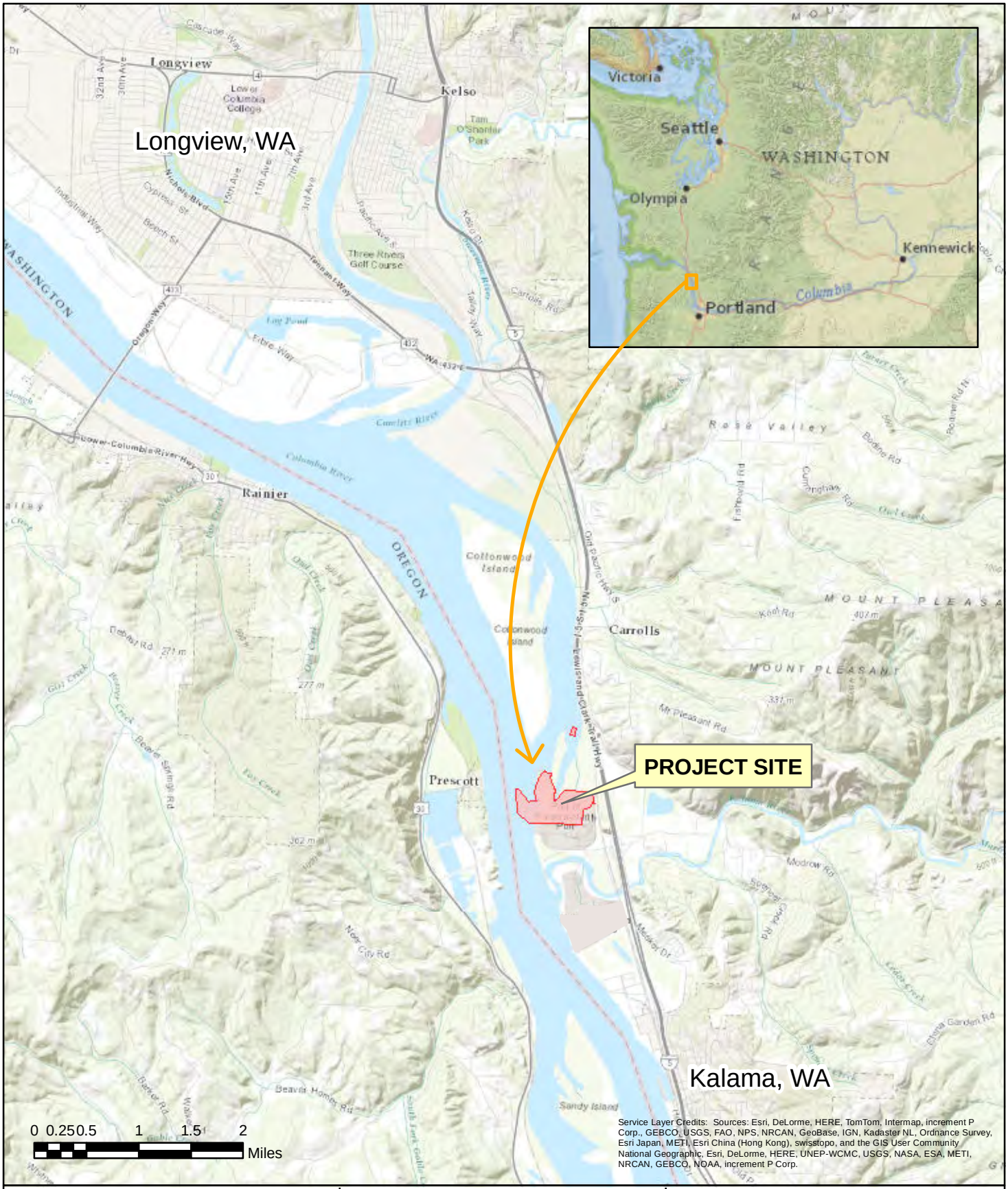
APPENDIX A:
Graphics



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PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz County
STATE OF: WA
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 1: VICINITY MAP

Port of Kalama

Address: 110 W. Marine Dr.
Kalama, Wa. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

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November 2015

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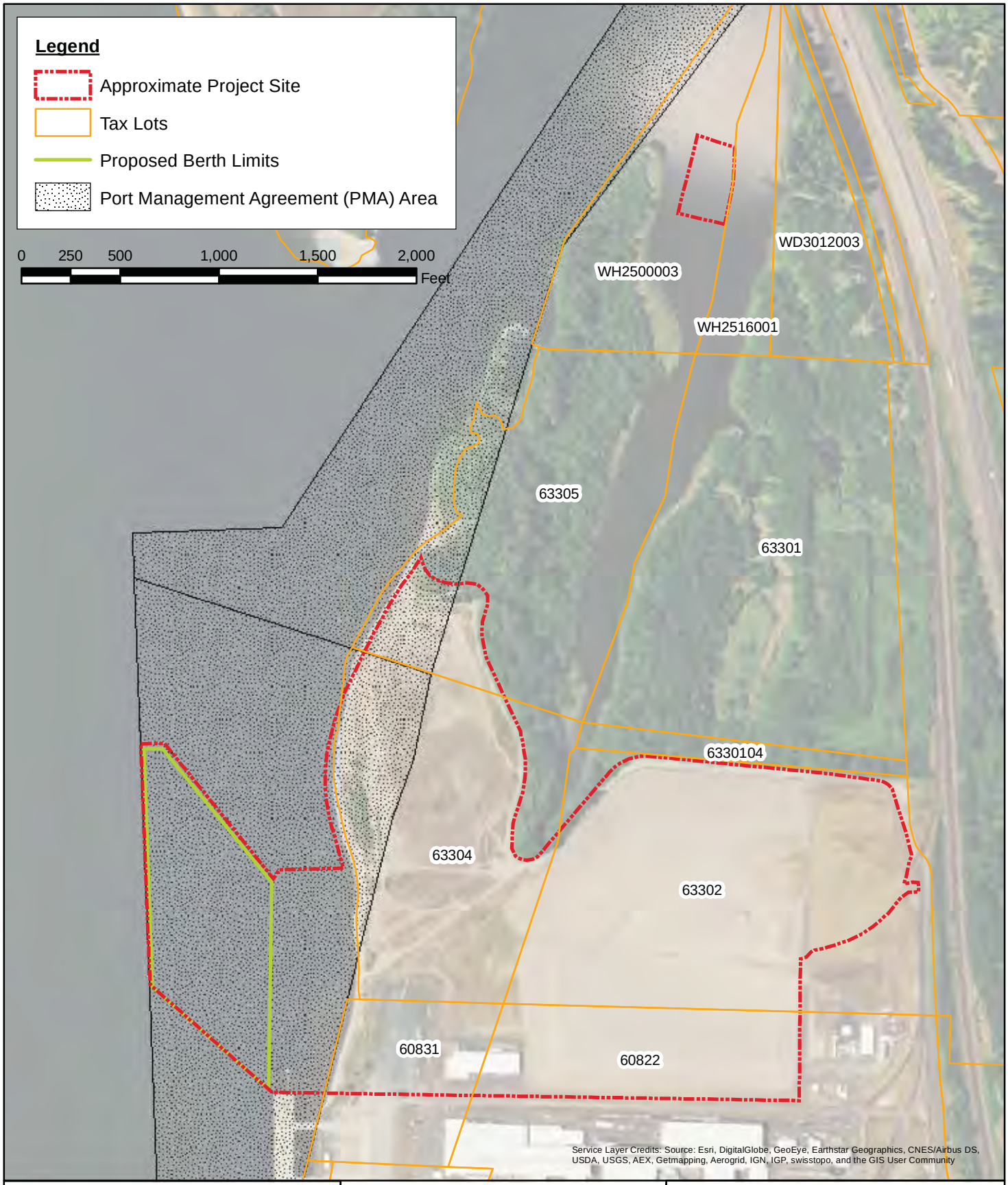

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FIGURE 2: PARCEL MAP

Port of Kalama

Address: 110 W. Marine Dr.
Kalama, Wa. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

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November 2015

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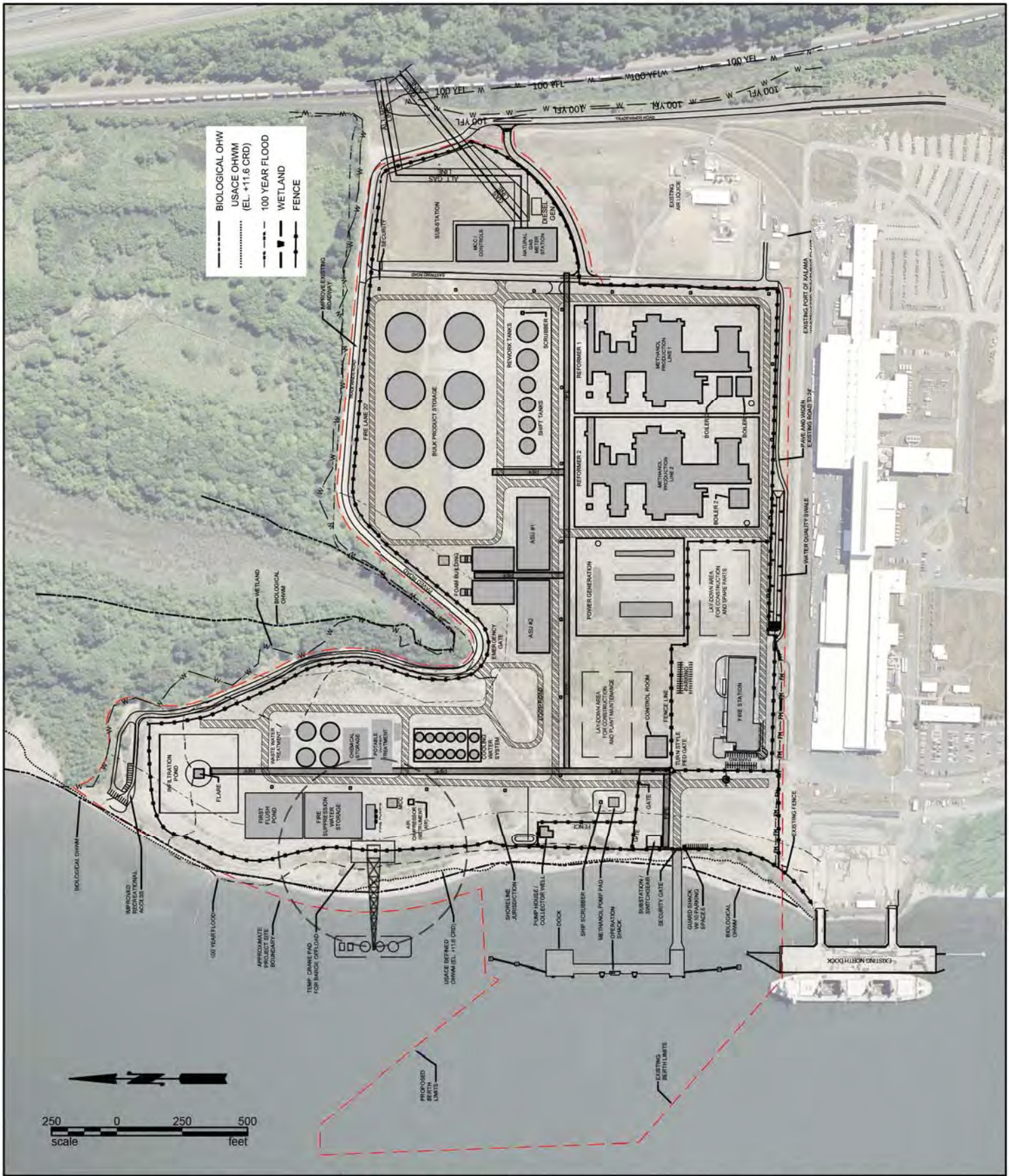

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IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 3: CONCEPTUAL SITE PLAN

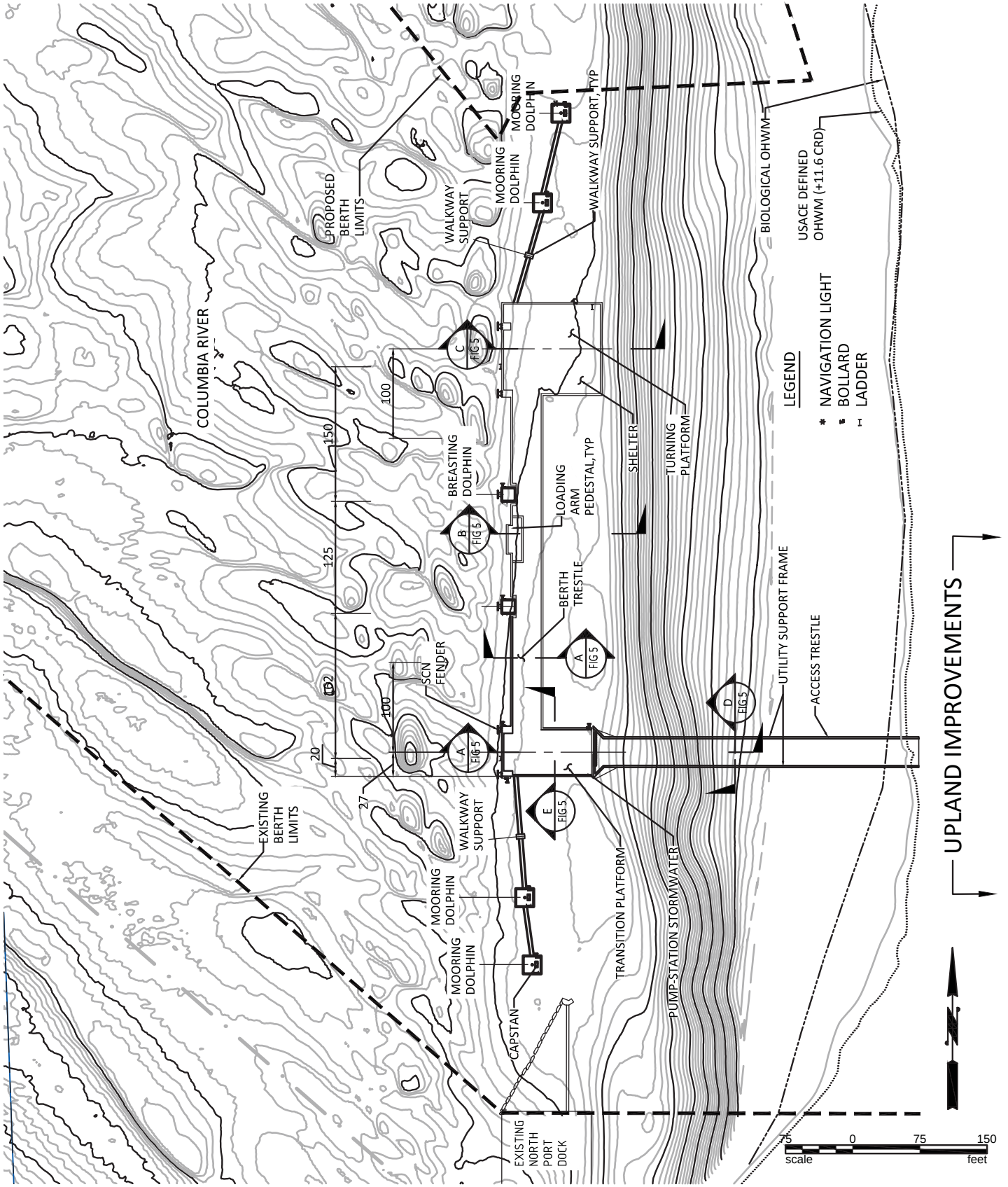
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 43"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 4: Marine Terminal Plan

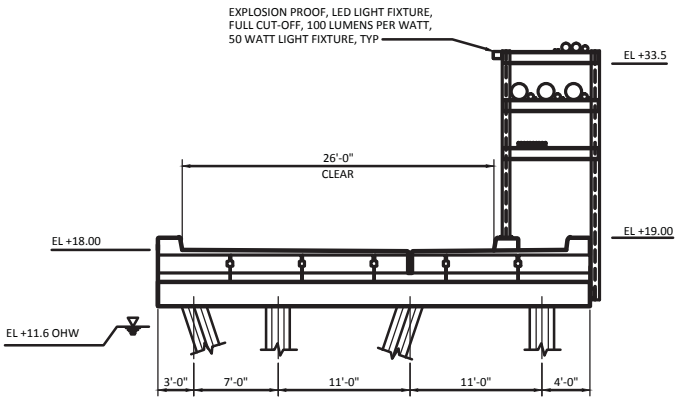
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

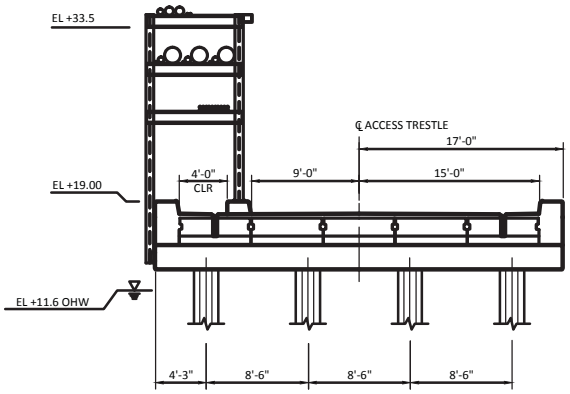
PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

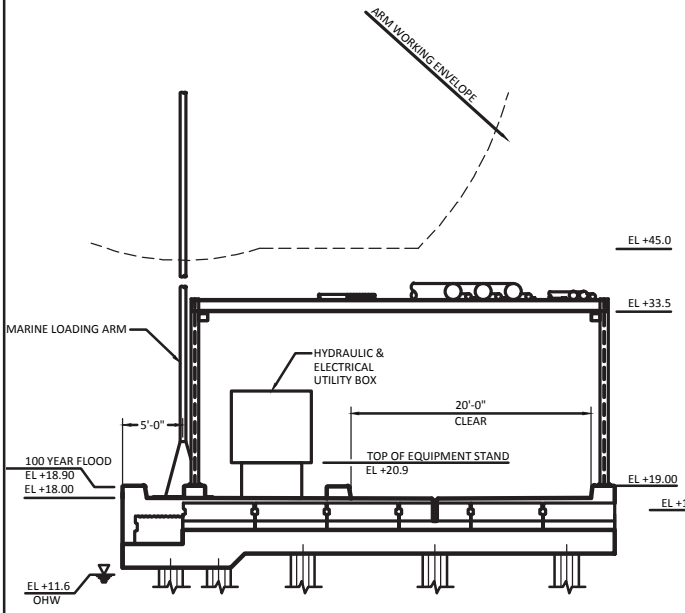
November 2015



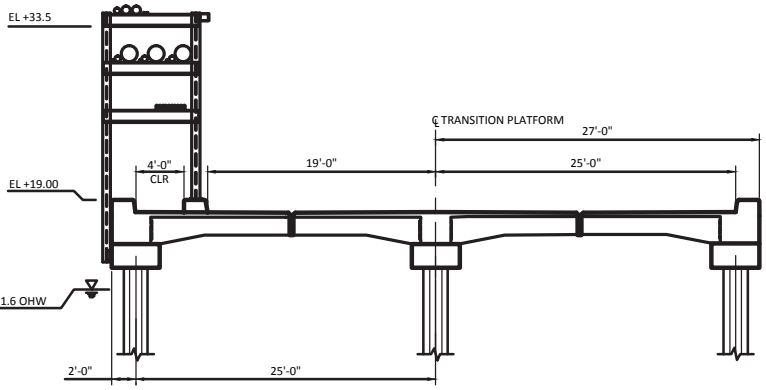
A FIG 5 BERTH TRESTLE
SCALE: 1/16"=1'-0"



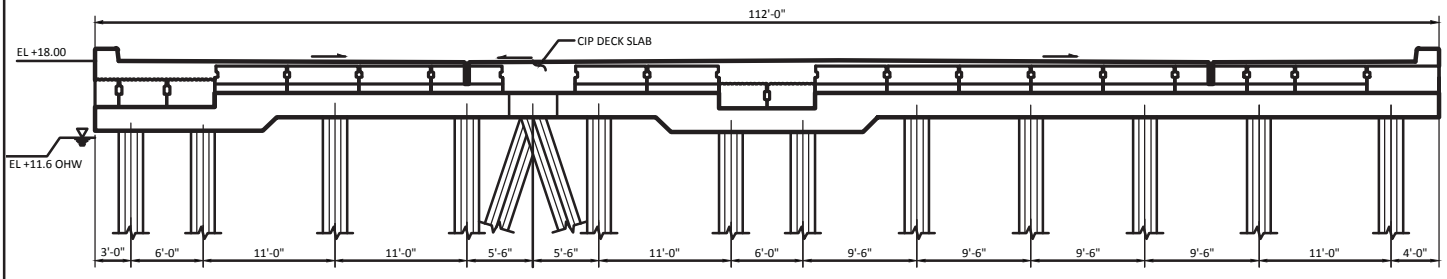
D FIG 5 ACCESS TRESTLE @ UTILITY FRAME
SCALE: 1/16"=1'-0"



B FIG 5 BERTH TRESTLE @ MARINE LOADING ARM
SCALE: 1/16"=1'-0"



E FIG 5 TRANSITION PLATFORM @ UTILITY FRAME
SCALE: 1/16"=1'-0"



C FIG 5 DOCK SECTION-TURNING PLATFORM
SCALE: 1/16"=1'-0"

PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 5: DOCK CROSS-SECTIONS

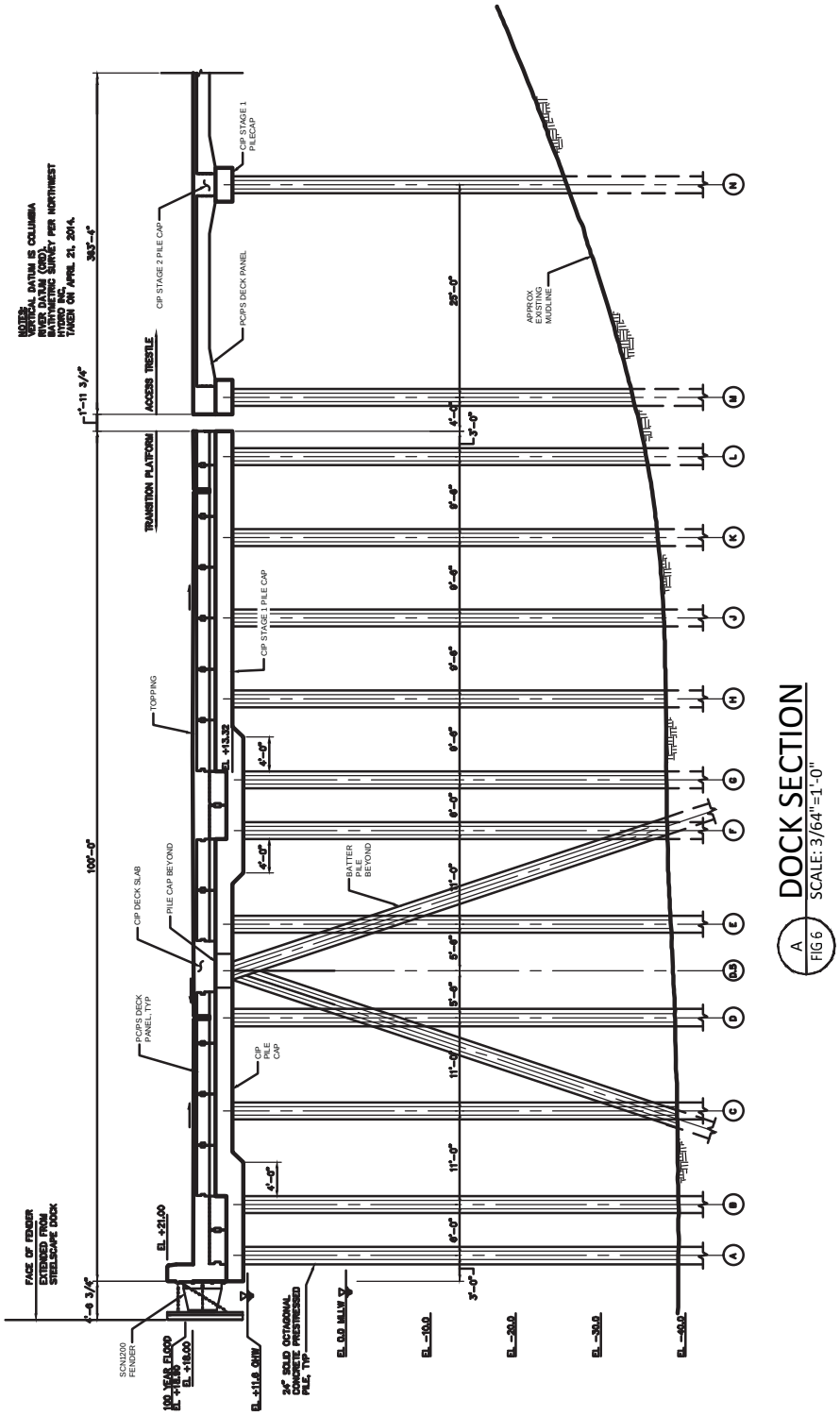
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



A / FIG 6 DOCK SECTION
SCALE: 3/64"=1'-0"

PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 6: TRESTLE SECTION

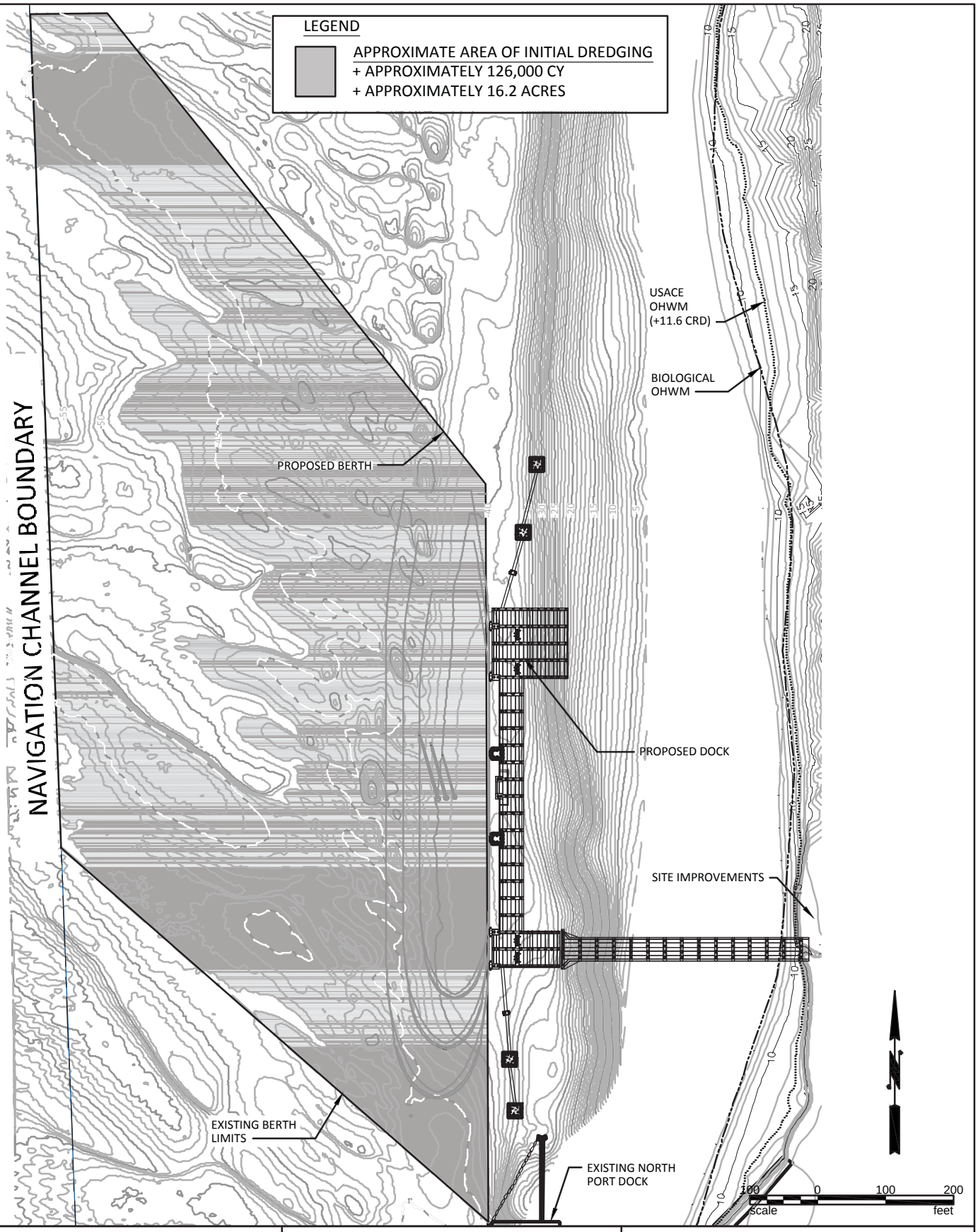
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 7: DREDGING PLAN

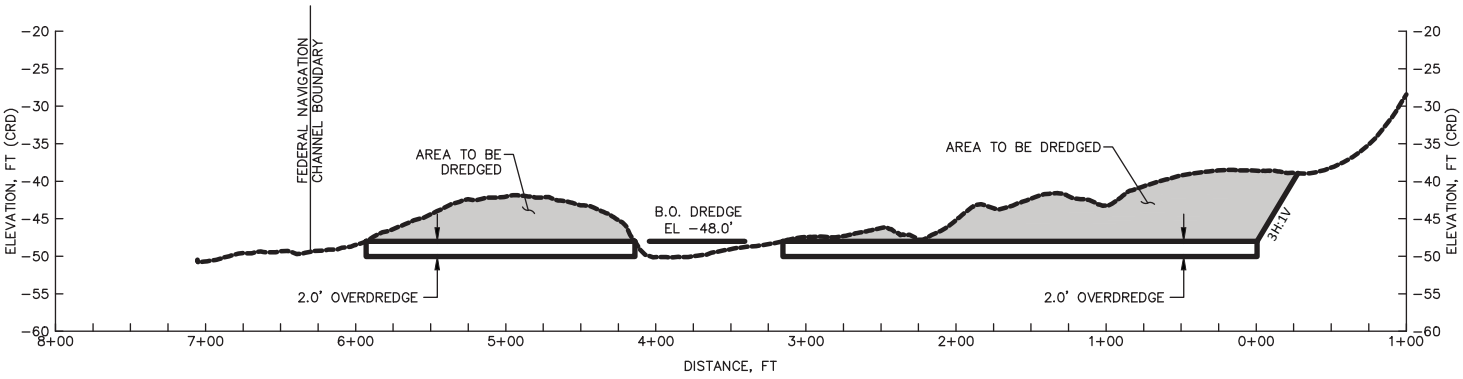
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 8: DREDGING SECTION

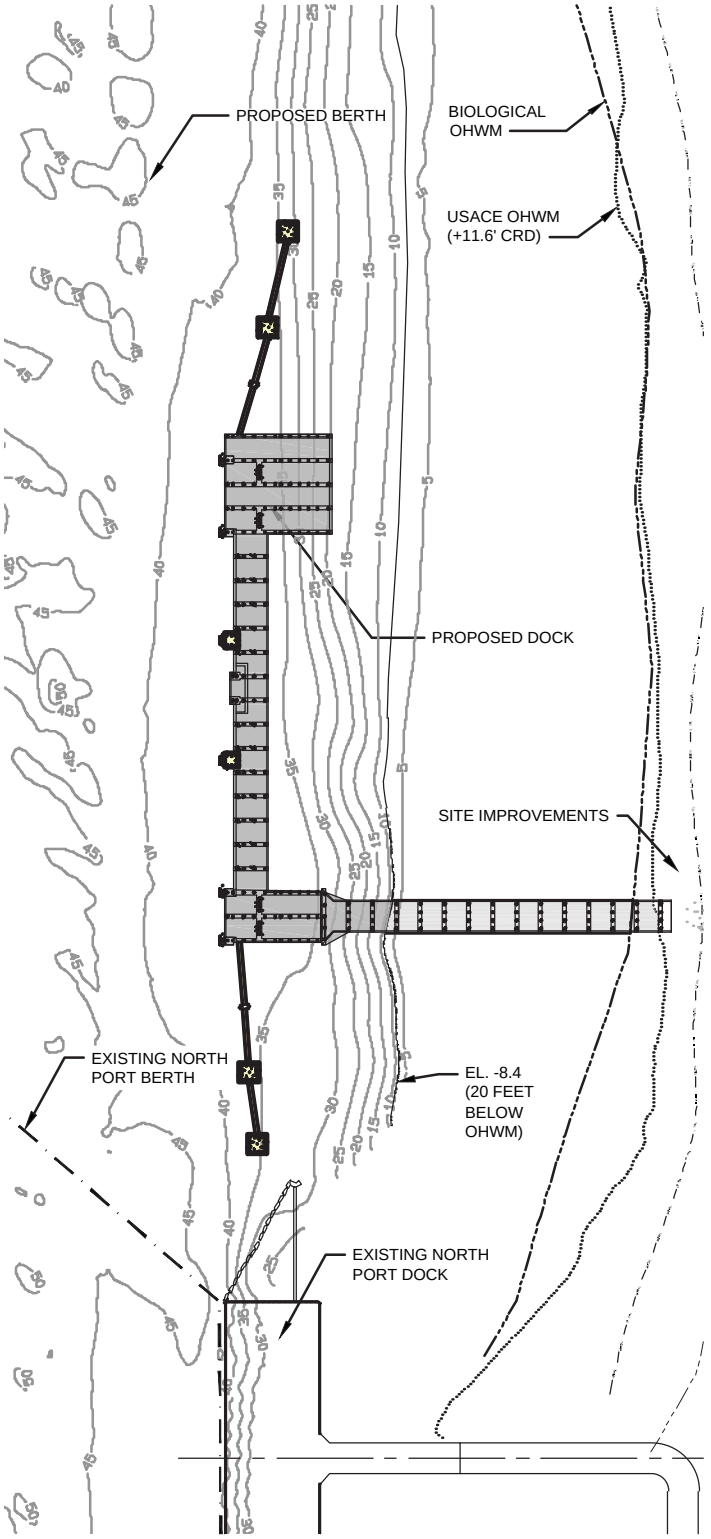
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



LEGEND

ZONE 1: **SHALLOW WATER (CORPS OHWM ELEVATION [11.6 CRD] TO 20 FEET BELOW CORPS OHWM)**

ZONE 2: **DEEP WATER (DEEPER THAN 20 FEET BELOW CORPS OHWM)**

200 0 100 200 feet
scale

Shoreline Location Description	Area of Over-water Coverage		# Piles			Area of Pile Footprint (sf)
	Solid	Grated	24-inch Concrete	12-inch Steel	18-inch Steel	
Shallow Water (Corps OHWM elevation [11.6 CRD] to 20 feet below Corps OHWM)						
Access Trestle	**10,925 sf**	**N/A**	**52**	**-**	**-**	**173**
Subtotal	**10,925 sf**	**N/A**	**52**	**-**	**-**	**173**
Deep Water (Deeper than 20 feet below Corps OHWM)						
Access Trestle	**1,450 sf**	**N/A**	**9**	**-**	**-**	**30**
Transition Platform	**5,400 sf**	**N/A**	**41**	**-**	**-**	**136**
Berth Trestle	**13,470 sf**	**N/A**	**58**	**-**	**-**	**192**
Turning Platform	**11,648 sf**	**N/A**	**68**	**-**	**-**	**225**
Fender System	**N/A**	**N/A**	**-**	**12**	**-**	**11**
Breasting Dolphins (2)	**450 sf**	**N/A**	**14**	**-**	**-**	**46**
Mooring Dolphins (4)	**800 sf**	**N/A**	**48**	**-**	**-**	**159**
Grated Walkway	**N/A**	**1,588 sf**	**-**	**-**	**4**	**7**
Subtotal	**34,018 sf**	**1,588 sf**	**290**	**12**	**4**	**806**
10% Contingency for Concrete Piles*	**N/A**	**N/A**	**30**	**N/A**	**N/A**	**100**
Total in-/Over-water	**44,943 sf**	**1,588 sf**	**320**	**12**	**4**	**1,079**

PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 9: AQUATIC IMPACTS

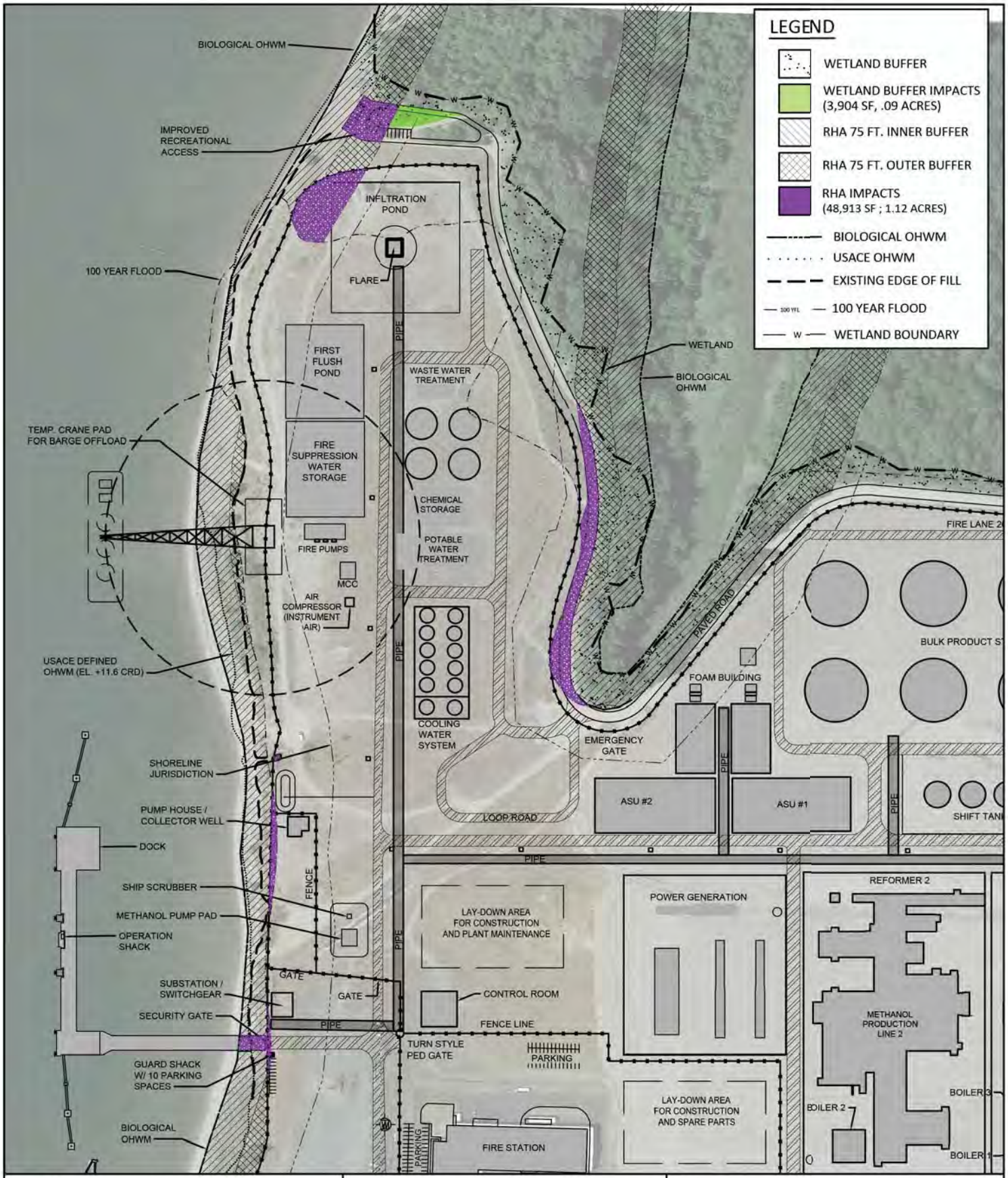
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 10 : RIPARIAN &WETLAND BUFFER IMPACTS

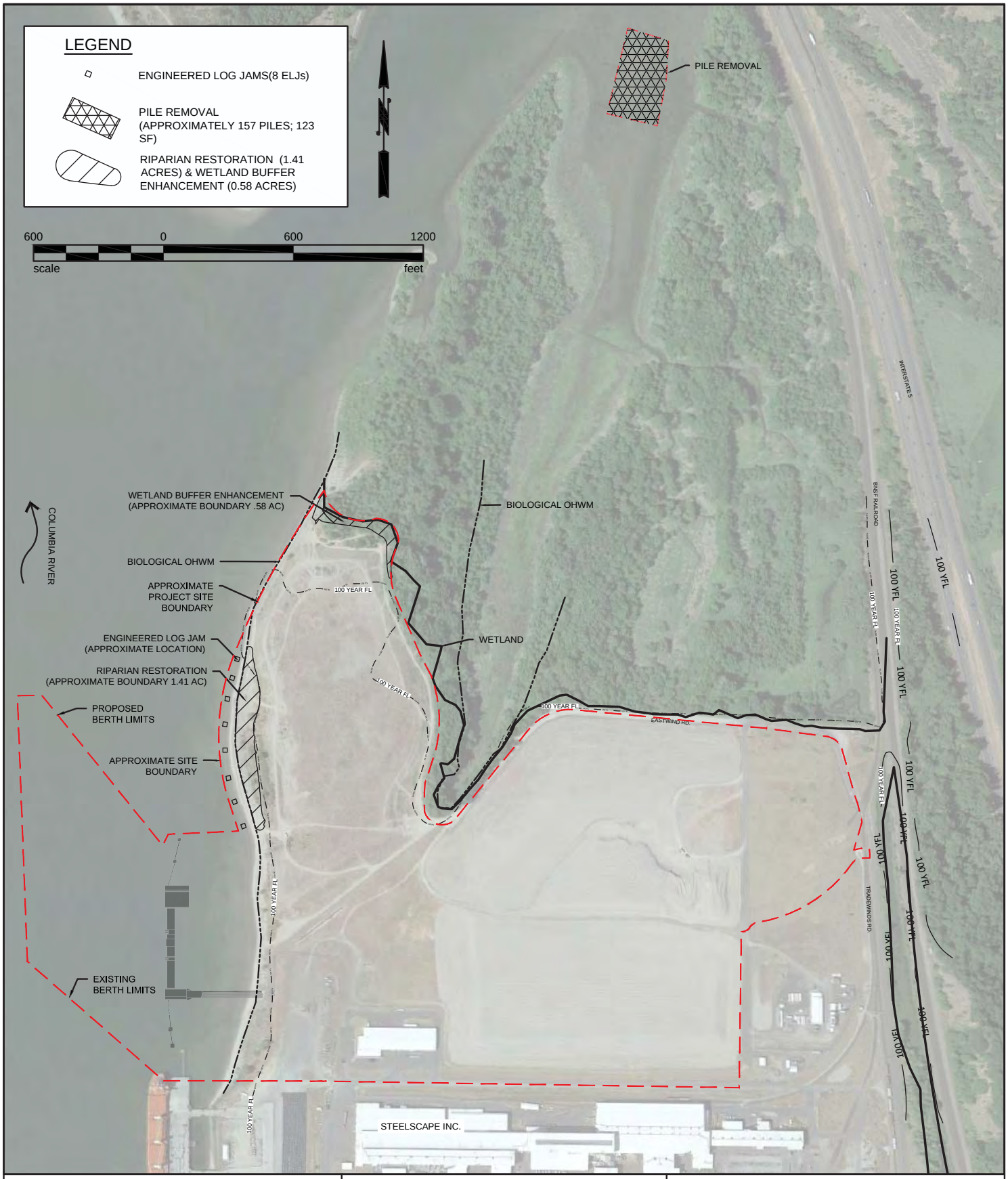
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 11: MITIGATION OVERVIEW

Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015

PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 12: PILE REMOVAL

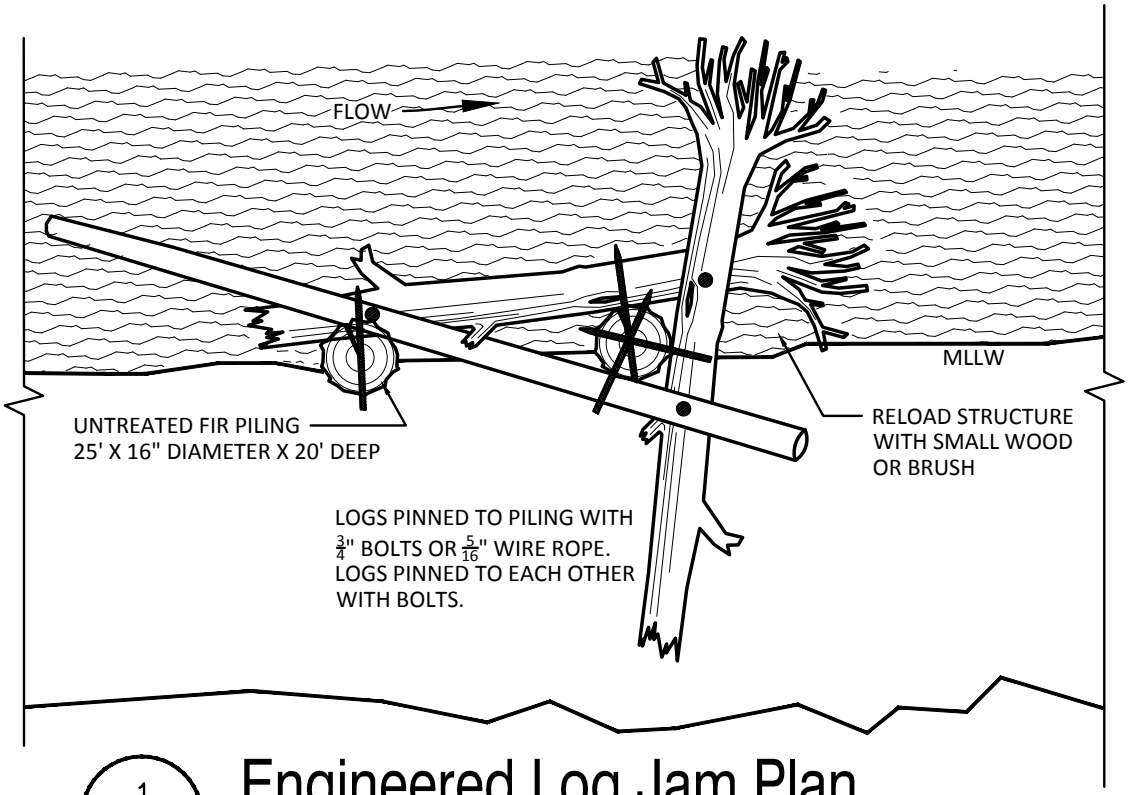
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

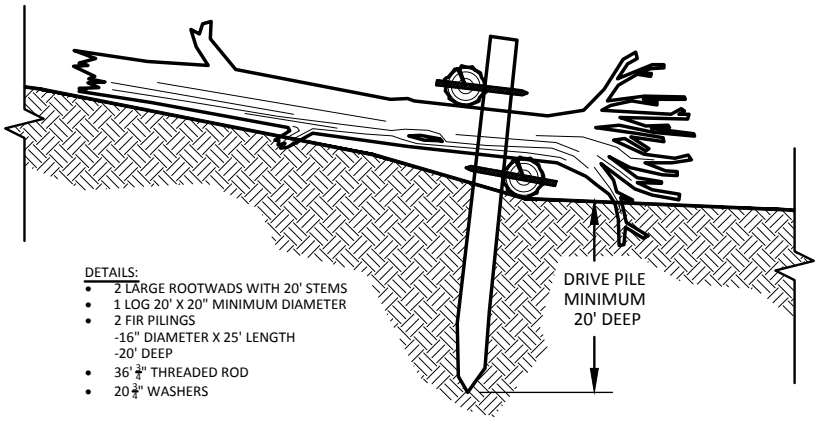
PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



1 – Engineered Log Jam Plan
SCALE: NTS



2 – Engineered Log Jam Section
SCALE: NTS

PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 13: ENGINEERED LOG-JAM DETAILS

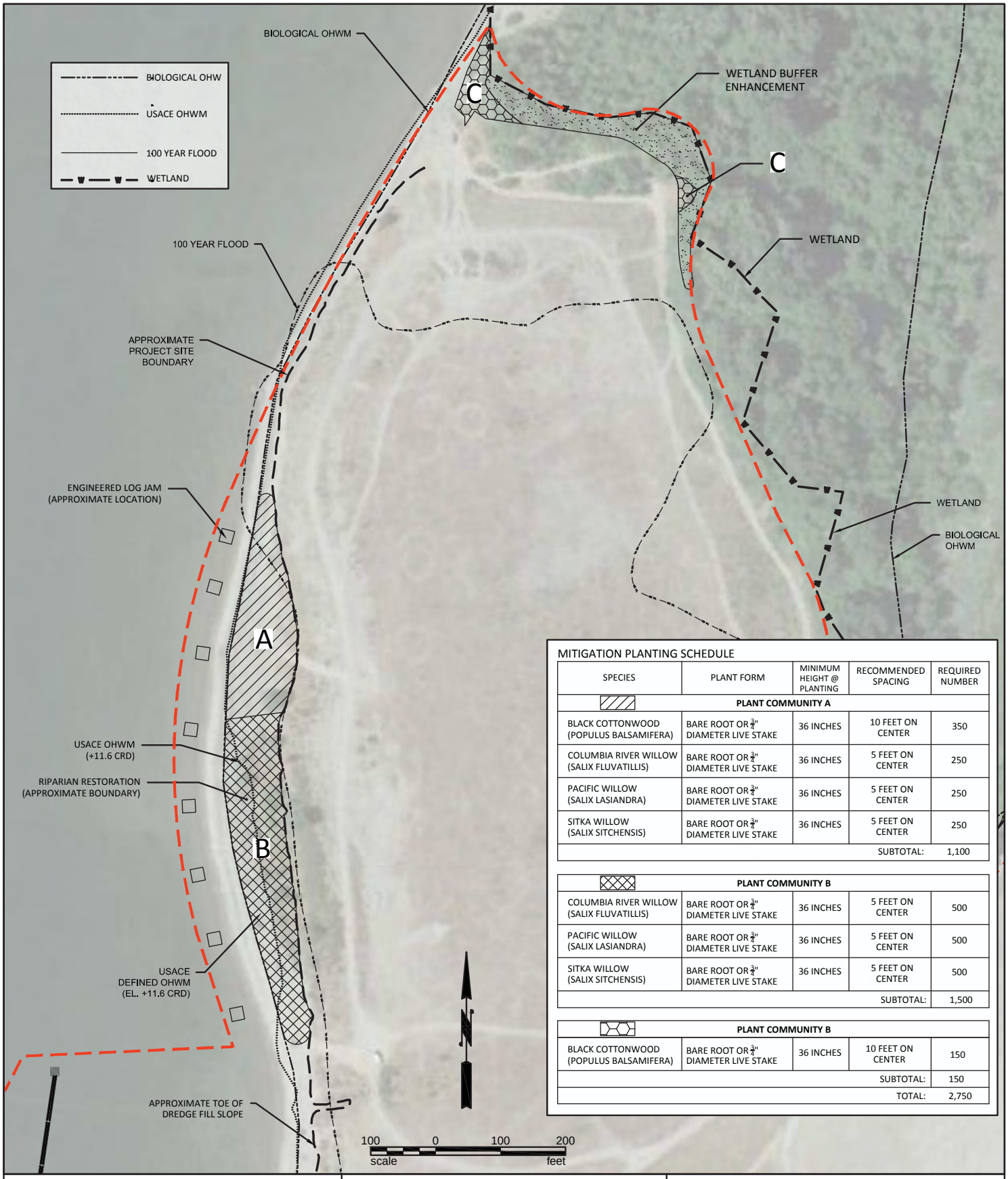
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45Á02' 40"
LONGITUDE: -122Á52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



MITIGATION PLANTING SCHEDULE

SPECIES	PLANT FORM	MINIMUM HEIGHT @ PLANTING	RECOMMENDED SPACING	REQUIRED NUMBER
	PLANT COMMUNITY A			
BLACK COTTONWOOD (POPULUS BALSAMIFERA)	BARE ROOT OR ¾" DIAMETER LIVE STAKE	36 INCHES	10 FEET ON CENTER	350
COLUMBIA RIVER WILLOW (SALIX FLUVATILLIS)	BARE ROOT OR ¾" DIAMETER LIVE STAKE	36 INCHES	5 FEET ON CENTER	250
PACIFIC WILLOW (SALIX LASIANDRA)	BARE ROOT OR ¾" DIAMETER LIVE STAKE	36 INCHES	5 FEET ON CENTER	250
SITKA WILLOW (SALIX SITCHENSIS)	BARE ROOT OR ¾" DIAMETER LIVE STAKE	36 INCHES	5 FEET ON CENTER	250
			SUBTOTAL:	1,100
	PLANT COMMUNITY B			
COLUMBIA RIVER WILLOW (SALIX FLUVATILLIS)	BARE ROOT OR ¾" DIAMETER LIVE STAKE	36 INCHES	5 FEET ON CENTER	500
PACIFIC WILLOW (SALIX LASIANDRA)	BARE ROOT OR ¾" DIAMETER LIVE STAKE	36 INCHES	5 FEET ON CENTER	500
SITKA WILLOW (SALIX SITCHENSIS)	BARE ROOT OR ¾" DIAMETER LIVE STAKE	36 INCHES	5 FEET ON CENTER	500
			SUBTOTAL:	1,500
	PLANT COMMUNITY B			
BLACK COTTONWOOD (POPULUS BALSAMIFERA)	BARE ROOT OR ¾" DIAMETER LIVE STAKE	36 INCHES	10 FEET ON CENTER	150
			SUBTOTAL:	150
			TOTAL:	2,750

PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River, river mile 72
COUNTY OF: Cowlitz
APPLICATION BY: Port of Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, BNSF, WDFW

FIGURE 14: RIPARIAN PLANTING DETAILS

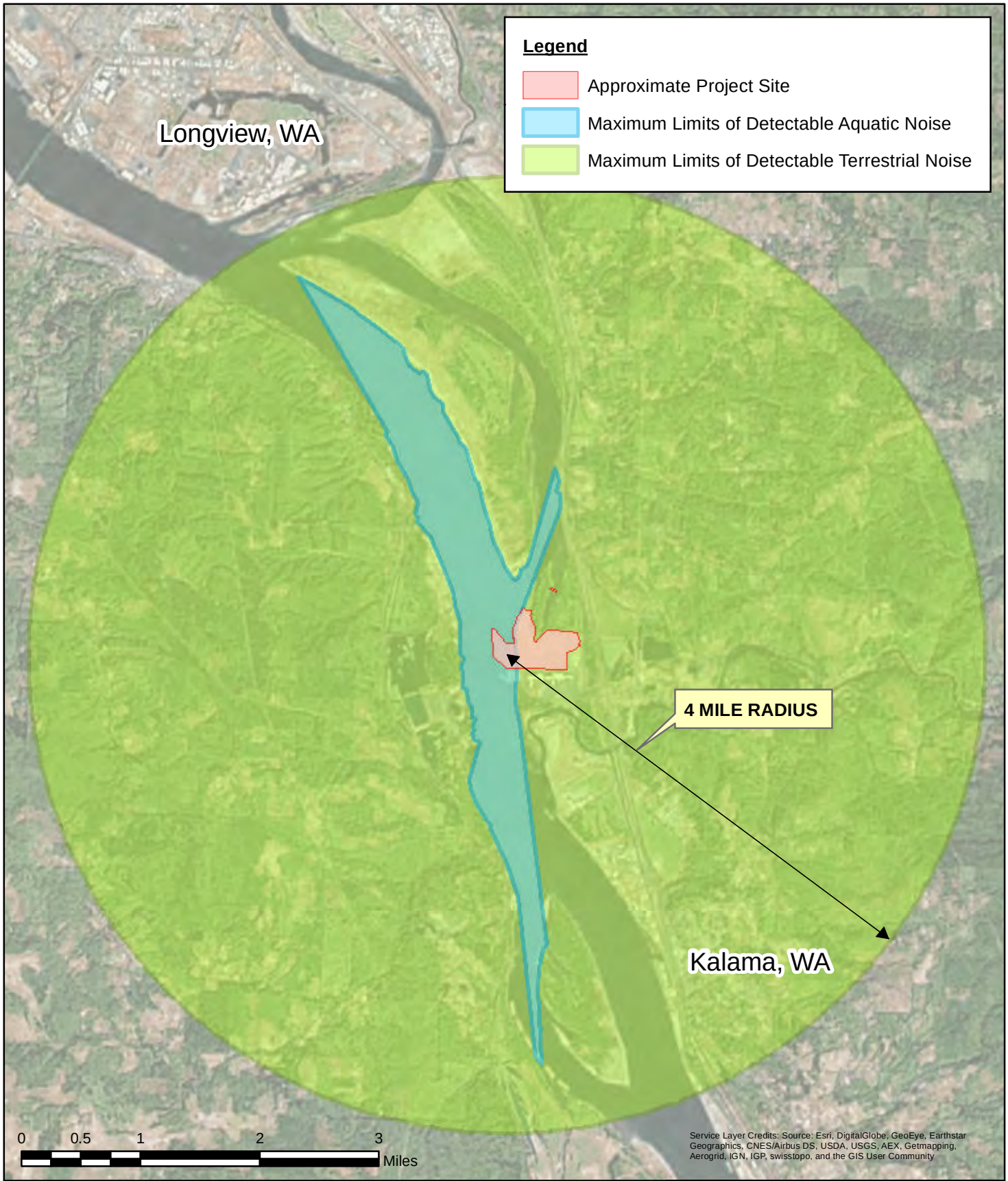
Port of Kalama

Address: 110 W. Marine Dr.
Kalama, WA. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

November 2015



PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River
COUNTY OF: Cowlitz County
STATE OF: WA
APPLICATION BY: PORT OF Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, WDFW, BNSF

FIGURE 15: ACTION AREA

Port of Kalama

Address: 110 W. Marine Dr.
Kalama, Wa. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Porject

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum
OHWM (USACE)= +11.6' CRD

N
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November 2015

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APPENDIX B:
Marine Mammal Monitoring Plan

BergerABAM
210 E 13th Street, Suite 300, Vancouver, Washington 98660-2958
360/823-6100 • 360/823-6101 Fax • www.abam.com

PORT OF KALAMA
KALAMA MANUFACTURING AND MARINE EXPORT FACILITY PROJECT
MARINE MAMMAL MONITORING PLAN

INTRODUCTION

This monitoring plan has been prepared for the Port of Kalama (Port) for the development of the Kalama Manufacturing and Marine Export Facility Project (project). The plan has been prepared as an appendix to, and in support of, a request for an Incidental Harassment Authorization (IHA) under the Marine Mammal Protection Act (MMPA). Pursuant to Section 101(a)(5) (A-D) of the MMPA, as amended (16 USC 1371 (a)(5)), the Port is requesting that the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) issue an IHA for incidental take of harbor seal (*Phoca vitulina ssp. richardsi*), California sea lion (*Zalophus californianus*), and Steller sea lion (*Eumatopius jubatus*) during pile driving activities conducted during the construction of the project in the Columbia River at Kalama, Washington (River Mile [RM] 72).

This marine mammal monitoring plan is designed to avoid Level A harassment to marine mammals within the action area (as identified in the IHA application), and to monitor and record the extent of Level B harassment properly. The project will not result in Level A takes, and therefore does not require a Letter of Authorization. Please refer to the IHA application for a detailed discussion of the project and effects. The monitoring plan will also provide documentation regarding the presence, density, behavior, and movements of each individual species of marine mammal encountered, which will serve to inform regulatory agencies and future permit applicants with site specific information in a reach of the river where published information on marine mammal presence and behavior is limited.

Proposed in-water work will be conducted only during the in-water work window that is ultimately approved for this project. The currently published in-water work window for this reach of the Columbia River is 1 November – 28 February. However, regulatory agencies, including the USACE, Washington Department of Fish and Wildlife (WDFW), US Fish and Wildlife Service (USFWS), and NMFS, recently suggested modifying the window to take best available science into account and to address newly listed species. The following work windows are proposed for this project, as explained further below:

- Pile installation would be conducted between 1 September and 31 January.
- Dredging would be conducted between 1 August and 31 December.
- ELJ installation would be conducted between 1 August and 31 December.
- Pile removal may be conducted year-round.
- Work conducted below the OHWM, but outside the wetted perimeter of the river (in the dry), may be conducted year-round.

These work windows are necessary to accommodate the construction schedule, while simultaneously being cognizant of avoiding biologically sensitive time periods for given activities. One of the driving considerations for timing is the need to conduct all or most berth dredging prior to pile installation. The proposed dredging window is designed to begin early enough in the season to allow pile driving activities to begin on schedule, while avoiding the bulk of the peak juvenile salmonid outmigration in the spring/summer, and the peak run timing for Pacific eulachon in the late winter/early spring. An early pile installation window will minimize the need to extend pile installation into the late winter/early spring. The project proposes to use impact-driven concrete structural piles (rather than steel), which are not known to result in injurious levels of underwater noise. For this reason, an early start to the pile installation window will not result in adverse effects to any fish or other aquatic species. Engineered log jam installation could be conducted during late summer, fall, or early winter when low Columbia River water levels could be expected for better access to the shoreline and minimized disturbance to the aquatic environment. Pile removal activities and work conducted below the OHWM, but outside the wetted perimeter of the river (i.e., in the dry), are not expected to result in significant impacts to aquatic species or resources, and these activities therefore could be conducted year-round.

Weather, timing, and available equipment as well as this timeframe will influence construction crews and methods. Pile driving is expected to be completed over approximately 80-120 days (not necessarily consecutive) during the 2016–2017 and/or 2017/2018 in-water work windows. Ordinarily, work will be conducted during standard daylight working hours, roughly 8 to 10 hours a day.

During the pile installation window (1 September – 31 January), impact pile driving activities will not be initiated, or, if initiated, will cease temporarily, if any marine mammals are present within the Level A harassment threshold (the 190 dB isopleth, also referred to as the "injury protection zone") represented in Figure B-2 (for concrete piles) and B-3 (for steel piles). Additionally, the area within the Level B harassment zone (the 160 dB isopleth during impact driving, and the 120 dB isopleth during vibratory installation), represented in figures B-2, B-3, and B-4, will be monitored for documenting and reporting any Level B takes of marine mammals.

DISCUSSION

Tables 1 and 2 show the underwater and terrestrial injury and disturbance thresholds that NMFS has established for marine mammals.

Table 1. Underwater Injury and Disturbance Threshold Decibel Levels for Marine Mammals

Criterion	Criterion Definition	Threshold*
Level A harassment	PTS (injury) conservatively based on TTS**	190 dB RMS for pinnipeds 180 dB RMS for cetaceans
Level B harassment	Behavioral disruption for impulsive noise (e.g., impact pile driving)	160 dB RMS
Level B harassment	Behavioral disruption for non-pulse noise (e.g., vibratory pile driving, drilling)	120*** dB RMS

*All decibel levels referenced to 1 micropascal (re: 1 µPa). Note all thresholds are based off root mean square (RMS) levels
** PTS=Permanent Threshold Shift; TTS=Temporary Threshold Shift
***The 120 dB threshold may be adjusted slightly if background noise levels are at or above this level.

Table 2. Terrestrial Injury and Disturbance Threshold Decibel Levels for Pinnipeds

Criterion	Criterion Definition	Threshold*
Level A harassment	PTS (injury) conservatively based on TTS**	None established
Level B harassment	Behavioral disruption for harbor seals	90 dB RMS
Level B harassment	Behavioral disruption for non-harbor seal pinnipeds	100 dB RMS

*All decibel levels referenced to 20 micropascal (re: 20 µPa). Note all thresholds are based off root mean square (RMS) levels
** PTS=Permanent Threshold Shift; TTS=Temporary Threshold Shift

Underwater Noise

Concrete Piles

The 190 dB RMS Level A harassment (injury) threshold for underwater noise for pinniped species could be exceeded at a distance of up to 4 feet (1 m) during impact driving of concrete piles. Additionally, the 160 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped species could be exceeded at a distance of up to 382 feet (117 m) during impact driving of concrete piles.

The area within 10 meters of each pile being driven would be monitored during impact driving of concrete piles according to the protocol identified in the marine mammal monitoring plan in Appendix B, and would be maintained as an injury protection zone, where impact pile driving would be shut down immediately if any marine mammals entered. This would effectively eliminate the possibility of any marine mammal being exposed to Level A harassment.

The distance to the Level B harassment threshold during impact driving of concrete piles (the 160 dB RMS isopleth) (382 feet [117 m]) would be monitored during impact pile driving according to the protocol described in the monitoring plan. This monitoring would be conducted by the same observer monitoring the Level A harassment zone. Any marine mammal present within this zone would be monitored, but impact pile driving activity would not be stopped. Any marine mammal documented within this zone during impact pile driving would constitute a Level B take, and would be recorded and reported as such.

Steel Piles

Steel piles are expected to be installed only with a vibratory hammer, and impact pile installation is not expected to be required. If any impact installation or proofing of steel piles is required, a bubble curtain would be implemented.

The 190 dB RMS Level A harassment (injury) threshold for underwater noise for pinniped species could be exceeded at a distance of up to 61 feet (18 m) during impact driving of steel piles. Additionally, the 160 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped species could be exceeded at a distance of up to 6,061 feet (1,848 m) during impact driving of steel piles. If any impact installation of steel piles is required, the area within 61 feet (18 m) of the dock would be monitored and maintained as an injury protection zone, where impact pile driving would be shut down immediately if any marine mammals entered. This would effectively eliminate the possibility of any marine mammal being exposed to Level A harassment.

During the vibratory installation of steel piles, the 120 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped species could theoretically be exceeded at a distance of over 13 miles (21,544 m), although the extent of actual sound propagation would be limited to the area identified in Figure B-4 because of the shape and configuration of the river in the vicinity.

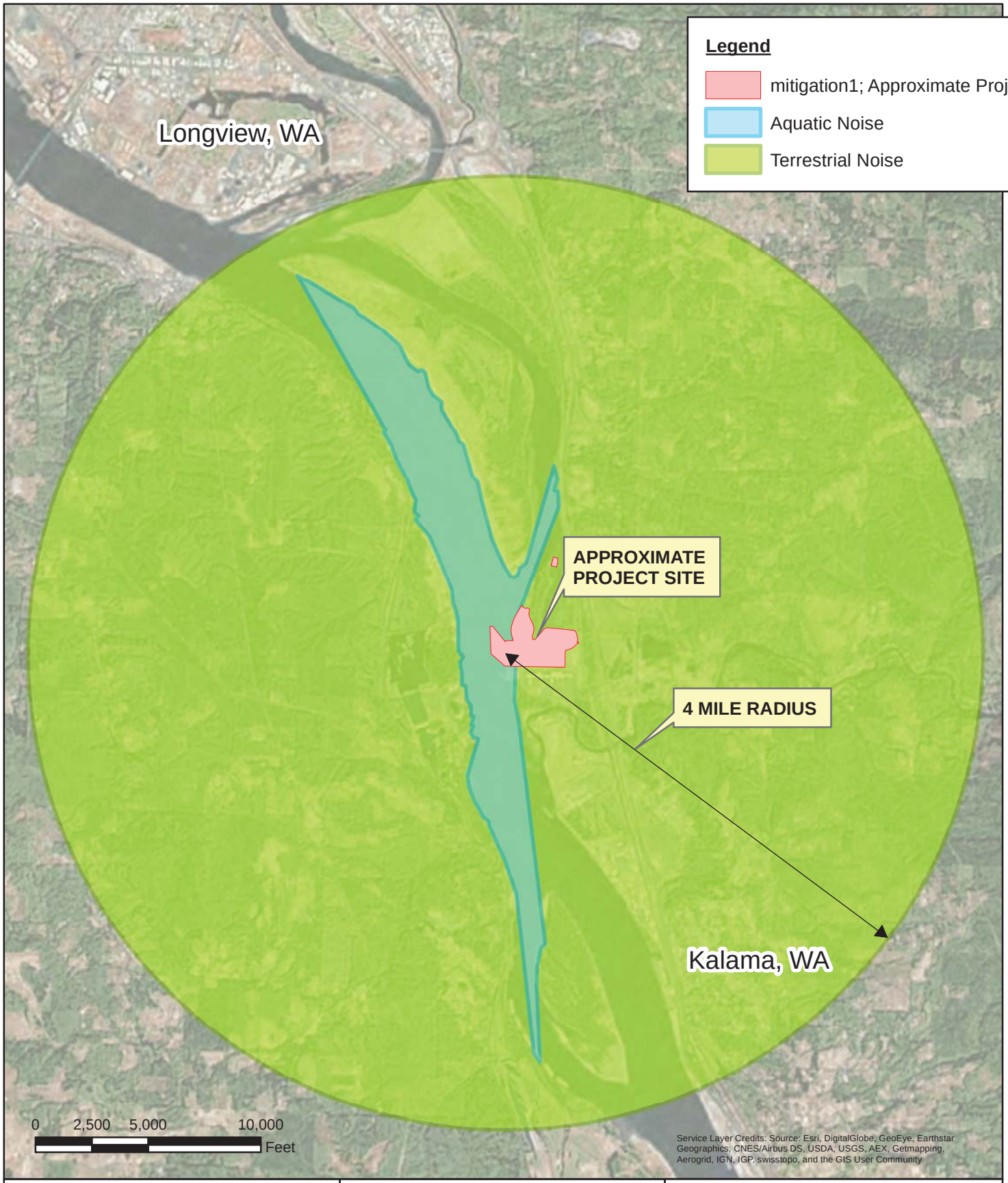
The distance to the Level B harassment threshold during vibratory driving of steel piles (120 dB RMS isopleth) (the full extent of the action area) would be monitored intermittently, according to the protocol described in the monitoring plan. Any marine mammal present within this zone would be monitored, but vibratory pile driving activity would not be stopped if marine mammals were found to be present. Any marine mammal documented within this zone during vibratory pile driving would constitute a Level B take, and would be recorded and reported as such.

Monitoring of the 120 dB isopleth will be conducted on the first two days of vibratory pile driving, and thereafter at a minimum of every third day of vibratory pile driving for purposes of estimating and reporting the number of marine mammals potentially exposed to underwater noise above the Level B harassment threshold. Monitoring during vibratory pile driving will be conducted by at least 3 observers as shown on Figure B-4.

TERRESTRIAL NOISE

The terrestrial noise analysis presented in the IHA application (BergerABAM 2014) indicates that, for harbor seals, terrestrial noise during pile driving is expected to attenuate to below the 90 dB RMS Level B threshold at a distance of approximately 317 feet (96 m) during impact driving and up to 273 feet (83 m) during vibratory pile driving. For non-harbor seal pinnipeds, terrestrial noise during pile driving is expected to attenuate to below the 100 dB RMS Level B threshold at a distance of up to 126 feet (38 m) during impact driving and up to 58 feet (17 m) during vibratory pile driving.

All of these distances in which Level B terrestrial noise levels could be exceeded are within the distances that will be monitored for underwater noise. Since no pinniped haulout sites or habitat occur within the action area, no pinnipeds are expected to haulout within the action area. As a result, any marine mammals that enter the area in which Level B terrestrial noise levels could be exceeded will be in an aquatic environment, and will be recorded as a Level B take resulting from underwater noise. No additional takes are anticipated as a result of temporarily elevated terrestrial noise levels and, as such, the terrestrial noise isopleths are not taken into account in this monitoring plan.



PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River
COUNTY OF: Cowlitz County
STATE OF: WA
APPLICATION BY: PORT OF Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, WDFW, BNSF

FIGURE B1: Action Area

Port of Kalama
Address: 110 W. Marine Dr.
Kalama, Wa. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Porject

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum

November 2015

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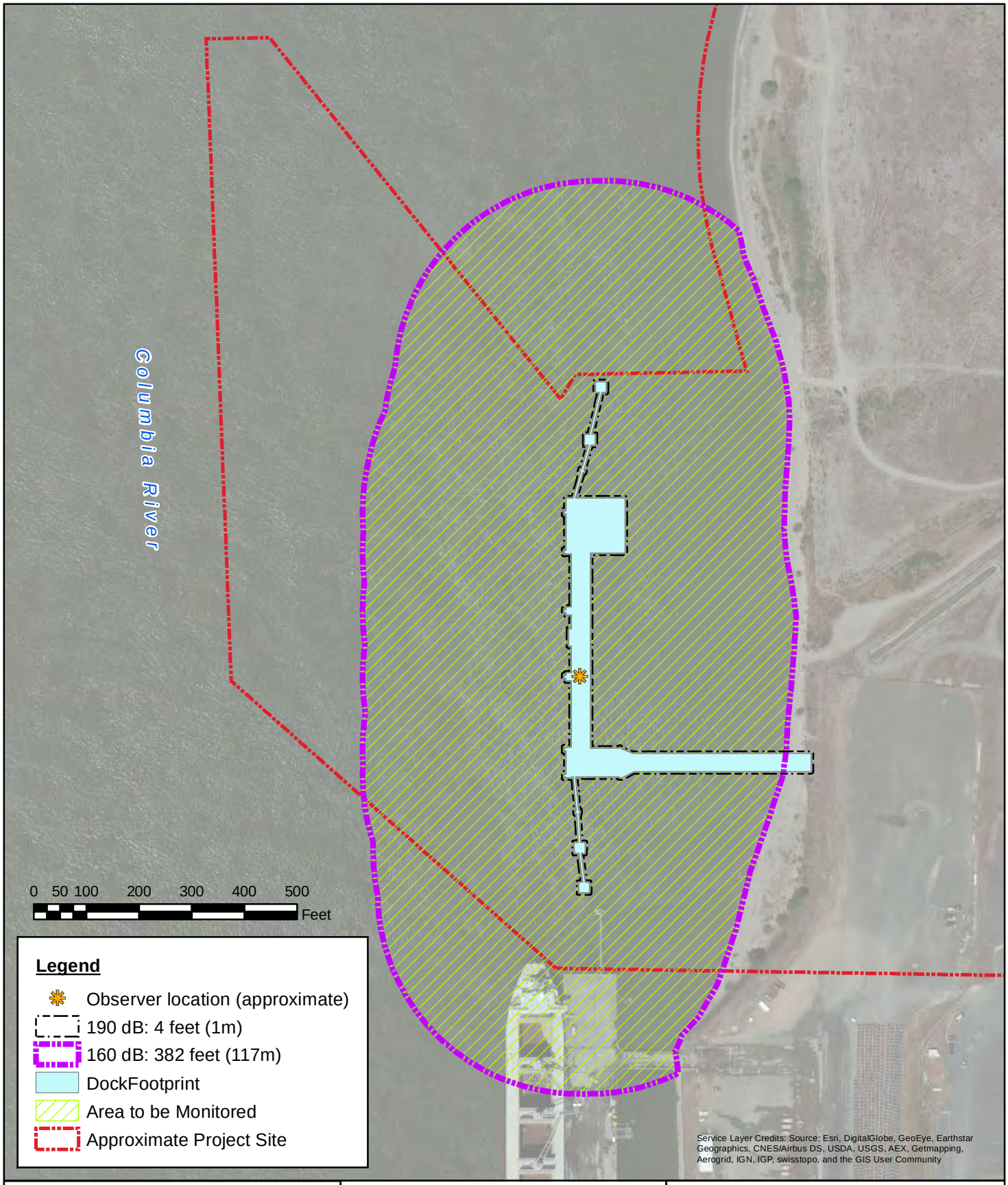
MONITORING PROTOCOL

Marine mammal monitoring during the project will consist of the following procedure.

1. Individuals meeting the minimum qualifications identified below will be present on site (on land or dock) at all times during pile driving activities conducted for the project.
2. The impact temporary effect area will be monitored by a single, land-based observer during all impact pile driving activities. This individual will be stationed in the general vicinity of the pile being driven and will have clear line of sight views of the entire area within which temporary effects can be expected (Figure B-2 for concrete piles; Figure B-3 for steel piles).
3. For the first two days of vibratory pile driving, and thereafter on every third day of vibratory pile driving, the vibratory temporary effect area will be monitored by three, land-based observers during vibratory pile driving activities. The first individual will be stationed in the general vicinity of the pile being driven and will have clear line of sight views of the entire inner harbor. A second observer would be stationed at an accessible location downstream, most likely at the northern tip of Prescott Beach County Park. This second observer would observe the northern (downstream) portion of the vibratory temporary effect area. A third observer would be stationed at an accessible location upstream, and would observe the southern (upstream) portion of the vibratory temporary effect area.
4. The individuals will scan the waters within each monitoring zone activity using binoculars (Vector 10X42 or equivalent), spotting scopes (Swarovski 20-60 zoom or equivalent)(Washington Department of Fish and Wildlife 2000), and visual observation.
5. The area within 10 meters of each concrete pile being driven (and 18 meters of each steel pile being driven)will be maintained as an injury protection zone, in which impact pile driving will be shut down immediately if any marine mammal is observed with the area.
6. The area within which the Level B harassment thresholds could be exceeded (the 160 dB RMS isopleth for impact driving, and the 120 dB RMS isopleth during vibratory driving) will also be monitored for the presence of marine mammals. Marine mammal presence within these zones, if any, will be monitored but pile driving activity will not be stopped if marine mammals were found to be present. Any marine mammal documented within the 160 dB isopleth during impact driving, or the 120 dB isopleth during vibratory driving, will constitute a Level B take, and will be recorded and used to document the number of take incidents. Monitoring during vibratory pile driving will occur during every three days of vibratory pile driving, to estimate the number of individuals present within the Level B harassment area.
7. If waters exceed a sea-state which restricts the observers' ability to make observations within the injury protection zone (the 190 dB isopleth) (e.g. excessive wind or fog), impact pile installation will cease until conditions allow the resumption of monitoring. Vibratory pile installation would continue under these conditions.
8. The waters will be scanned 15minutes prior to commencing impact pile driving activities and during all pile driving activities. If marine mammals enter or are observed within the designated Level A injury protection zone during or 15 minutes prior to impact pile driving, the monitors will notify the on-site construction manager to not begin or to cease work until the animal has moved outside the designated radius.



PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River
COUNTY OF: Cowlitz County
STATE OF: WA
APPLICATION BY: PORT OF Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, WDFW, BNSF

FIGURE B2: Impact Area of Temporary Effect (Concrete Piles)

Port of Kalama
Address: 110 W. Marine Dr.
Kalama, Wa. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum

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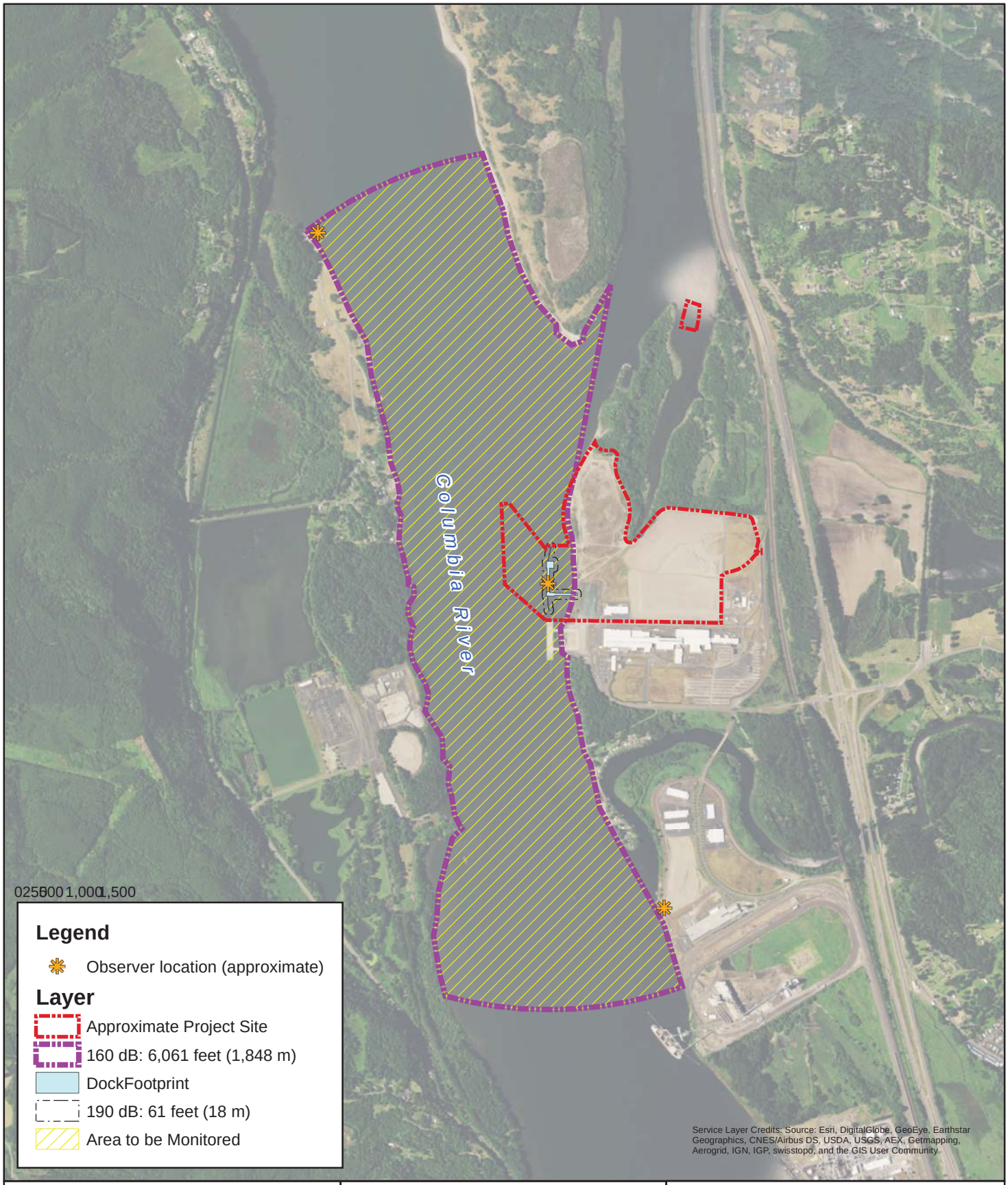

PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River
COUNTY OF: Cowlitz County
STATE OF: WA
APPLICATION BY: PORT OF Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, WDFW, BNSF

FIGURE B3: Impact Area of Temporary Effect (Steel Piles)

Port of Kalama
Address: 110 W. Marine Dr.
Kalama, Wa. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum

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November 2015

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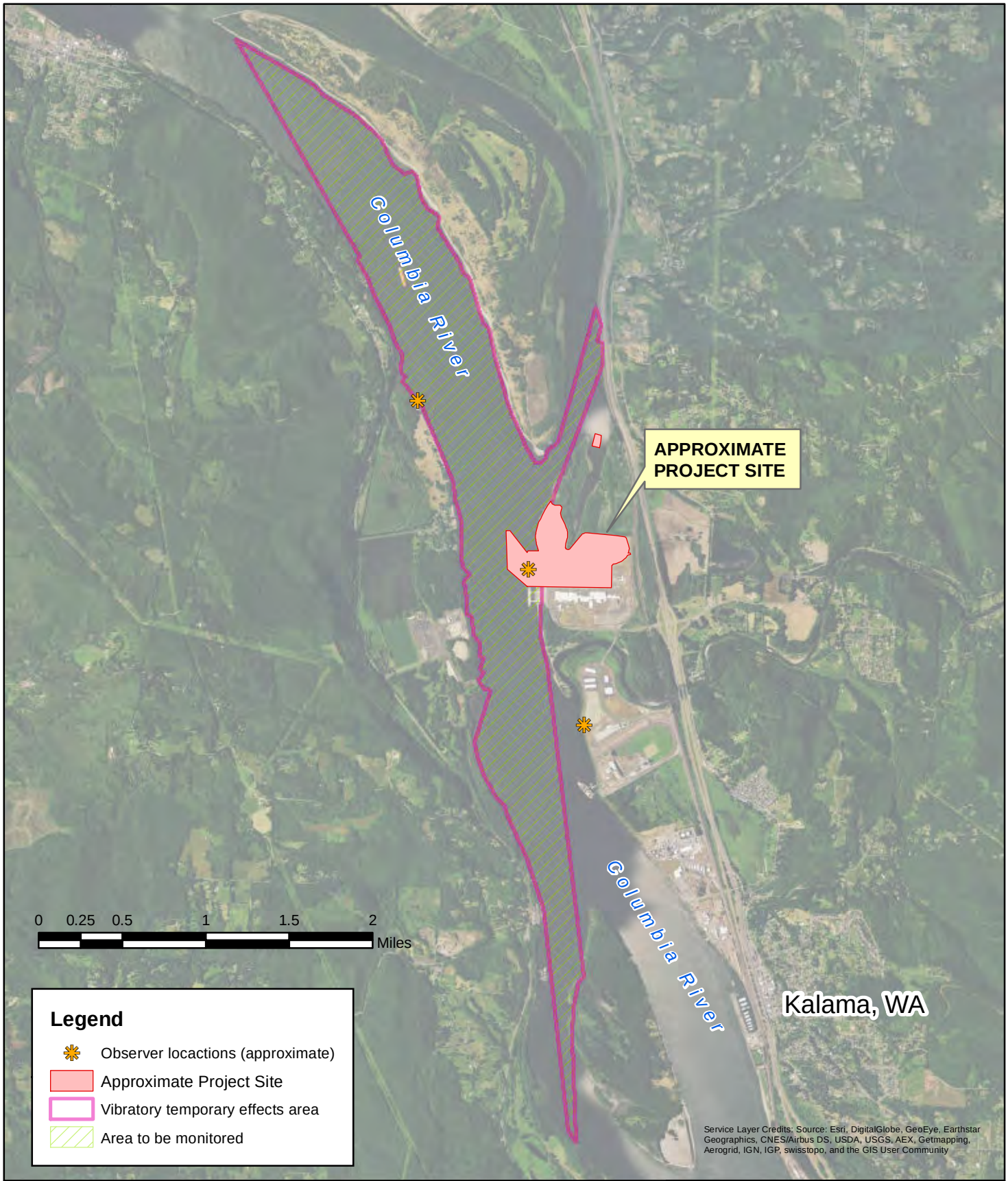

PURPOSE: Construct a facility to manufacture and export methanol

IN: Columbia River
COUNTY OF: Cowlitz County
STATE OF: WA
APPLICATION BY: PORT OF Kalama

ADJACENT PROPERTY OWNERS: Port of Kalama, WA DNR, WDFW, BNSF

FIGURE B4: Vibratory Area of Temporary Effect

Port of Kalama
Address: 110 W. Marine Dr.
Kalama, Wa. 98625

PROJECT: Kalama Manufacturing and Marine Export Facility Project

LATITUDE: 45° 02' 40"
LONGITUDE: -122° 52' 00"
DATUM: CRD Columbia River Datum

November 2015

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MINIMUM QUALIFICATIONS FOR MARINE MAMMAL OBSERVERS

1. Visual acuity in both eyes (correction is permissible) sufficient for discernment of moving targets at the water's surface with the ability to estimate target size and distance. Use of binoculars may be necessary to correctly identify the target.
2. Experience and ability to conduct field observations and collect data according to assigned protocols (this may include academic experience).
3. Experience or training in the field identification of the marine mammals that could potentially be encountered.
4. Sufficient training, orientation, or experience with the construction operation to provide for personal safety during observations.
5. Writing skills sufficient to prepare a report of observations that will include such information as the number and types of marine mammals observed; the behavior of marine mammals in the project area during construction; the dates and times when observations were conducted; the dates and times when in-water construction activities were conducted; the dates and times when marine mammals were present at or within the defined disturbance zone; the dates and times when in-water construction activities were suspended to avoid incidental harassment by disturbance from construction noise; etc.
6. Ability to communicate orally, by radio or in person, with project personnel to provide real time information on marine mammals observed in the area.

REFERENCES

BergerABAM. 2014. Request For An Incidental Harassment Authorization Under the Marine Mammal Protection Act – Port of Kalama - Kalama Manufacturing and Marine Export Facility. April 2015.

Washington Department of Fish and Wildlife. 2000. Final Report. Monitoring Incidental Harassment of Harbor Seals (Phoca vitulina richardsi) at Gertrude Island during the McNeil Island Corrections Center Still Harbor Dock Renovation Project. 1 December 1998 to 15 August 1999. Dyanna Lambourn and Steven Jeffries. Washington Department of Fish and Wildlife Marine Mammal Investigations. Tacoma, WA. January 10, 2000.