PORT OF VANCOUVER, USA
TERMINAL 5 BULK POTASH HANDLING FACILITY
REQUEST FOR AN INCIDENTAL HARASSMENT AUTHORIZATION UNDER THE MARINE MAMMAL PROTECTION ACT

May 2011

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1.0 SUMMARY OF THE REQUEST

This report was prepared for the Port of Vancouver USA (Port) and BHP Billiton Canada Inc. (BHP Billiton) for development of the Terminal 5 Bulk Potash Handling Facility (proposed project) to be constructed and operated by BHP Billiton Canada Inc. or an affiliate of the BHP Billiton Group.

The Port requests that the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) issue an incidental harassment authorization (IHA) for incidental take (in the form of Level B harassment) of Steller sea lion, California sea lion, and harbor seal during pile driving activities conducted during the construction of the Terminal 5 Bulk Potash Handling Facility in the Columbia River in Vancouver, Washington.[1]

BHP Billiton is proposing to lease part of Terminal 5 located at the Port for the purpose of establishing a bulk handling export facility to allow shipping of approximately 8 million tonnes per annum (Mtpa) of potash to global markets. The facility will accept potash shipped by rail from potash mines located in Saskatchewan, Canada. On-site infrastructure is proposed to enable the unloading of rail cars into on-site storage, and the conveyance of potash to vessels at a new berth to be constructed on the Columbia River adjacent to the facility. The on-site infrastructure will include dedicated rail facilities for BHP Billiton and the construction and installation of materials handling equipment, storage structures, utilities, and internal access roads on the site, a marine berth with ship loaders and other related ancillary infrastructure.

Construction of the project will require pile installation below the ordinary high water mark (OHWM) of the Columbia River, which has the potential to result in effects to marine mammals. The potential impacts of the proposed project on marine mammals include noise, water quality, and direct habitat effects associated with construction of the marine structures. Of these potential effects, temporarily elevated noise from vibratory and impact pile driving is the only impact that could result in take. The potential for the project to affect marine mammals in the Exclusive Economic Zone (EEZ) was also evaluated, but the analysis showed that the project would not result in a measurable increase in the number of marine mammal ship strikes within the EEZ.

Three marine mammal species, subspecies, or distinct population segments (DPSs) have known distribution ranges that include the portion of the Columbia River in which

[1] Section 101(a)(5) (A-D) of the MMPA, as amended (16 U.S.C 1371 (a)(50).

construction activities will occur. These are Steller sea lion (*Eumatopius jubatus*), California sea lion (*Zalophus californianus*), and harbor seal (*Phoca vitulina* ssp. *richardsi*).

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 expected to occur as a result of the proposed action, as a marine mammal monitoring plan will be implemented to effectively minimize the possibility of any marine mammals being exposed to terrestrial or underwater noise levels above the injury threshold established by NMFS.

This request has three appendices: Appendix A contains the figures, Appendix B provides a selection of site photographs, and Appendix C contains the marine mammal monitoring plan.

2.0 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.[2]

The Terminal 5 Bulk Potash Handling Facility project will require work in waters that support marine mammal species. The federal Marine Mammal Protection Act (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 IHA provided an activity will have negligible impacts to marine mammals and will not adversely affect subsistence uses of marine mammals.

The project timing, duration, and activities have been analyzed for their potential to result in incidental taking of marine mammals protected under the MMPA. The analysis determined that the only project component that has the potential to result in take is temporarily elevated underwater noise during the impact and vibratory pile driving associated with the construction of the shiploaders, marine berthing facilities, and stormwater outfall. These activities have the potential to result in Level B harassment (behavioral disruption) only, as a monitoring plan will be implemented to effectively minimize the possibility of marine mammals being exposed to Level A harassment (harassment resulting in injury or direct mortality).

The project requests an IHA for incidental take due to potential Level B harassment of three marine mammal species that may occur in the project vicinity: Steller sea lion,

[2] The italicized material throughout this document discusses what should be included in an IHA request and is drawn from the NOAA Fisheries website, http://www.nmfs.noaa.gov/pr/permits/incidental.htmhttp://www.nmfs.noaa.gov/pr/permits/incidental.htm.

California sea lion, and harbor seal. Although only the pile driving activities associated with the shiploaders, marine berthing facilities, and outfall have the potential to result in Level B take, a summary of the entire project is provided here for completeness.

The proposed project will consist of the following elements:

- Relocating an existing track (4000) and constructing an additional loop track (4102)
- The construction of:
    - A railcar dumper building,
    - A potash storage building,
    - An administration and maintenance building,
    - A potential fuel station,
    - Conveyors, potash transfer towers, and other transfer facilities,
    - A surge bin tower,
    - Shiploaders and marine berthing facilities,
    - On land access ways,
    - New (or upgrading of) utilities, including stormwater, water, sanitary sewer, electrical, telecommunications, and natural gas
- The relocation of other utilities where conflicts occur with proposed construction activities
- Site grading activities including possible pre-load material
- The potential installation of a temporary batch plant during construction
- Temporary construction trailers
- Mitigation actions

Additional information regarding the specific project elements with the potential for an incidental taking of marine mammals included in section 7.2. Table 1 provides a summary of the pile installation activities proposed to occur during November 1, 2012–February 28, 2013.

Table 1. Summary of Pile Installation Activities

Activity	Number of Piles (maximum)	Location
Install permanent piles for ship loader and berth.	100, 36- to 40 in (914- to 1,016mm) steel pipe piles	Port of Vancouver Terminal 5, Columbia River Mile 103.3
Install and remove temporary piles during construction of ship loader and berth.	95, 18- to 24-in (457- to 610-mm) steel pipe piles	Port of Vancouver Terminal 5, Columbia River Mile 103.3
Install permanent piles for stormwater outfall	8, 16-in steel H-piles	Port of Vancouver Terminal 5, Columbia River Mile 103.3

3.0 PROJECT PURPOSE AND NEED

The purpose of the proposed project is to construct a facility designed to receive and store bulk quantities of potash and then ship it to various international destination ports. In order to accomplish the receipt, storage, and transfer of potash, the proposed project will involve the construction and installation of materials handling equipment, structures, utilities, and roads on the site

The potash mining projects in Saskatchewan are being developed to meet the demand for potash in emerging markets such as China, India, and Southeast Asia where economic growth is driving increased agricultural production. The proposed Port project is needed to support those mines and the project, and the proposed project site provides the best combination of infrastructure and facilities to serve these intended markets.

3.1 Project Setting and Land Use

The proposed project is located at 5701 NW Lower River Road in Vancouver, Washington. The proposed project site is located approximately 3 miles (4.8 km) northwest of downtown Vancouver, Washington, and is composed of submerged, tidal, nearshore, and upland lands (Figure 1).

The site is located along a 2,300-foot (ft) (701-meter [m]) long section of shoreline owned by the Port on the north bank of the Columbia River across from Hayden Island centered approximately at river mile (RM) 103.3. The site is a heavy industrial site, which had been used since the 1940s for aluminum smelting as well as for the fabrication and outdoor storage of aluminum ingots. The sediment adjacent to the project site was remediated in 2009 as part of the Alcoa Sediment Remediation project under the oversight of the Washington State Department of Ecology (Ecology) and the provisions of the Washington State Sediment Management Standards and Model Toxics Control Act. Polychlorinated biphenyl (PCB) exceedances of project-specific cleanup standards were addressed during the remediation through dredging. The sediment adjacent to the project site achieved a clean closure designation from Ecology as a result of a successful remediation (Ecology 2010). The site is presently used for storage of large windmill components.

Uses surrounding the Terminal 5 site are primarily industrial. The following uses border the site: the Clark Public Utilities (CPU) River Road Generating Plant is approximately 100 ft (30.5 m) to the northeast, the Tidewater Barge Company is approximately 100 ft (30.5 m) to the west, and the Clark County Correctional Facility is approximately 600 ft (183 m) to the east. The portions of Terminal 5 not encompassed by the proposed project are presently used for outdoor storage of wind turbine towers. The site is bordered to the south by the Columbia River and to the east by the Port's Terminal 4 property, which is predominantly used for staging and distributing Subaru vehicles and cargo storage (Figure 2).

This reach of the Columbia River is approximately 3,000 ft (914 m) wide on average, and is surrounded by industrial areas (Figures 2-3). Most of the marine portion of the project is located on submerged and tidal lands. The Port has a Port Management Agreement with the Washington State Department of Natural Resources (DNR) for the submerged aquatic lands. A portion of the project will occur within designated shorelines of the state of Washington, as regulated by local governments under the Shoreline Management Act (SMA). All of the shoreline is within the jurisdiction of the City of Vancouver (City). Under the City's Shoreline Management Master Program, the designation for this area is Urban High Intensity, and the area is zoned as Heavy Industrial.

3.2 Specific Project Activities

The proposed action consists of both upland and marine components (Figures 4-8). As stated in section 7.2, the analysis provided in this document has determined that the only project component that has the potential to result in take is temporarily elevated underwater noise during impact and vibratory pile driving. These activities have the potential to result in Level B harassment (behavioral disruption) only, as a monitoring plan will be implemented to effectively minimize marine mammal exposure to Level A harassment (harassment resulting in injury or direct mortality). The rest of the in-water and over-water components of the project are provided here for completeness.

All permanent piles proposed for in-water work will consist of 36- to 40 in (914- to 1,016 mm) diameter steel pipes for the shiploader and berth and steel H-piles for the stormwater outfall. Approximately 108 permanent and 94 temporary piles will be installed during the approved in-water work window, which is anticipated to be between November 1, 2012 and February 28, 2013. Installation will occur through both vibratory and impact methods as described in section 3.3.

3.2.1 Shiploading System

The shiploading system will be designed to serve the facility at full build out (final capacity of approximately 8 million tonnes per annum [Mtpa]), and to accommodate vessels capable of navigating the Columbia River shipping channel, ranging in size from 20,000 deadweight tonnage (DWT) to 60,000 DWT. Potash will be transported to a dual-quadrant shiploader system (Figures 4 and 6) on a fully enclosed belt conveyor system, in order to prevent the ingress of moisture and foreign objects and to minimize fugitive dust emissions. The berth structures for the dual-quadrant shiploading system will consist of two shiploader quadrant beams and pivot supports, complete with access roadway, the central maintenance access platform, four berthing dolphins, two mooring dolphins, and interconnecting catwalks. Shiploaders will be designed to minimize the length of belt exposed to the environment and will be equipped with soft loading, cascade-style chutes to minimize dust generation. The shiploader pivot supports will be sized to accommodate the shiploader feed conveyor transfer and the electrical substation for the wharf facilities.

The deck structure will be constructed of reinforced concrete pile caps, precast box beams, and composite concrete topping. Reinforced concrete up-stands will support the pivot loads for the quadrant loaders. The quadrant beams will consist of short-length concrete box beams with extended flanges for walkways on both sides of the crane rail. The berthing dolphins are piled structures with concrete pile caps, and will be equipped with fender systems and mooring bollards for ship mooring lines. The mooring dolphins are also piled structures with concrete pile caps, and will be placed beyond the berthing dolphins to accommodate bow and stern mooring lines.

The shiploader feed conveyors will be self-supporting spans, using steel trusses, and will be supported on piled bents and cast-in-place reinforced concrete pile caps.

The types and numbers of piles for each project element are discussed below.

3.2.1.1 Quadrant Beams and Pivot Supports

The dual quadrant shiploaders will be supported by pivot pile caps at the shoreline and by pile-supported quadrant beams at the berth. Each pivot pile cap will be cast-in-place concrete and will be topped by a concrete pivot bearing upstand that supports the end of the shiploader.

Two pile-supported quadrant beams will support the crane rail, allowing the shiploader truck assemblies to travel along an arc to load the multiple holds on the vessels (Figure 4). Each of the quadrant beams will consist of cast-in-place concrete pile caps. Nine pre-cast concrete box girders will rest on the pile cap to support the crane rail and provide a maintenance walkway.

A total of 36, 36- to 40-in (914- to 1,016-mm) diameter steel piles will be installed between November 1, 2012 and February 28, 2013 for this element.

3.2.1.2 Mooring and Berthing Dolphins and Platform

For vessel mooring, four breasting dolphins, and one center platform (for mooring and vessel access) will be constructed. Each of the breasting dolphins and the center platform will include two cone rubber fenders and steel fender panels attached one above the other to a precast concrete panel (Figures 4-5). This positioning will allow the berth to operate at a variety of river levels. Each breasting dolphin will consist of five 36- to 40-in (914- to 1,016-mm) diameter steel batter piles and one 36-in (914 mm) diameter steel plumb pile supporting a cast-in-place concrete pile cap.

The center platform will be connected to the inner two breasting dolphins by an 8-ft (2.4 m) wide walkway constructed of precast concrete box beams. The two outer and two inner breasting dolphins will be connected by a 6-ft 6¾-in (2 m) steel grated walkway approximately 70 ft (21.3 m) in length. The center platform will consist of six 36- to 40-in (914- to 1,016-mm) diameter steel plumb piles supporting a cast-in-place concrete pile cap.

Two mooring dolphins will be constructed upstream of the shiploader to provide anchoring points for bow or stern lines. Each mooring dolphin will consist of four 36- to 40-in (914- to 1,016-mm) diameter steel batter piles supporting a cast-in-place concrete pile cap. Access to the mooring dolphins will be provided from the shiploader quadrant beams by 6-ft-6¾-in (2 m) wide steel grated walkways. Downstream anchor points will be provided by newly installed mooring points on the existing dock. Up to four additional anchoring piles consisting of 36- to 40- in (914- to 1,016-mm) steel pipe piles will be installed to transfer the mooring loads to the shoreline.

A total of 42, 36- to 40-in (914- to 1,016-mm) diameter steel piles will be installed between November 1, 2012 and February 28, 2013 for this element.

3.2.1.3 Access Trestles

To provide vehicle and equipment access to the center platform and the shiploaders, two access trestles will be provided that converge at a central support dolphin with a single trestle extending to the center platform to provide access to the vessel (Figure 4). The two trestle legs are necessary to provide maintenance access to the shiploaders. When maintenance is necessary, the shiploaders will be moved to the most inward position parallel to the access trestle legs. Service vehicles and cranes will be located on the trestle to service the equipment. The maintenance roadway will accommodate a 44-ton (40-metric tonne) mobile crane.

The trestle will be 24 ft (7.3 m) wide and constructed of pre-cast concrete box beams supported on steel pipe piles with steel bull rail. Each initial leg will be supported on land by a pile-supported abutment located above the OHWM. Each trestle leg will be supported by two 36- to 40-in (914- to 1,016-mm) diameter steel pipe piles. The central trestle will be supported by the central support dolphin and the center berthing dolphin.

A total of 10, 36- to 40-in (914- to 1,016-mm) diameter steel piles will be installed between November 1, 2012 and February 28, 2013 for this element.

3.2.2 Stormwater Outfall

The stormwater management design for the project requires an upgrade to the existing stormwater outfall on the site. Due to the need for increased capacity for the entire redeveloped Terminal 5 the project will also include the installation of a larger stormwater outfall. The existing stormwater outfall will be upsized to a 48- to 60-in (1219-1524 mm) diameter pipe (Figure 8). The new outfall will replace the existing outfall but will be located downstream from the existing outfall. The existing outfall will be removed and decommissioned once the new outfall is operational.

The outfall pipe will be supported on a pile and beam system. With this system, a pair of H-piles would be driven at each joint in the run of an unburied (supported) storm drain pipe. The piling would be driven to adequate depth to achieve fixity and a steel beam would be bolted across the two piles. The storm drain pipe would bear on these beams and would be held in place with a saddle and/or strap structurally connected to the

beam. This technique requires little earthwork or disturbance to the river bottom, but it does entail pile installation in the river. These piles can be embedded using vibratory equipment without proofing with an impact hammer. Areas disturbed by the outfall construction will be restored by either replacing the riprap or planting/seeding the exposed earth. Appurtenant structures, such as manholes, will be required to provide permanent access.

A total of 8, 16-in steel H-piles will be installed between November 1, 2012 and February 28, 2013 for this element.

3.3 Construction Methods

The in-water and overwater construction methods for the various components of the marine structures (i.e., shiploaders and support structures, mooring and berthing dolphins and platform, and access trestles) include pile installation and removal as well as over-water work to install the marine structures. These activities are described in the following sections.

Pile removal and pile installation activities will occur below the OHWM of the Columbia River. Piles will be removed by vibratory extraction or by pulling them directly with a crane mounted on a barge. If a pile breaks above or below the mudline, it will be cut with a pneumatic underwater chainsaw or pushed in to the sediment consistent with agency-approved BMPs. Piles will be installed with a combination of impact and vibratory driving.

The project requires the installation of approximately 116, 36-to 40-in (914- to 1,016-mm) steel piles (102 planned and 14 contingency). Of these, approximately 100 will be located below the OHWM of the Columbia River. The diameter of the piles is based on critical design considerations, including soil liquefaction and associated lateral spreading, which were evaluated for pile structural stability. Due to the potential for seismically induced lateral spreading, a very high pile structural capacity is required. To achieve the required structural capacity, a 36- to 40-in (914- to 1,016-mm) diameter steel pile is necessary. Piles will be open-ended, and in order to achieve sufficient structural capacity it may be necessary to excavate the material from the inside of the pile casing once installed, and fill the excavated pile casing with concrete. If this is necessary, the installed piles would be excavated with an auger or similar method, using appropriate BMPs to capture all excavated material. Concrete would be installed via the tremie method, to minimize the possibility of any concrete coming into contact with the water.

The in-water piles will be installed by a crane located on a derrick barge with piles and materials stored on a work barge; a tugboat will also be required. Shoreline piles are expected to be installed from shore by land-based equipment.

To the greatest extent possible, piles will be driven using a vibratory hammer. Piles will be driven to refusal with the vibratory hammer, and then to final tip elevations with an

impact hammer. Temporary piles are expected to be used to support the guides that will position and align the permanent piles and for the concrete formwork. Three or four piles are expected to be installed during construction in up to 23 different locations to total approximately 95 temporary piles. These temporary piles will be 18- to 24-in (457 to 610 mm) diameter open-ended steel pipe and will be driven solely with a vibratory hammer.

3.3.1.1 Vibratory Driving

The vibratory hammer method is a common technique used to drive piles where the type of sediment allows it. This process begins by placing a choker around the pile and lifting it into vertical position with the crane. The pile is then lowered into position and set in place at the mudline. The pile is held steady while the vibratory hammer drives it to the required tip elevation. For this project, it is expected that the vibratory hammer will be used to drive all of the permanent structural piles to the extent practicable as well as all of the approximately 95 temporary piles.

3.3.1.2 Impact Driving

Following vibratory driving to refusal (the point at which the pile will no longer advance with the vibratory hammer), the project will use an impact hammer to drive piles to their final tip elevations. An impact hammer will also be needed to "proof" a portion of the structural piles. Proofing is the process of striking piles with an impact hammer to verify their load-bearing capacity.

An impact hammer is a large steel device that works with a hydraulic or diesel piston. Impact hammers have guides (called a lead) that hold the hammer in alignment with the pile while the heavy piston moves up and down, striking the top of the pile and driving it into the substrate from the downward force of the hammer on the top of the pile. Where the impact hammer is used, a bubble curtain or other similar noise attenuation method (such as sound attenuation pile caps, increased hammer size, etc.) will be employed.

4.0 DATES, DURATION, AND REGION OF ACTIVITY

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

4.1 Dates and Duration

It is anticipated that pile installation activities will begin November 1, 2012. Pile installation will be restricted to the in-water work window for the project. The current WDFW-recommended work window for this area is November 1–February 28 annually. If pile installation cannot be completed within a single in-water work window an additional IHA request will be made for subsequent activities.

During this time period 1 to 2 piles will be installed per day. The exact duration of the pile installation activity occurring each day will vary depending on the installation

procedures and geotechnical conditions encountered. It is estimated that each pile will require between 2 and 3 hours of vibratory installation and between 1 and 2 hours of impact driving to install.

4.2 Region of Activity

The proposed project will occur at the Port's Terminal 5, which is located at 5701 NW Lower River Road in Vancouver, Washington at approximately Columbia RM 103.3.

The project will occur within the NE and NW quarters of Section 19, T2N R1E Willamette Meridian (WM); in the SE and SW quarters of Section 18, T2N R1E W.M.; the SE quarter of Section 13, T2N R1W W.M.; the SE quarter of Section 31 T3N R1E W.M.; the NE quarter of Section 28 T2N R1E W.M; and the SE and SW quarters of Section 12 T2N R1W W.M.

The "action area" (as defined in the biological evaluation [BE]; Anchor QEA 2011), is the extent of the detectable effects that could occur as a result of the project, and is defined for this project by the extent of temporarily elevated underwater noise that could occur during pile driving (Figure 9).

5.0 AFFECTED SPECIES AND NUMBERS IN THE AREA

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

As stated, three marine mammal species, subspecies, or DPSs have known distribution ranges that include the portion of the Columbia River in which construction activities will occur (Table 2). Table 2 lists the marine mammal species addressed in this IHA request.

Table 2. Marine Mammal Species Addressed in this IHA Request

Species Name		Listing Status*	Critical Habitat	Run Timing
Common Name	Scientific Name			
Harbor Seal	(*Phoca vitulina* ssp. *richardsi*)	Not listed	None	January–May
California Sea Lion	(*Zalophus californianus*)	Not listed	None	January–May
Eastern DPS Steller Sea Lion	(*Eumatopius jubatus*)	Threatened	Designated	January–May

* Under the Endangered Species Act (ESA)

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 migration corridor to and from Bonneville Dam. The Corps has monitored pinniped presence and salmonid predation at Bonneville Dam (RM 146) since 2002, and its recently published evaluation of pinniped predation in the Bonneville Dam tailrace (Stansell et al. 2010) is the primary source of data regarding pinniped presence, numbers, and run timing within the action area. Supporting evidence comes from Oregon Department of Fish and Wildlife (ODFW) marine mammal biologists (pers. comm., Bryan Wright, October 20, 2010). In its 2000 Atlas of Seal and Sea Lion Haulout Sites in Washington (Jeffries et al. 2000), WDFW did

not identify any significant haulout sites upstream of the Cowlitz River on the Columbia River, so the numbers recorded at the dam are presumed to be a close approximation of the numbers of individuals that may be present within the action area.

Pinniped species with known distribution within the action area are harbor seal, California sea lion, and Steller sea lion. The Corps reports that in 2010, a minimum estimated total of 166 pinnipeds were recorded at Bonneville Dam, consisting of 89 California sea lions and 75 Steller sea lions. The remaining two individuals presumably were harbor seals (Stansell et al. 2010).

5.1 Steller Sea Lion

Since 2002 when record-keeping began, Steller sea lions have been sighted rarely 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 and, in 2010, 75 individuals were documented. No Steller sea lion haulouts or haulout habitat are documented within the action area, so any individuals present during construction or operation of the facility will be moving quickly through the action area.

5.2 California Sea Lion

California sea lions have historically been the most frequently observed pinniped species at Bonneville Dam (Stansell et al. 2010). In 2010, 89 individuals were identified, a slight increase from the 54 recorded in 2009. The largest number (104) of California sea lions was recorded in 2003. There are no California sea lion haulouts within the action area, so any individuals present during construction or operation will likely be moving quickly through the action area.

5.3 Harbor Seal

Harbor seals are documented only infrequently as far upstream in the Columbia River as Vancouver. The nearest documented haulout is near Wallace Island, near RM 43, which is approximately 60 miles (97 km) downstream of the proposed action area (pers. comm., Bryan Wright, October 20, 2010). In each year since 2002, the Corps has documented no more than three harbor seals at Bonneville Dam, and in some years, only one or two individuals are identified. The individual harbor seals that may be present within the action area will likely be moving rapidly through on their way to or from Bonneville Dam.

6.0 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.

6.1 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 DPSs 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 (NMFS 2008a). The Steller sea lion stock that migrates in the Columbia River is part of the Eastern DPS. The species is 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 (NMFS 2008a). Habitat requirements include islands or isolated shoreline areas for breeding and undisturbed water for feeding.

The eastern DPS of Steller sea lions is listed as threatened under the ESA, and is therefore designated as "depleted" under the MMPA. As a result, this stock is classified as a strategic stock. The eastern stock of Steller sea lion has been proposed as a candidate for removal from listing under the ESA by the Steller sea lion recovery team and NMFS (NMFS 2008a), based on its annual rate of increase of approximately 3% since the mid-1970s. Although the stock size has increased, its status relative to its optimum sustainable population (OSP) level is unknown. The overall annual rate of increase of 3.1% throughout most of the range of the eastern DPS stock has been consistent and long term, and may indicate that this stock is reaching OSP size (NMFS 2008a, Pitcher et al. 2007).

6.2 California Sea Lion

California sea lions on the West Coast of the US 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: 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 (NMFS 2007b).

California sea lions in the US are not listed as "endangered" or "threatened" under the ESA or as "depleted" under the MMPA. Although current total human-caused mortality is unknown (due to a lack of data from the California set gillnet fishery that historically has been the largest source of human-caused mortalities), California sea lions are not considered a "strategic" stock under the MMPA because (based on historical takes in the set gillnet fishery and current levels of fishing effort) total human-caused mortality is still likely to be fewer than the potential biological removal (PBR) of 8,511 individuals (NMFS 2007b).

6.3 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.

According to the most recent status report published by NMFS (NMFS 2007a), harbor seals are not considered to be "depleted" under the MMPA nor are they listed as "threatened" or "endangered" under the ESA. Based on currently available data, the level of human-caused mortality and serious injury is not known to exceed the PBR level of 1,343 harbor seals per year. Therefore, the Oregon/Washington Coast stock is not classified as a "strategic" stock, and is within its OSP level (NMFS 2007a, Jeffries et al. 2000, Brown et al. 2005).

7.0 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….*[3]

7.1 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 installation operations associated with the construction of the proposed project from November 2012 to November 2013. The project requests an IHA for incidental take of marine mammals described within this application for 1 year. It is anticipated that the Port will request an additional IHA until the pile installation is completed, anticipated to be in 2014. 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 or death, which would require an LOA.

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

7.2 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 expected 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 (Appendix C) will effectively minimize exposure 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 Level B take.

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 slightly adjusted 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 micropascal (re: 20 µPa). Note all thresholds are based on RMS levels.
** PTS=Permanent Threshold Shift; TTS=Temporary Threshold Shift

7.2.1 Underwater Noise

Underwater noise will be generated during proposed installation of steel piles associated with the shiploader and marine berth and the outfall. Table 5 indicates the maximum sound levels generated during the installation of steel piles.

Table 5. Maximum Sound Levels for Impact Driving and Vibratory Installation of Unattenuated Steel Piles.

Pile Diameter	Sound Level (Single Strike)			Sound Level (Vibratory Installation
36 to 40 inches (914 to 1,016 mm) - Unattenuated	208 dB Peak	195 dB RMS	180 dB SEL	174 dB RMS

Source: Anchor QEA 2011

Based on the results of the noise attenuation analysis, it has been determined that the 190 dB RMS Level A harassment (injury) threshold for underwater noise for pinniped

species could be exceeded at a distance of up to 70 ft (21 m) during impact pile driving. 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 1.3 miles (2 km) during impact pile driving. During vibratory pile driving, the 120 dB RMS Level B harassment (behavioral disruption) for underwater noise for pinniped species could be exceeded at a distance of approximately 7 miles (11 km), as identified in Figure 9, which considers the extent of actual sound propagation based on the shape and configuration of the river in the vicinity.

The distance to the underwater Level A harassment threshold for pinnipeds (the 190 dB isopleth) (70 ft [21 m]) will be monitored during impact pile driving according to the protocol described in the project's marine mammal monitoring plan (Appendix C). 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 mammal enters. This will reduce the possibility of any marine mammal being exposed to Level A harassment.

The distances to the Level B harassment thresholds for impact driving (the 160 dB RMS isopleth) (1.3 miles [2 km]) and vibratory driving (120 dB RMS isopleth) (the full extent of the action area) also will be monitored according to the monitoring plan (Appendix C). Marine mammal presence within these Level B harassment zones, if any, will be monitored, but pile driving activity will not be stopped if marine mammals are found to be present. Any marine mammal documented within the Level B harassment zones (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 reported as such.

7.2.2 Terrestrial Noise

While there are no documented marine mammal haulout areas in the project 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 dB peak (WSDOT 2010). Vibratory pile drivers produce terrestrial noise levels of approximately 101 dB peak (WSDOT 2010). The Level B harassment threshold for harbor seals is 90 dB RMS and for non-harbor seal pinnipeds is 100 dB RMS A terrestrial noise attenuation analysis was performed using the practical spreading loss (PSL) model (WSDOT 2010). The results of the analysis indicated that the 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.

8.0 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.

8.1 Steller Sea Lion

Steller sea lion do not breed or birth anywhere within the Columbia River system. The eastern stock of Steller sea lions breeds on rookeries located in southeast Alaska, British Columbia, Oregon, and California; there are no rookeries located in Washington (NMFS 2008a). 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 non-breeding adult males and females traveling to and from Bonneville Dam.

As discussed above, Steller sea lions have historically been sighted only rarely 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 fewer than 12.6 individuals per day (between January 1 and May 31). While no specific data exists regarding the number of trips up and down river each sea lion makes, it is assumed that, on average, each individual sea lion makes one round trip during the spring migration.

For a conservative assessment, it has been estimated that up to 75 Steller sea lions may pass through the action area during the migration to and from Bonneville Dam each season, for a total of up to 150 individual trips through the action area (one upstream and one downstream). Since all pile installation will occur within the in-water work window (November 1–February 28), the peak of the run in April and May will be avoided. Steller sea lion presence at the dam in January and February 2010 represented (conservatively) less than a third of the total run for the year. Using these numbers, it has been estimated that no more than one third of the total run of Steller sea lions (approximately 25 individuals) could be exposed to Level B harassment. Since each individual potentially could be exposed on both the upstream and return trips, this could represent up to 50 individual takes of Steller sea lion, but the actual number of anticipated takes is likely to be significantly less.

8.2 California Sea Lion

As with Steller sea lions, California sea lions do not breed or birth anywhere in the Columbia River system and their nearest documented breeding ground is on the islands off the coast of southern California (NMFS 2007b). 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 non-breeding adult males and females traveling to and from Bonneville Dam.

As discussed above, California sea lions have historically been the most frequently observed pinniped species at Bonneville Dam (Stansell et al. 2010). In 2010, 89 California sea lions were identified, at an average rate of fewer than 10 individuals per day (between January 1 and May 31). While no specific data exists regarding the number of trips up and down river each sea lion makes, it is assumed that, on average, each sea lion makes one round trip during the spring migration. In 2010, California sea lions spent an average of 10 days at the dam, with the longest stay recorded being 39 days (Stansell et al. 2010).

For a conservative assessment, it has been estimated that up to 90 California sea lions may pass through the action area during the migration to and from Bonneville Dam each season, for a total of up to 180 individuals passing through the action area. Since all pile installation will occur within the in-water work window (November 1–February 28), the peak migration in April and May will be avoided. California sea lion presence at the dam in January and February 2010 represented (conservatively) less than a third of the total run for the year. Using these numbers, it has been estimated that no more than one third of the total run of California sea lions (approximately 30 individuals) could be exposed to Level B harassment. Since each individual potentially could be exposed on both the upstream and return trips, this would represent a total of up to 60 individual takes of California sea lion; however, the actual number of expected takes is likely to be significantly less.

8.3 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 estuary, approximately 100 miles (161 km) 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 installation activities will be non-breeding adult males and females.

As discussed in section 5.3, harbor seals are only infrequently documented as far upstream in the Columbia River as Vancouver. The nearest documented haulout is near Wallace Island, near RM 43, which is approximately 60 miles (97 km) downstream of the action area (pers. comm., Bryan Wright, October 20, 2010). In each year since 2002, the Corps has documented no more than three harbor seals at Bonneville Dam, and in some years, only one or two individuals are identified. The individual harbor seals that may be present within the action area will likely be moving rapidly through on their way to or from Bonneville Dam, primarily during the months of January–May, with the peak occurring around April. All pile installation will occur within the in-water work window (November 1–February 28), avoiding the timing of the peak of the run. However, for purposes of making a conservative assessment, it is estimated that up to three harbor seals may be present within the action area during pile installation, and potentially could be exposed to Level B harassment. Since each individual potentially could be

exposed on both the upstream and return trips, this would represent a total of up to 6 individual takes of harbor seal.

9.0 ANTICIPATED IMPACT ON SPECIES OR STOCKS

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

The potential impacts of the proposed project on marine mammals include noise, water quality, and direct habitat effects associated with construction of the marine structures, and the potential for an increase in the number of ship strikes as a result of operation. Of these potential effects, temporarily elevated noise from vibratory and impact pile driving is the only impact that could result in take. A more detailed effects analysis follows.

9.1 Underwater Noise

As discussed in section 7.2.1, underwater noise during pile driving 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 driving according to the monitoring plan (Appendix C).

The distance to the injury threshold for pinnipeds (190 dB_{RMS}) will be monitored during pile driving according to the protocol identified in the marine mammal monitoring plan (Appendix C). 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 is observed, thus effectively minimizing the possibility of marine mammals being exposed to injury level harassment.

The distances to the disturbance thresholds for impact driving (the 160 dB RMS isopleth) and vibratory driving (120 dB RMS isopleth) will also be monitored during pile driving activities according to the monitoring plan (Appendix C). Marine mammal presence within these zones, if any, will be monitored, but pile driving activity will not be stopped if marine mammals are present. Potentially, 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 defined as disturbance.

Disturbance is expected to 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 action area or any direct injury or mortality, are not anticipated.

9.2 Terrestrial Noise

As discussed in section 7.2.2, temporarily elevated terrestrial noise levels during pile driving 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.

Since neither documented pinniped haulout sites nor suitable terrestrial habitat occur within the action area, no pinnipeds are expected to haul out 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 not be expected to be significantly affected 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.

9.3 Water Quality

Pile installation and removal may increase turbidity resulting from suspended sediments temporarily. Any increases would be temporary, localized, and minimal. All project construction will be in compliance with Washington state water quality standards under WAC 173 201A 200(1)(e)(i). Based on flow data for the Columbia River, temporary exceedances for turbidity could occur up to 300 ft (91 m) downstream from areas of pile installation and removal.

Additionally, during any in-water construction activities there is a risk of localized and temporary water quality impairments from the unintentional release of machinery fluids. All necessary actions will be taken to avoid such a discharge, and in the event of a spill, containment and cleanup would take precedence over continued work. Any potential for construction material or debris to enter the water will be managed by strictly adhering to above-water and in-water BMPs.

Marine mammals are not expected to be affected by potential water quality impairments that could occur during pile installation or removal activities or during operation of the constructed facility. Any potential effects will be temporary, localized, and greatly minimized by adherence to the BMPs described in this document and would not result in take.

9.4 Direct Habitat Impacts

Overall, the proposed marine structures will increase overwater coverage by approximately 21,626 sf (2,009 m^2) and the number of piles in the aquatic environment by approximately 100. However, 84 percent of the overwater coverage (18,132 sf [1,685 m^2]) and 95 percent of the piles (94) will be placed in the deep water zone (measured as greater than 20 ft [6 m] of water depth from the OHWM, which is 15.2 ft [14.6 m] Columbia River Datum [CRD]). A small amount of overwater coverage (2,964 sf [275 m^2]) and a small number of piles (5) will be placed in the shallow water zone (measured as 20 ft (6 m) or less of water depth from the Corps-defined OHWM (15.2 ft [14.6 m] CRD at RM 103]), but in an area completely armored with riprap substrate. In addition,

the installation of the replacement stormwater outfall may impact approximately 100 sf (9.3 m^2) of area below the OHWM.

The direct habitat impacts from installing the piles and stormwater outfall supports and the overwater shading are not expected to affect marine mammals significantly. The project has implemented a habitat mitigation plan which will mitigate fully for any temporarily or permanently impacted aquatic habitat function. Marine mammals use the action area as a migratory corridor between the Columbia River estuary and Bonneville Dam. There is no suitable habitat for hauling out within the action area, and marine mammals typically pass through it quickly during their migration in deep water habitats. Pinnipeds are not expected to use the structure, or to be affected by the increase in overwater shading.

9.5 Ship Strikes

An analysis in the BE (Anchor QEA 2011) examined the project's potential to result in an increase in ship traffic within the EEZ of the Pacific Ocean. Several cetacean species are distributed within this zone, including blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*), killer whales (*Orcinus orca*), minke whales (*Balaenoptera acutorostrata*), and gray whales (*Eschrichtius robustus*). The analysis in the BE found that the project potentially could increase the number of vessel calls to the state of Washington by a maximum of approximately 1.5% from current levels, which would not result in any measurable increase in the number of vessel strikes. Therefore, the proposed project will have no measurable or significant effect on the species described above, and they are not addressed elsewhere in this IHA request.

10.0 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 (NMFS 2008b). Both the ESA and the MMPA contain provisions that allow coastal Alaska natives to harvest endangered, threatened, or depleted species for subsistence purposes, but the number of subsistence takes has shown steady decline in recent years (NMFS 2008b). Since the proposed action will not result in any mortality of any marine mammals, it is concluded that it will have no impact on the availability of any marine mammal species or stocks for subsistence uses.

11.0 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.

Impacts to marine mammal habitat as a result of the proposed action will be limited to temporary noise impacts during pile driving, temporary water quality impacts from localized increased turbidity, and direct habitat impacts resulting from overwater shading and substrate disturbance. As described in section 9.0, temporary noise and water quality impacts have been minimized to the greatest extent possible through impact minimization measures and implementation of BMPs, and are not expected to affect marine mammal habitat within the action area significantly.

Permanent direct habitat impacts associated with pile placement and overwater shading are also not expected to affect marine mammal habitat significantly, as marine mammals use the action area solely as a migratory corridor between the Columbia River estuary and Bonneville Dam. There is no suitable habitat for hauling out within the action area, and marine mammals typically pass through it quickly during their migration in deep water habitats.

A mitigation plan has been proposed for the project to replace impacted aquatic habitat functions resulting from the placement of piles, the stormwater outfall replacement, and overwater shading in functional nearshore habitats. The proposed mitigation will consist of pile removal activities (both on site and at the Port's Terminal 2) and riparian restoration along Buckmire Slough. While these mitigation activities are not specifically required to address any measurable impacts to marine mammal habitat, they will offset the relatively minor impacts to the aquatic environment, thereby restoring affected aquatic function.

12.0 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.

Temporarily elevated underwater noise levels during pile driving will result in portions of the action area being less suited to marine mammal migration, and have the potential to result in Level B take as described in section 7.0. These temporary impacts to habitat associated with underwater noise levels will not have a significant impact on any marine mammal populations. Level A take is unlikely to occur, as a result of the implementation of the marine mammal monitoring protocol attached as Appendix C.

Temporary impacts to marine mammal habitat related to temporarily elevated turbidity levels during pile installation and removal activities are not expected to result in any measurable or significant impacts to the marine mammal populations as they are expected to be migrating rapidly through the action area. Any effects to marine mammal habitat have been minimized through the implementation of BMPs and impact minimization measures, and will not have any significant impact on any marine mammal population.

Similarly, the direct habitat impacts associated with overwater shading and with the habitat lost as a result of pile placement for the new in-water structures are expected to be insignificant. The new structures will not impede migration through the action area significantly, nor will their placement result in any functional changes in the composition of prey or predator species. 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.

13.0 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 marine mammals.

13.1 Impact Avoidance and Minimization Measures

In addition to BMPs and conservation measures, impact avoidance and minimization measures are proposed that avoid and minimize the potential for adverse environmental effects. General impact avoidance and minimization measures include those listed below.

- Timing restrictions are used to avoid in-water work when listed species are most likely to be present. The current WDFW-recommended work window for this area is November 1–February 28 annually
- Project construction will be completed in compliance with Washington state water quality standards (WAC 173-201A), including:
- No petroleum products, fresh cement, lime, concrete, chemicals, or other toxic or deleterious materials will 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 to be used for the construction and operation of the project. 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 will also outline

management elements such as personnel responsibilities, project site security, site inspections, and training.

- The SPCC plan will outline the measures that will be taken to prevent the release or spread of hazardous materials, either found on site and encountered during construction but not identified in contract documents, or any hazardous materials that is stored, used, or generated on the construction site during construction activities. These items include, but are not limited to, gasoline, oils, and chemicals.
- Applicable spill response equipment and material designated in the SPCC plan will be maintained at the job site.

13.2 Best Management Practices

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

13.2.1 General BMPs

Typical construction BMPs for working in, over, and near water will be applied, including activities such as:

- Checking equipment for leaks and other problems that could result in the discharge of petroleum-based products or other material into the Columbia River.
- Corrective actions will be taken in the event of any discharge of oil, fuel, or chemicals into the water, including:
- In the event of a spill, containment and cleanup efforts will begin immediately and be completed in an expeditious manner, in accordance with all local, state, and federal regulations and taking precedence over normal work. Cleanup will include proper disposal of any spilled material and used cleanup material.
- The cause of the spill will be ascertained and appropriate actions taken to prevent further incidents or environmental damage.
- Spills will be reported to the Washington State Department of Ecology's Southwest Regional Spill Response Office at (360) 407-6300.
- Work barges will not be allowed to ground out on the river bottom.
- Excess or waste materials will not be disposed of or abandoned waterward of ordinary high water or allowed to enter waters of the state. Waste materials will be disposed of in an appropriate landfill.
- 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.

13.2.2 Pile Removal BMPs

Pile removal BMPs will be applied, including activities such as:

- While creosote-treated piles are being removed, a containment boom will surround the work area to contain and collect any floating debris and sheen. Any debris will be retrieved and disposed of properly.
- The piles will be dislodged with a vibratory hammer, when possible and will not be intentionally broken by twisting or bending.
- The piles will be removed in a single, slow, and continuous motion in order to minimize sediment disturbance and turbidity in the water column.
- If a pile breaks above or below the mudline, it will be cut or pushed in the sediment consistent with agency approved BMPs.
- Removed piles, stubs, and associated sediments (if any) will be contained on a barge. If piles are placed directly on the barge and not in a container, the storage area will consist of a row of hay or straw bales, filter fabric, or similar material placed around the perimeter of the barge.
- All creosote-treated material, pile stubs, and associated sediments (if any) will be disposed of by the contractor in a landfill approved to accept those types of materials.

13.2.3 Pile Installation BMPs

Pile installation BMPS to be applied will include the following:

- To minimize noise levels, to the extent possible, the vibratory hammer method will be used to drive all piles.
- A bubble curtain or other similar noise attenuation method (such as sound attenuation pile caps, increased hammer size, etc.) will be employed during impact pile driving.
- A marine mammal monitoring plan (included as Appendix C) will be implemented during pile driving activities to reduce the risk of potential marine mammal impacts. The area within which the Level A harassment thresholds could be exceeded (the 190 dB isopleth during impact pile driving) will be maintained as an injury protection zone. The injury protection zone will be scanned for at least 15 minutes before impact pile driving activities begin and during all impact pile driving activities. If a marine mammal enters or is observed within the designated Level A injury protection zone 15 minutes prior to impact pile driving, the monitors will notify the on-site construction manager to not begin work until the animal has moved outside the designated radius or has not been sighted for at least 15 minutes. If a marine mammal is sighted within or on a path toward the injury protection zone during pile installation, then pile installation activities will cease until the animal has cleared the zone or 15 minutes have elapsed since the last sighting.
- A "soft-start" technique will be used. For vibratory pile installation, the soft-start procedure would require contractors to initiate noise for 15 seconds at 40-60 percent reduced energy followed by a 1-minute waiting period. The procedure would be repeated two additional times before full energy is achieved. For impact hammering, contractors would provide an initial set of three strikes at 40 percent energy,

followed by a 1-minute waiting period, then two subsequent three-strike sets. The soft-start procedure would be conducted prior to driving each pile if pile installation ceases for more than 30 minutes.

- If material needs to be excavated from inside piles to facilitate infill of concrete for structural purposes, appropriate methods will be put in place to minimize the contact of any excavated material with the marine environment.
- Excavated material will be stockpiled and disposed of in an appropriate upland location.

13.2.4 Overwater Concrete BMPs

Concrete work over water will include the following BMPs:

- Wet concrete will not be allowed to come into contact with surface waters.
- Forms for any concrete structure will be constructed to prevent leaching of wet concrete.
- Curing concrete will not be watered.
- If piles need to be filled with concrete, concrete will be installed using the tremie method.

13.2.5 Stormwater Outfall Support Structure Construction BMPs

During construction of the stormwater outfall support structures, the following BMPs will be employed:

- The vibratory hammer method will be used to drive steel piles, to the extent possible, to minimize noise levels.
- Silt curtains may be employed if there is significant disturbance to the river bottom.
- Excavated material will be stockpiled and disposed of in an appropriate upland location.
- Construction may occur during the approved in-water work window for the Lower Columbia River, or during low water, when work can occur above the usual seasonal low water level.
- Temporary jute netting or cut straw, wattles, and/or silt fencing may be placed in disturbed areas of the shoreline.
- Work will be performed from the land side where possible.

14.0 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 Vancouver, Washington. No activities will take place in or near a traditional Arctic hunting place.

15.0 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 plan (Appendix C) which will be implemented to minimize the potential for exposure to Level A harassment, and to document and quantify the number of Level B takes. See Appendix C for details regarding the monitoring protocol.

A monitoring report will be prepared following the end of the in-water work window in which monitoring is conducted, and will be submitted to NMFS Office of Protected Resources. The purpose of each monitoring report will be to summarize the activities conducted which may result in take, species documented, and number of takes recorded during the monitoring period. Each monitoring report will include the following:

- A brief summary of the relevant activities conducted during the monitoring period (in this case, pile driving activities);
- the number of marine mammals documented during the monitoring period, by species;
- the behavioral responses (if any) of any marine mammals recorded during pile driving activities;
- any actions taken as a result of the documented presence of marine mammals during pile driving; and
- a summary of the number of Level B takes recorded during the monitoring period.

16.0 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 for 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.

17.0 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 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 effectively minimize the potential for Level A harassment.

While 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.

18.0 LITERATURE CITED

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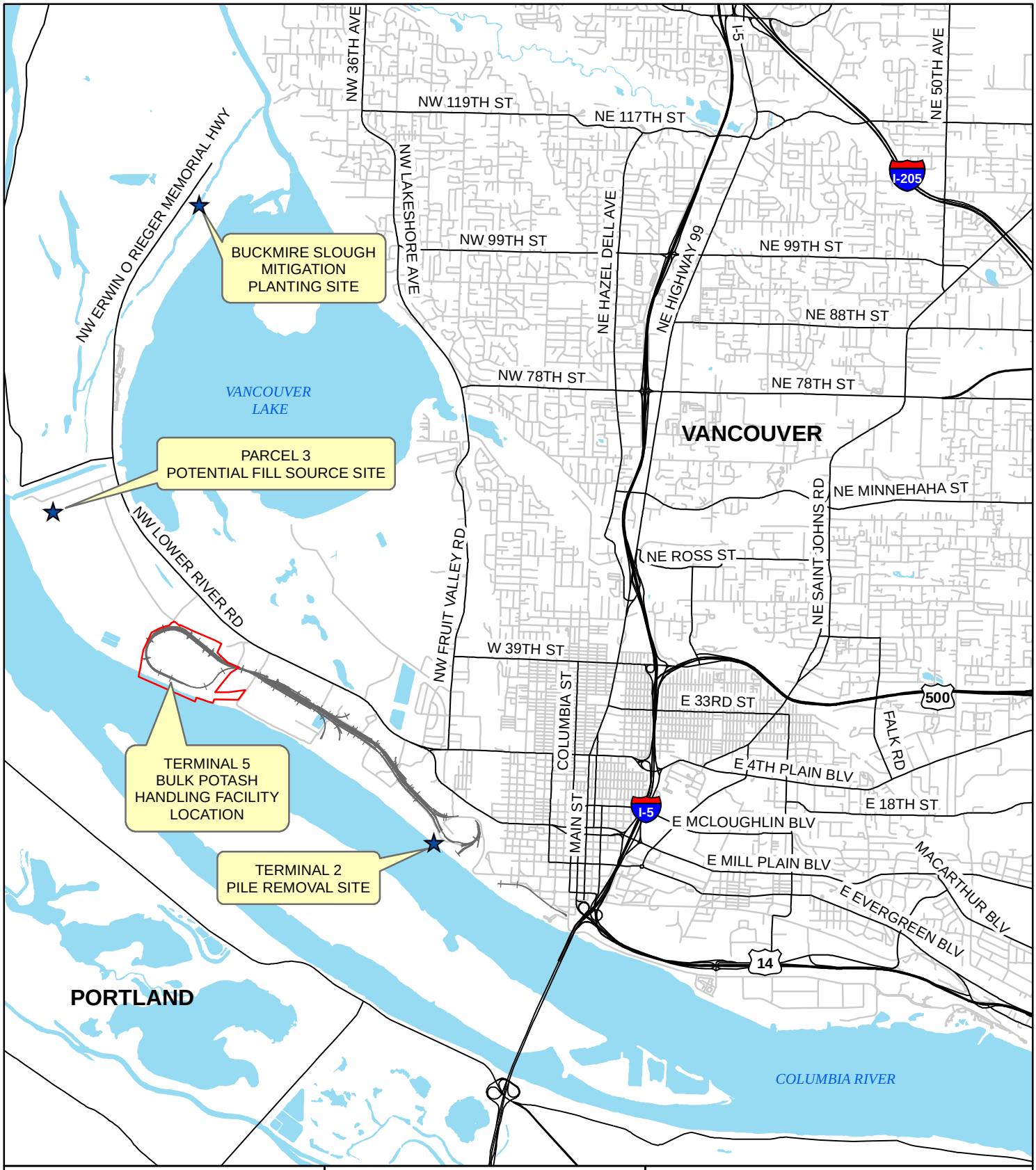
APPENDIX A:
Figures

APPENDIX B:
Photosheets

APPENDIX C:
Marine Mammal Monitoring Plan



ADJACENT PROPERTY OWNERS:
Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co.

DATUM: VERTICAL - CRD

FIGURE 1
VICINITY MAP

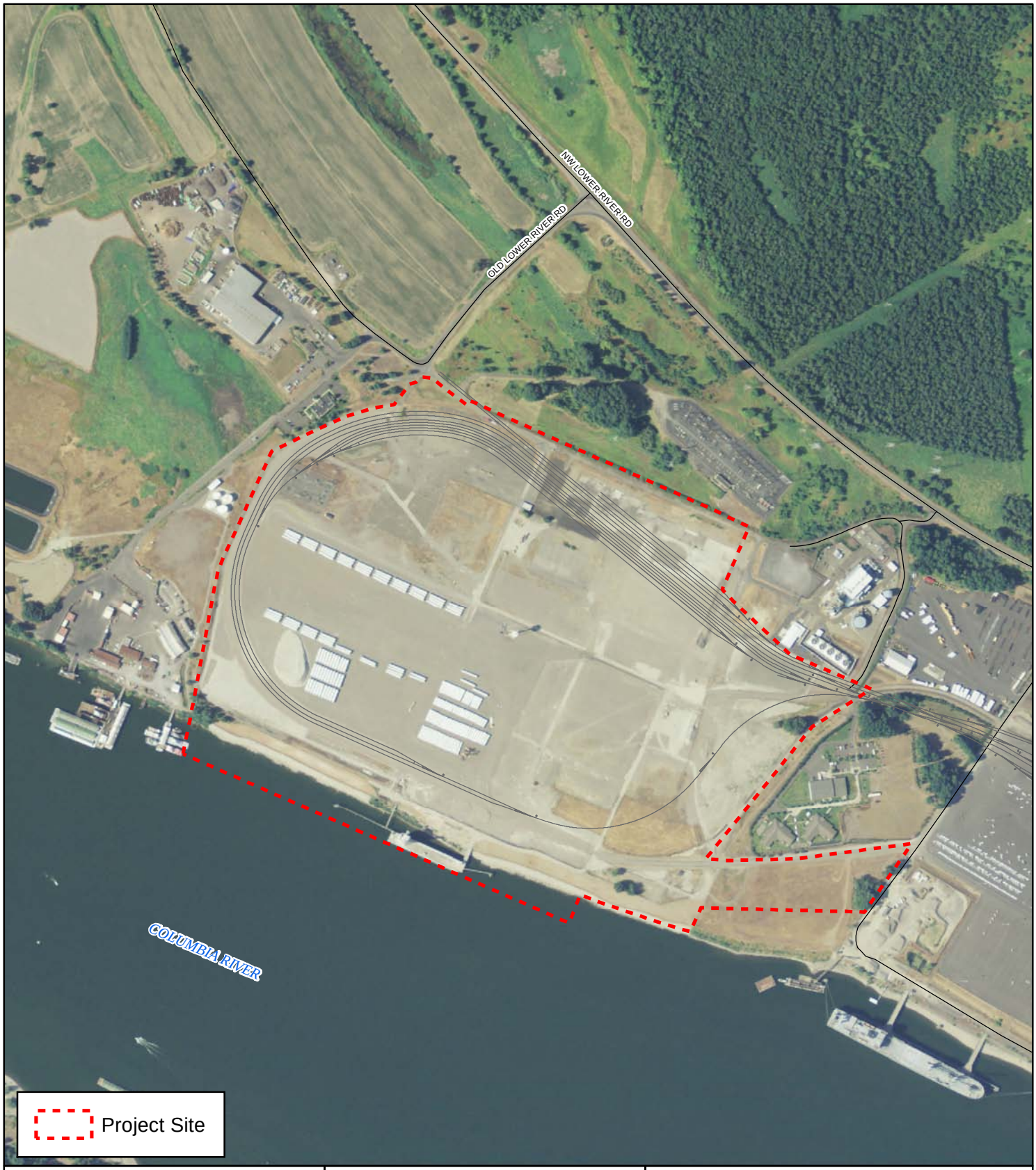
PORT OF VANCOUVER, USA
3103 NW LOWER RIVER ROAD
VANCOUVER, WA 98660
360.693.3611

PORT OF VANCOUVER
TERMINAL 5 BULK POTASH HANDLING FACILITY

0 0.5 1 2 Miles
0 0.5 1 2 Kilometers

N

IN: COLUMBIA RIVER
COUNTY OF: CLARK STATE OF: WA
APPLICATION BY: PORT OF VANCOUVER
FEBRUARY 2011



ADJACENT PROPERTY OWNERS:
Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co.

DATUM: VERTICAL - CRD

FIGURE 2
AERIAL PHOTOGRAPH

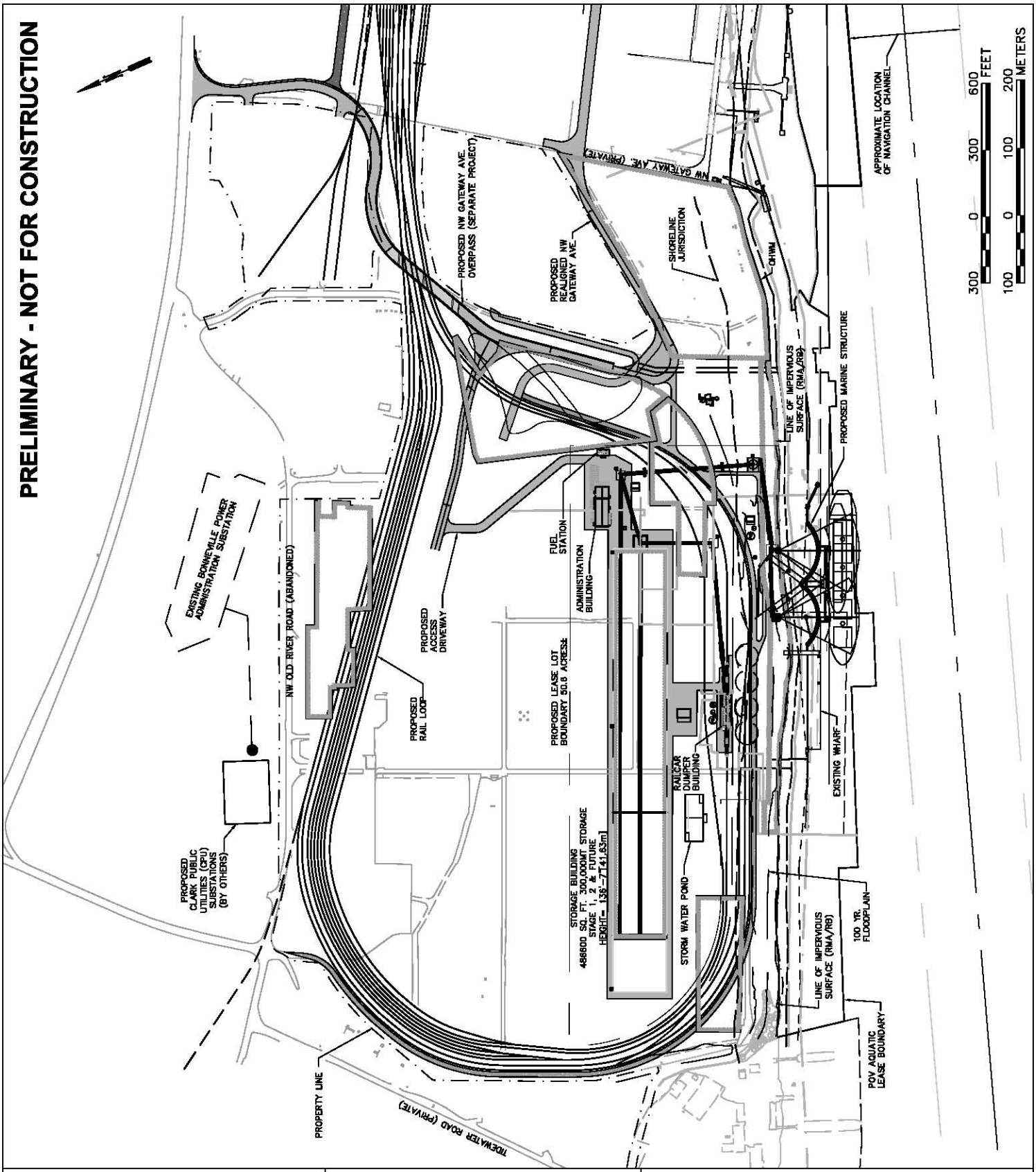
PORT OF VANCOUVER, USA
3103 NW LOWER RIVER ROAD
VANCOUVER, WA 98660
360.693.3611

PORT OF VANCOUVER
TERMINAL 5 BULK POTASH HANDLING FACILITY

0 250 500 1,000 1,500 Feet
0 100 200 400 Meters

N

IN: COLUMBIA RIVER
COUNTY OF: CLARK STATE OF: WA
APPLICATION BY: PORT OF VANCOUVER
FEBRUARY 2011



ADJACENT PROPERTY OWNERS:
Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co.

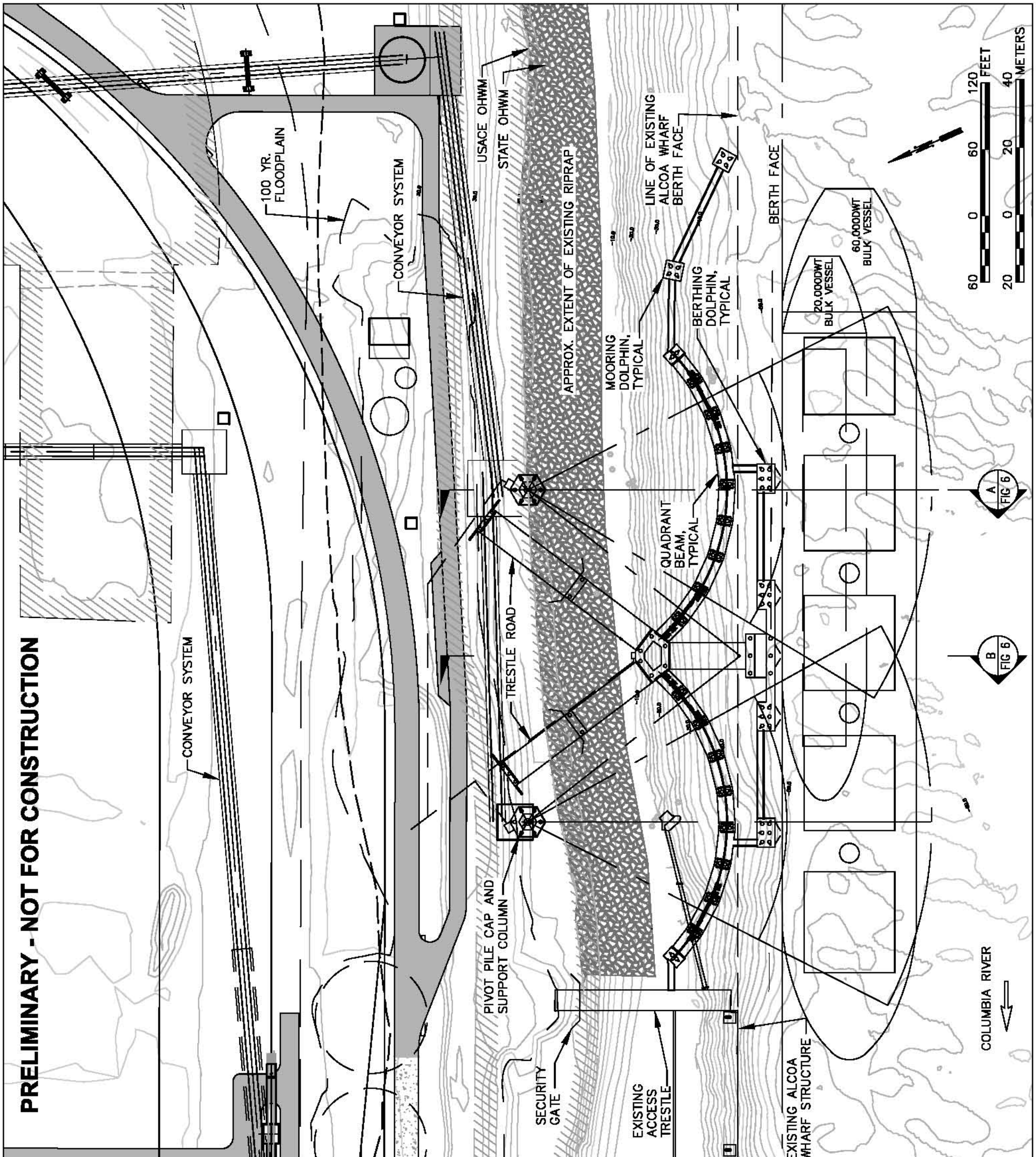
DATUM: VERTICAL - CRD

FIGURE 3
SITE PLAN

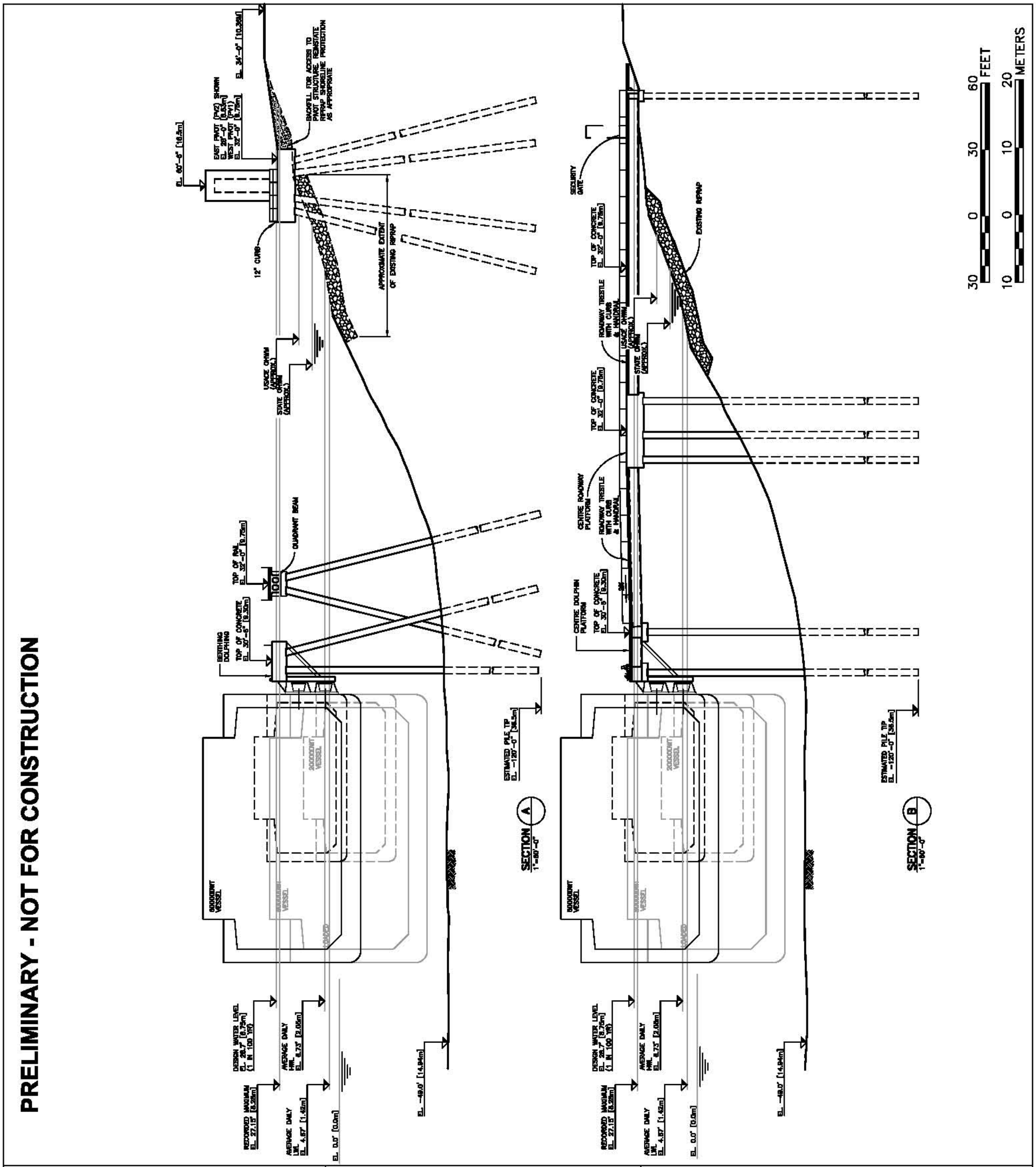
PORT OF VANCOUVER, USA
3103 NW LOWER RIVER ROAD
VANCOUVER, WA 98660
360.693.3611

PORT OF VANCOUVER
TERMINAL 5 BULK POTASH HANDLING FACILITY

IN: COLUMBIA RIVER
COUNTY OF: CLARK STATE OF: WA
APPLICATION BY: PORT OF VANCOUVER
FEBRUARY 2011



ADJACENT PROPERTY OWNERS:	FIGURE 4	PORT OF VANCOUVER
Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co.	MARINE STRUCTURES PLAN VIEW	TERMINAL 5 BULK POTASH HANDLING FACILITY
DATUM: VERTICAL - CRD	PORT OF VANCOUVER, USA 3103 NW LOWER RIVER ROAD VANCOUVER, WA 98660 360.693.3611	IN: COLUMBIA RIVER COUNTY OF: CLARK STATE OF: WA APPLICATION BY: PORT OF VANCOUVER FEBRUARY 2011



ADJACENT PROPERTY OWNERS:
Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co.

DATUM: VERTICAL - CRD

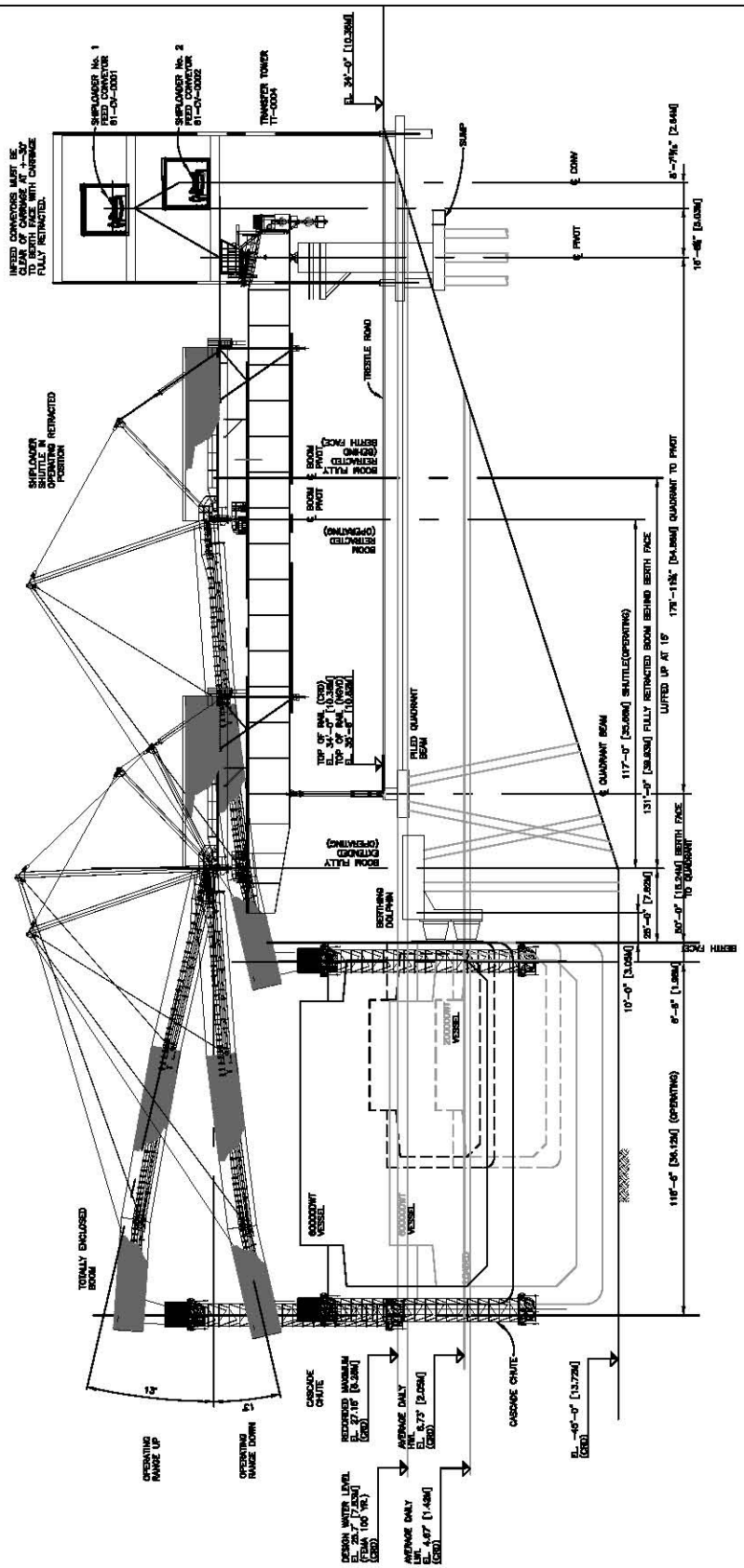
FIGURE 5
MARINE STRUCTURES
CROSS SECTION

PORT OF VANCOUVER, USA
3103 NW LOWER RIVER ROAD
VANCOUVER, WA 98660
360.693.3611

PORT OF VANCOUVER
TERMINAL 5 BULK POTASH HANDLING FACILITY

IN: COLUMBIA RIVER
COUNTY OF: CLARK STATE OF: WA
APPLICATION BY: PORT OF VANCOUVER
FEBRUARY 2011

PRELIMINARY - NOT FOR CONSTRUCTION



ADJACENT PROPERTY OWNERS:
Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co.

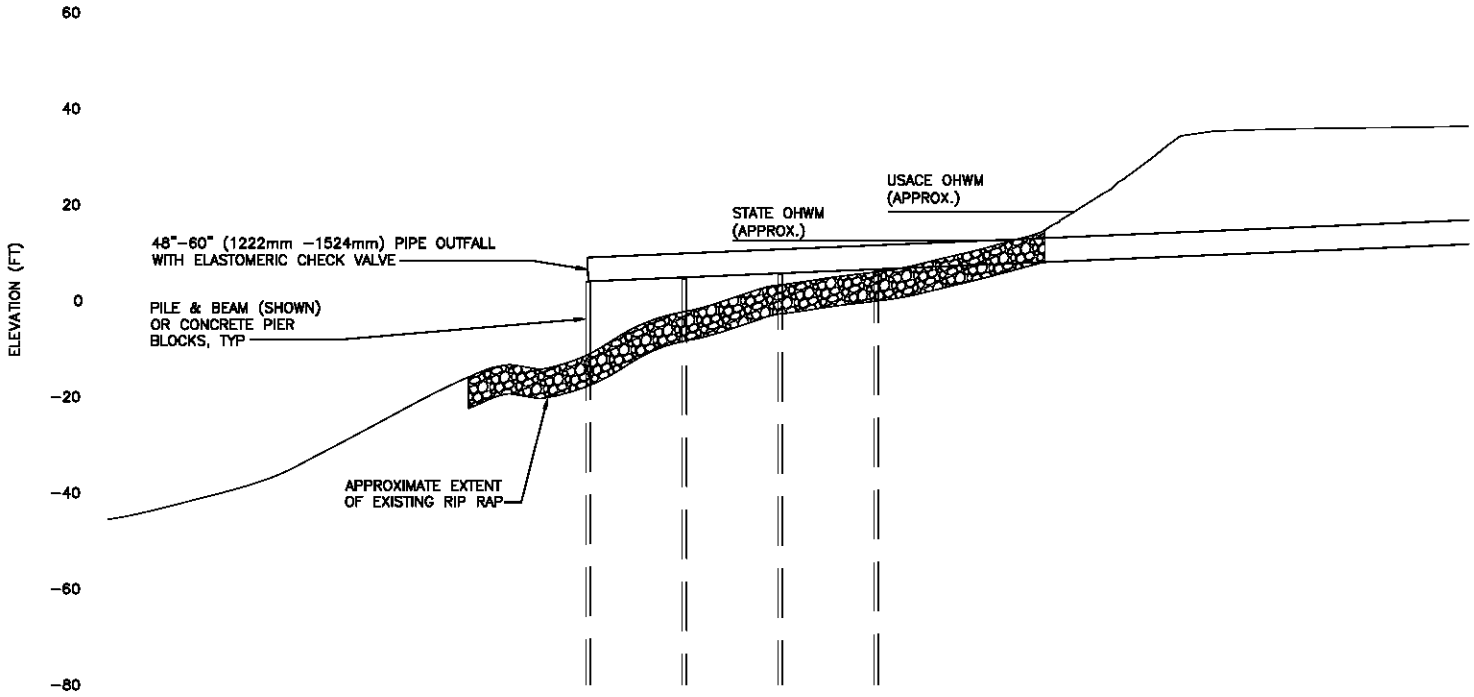
DATUM: VERTICAL - CRD

FIGURE 6
SHIPLOADER CROSS SECTION

PORT OF VANCOUVER, USA
3103 NW LOWER RIVER ROAD
VANCOUVER, WA 98660
360.693.3611

PORT OF VANCOUVER
TERMINAL 5 BULK POTASH HANDLING FACILITY

IN: COLUMBIA RIVER
COUNTY OF: CLARK STATE OF: WA
APPLICATION BY: PORT OF VANCOUVER
FEBRUARY 2011



20 0 20 40 FEET

6 0 6 12 METERS

ADJACENT PROPERTY OWNERS:
Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co.

DATUM: VERTICAL - CRD

FIGURE 7
STORMWATER OUTFALL UPGRADE

PORT OF VANCOUVER, USA
3103 NW LOWER RIVER ROAD
VANCOUVER, WA 98660
360.693.3611

PORT OF VANCOUVER
TERMINAL 5 BULK POTASH HANDLING FACILITY

IN: COLUMBIA RIVER
COUNTY OF: CLARK STATE OF: WA
APPLICATION BY: PORT OF VANCOUVER
FEBRUARY 2011

ADJACENT PROPERTY OWNERS:
Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co.

DATUM: VERTICAL - CRD

FIGURE 8
AQUATIC IMPACTS

PORT OF VANCOUVER, USA
3103 NW LOWER RIVER ROAD
VANCOUVER, WA 98660
360.693.3611

PORT OF VANCOUVER
TERMINAL 5 BULK POTASH HANDLING FACILITY

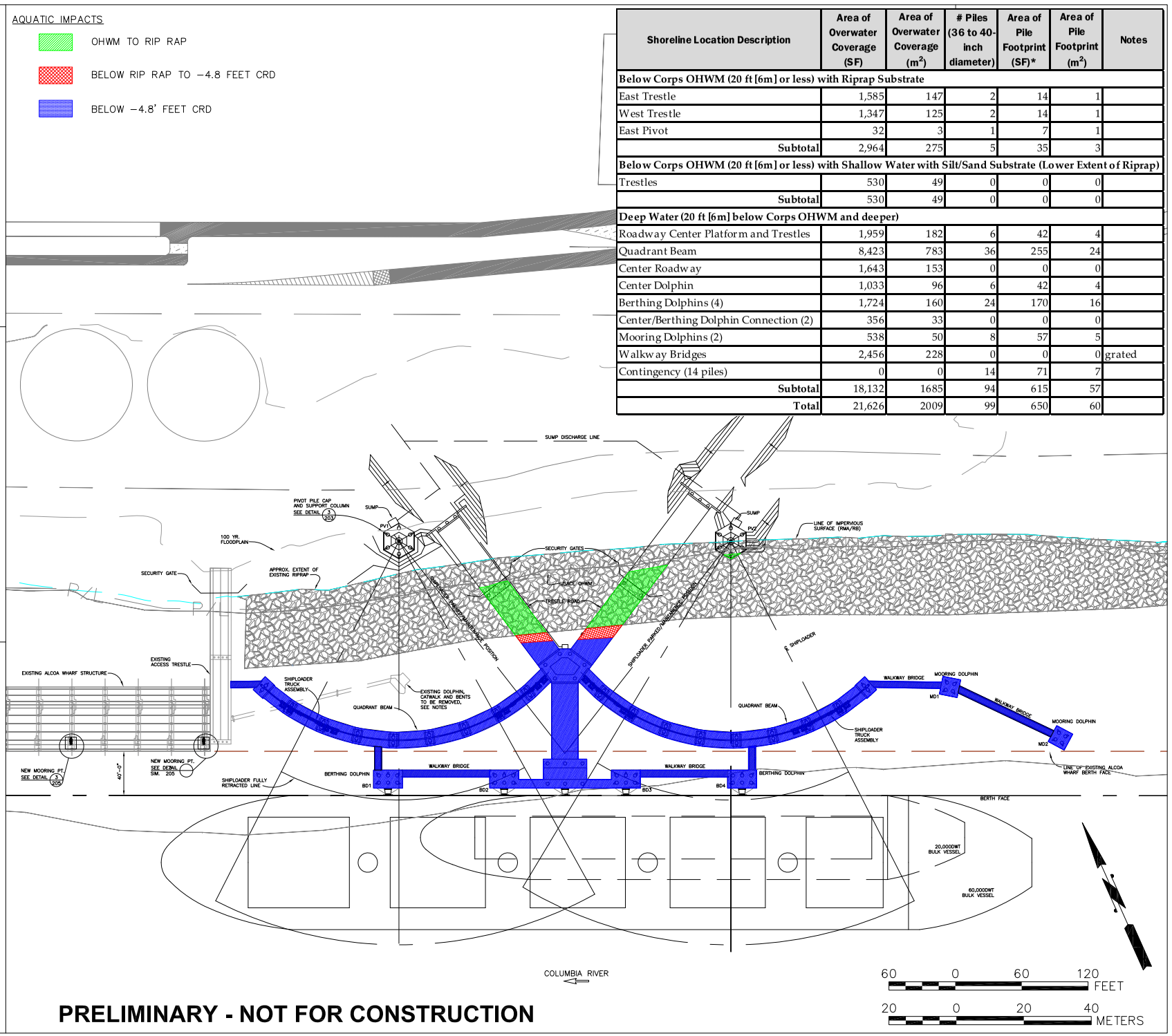
IN: COLUMBIA RIVER
COUNTY OF: CLARK
APPLICATION BY: PORT OF VANCOUVER
FEBRUARY 2011

STATE OF: WA

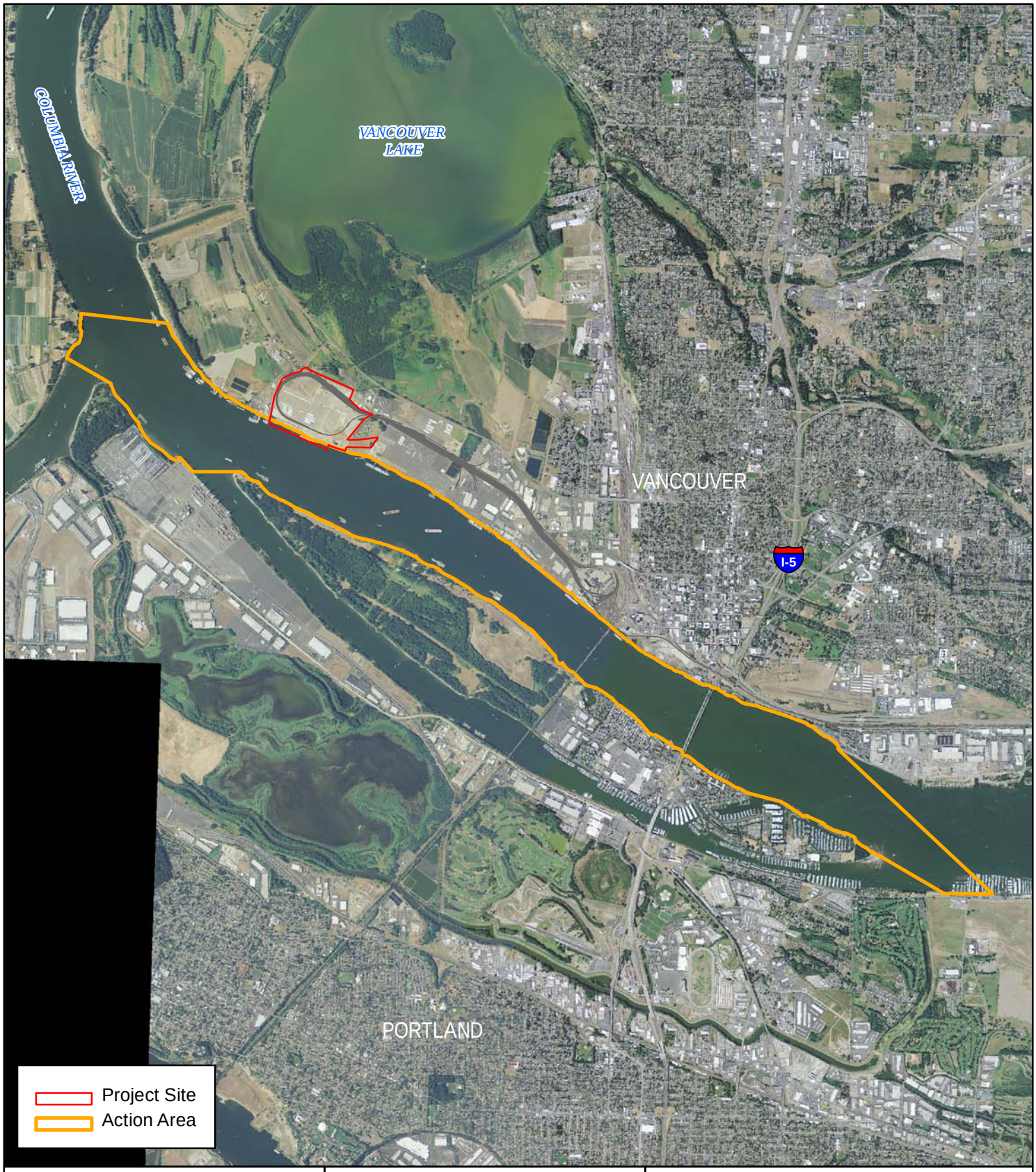
AQUATIC IMPACTS

- OHWM TO RIP RAP
- BELOW RIP RAP TO −4.8 FEET CRD
- BELOW −4.8' FEET CRD

Shoreline Location Description	Area of Overwater Coverage (SF)	Area of Overwater Coverage (m^2)	# Piles (36 to 40-inch diameter)	Area of Pile Footprint (SF)*	Area of Pile Footprint (m^2)	Notes
Below Corps OHWM (20 ft [6m] or less) with Riprap Substrate						
East Trestle	1,585	147	2	14	1	
West Trestle	1,347	125	2	14	1	
East Pivot	32	3	1	7	1	
Subtotal	2,964	275	5	35	3	
Below Corps OHWM (20 ft [6m] or less) with Shallow Water with Silt/Sand Substrate (Lower Extent of Riprap)						
Trestles	530	49	0	0	0	
Subtotal	530	49	0	0	0	
Deep Water (20 ft [6m] below Corps OHWM and deeper)						
Roadway Center Platform and Trestles	1,959	182	6	42	4	
Quadrant Beam	8,423	783	36	255	24	
Center Roadway	1,643	153	0	0	0	
Center Dolphin	1,033	96	6	42	4	
Berthing Dolphins (4)	1,724	160	24	170	16	
Center/Berthing Dolphin Connection (2)	356	33	0	0	0	
Mooring Dolphins (2)	538	50	8	57	5	
Walkway Bridges	2,456	228	0	0	0	grated
Contingency (14 piles)	0	0	14	71	7	
Subtotal	18,132	1685	94	615	57	
Total	21,626	2009	99	650	60	



PRELIMINARY - NOT FOR CONSTRUCTION



ADJACENT PROPERTY OWNERS:
Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co.

DATUM: VERTICAL - CRD

FIGURE 9
ACTION AREA

PORT OF VANCOUVER, USA
3103 NW LOWER RIVER ROAD
VANCOUVER, WA 98660
360.693.3611

PORT OF VANCOUVER
TERMINAL 5 BULK POTASH HANDLING FACILITY

0 0.5 1 2 Miles
0 0.5 1 2 Kilometers

N

IN: COLUMBIA RIVER
COUNTY OF: CLARK STATE OF: WA
APPLICATION BY: PORT OF VANCOUVER
FEBRUARY 2011

Photo 1: This photograph is taken facing east (upstream) from the existing dock, and documents the riparian and nearshore conditions at the site and the extent of bank armoring.

Photo 2: This photograph is taken facing west (downstream) and documents the condition of the existing dock, and the nature of the riparian and upland habitat conditions within the project area.

ADJACENT PROPERTY OWNERS: Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co. DATUM: VERTICAL - CRD	PHOTOSHEET 1 PORT OF VANCOUVER, USA 3103 LOWER RIVER ROAD VANCOUVER, WA 98660 360.693.3611	PORT OF VANCOUVER TERMINAL 5 BULK POTASH HANDLING FACILITY IN: COLUMBIA RIVER COUNTY OF: CLARK STATE OF: WA APPLICATION BY: PORT OF VANCOUVER May 2011

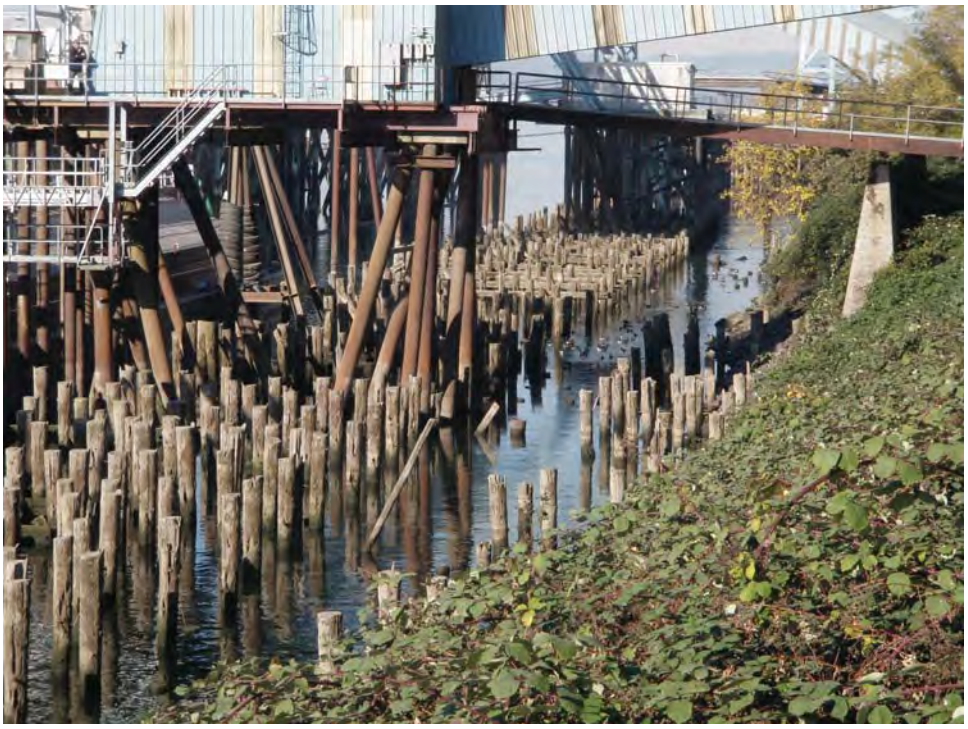


Photo 3: This photograph documents treated timber piles at Terminal 2. A portion of these piles will be removed as mitigation for the new steel piles that are required for the project.

Photo 4: This photograph is taken facing south (upslough) at the location of the proposed riparian plantings at Buckmire slough. The planting area is on the right side of the photo, which is dominated for much of its length by dense stands of Himalayan blackberry (*Rubus armeniacus*).

ADJACENT PROPERTY OWNERS: Port of Vancouver, Washington Department of Natural Resources (WDNR), Clark County, Clark Public Utilities, and Russell Towboat and Moorage Co. DATUM: VERTICAL - CRD	PHOTOSHEET 2 PORT OF VANCOUVER, USA 3103 LOWER RIVER ROAD VANCOUVER, WA 98660 360.693.3611	PORT OF VANCOUVER TERMINAL 5 BULK POTASH HANDLING FACILITY IN: COLUMBIA RIVER COUNTY OF: CLARK STATE OF: WA APPLICATION BY: PORT OF VANCOUVER May 2011

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PORT OF VANCOUVER, USA
TERMINAL 5 BULK POTASH HANDLING FACILITY
MARINE MAMMAL MONITORING PLAN

1 INTRODUCTION

This monitoring plan was prepared for the Port of Vancouver USA (Port) and BHP Billiton Canada Inc. (BHP Billiton) for the development of the Terminal 5 Bulk Potash Handling Facility (proposed project) to be constructed and operated by BHP Billiton Canada Inc. or an affiliate of the BHP Billiton Group. 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's National Marine Fisheries Service (NMFS) issue an IHA for the 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 Vancouver, Washington (River Mile [RM] 103). This marine mammal monitoring plan is designed to effectively minimize 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, the project does not require a letter of authorization (LOA). Please refer to the IHA application for a detailed discussion of the project and effects.

In-water work will be restricted to the in-water work window for the project. The WDFW-recommended work window for this area is November 1–February 28, annually. Impact pile driving activities will not be initiated, or, if initiated, will cease temporarily, if any marine mammal is present within the Level A harassment threshold (the 190 dB isopleth, also referred to as the "injury protection zone") represented in Figure C-1. Additionally, the area within the Level B harassment zone (the 160 dB isopleth during impact driving, and the 120 dB isopleth during vibratory installation) will be monitored for the purpose of documenting and reporting any Level B takes of marine mammals.

2 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

Based on the results of the noise attenuation analysis conducted for the project (Anchor QEA, LLC 2011), it has been determined that the Level A harassment (injury) threshold for underwater noise for pinniped species could be exceeded at a distance of up to 70 feet (21 meters) during impact pile driving activities. Additionally, the Level B harassment (behavioral disruption) for underwater noise for pinniped species could be exceeded at a distance of up to 31.3 miles (50.4 kilometers) during impact pile driving. During vibratory pile driving, because of the shape and configuration of the river, the Level B harassment (behavioral disruption) for underwater noise for pinniped species could be exceeded throughout the full extent of the action area identified in Figure C-1.

During pile driving, the area where underwater noise levels may exceed the Level A harassment threshold for pinnipeds (the 190 dB isopleth) will be monitored according to the protocol described in this plan. This area will be maintained as an injury protection zone. To prevent Level A harassment, impact pile driving will be shut down immediately if any marine mammals are observed entering the area, effectively reducing the possibility of any marine mammals being exposed to Level A harassment, and, for this reason, the project will not require an LOA for Level A takes.

During pile driving, the area where underwater noise levels may exceed the Level B harassment thresholds for impact driving (the 160 dB RMS isopleth) and vibratory driving (120 dB RMS isopleth) will be monitored intermittently according to the protocol described in this plan. Marine mammal presence within this area, if any, will be monitored, but pile driving activity will not be stopped if marine mammals are observed to be present. Marine mammals documented within the Level B harassment area during pile driving will constitute a Level B take, and will be recorded and used to document the number of take incidents.

3 TERRESTRIAL NOISE

The area in which terrestrial noise levels could exceed the Level B harassment thresholds is within the distances that will be monitored for underwater noise (Anchor QEA 2011). Since no pinniped haulout sites or suitable haulout habitat occur within the action area, no pinnipeds are expected to haul out 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. As such, the terrestrial noise isopleths are not taken into account in this monitoring plan.

Figure C-1. Action Area

4 MONITORING PROTOCOL

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

1. At least one person meeting the minimum qualifications identified below will be present on site (on land or dock) at all times during in-water pile driving activities.
2. Two areas will be monitored during pile driving (Figure C-2). One person will be present at all times during impact pile driving to monitor the injury protection zone (the 190 dB isopleth). This person will be stationed either on the pile driving rig or in the immediate vicinity, and will have clear line of sight views of the injury protection zone. Once every five days of pile driving activity, two additional people will monitor the area within the Level B harassment zone (the 160 dB RMS isopleth for impact driving, and the 120 dB RMS isopleth during vibratory driving). One observer will be stationed in the upstream portion of the action area in the vicinity of the Interstate 5 bridge, and will monitor the Level B harassment zone in the upstream portion of the action area. The second observer will be stationed either on the pile driving rig or in the immediate vicinity, and will monitor the Level B harassment zone in the downstream portion of the action area. The observers will record any presence of marine mammals by species, document any behavioral responses noted, and record Level B takes when sightings overlap with pile installation activities.
3. The observers 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.
4. The area within which the Level A harassment thresholds could be exceeded (the 190 dB isopleth during impact pile driving) will be maintained as an injury protection zone. The injury protection zone will be scanned for at least 15 minutes before beginning and during all impact pile driving activities. If a marine mammal enters or is observed within the designated Level A injury protection zone 15 minutes prior to impact pile driving, the obervers will notify the on-site construction manager to not begin work until the animal has moved outside the designated radius or has not been sighted for at least 15 minutes.
5. If a marine mammal is sighted within or on a path toward the injury protection zone during pile installation, then pile installation activities will cease until the animal has cleared the zone or 15 minutes have elapsed since the last sighting.
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 are 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 will occur every five days in order to estimate the number of individuals present within the Level B harassment area.

7. If waters exceed a sea-state which restricts the obervers' 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.

Figure C-2. Monitoring Locations and Observation Radii

5 MINIMUM QUALIFICATIONS FOR MARINE MAMMAL OBSERVERS

1. Visual acuity in both eyes (correction is permissible) sufficient to discern moving targets at the water's surface and 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 marine mammals (i.e. pinnipeds).
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.

6 REFERENCES

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