Chapter 2

Proposed Action and Alternatives

2.1 INTRODUCTION

This chapter describes the Applicant's Proposed Action to develop a new crude oil distribution facility (the Vancouver Energy Distribution Terminal Facility [Facility]) at the Port of Vancouver (Port). It includes a description of the proposed Facility's location, the individual Project elements that make up the complete Facility, and the activities that would occur during its construction, operation, and eventual decommissioning. This chapter also describes how crude oil would be transported by rail to the proposed Facility and by marine vessels from the proposed Facility to receiving refineries. Alternatives to the Proposed Action that were evaluated but eliminated from further consideration in this Draft Environmental Impact Statement (EIS) are also described. Finally, potential actions that could occur if the proposed Project were not built and operated (i.e., the No Action Alternative) are also described.

The Applicant is proposing to construct and operate a Facility that would receive an average of 360,000 barrels (bbl) of crude oil per day by rail, temporarily store the oil onsite, and then load the oil onto marine vessels for transport to existing refineries primarily located on the West Coast of the United States.[1] The crude oil would be delivered to the proposed Facility by rail in "unit trains" composed of up to 120 sole-purpose crude oil tank cars. An average of four unit trains would arrive at the proposed Facility each day. Occasionally, a fifth train may arrive within a 24-hour period. A fifth train would begin unloading within that 24-hour period but would not complete unloading until the following 24-hour period. On other days (or subsequent days) only three trains may arrive within certain 24-hour periods, thus equating to an average of four train arrivals per day (Vancouver Energy 2015). Based on these assumptions, the maximum throughput of crude oil at the proposed Facility would be 131,400,000 bbl per year.

The receipt of an average of 360,000 bbl of crude oil each day is based on the following assumptions:

- An average of four unit trains would arrive at and depart from the proposed Facility each day for a total of 2,920 one-way train-trips (1,460 round trips) per year
- Each unit train would consist of 120 tank cars
- Each tank car could hold up to 750 bbl[2] of crude oil
- Each unit train would deliver 90,000 bbl of crude oil
- The time required to unload a single unit train would be approximately 12 to 14 hours
- Up to three trains could be unloaded at the same time

According to the Applicant, because the Terminal 5 area does not have the property available to add any additional rail loops sized for unit train operations beyond those described in this Draft EIS, the proposed Facility cannot receive more than an average of four trains per day without creating impacts to other

1 Receiving refineries could include those located in Alaska, Hawaii, California, and Washington.

2 The capacity of a single rail tank car is assumed to be 750 bbl, though actual carloads are limited by cargo weight, tank car weight, and vapor space requirements. In actual practice, each tank car often holds from 650 to 690 bbl of crude oil (Appendix E).

existing and future Port rail operations and the Burlington Northern Santa Fe (BNSF) mainline traffic (Corpron and Makarow, pers. comm., 2015).

All tank cars used to transport crude oil to the proposed Facility would be required to meet the new US Department of Transportation (DOT) Specification 117 (DOT-117) tank car standards jointly issued by the Pipeline and Hazardous Materials Safety Administration (PHMSA) and Federal Railway Administration (FRA) on May 1, 2015. These new standards require increased thickness of the tank shell, full height protection (head shields) at each end, improved protection for top fittings and discharge valves, and reconfigured tank vents for automatic reclosing to reduce vulnerability to breaching or failure during derailments for newly manufactured tank cars and retrofits of older tank cars (see Section 4.2.4.2 for details on DOT-117 standards).

Once a loaded unit train arrives at the proposed Facility, the crude oil would be unloaded from the railcars and either pumped directly to marine vessels at modified berths on the Columbia River or pumped through a network of transfer pipelines to a storage area containing six aboveground storage tanks. During marine vessel loading, the crude oil would be transferred via pipeline and associated hoses to a modified existing marine terminal on the Columbia River. The marine vessels would then transit down the Columbia River and across open ocean to marine facilities capable of offloading the crude oil for delivery to receiving refineries.

According to the Applicant, approximately 80 percent of the marine vessels expected to call at the proposed Facility would be in the 46 million deadweight tons (MDWT) size range. Smaller numbers of the marine vessels in the 105 MDWT and 165 MDWT size ranges (approximately 15 percent and 5 percent, respectively) may also call at the proposed Facility. Typical operations would involve the arrival, loading, and departure of one vessel in each 24-hour period, which equates to approximately 365 vessel calls[3] per year. The Applicant has indicated that vessels would be allowed to depart the marine terminal only when conditions at the Columbia River bar allow departure to the open sea without having to anchor or loiter upriver from the bar. This requirement would likely result in an actual range of vessel calls of between 345 and 365 per year.

It should be noted that the Applicant would not source or own any crude oil, nor arrange for rail transportation of crude oil to the proposed Facility, or for marine vessel transportation of crude oil from the proposed Facility. Rather, the Applicant would receive its customers' crude oil by rail, unload and stage that crude oil in onsite tanks, and load the crude oil onto vessels provided by those customers. The Applicant has reported its customers would likely source crude oil primarily from mid-continent North American locations, including the Bakken formation that covers parts of North Dakota and Montana and Saskatchewan, Canada. Depending on market conditions and the needs of the proposed Facility's customers, crude oil may also come from other North American formations, such as the Niobrara in Wyoming and Colorado and the Uinta in northeast Utah (Corpron and Makarow, pers. comm., 2015).

While projecting future market conditions is nearly impossible, based on the strength of Bakken production and market conditions known at this time, the Washington Energy Facility Site Evaluation Council (EFSEC) believes it is reasonable to assume that the Bakken would be the likely source of the mid-continent North American crude oil delivered to the proposed Facility. Because BNSF owns or controls the rail infrastructure in the Bakken region, and rail transport agreements and rates tend to favor a single carrier, EFSEC has assumed that BNSF would be the likely rail transporter of crude oil from the Bakken to the proposed Facility. For the purposes of impact analysis in this Draft EIS, it is assumed that loaded unit trains would originate near Williston, North Dakota, and would transport crude oil to the proposed Facility following the Columbia River Alignment (see Figure 3.0-2 in Chapter 3). Although the

3 A vessel call at the marine terminal would involve two river transits—one inbound and one outbound.

precise routing of individual unit trains would be determined by BNSF depending on the location of the unit train loading facility and track usage and condition at the time of delivery, this rail transportation route is considered by EFSEC to be an appropriate representative rail delivery route for the purposes of environmental analysis in this Draft EIS because it is the most direct route between likely crude oil loading facilities in North Dakota and the Port.[4]

The extraction, refining, and end use of the crude oil that would be handled at the proposed Facility could be considered related to the proposed Facility. However, because of the ongoing high demand for crude oil by West Coast refineries, it can be assumed that similar quantities of crude oil would be extracted from the same sources, refined at the same West Coast refineries, and used by the same customers, with or without the proposed Facility. Therefore, these activities are not so closely related as to constitute a single course of action that must be evaluated in the same environmental document as required by Washington Administrative Code (WAC) 197-11-060(3)(b). Nevertheless, in an effort to respond to concerns raised during scoping, EFSEC has elected to prepare a qualitative analysis of the potential impacts of these activities as they relate to the contribution of greenhouse gases and climate change. This analysis is presented in Chapter 5.

2.2 DESCRIPTION OF THE PROPOSED ACTION

The information presented in this section is based on information provided by the Applicant and describes the proposed Project that is analyzed in the remainder of this Draft EIS.

2.2.1 Proposed Facility Site

The proposed Facility would occupy several distinct but connected areas at Terminals 4 and 5 at the Port, located on the northern bank of the Columbia River. See Figure 1-1 for a general vicinity map and Figure 2-1 for a view identifying the proposed Facility site layout and existing adjacent properties. The proposed Facility would occupy approximately 47.4 acres within the Port, most of which is leased from the Port for exclusive use by the Applicant. Rail access to the site is available from the east, and two vessel berths (Berths 13 and 14) are located on the Columbia River at approximately river mile (RM) 103.5.

The proposed Facility would be constructed and operated on a site that was previously used for intensive industrial purposes dating back to the 1940s when Evergreen Aluminum LLC and Aluminum Company of America (Alcoa) first developed the site for aluminum smelting operations. Berths 13 and 14 were constructed in the early 1990s.

In 2009, the Port purchased the land that now makes up Terminals 4 and 5. With the exception of the onsite water tower and Berths 13 and 14 in the Columbia River, all structures of the former aluminum processing plant have been removed and remediation of contamination associated with the former use of the property has been completed.

4 Two alternative rail routes in Washington are available (Figure 2-22). However, those routes cross the Cascade Mountains and have steep inclines, and so are not typically used by heavy loaded trains.

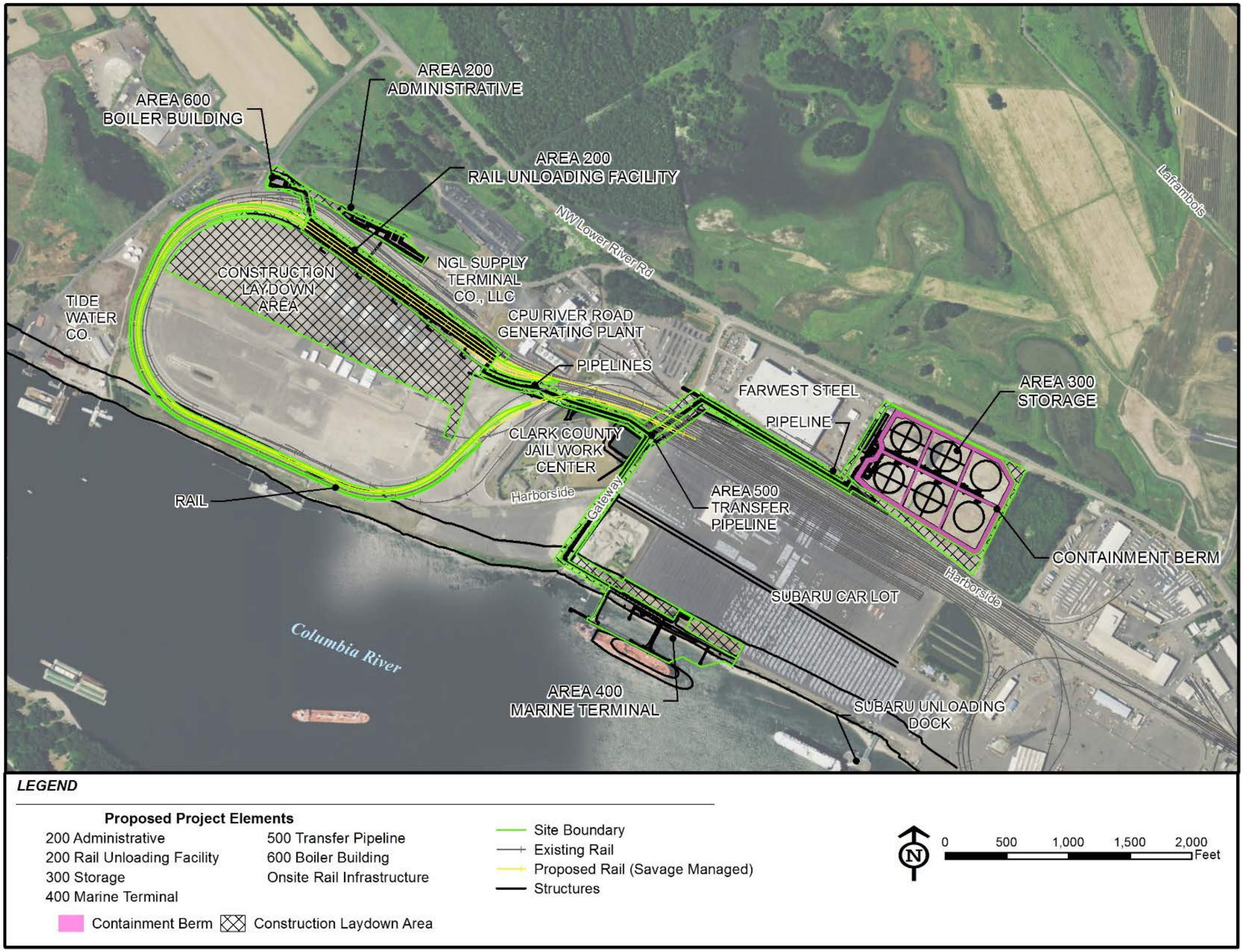

Figure 2-1. Proposed Facility Site Layout and Existing Adjacent Properties

In June 2010, the Port completed installation of 35,000 feet of new rail track at Terminal 5, constructed in a loop with associated yard tracks, to allow the handling of unit trains up to 7,500 feet long within the Port's internal rail complex. The capacity of the loop track was expanded in April 2013 to handle unit trains up to 8,400 feet long. Both track expansions were constructed as part of the West Vancouver Freight Access (WVFA) project. The WVFA project is an ongoing effort undertaken by the Port to improve mainline freight rail access and mobility (Port of Vancouver 2015).

The Port currently leases the area in the southwestern portion of the loop track for the outdoor storage of wind turbine components and other cargo. An earlier proposal by BHP Billiton to develop a potash export facility within the loop track area has been abandoned, and the Port is currently marketing the vacant property (Port of Vancouver 2014).

At Terminal 4, Subaru Auto and other tenants lease Port property between the proposed storage area (Area 300) and Berths 13 and 14 (Area 400). Other tenants currently leasing Port property adjacent to the proposed Facility include NGL Supply Terminal Co., Kelly Steel, Farwest Steel, and CalPortland. Properties adjacent to the proposed Facility that are not owned by the Port include the Clark County Jail Work Center (JWC) and the Clark Public Utilities (CPU) River Road Generating Plant.

2.2.2 Project Elements

For the purposes of this EIS, all onsite Project elements are collectively referred to as the proposed Facility. The proposed Facility would include construction and operation of various Project elements in different areas as shown on Figure 2-1. A brief description of each is provided in Table 2-1. Additional detail on each Project element is provided in the subsections that follow.

All of the proposed Project elements at the proposed Facility would be designed and operated with fire suppression systems and/or equipment. The Applicant has stated that the proposed Facility's fire suppression systems and equipment would comply with applicable state and local requirements, American Petroleum Institute and National Fire Protection Association (NFPA) guidelines and standards, and Factory Mutual Global insurance requirements, and would include manual fire extinguishers, automatic sprinkler systems, and high-capacity water jets (monitors) designed to apply foam. While the sections below summarize the proposed fire suppression systems and equipment by Project element, additional details on the various fire protection systems the Applicant has proposed to incorporate into the design of the proposed Facility are included in Appendix B.

Table 2-1. Summary of Proposed Project Elements

Project Element	Description	Site Location	Area (acres)
Onsite Rail Infrastructure	Includes rail infrastructure consisting of two additional rail loop tracks to be added to existing Port rail infrastructure. In the future, the proposed Facility would incorporate a third rail loop that the Port would construct for the proposed Facility's exclusive use, serving the third unloading track (see Section 2.2.2.1 below)	N ½ Section 19 and S ½ Section 18, T2N, R1E WM Parcels: 152799-000, 152903-000, 152905-000, 152798-000	5.4
Administrative and Support Buildings (Area 200)	Includes three approximately 3,400-square-foot office buildings that would house administrative functions, lockers, restrooms, and other employee support facilities	NE ¼ Section 19 and S ½ Section 18, T2N, R1E WM Parcels: 152799-000, 152903-000	1.6
Railcar Unloading Facility (Area 200)	Includes support buildings, parking, rail access to the railcar unloading facility, and the railcar unloading facility	NE ¼ Section 19 and S ½ Section 18, T2N, R1E WM Parcels: 152799-000, 152903-000	6.2
Storage Tanks (Area 300)	Encompasses the product storage tanks and associated secondary containment, the Area 300 storage building, and associated control and ancillary systems	N ½ Section 20, T2N, R1E WM Parcel: 152173-000	20.8
Marine Terminal (Area 400)	Includes product conveyance and loading facilities located on the dock at Port Berths 13 and 14, the marine vapor combustion units, emergency containment and response equipment, and control and ancillary facilities associated with vessel loading	NW ¼ Section 20, T2N, R1E WM Parcels: 152166-000, 503030-000, 503030-003	7.7
Transfer Pipelines (Area 500)	Includes the corridors for the transfer pipelines that would connect the railcar unloading area, storage tanks, and marine terminal, allowing conveyance of crude oil between the various proposed Facility elements	NE ¼ Section 19 and NW ¼ Section 20, T2N, R1E WM Parcels: 152184-000, 152177-000, 152179-000, 986027-146, 986027-027, 50303-001, 152166-000	4.9
Boiler Building (Area 600)	Houses two primary electrically powered boilers and one standby natural gas–fired boiler to provide steam for the heating of tank cars during unloading of crude oil; area includes the piping facilities to carry generated steam to the railcar unloading area	SW ¼ Section 19, T2N R1E WM Parcel:152799-000	0.8
Total			47.4

Port = Port of Vancouver, WM = Willamette Meridian

2.2.2.1 Onsite Rail Infrastructure

Existing site rail infrastructure consists of three rail track loops that enter the proposed Facility site from the east and proceed in a clockwise direction around the perimeter of the site (Figure 2-2). The rail track loops split multiple times, creating additional tracks before they exit the site. The Port has permitted and plans to construct several additional rail projects at Terminal 5 as part of the WVFA Project (Table 2-2). This work includes the current construction of WVFA Project 11A, which consists of shifting two existing Terminal 5 rail loop tracks (4105 and 4102) further outward and constructing an additional loop track (4106) between tracks 4105 and 4107, for a total of four loop tracks. In the future, the Port will construct a fifth loop track (4202), which will be located on the inside of the rail loop. The shifting and construction of the rail track loops described above are Port-related rail improvement projects and are not dependent on the proposed Facility being built (Harding, pers. comm., 2015).

As part of the proposed Facility, the Applicant would relocate approximately 1,500 feet of tracks 4106 and 4107 to allow for track tie-ins into the railcar unloading facility in Area 200, for release of tank cars back to the main track from the railcar unloading facility, and to separate tank cars in need of repair or further inspection from the remainder of a unit train (BergerABAM 2015b). As part of the proposed Project, the Port would grant the proposed Facility exclusive use of tracks 4106 and 4107 and the Applicant would construct a new approximately 4,900-foot loop track (4101) on the outside of the existing loop tracks (Figure 2-3). Construction of this new track (4101) would reduce the width of the existing inspection road on the outside of the track from 24 to 13 feet and would require the addition of pullouts to allow vehicle passing. When unloading volumes at the proposed Facility reach and exceed 120,000 barrels per day (bpd), the Port would grant the Applicant exclusive use of track 4105, and at the same time, track 4101 would be transferred to the Port's use and would not be used by the Applicant (Harding, pers. comm., 2015) (Table 2-2).

Table 2-2. Onsite Rail Infrastructure Improvements

Track Number	Activity	Permitted as Part of WVFA Project	Constructed as Part of the Proposed Facility	Operated as Part of the Proposed Facility
4102	Shift existing track (WVFA Project 11A)	X		
4105	Shift existing track (WVFA Project 11A)	X		X[a]
4106	Construct new track (WVFA Project 11A)	X	X (partial relocation)	X
4107	Existing rail line		X (partial relocation)	X
4101	New rail line, reduce width of inspection road, add pullouts[b]		X[c]	
4202	New rail line	X		

Notes:

a When unloading volumes reach and exceed 120,000 bpd, the Port would grant exclusive use of track 4105 to the Applicant.

b Installation of track 4101 requires reduction of inspection road width from 24 feet to 13 feet and the installation of pullouts to allow passing of vehicles.

c When unloading volumes reach and exceed 120,000 bpd, the Applicant would transfer use of track 4101 to the Port.

WVFA = West Vancouver Freight Access

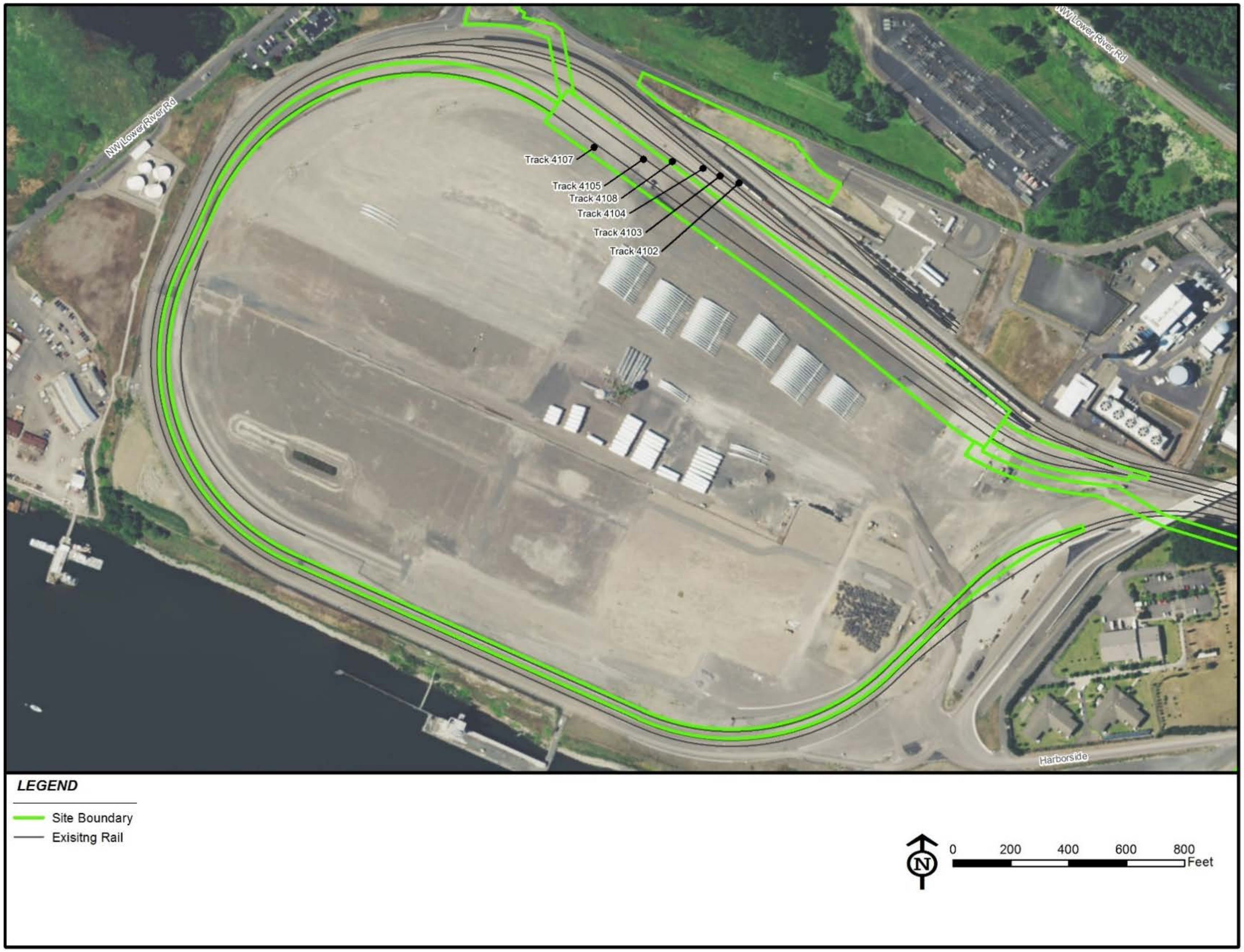

Figure 2-2. Existing Onsite Rail Infrastructure

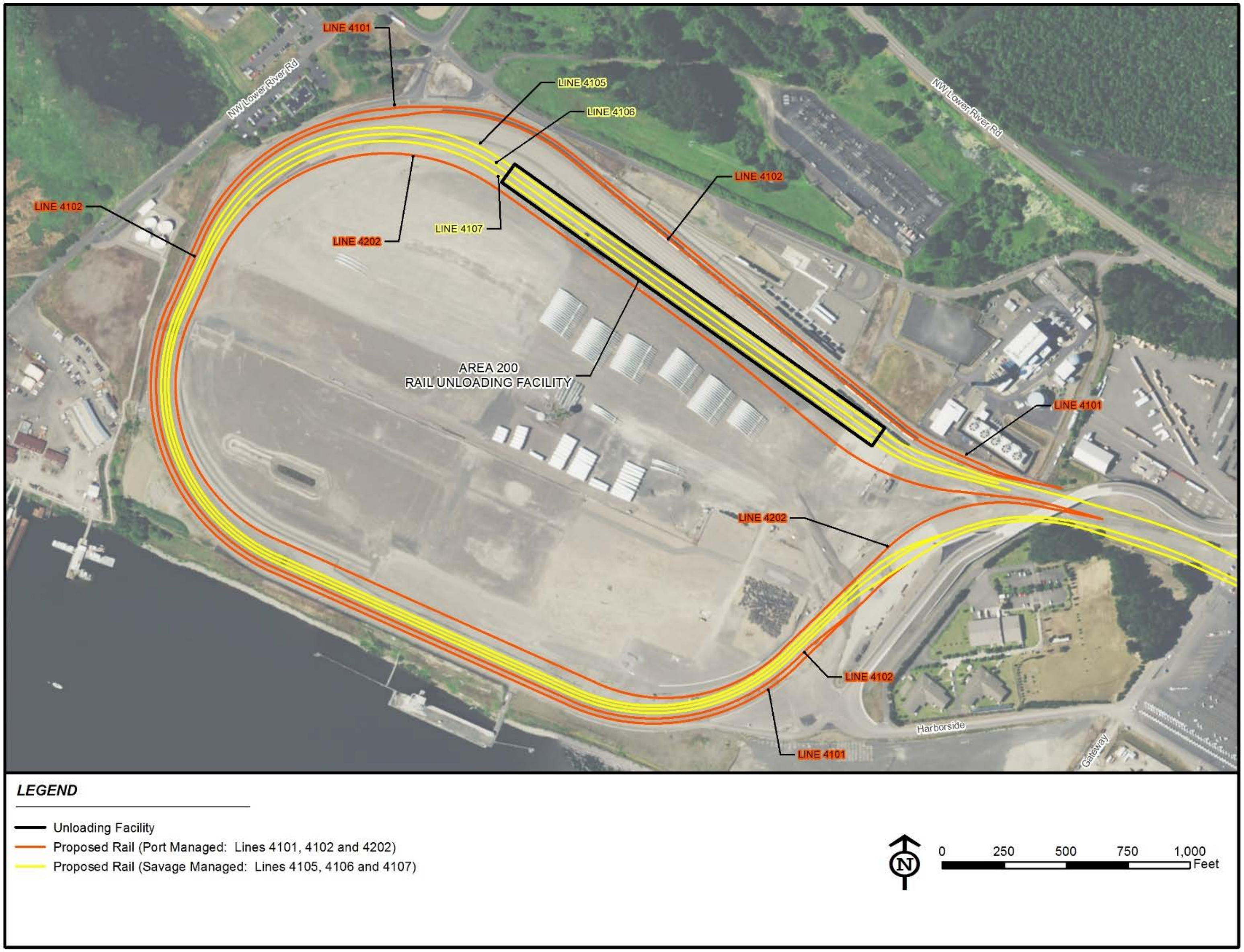

Figure 2-3. Proposed Onsite Rail Infrastructure

2.2.2.2 Administrative and Support Buildings (Area 200)

The proposed Facility would require three approximately 3,400-square-foot office buildings that would house administrative functions, lockers, restrooms, and other employee support facilities within the unloading and office area (Area 200) (Figure 2-1). These buildings would be located on the northern side of the Terminal 5 loop south of an existing private road. Parking and landscaping would be provided.

One pedestrian bridge over the rail lines would be constructed in this area to provide access for workers from the administrative and support buildings to the interior of the rail loop system. Four additional pedestrian bridges would be constructed for workers to pass over the unit trains inside the railcar unloading facility and also to provide worker egress from the rail loop system. The pedestrian bridges would be grated and would be a minimum of 3 feet wide to facilitate emergency access.

To direct the flow of visitors, signage would be located near the administrative and support buildings or near the boiler building (Area 600). Additional signage may be added at existing common Port entrance locations.

Fire Protection Systems

The administrative and support buildings in Area 200 would be equipped with ABC-rated manual fire extinguishers.

2.2.2.3 Railcar Unloading Facility (Area 200)

The railcar unloading facility would encompass portions of rail loops 4105, 4106, and 4107 on the northern part of Terminal 5, south of the administrative and support buildings (Figure 2-1). A pedestrian bridge would provide access from the administrative and support buildings over the rail lines to the railcar unloading facility. Figure 2-4 provides a plan view of the arrangement of the railcar unloading facility with respect to existing rail lines and the administrative and support buildings.

The railcar unloading facility would be a covered structure enclosing three parallel tracks (4105, 4106, and 4107). Each track would include 30 tank car unloading stations, for a total of 90 tank car unloading stations within the entire structure. A crude oil collection pipe header would collect the flow of crude oil from each group of six railcars. Five collection pipe headers would be located along each 30-car track within the railcar unloading facility. Each collection pipe header would be directly connected to a dedicated pumping station that would transfer crude oil into a 24-inch-diameter transfer pipeline. One transfer pipeline would serve each unloading track. The collection pipe headers would be housed in two below-grade trenches running parallel to the rail tracks. Although the primary purpose of the trenches is to house the collection pipe headers, the stormwater and inadvertent release collection line, and electrical and data lines, the trenches would also provide secondary containment in the event of a crude oil release during unloading. The railcar unloading facility would be approximately 1,850 feet long and 91 feet wide with a maximum height of approximately 50 feet. A cross-section view of the railcar unloading facility is shown in Figure 2-5, and a cross-section view of a typical railcar unloading station is shown in Figure 2-6.

Each unloading track within the railcar unloading facility would be capable of unloading crude oils with a viscosity that allows gravity drainage and conveyance without heating. One of the three tracks within the unloading facility (track 4105) would also incorporate railcar steam heating equipment to facilitate high-viscosity crude oil gravity drainage. Steam for this equipment would be generated in a boiler building located west of the administration and support buildings (see Section 2.2.2.7). The crude oil drained from the tank cars would be conveyed through a closed transfer system to either onsite storage tanks or directly to marine vessels.

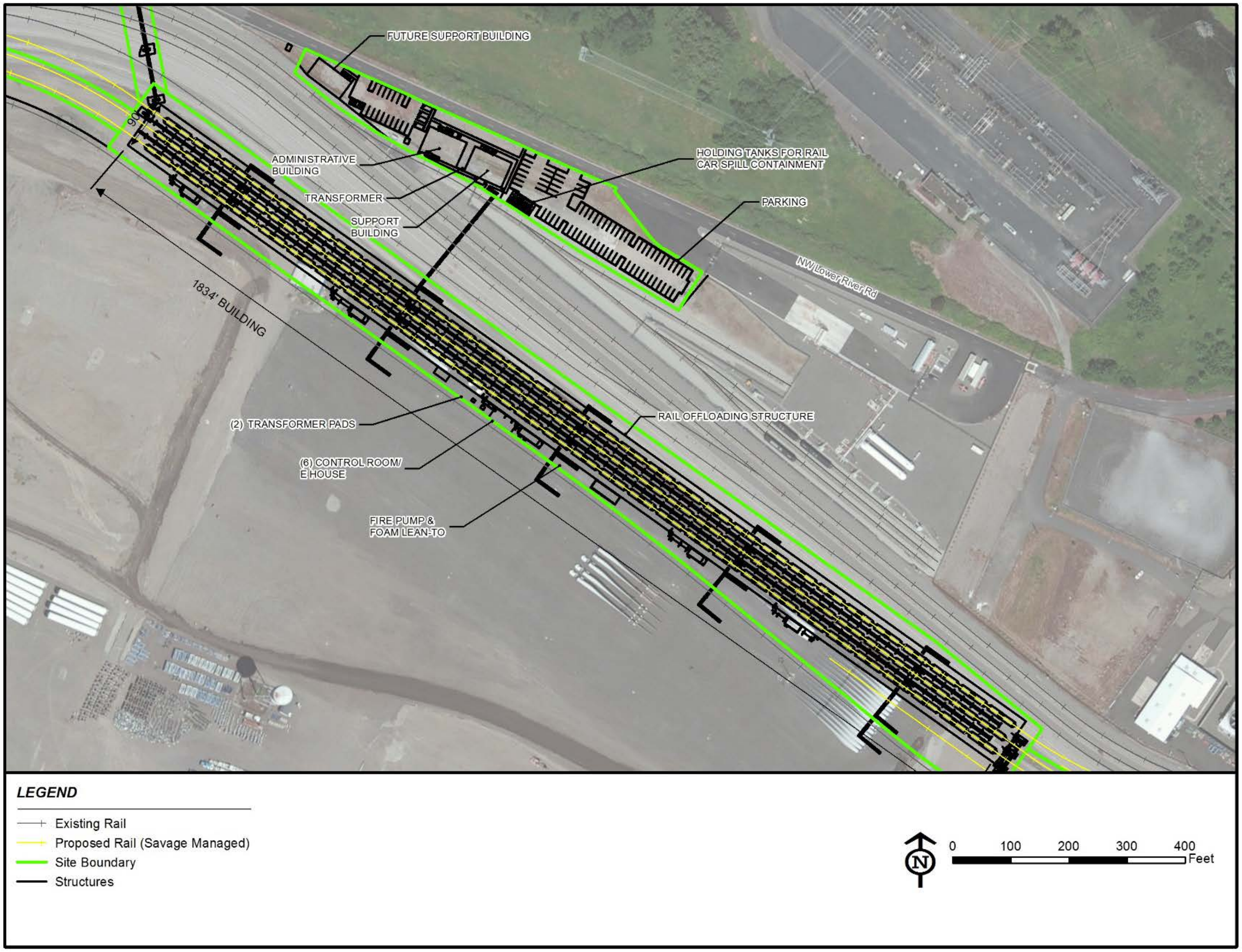

Figure 2-4. Plan View of Railcar Unloading Facility

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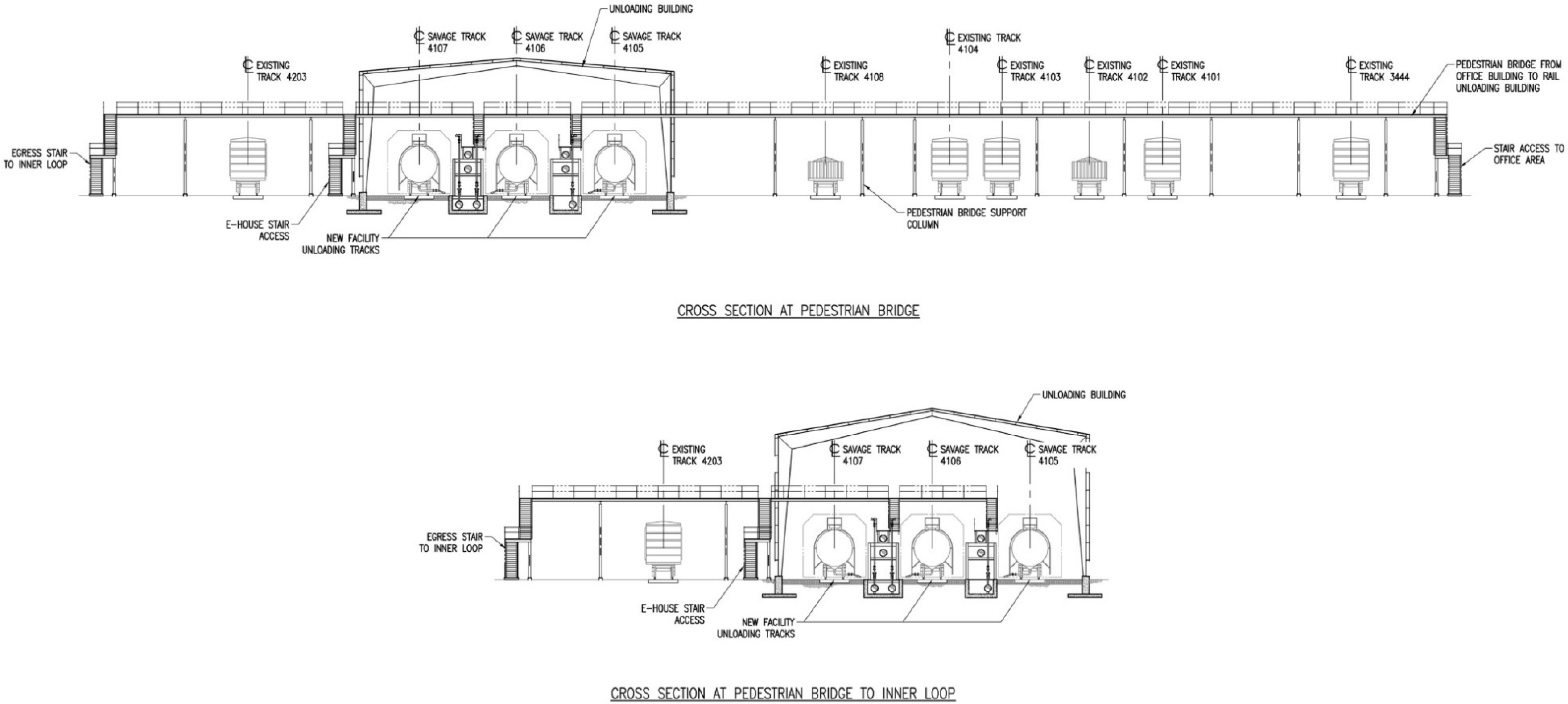

Figure 2-5. Railcar Unloading Facility Cross-Section

Source: BergerABAM 2014a

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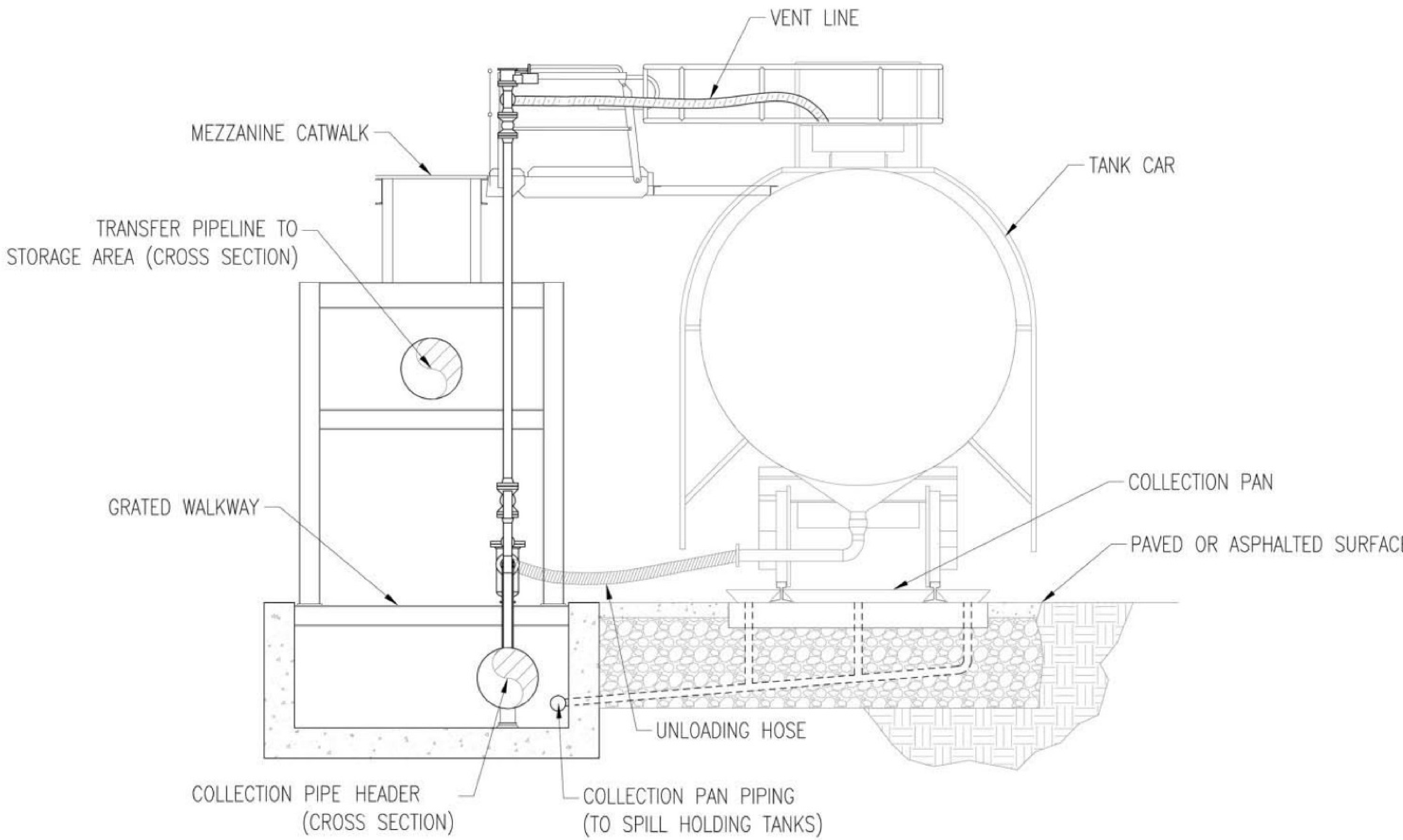

Figure 2-6. Typical Railcar Unloading Station Cross-Section

Source: BergerABAM 2014a

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The following spill or leak containment structures and equipment would be constructed or installed within the railcar unloading area:

- Collection pans between rails would be piped to a separate line that conveys stormwater and inadvertent releases to railcar unloading facility containment tanks (also known as holding tanks).
- Containment tanks would be installed to collect inadvertent releases of crude oil. Leaked or spilled crude oil would be captured in a collection pan, would flow by gravity into a dedicated line, and then be conveyed from the unloading facility to two secondary containment tanks. The tanks would be constructed of steel, covered, and anchored in accordance with applicable seismic design requirements. The two secondary containment tanks would have a total capacity of 1,000 bbl, enough to contain over 130 percent of the contents of a single tank car. If a discharge to these tanks occurred, the contents of the tanks would be removed by vacuum trucks and disposed at an approved offsite location licensed to handle spilled oil.
- Concrete trenches and concrete pump basins would contain the piping and pumping systems associated with the unloading area. These trenches and basins would serve as secondary containment in the event of a release of crude oil from the piping and pumping equipment. The pump basins would measure approximately 58 by 58 square feet and would be 12 feet deep. Trenches and pump basins would be constructed of concrete, coated with sealant, and treated with chemical-resistant joint sealant. The trenches would be designed to be watertight using a water stop at the concrete joints to prevent groundwater from entering the trench and to contain water collected within the trench. The containment trenches would be installed between, and adjacent to, the tracks of the railcar unloading facility to capture any rainwater, inadvertently released oil, and fire retardant, and would be directed to sump pumps installed at low points within each containment trench. The sump pumping system would transfer such nonprocess wastewater to the railcar unloading facility containment tanks, where it would be removed by a vacuum truck or pumped out of the tanks and hauled offsite to a licensed and approved disposal facility.
- Improved ground surfaces within the railcar unloading facility would be constructed of concrete.

E-Houses and Control Systems

The tank car unloading process would be controlled from six electrical houses (E-houses), enclosures specifically built to protect critical electrical equipment. These E-houses would be approximately 825 square feet with a maximum height of 15 feet and would be pad-mounted on 225-square-foot pads. The E-houses would be constructed adjacent to the railcar unloading facility. The tank car unloading primary control system and the primary control system managing the flow of crude oil from the railcar unloading facility to the storage tanks would also be located in these E-houses.

Fire Protection Systems

A fire pump and foam building housing an emergency fire pump and fire protection systems would be located on the southwestern side of the railcar unloading facility (Figure 2-4). A small storage tank of 500 gallons or less to hold ultralow sulfur diesel fuel and a fire foam concentrate tank (1,000 gallons) would be located inside the fire pump and foam building. The single-story building would have an approximate footprint of 750 square feet. The fire pump and foam building would have a closed-head wet-pipe water-only sprinkler system that would be compliant with NFPA 20 and would automatically be activated by a fire.

Fire hydrants would be located at 300-foot intervals along the south side of the railcar unloading area. In addition, an interlock pre-action 3 percent foam-water sprinkler system would serve the railcar unloading area and would include automatic and manual foam release systems, temperature monitors, pump monitors, linear heat detectors, gas detectors, manual alarm stations, tamper-resistant systems, and automatic exterior alarm horns and strobes. The sprinkler system would activate as necessary and would be designed with a density of 0.30 gallons per minute (gpm)/4,000 square feet with a hose allowance of 500 gpm. The system would be installed under walkways, in the pump basin areas, and at the roof level of the railcar unloading structure. Once activated, the foam-water sprinkler system would control or extinguish a crude oil pool fire and would provide cooling to railcars and nearby buildings and equipment. In addition to the automatic fire suppression system, manual pull stations would be located within 5 feet of each egress point and near the fire alarm control panel, which, when pulled, would activate the alarm system and commence shutdown of crude oil transfer operations. The manual foam release stations would be located near stairway exit paths.

2.2.2.4 Storage Tanks (Area 300)

Six aboveground storage tanks would be constructed to temporarily store crude oil received at the proposed Facility prior to loading onto marine vessels (Figure 2-7). The storage tanks would be double-bottomed and would have both a fixed external roof and an internal floating roof. The storage tanks would be approximately 50 feet in height and 240 feet in diameter. The net working capacity of the storage tanks would be approximately 340,000 bbl per tank, with an additional 20,000 bbl as a minimum operating volume that would remain in the concave bottom of the tank. The normal fill level of the tank represents the maximum volume of liquid stored on a normal operating basis, which is the sum of the minimum operating volume (20,000 bbl) and the net working capacity (340,000 bbl) for a total of 360,000 bbl. The tanks have been designed to accommodate an additional volume of 15,000 bbl for overfill protection, which under normal operating conditions would remain empty.

All of the tanks would be equipped with mixers to prevent heavier liquid crude oil fractions[5] from settling to the bottom of the tank and stratifying during storage. Each tank would have a fixed roof to keep precipitation from reaching the inside of the tank and an internal floating roof with dual seals[6] to control vapor emissions to the atmosphere. The primary floor of each tank would provide initial containment, and the second floor of each tank would act as secondary containment. The interstitial space within the double-bottomed tanks would include a leak detection system between the tank floors. Two of the six tanks would be fitted with electric tank heaters to increase the flow characteristics of higher viscosity crude oils that flow more easily at higher temperatures (Figure 2-8).

The storage tanks would be placed in an area surrounded by a containment berm and lined with an impervious membrane. This containment area would have a capacity at least equal to 110 percent of the volume of one storage tank in addition to the volume of water from a 24-hour, 100-year storm event. As additional protection, 24-inch-high intermediate berms would be installed within the larger containment area to separate each of the six tanks. The impervious membrane lining the containment berm would prevent downward migration of crude oil releases into the underlying soil profile. The impervious membrane liner would either be tied into the tank foundations or would cover the entire containment area (Figure 2-9).

5 When mixed, different oil types will separate and settle or rise depending on the hydrocarbon composition.

6 The internal floating roof of the crude oil storage tanks would have primary and secondary rim seals. The typical arrangement of such seals is a mechanical shoe primary seal that presses against the wall of the tank, and a secondary seal wiper mounted above the primary seal to provide additional control of evaporative losses.

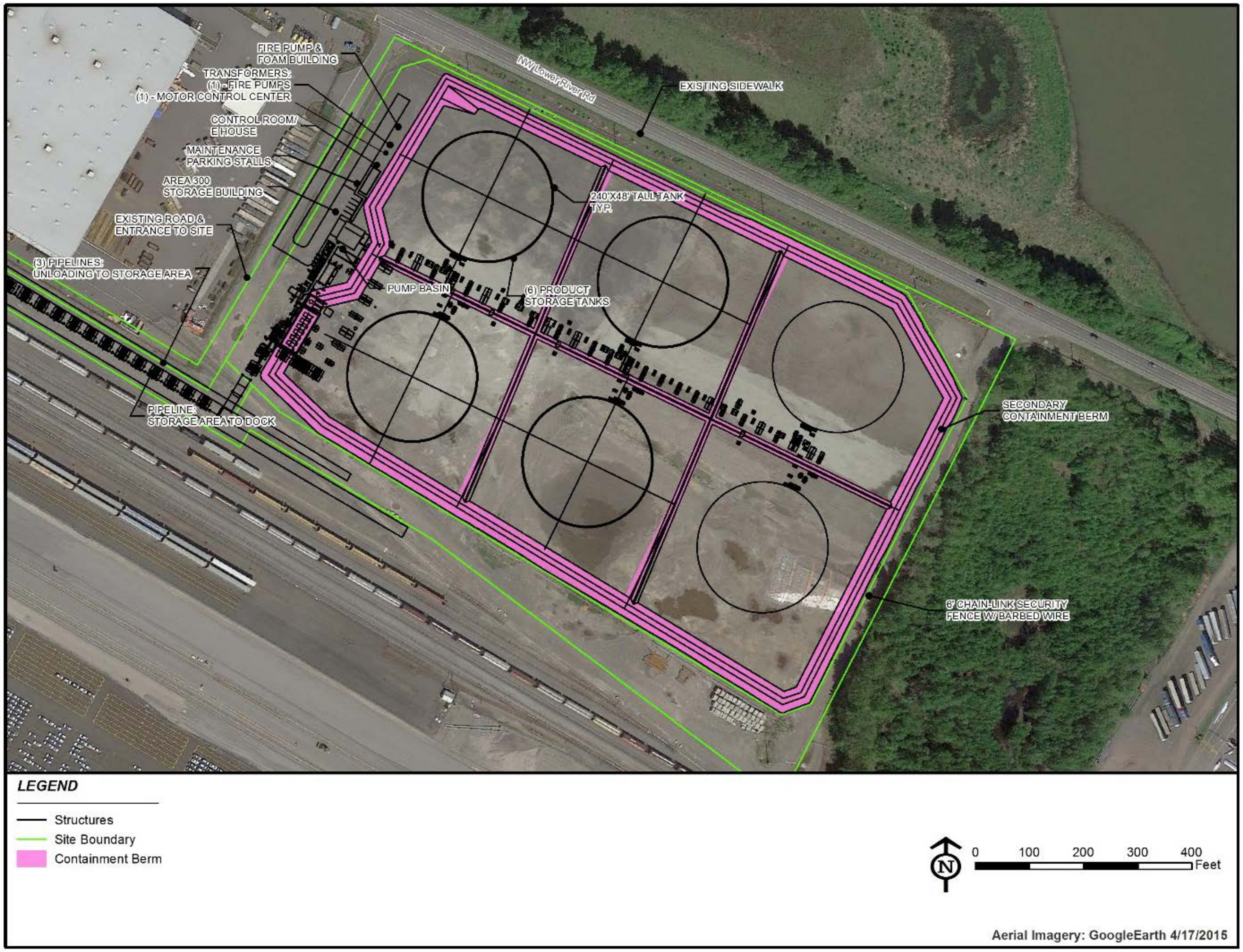

Figure 2-7. Storage Tanks (Area 300)

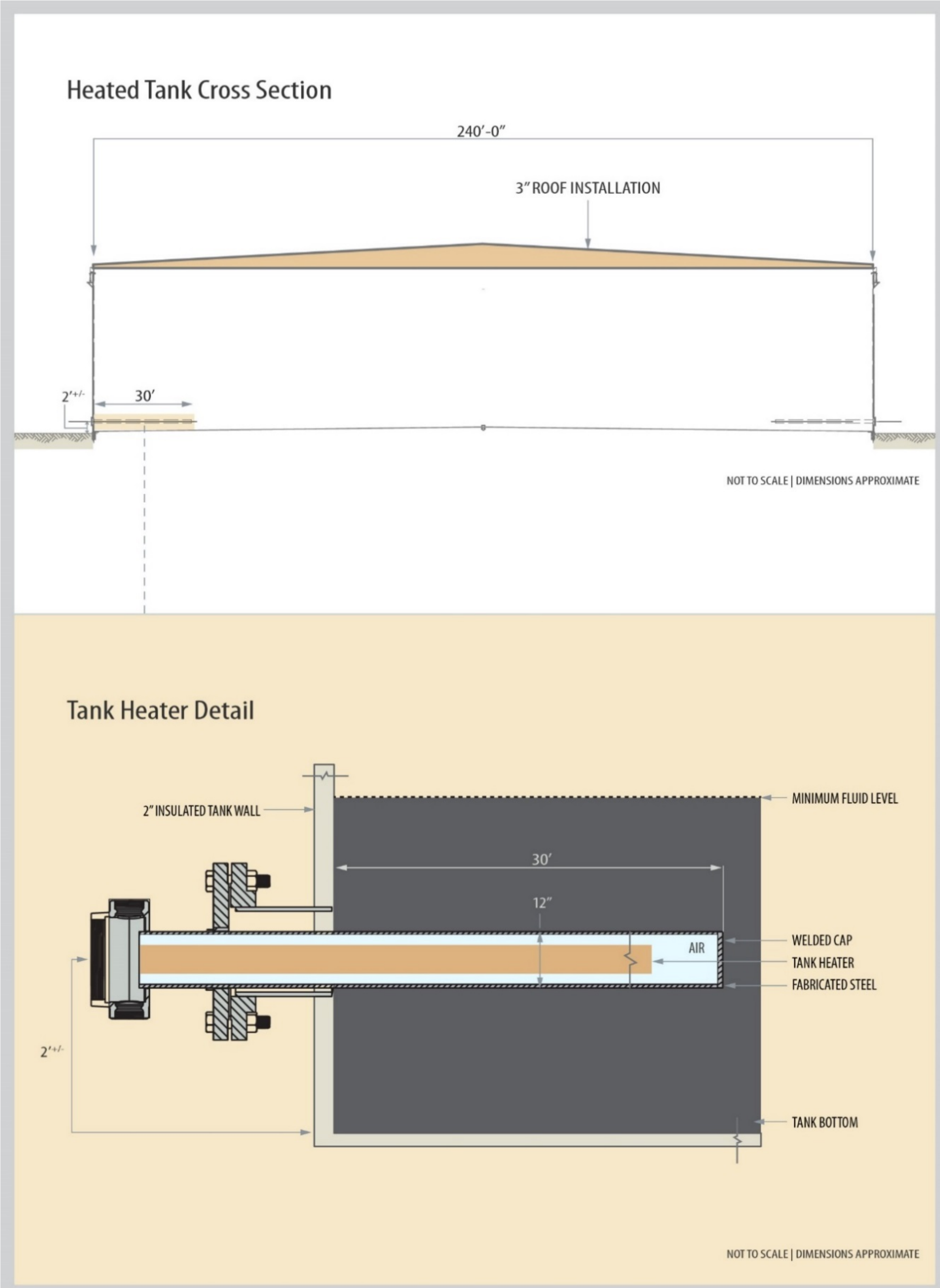

Figure 2-8. Schematic of Typical Heated Tank

Source: BergerABAM 2015c

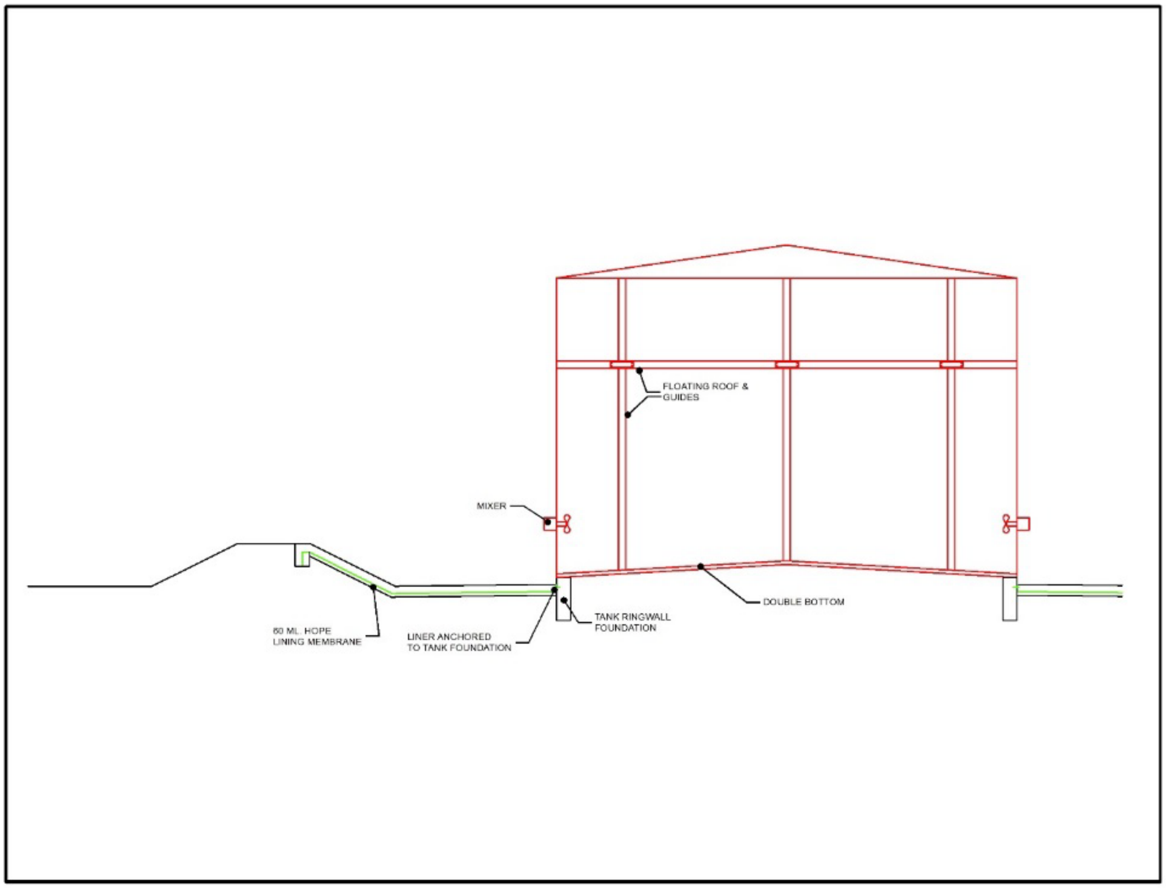

Figure 2-9. Cross-Section of Typical Storage Tank with Containment Berm

Source: BergerABAM 2014a

The Applicant proposes the following measures to prevent or contain discharges of oil from the storage tanks:

- The Applicant has committed to design the storage tanks to meet the NFPA 30 requirements and associated manufacturing standards, which would include measures to prevent tank overfill.
- The Applicant would use industry standard testing techniques to ensure that the tanks are constructed in accordance with prescribed design specifications.
- Cathodic protection of the tank components would be used to prevent corrosion from compromising tank integrity.
- Hydrostatic testing of the tanks would be conducted to ensure they can withstand operational stresses and loads prior to receiving crude oil.
- The storage tanks would be constructed on a concrete foundation/ringwall with a double tank bottom equipped with interstitial leak detection.

A fire pump house and foam building would contain an emergency fire pump and fire protection systems for storage operations. A small storage tank of 500 gallons or less would be located adjacent to the emergency fire pump to hold ultralow sulfur diesel fuel used to fuel the fire pump. The fire foam building would have a footprint of approximately 180 square feet; the fire pump house would have a footprint of approximately 750 square feet and would be single-story. A storage building would also be constructed.

Fire Protection Systems

If activated by the linear heat detection system or by the manual foam release station, an automatic fixed foam system located in each of the six aboveground storage tanks would discharge a 3 percent foam-water solution to protect the seal area of the internal floating roof from fire. The fire alarm system would be activated once sufficient heat from the fire reaches the linear heat detection cable located around the foam dam. Furthermore, like the railcar unloading area (Area 200), the fire pump and foam building in the storage tank area (Area 300) would have a closed-head wet-pipe water-only sprinkler system that would be automatically activated by a fire.

In addition to the automatic fire suppression systems, manual pull stations would be located at each egress point from the fire pump and foam building and E-house. When pulled, the manual pull stations activate the alarm system, thereby notifying the supervising station of the fire and commencing shutdown of crude oil transfer operations. The manual foam release stations would be located near the base of the stairs on the tanks, on a bank of release stations located at the fire pump and foam building, and at the top of the berm near the closest fire hydrant for each tank. Fire hydrants each equipped with a monitor nozzle, foam eductor, and pick-up line would be spaced at a maximum distance of 300 feet apart. Water supplied from the fire hydrants and applied to the storage tanks via the monitor nozzle would provide a cooling effect on the tanks. The foam eductor, when used in combination with the monitor nozzle, could be used to apply a foam-water solution to control a small pool fire within the berm area. In addition, an elevated monitor nozzle would be located near the crude oil pump basin and could provide manual fire suppression to the pump basin using foam-water solution supplied by the fire pump and foam building.

2.2.2.5 Marine Terminal (Area 400)

The proposed marine terminal would consist of two modified access trestles and two modified T-shaped docks that form two berthing locations (Berths 13 and 14) with associated marine vessel mooring elements. The terminal would be located south of the existing Subaru facility on the northern bank of the Columbia River (Figure 2-10). Crude oil would be transferred via pipeline to vessels at Berth 13. Berth 14 would be used to store equipment and perform operations associated with spill prevention and response. A mechanically operated 5-ton 30-foot-high crane would be installed at Berth 14 along with a workboat cradle (with trailer) for storage of an aluminum skiff. The navigation channel of the Columbia River at this location of the marine terminal is maintained at a depth of −43 feet (zero Columbia River datum [CRD]). The Port is permitted to deepen and maintain the berths at this location to the same depth.[7]

Existing Dock, Trestles, and Berths

The two existing berths (Berths 13 and 14) are steel pile–supported docks consisting of concrete-decked access trestles, T-shaped docks, four breasting dolphins,[8] and three mooring dolphins. The four breasting dolphins are steel pile–supported concrete structures connected to the T-shaped docks by steel-grated walkways. The three mooring dolphins are steel pile–supported concrete structures located between the shoreline and the docks (Figure 2-10).

7 USACE Nationwide Permit No. 2007-916, City of Vancouver Permit No. SHL2012-0017, Washington Department of Fish and Wildlife (WDFW) Hydraulic Project Approval Control Number 129626-1.

8 Dolphins are permanent isolated structures associated with docks to aid in positioning and securing of vessels to the dock; breasting dolphins are typically placed to keep the vessels from pressing against the pier and mooring dolphins are used to keep the vessels in a secured position at dock.

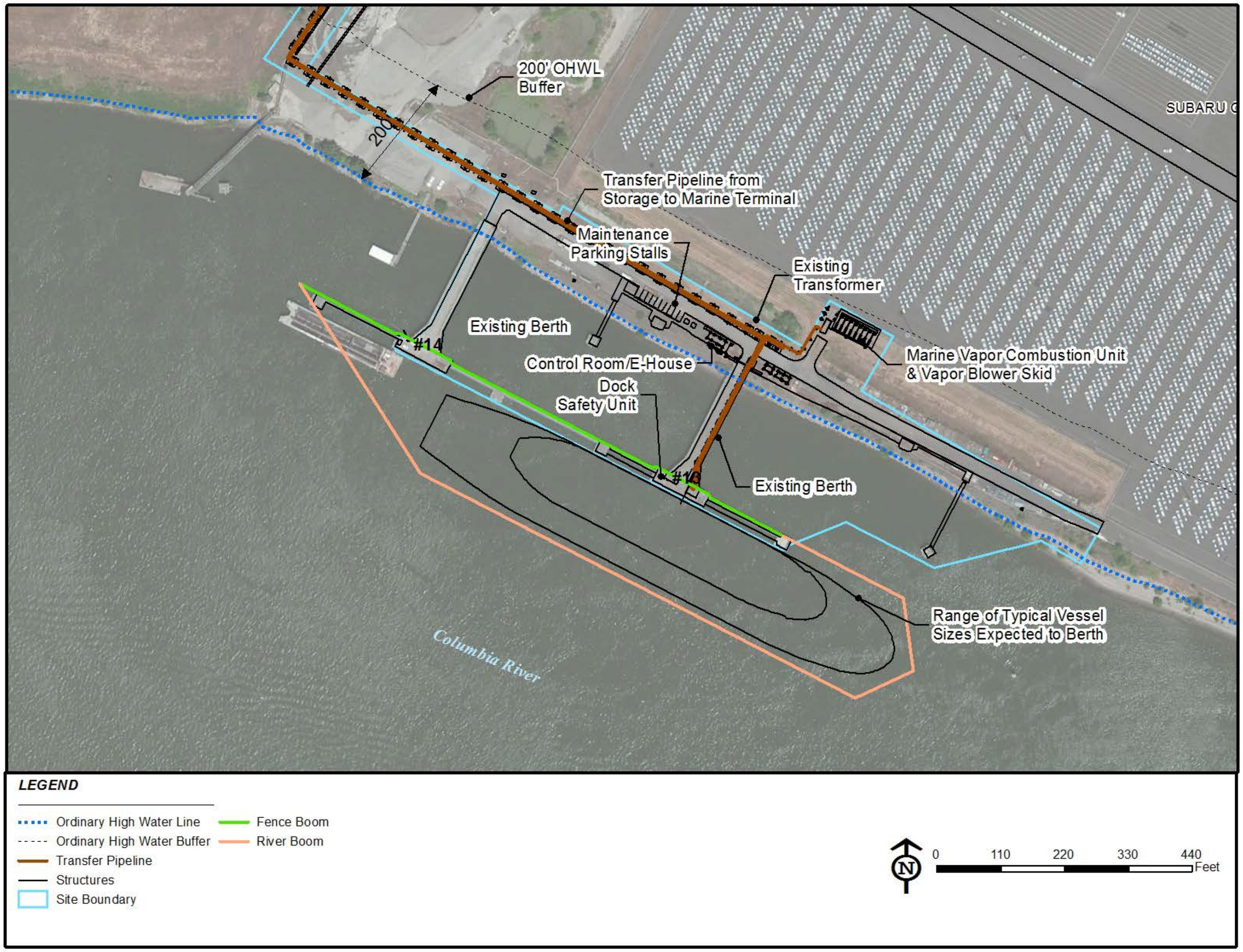

Figure 2-10. Marine Terminal (Area 400)

Note: An enlarged version of this figure is available in Appendix P.11.

Proposed Dock Modifications

To obtain an optimal mooring configuration and to meet current seismic standards, the Applicant has proposed the following modifications at the marine terminal to accommodate the proposed Facility:

- Removal of one breasting dolphin and associated walkway.
- Reinforcement of existing steel pipe piles supporting the Berth 13 dock, two breasting dolphins, and two mooring dolphins, including removal and replacement of decking and pile caps.
- Replacement and upgrade of existing steel trusses and walkways between Berth 13 and two breasting dolphins.
- Addition of a new movable walkway between two mooring dolphins and the shoreline.

Marine Vapor Combustion Unit

Up to eight marine vapor combustion units (MVCUs) would be installed on a 50- by 100-foot concrete slab adjacent to the existing Subaru facility. The MVCUs are used to combust hydrocarbons in the vapors expelled from empty marine vessels during the crude oil loading process. Each MVCU would be fitted with a 25-foot-high, 44-inch-diameter, steel exhaust stack. Additional details on the MVCUs are presented in Section 2.4.1.5.

E-House and Control Systems

The transfer of crude oil to the marine vessel loading facility would be controlled from a control room housed within a single-story E-house located adjacent to the marine terminal. The E-house would have a footprint of approximately 1,250 square feet. This system would control the flow of crude oil from the storage tanks to the marine loading system. Separate fire suppression control and gas detection systems would be provided at the marine terminal.

Fire Protection Systems

Two remote-controlled foam-water elevated monitor nozzles would be installed at the marine loading dock and would be supplied by the fire pump and foam building. The nozzles would be activated by manual foam release stations (located in the E-house and throughout the marine terminal, including at the loading berth) in the event of a fire on the berth or on a vessel. As with the unloading and office area and the storage area, the marine terminal would have a closed-head wet-pipe water-only sprinkler system that would be automatically activated by a fire. In addition to the automatic fire suppression systems, manual pull stations would be located at each egress point from the fire pump and foam building and E-house. When pulled, the manual pull stations would activate the alarm system, thereby notifying the supervising station of the fire and commencing shutdown of crude oil transfer operations.

A fire hydrant would also be located near the marine terminal. In the event of a vessel fire, international hose connections that would be located on the dock could be used to connect to the onboard fire protection system for an additional fire water supply.

2.2.2.6 Transfer Pipelines (Area 500)

A combination of aboveground and belowground steel pipelines would convey crude oil from the railcar unloading facility to the storage tanks and from the storage tanks to the marine vessel loading system (Figure 2-11). The transfer piping system would also be designed to allow crude oil to be conveyed directly from the railcar unloading facility to the marine vessel loading system. This design would allow occasional topping off of vessel loads and also allow the proposed Facility to begin limited operation prior to completion of storage tank construction. The transfer pipeline system would include:

- Three 24-inch-diameter, approximately 1,800-foot-long pipelines parallel to the railcar unloading facility to collect the crude oil from the collection pipe headers. One of these pipelines would be electrically heat-traced[9] to ensure that the temperature of more viscous crude oil types received at the proposed Facility would be maintained at approximately 150 degrees Fahrenheit (°F) during conveyance from the railcar unloading facility.
- Three 24-inch-diameter, approximately 5,500-foot-long pipelines extending from connections with the 24-inch-diameter pipelines paralleling the railcar unloading facility to the storage tanks in the storage area (Area 300). One of these pipes would also be electrically heat-traced to ensure that the temperature of more viscous crude oil types would be maintained at approximately150°F during conveyance from the unloading facility to the storage area.
- One 36-inch-diameter, approximately 5,300-foot-long pipeline to connect the storage tanks with the marine vessel loading system in the marine terminal (Area 400). This pipeline would be electrically heat-traced as well to ensure that the temperature of more viscous crude oil types would be maintained at approximately150°F during conveyance from the unloading facility to the storage area.
- One 6- to 12-inch-diameter, approximately 5,300-foot-long pipeline to return crude oil from the vessel loading system back to the storage tanks when necessary, such as during loading process shutdowns. Since the pipeline is not normally in use, it would also function as a pressure relief system that would alleviate pipe hammer[10] in the pipe conveyance system during rapid valve closures.
- One 16- to 22-inch-diameter, approximately 600-foot-long pipe to deliver hydrocarbon vapor displaced from crude oil holding tanks during loading of vessels to the MVCUs (see Section 2.4.1.5 for more information on the MVCUs).
- A skid-mounted 50- by 100-foot proving (flow/volume meter) station would be installed on a concrete pad at the exit of the unloading and office area (Area 200). The proving station includes a series of flow meters that are used to verify the volumetric flow of crude oil through the transfer pipelines as the crude oil is conveyed in the transfer pipelines from the railcar unloading facility (Area 200) to the storage tank area (Area 300) or marine terminal (Area 400).

Fire Protection Systems

New fire hydrants would be installed in the vicinity of the pipeline alignment to augment the water supply available from existing fire hydrants in the vicinity of the transfer pipelines (Area 500).

9 Heat-traced pipelines are externally heated insulated pipes. They would be used to transfer higher viscosity crude oils that flow more easily at higher temperatures.

10 Pipe hammer or transient pressure wave is the momentary increase in pressure that occurs in a liquid pipe system with a sudden change of direction or velocity of the liquid. When a rapidly closed valve suddenly stops flow in a pipeline, pressure energy is transferred to the valves and piping.

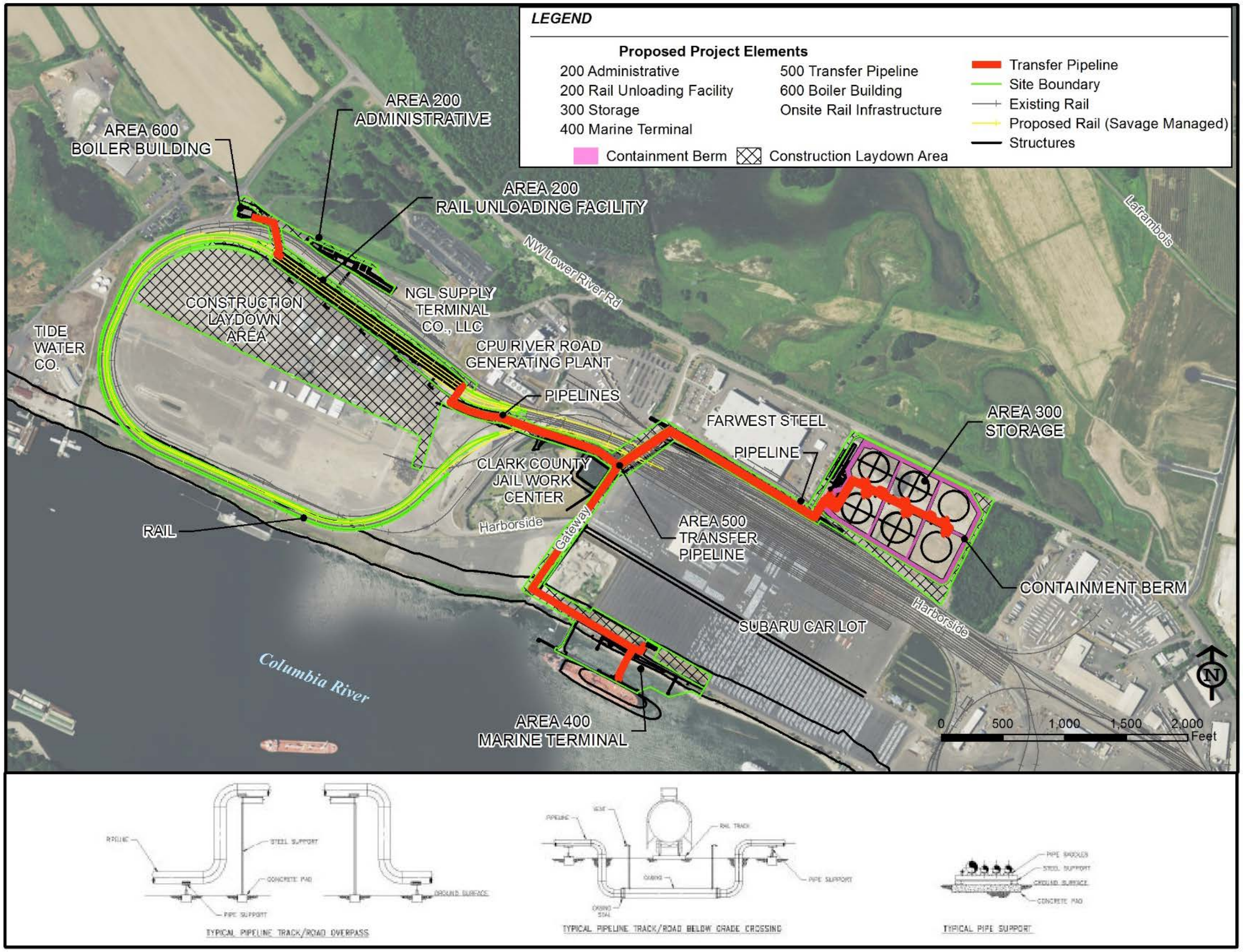

Figure 2-11. Transfer Pipeline System

Note: An enlarged version of this figure is available in Appendix P.11.

2.2.2.7 Boiler Building (Area 600)

The boiler building would be located west of the administration and support buildings (Figure 2-1). This building would have a footprint of approximately 6,000 square feet and would be approximately 45 feet high. It would house three natural gas–fired boilers, each with a capacity of 62 million British thermal units per hour, to provide steam for the heating of tank cars during unloading of crude oil. Natural gas would be supplied to the building from an upgraded existing natural gas pipeline serving the area. Steam from the boilers would be delivered to the point of use through insulated pipelines.

The boilers would use potable water obtained from the City of Vancouver (City) to generate steam, which would be treated with a standard commercial water softener. The softened water would then be treated, as needed, with a scale inhibitor, a corrosion inhibitor, and an oxygen scavenger. The pH of the water would be adjusted to the extent required. Boiler blowdown[11] water would be cooled to reduce its temperature below 140°F and then would be pumped to the unloading and office area (Area 200), where it would be treated with an oil-water separator and mixed with domestic wastewater from the administration buildings prior to discharge to the existing Terminal 5 sanitary sewer system.

Fire Protection Systems

The Applicant proposes to install manual fire extinguishers, manual and automatic alarms, and smoke detectors at the boiler building. Adjacent hydrants would provide water supply for fire protection.

2.3 FACILITY CONSTRUCTION ACTIVITIES

This section describes the Applicant's proposed construction schedule, general construction activities and procedures, and details on the construction of specific elements of the proposed Facility.

2.3.1 Construction Schedule

Construction activities at the proposed Facility would occur over an 18-month construction period. The following Facility elements would be completed during the first 12 months of the construction period:

- All ground improvements necessary for the proposed Facility.
- A new, approximately 4,900-foot-long loop track (4101) to be located on the outside of the existing loop tracks.
- Relocation of approximately 1,500 feet of tracks 4106 and 4107 to allow for track tie-ins into the railcar unloading facility.
- Two of the three railcar unloading structures at the railcar unloading facility, including foundations, trenches, pump basins, catwalks/gangways, and piping necessary to support operations for two unloading tracks (tracks 4106 and 4107).
- The administrative building.
- One of the two support buildings.
- The entire exterior containment berm sized and designed for 110 percent of the largest storage tank and the rainfall from a 24-hour, 100-year storm event.
- Four of the six storage tanks.

11 Boiler blowdown is water intentionally expelled from a boiler to avoid excessive concentration of impurities.

- Intermediate berms sized to contain 10 percent of the contents of a tank.
- Facilities to capture, treat, and convey stormwater associated with four of the six storage tanks.
- Transfer pipelines serving the concurrent unloading of unit trains staged at two unloading tracks described above (tracks 4106 and 4107), including transfer pipelines to the storage area.
- Transfer pipelines serving the conveyance of crude oil from the storage area to the marine terminal, including the associated return line.
- All proposed improvements at Berths 13 and 14.
- The entire dockside safety unit and MVCU system.
- Fire suppression facilities sufficient to meet the suppression needs of the facilities installed.

Immediately following completion of the Facility elements listed above, work on the following Facility elements would begin. These would be completed during the final 6 months of the 18-month construction period:

- The second support building.
- Two additional storage tanks, each with the capability to accept heated crude.
- The third railcar unloading structure at the railcar unloading facility, including trenches, pump basins, catwalks/gangways, and piping necessary to support operations for one unloading track (track 4105), with the ability to handle heated crude oil.
- Transfer pipelines serving the concurrent unloading of unit trains staged at one unloading track (track 4105), including transfer pipelines to the storage area, with the ability to handle heated crude oil.
- Stormwater facilities to capture stormwater associated with these two storage tanks.
- The boiler building in Area 600 and a storage building in Area 300.
- Fire suppression facilities sufficient to meet the suppression needs of the additional facilities installed.

2.3.2 General Construction Activities and Procedures

2.3.2.1 Site Preparation and Restoration

Construction areas would be secured with temporary or permanent fences to control construction site access. Primary controlled construction access would be from the existing Gateway overpass located east of the proposed Facility. Secondary controlled access from the west would be at the western entrance to Terminal 5 and from the east would be through the storage area (Area 300) (Figure 2-12).

Construction laydown areas include approximately 57.2 acres of previously disturbed areas within and external to the proposed Facility boundary (Figure 2-12). These areas would be established for temporary construction trailers, storage of construction equipment and materials, and construction employee parking. Areas adjacent to the proposed transfer pipeline systems would be used to stage pipe prior to and during construction. Field toilets and temporary holding tanks would be installed for construction personnel. During construction, potable water would be provided in containers until permanent potable water service is established.

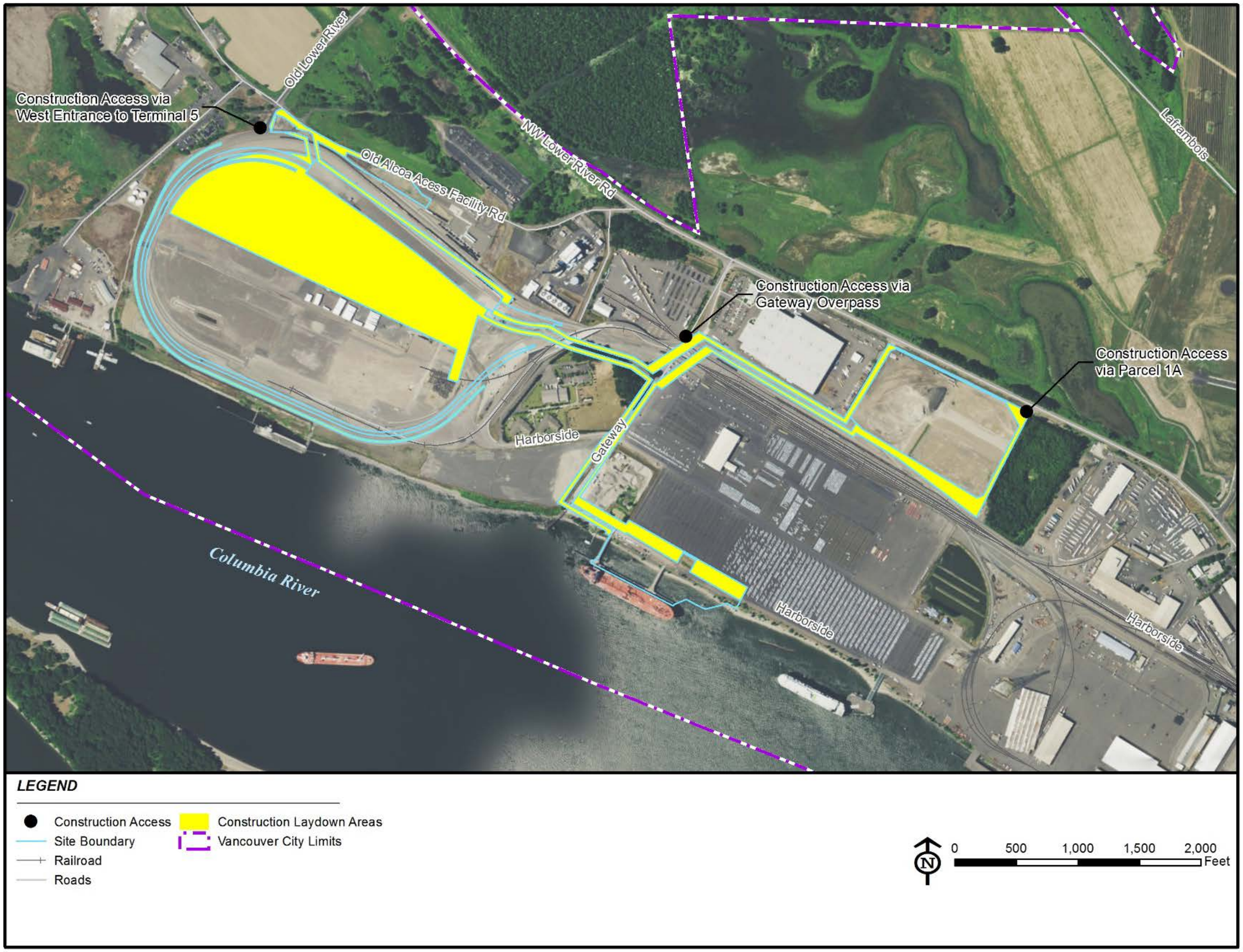

Figure 2-12. Temporary Construction Access and Laydown Areas

Where necessary to facilitate construction, existing aboveground and underground utilities, rail loops, and dock structural components would be removed and reinstalled as necessary. These construction activities would be coordinated with the owners and operators of these facilities.

The site is relatively flat, and limited grading would be required. Conventional construction equipment, including bulldozers, front-end loaders, trucks, scrapers, and graders, would be used for the grading of the site. Foundations required to support proposed Facility buildings and structures would be installed. After foundation installation, the overlying structures would be constructed.

Some foundations and utility and pipeline excavations may require dewatering during construction. It is anticipated that groundwater inflow, if encountered, would be controlled by pumping from sumps. A waste determination would be conducted for any groundwater that is extracted during dewatering activities in locations subject to restrictive covenants to determine appropriate disposal methods. See Section 3.3.3.1 for additional information on dewatering activities and procedures.

Construction best management practices (BMPs) would be followed to reduce impacts to water and air quality during construction (Table 2-3).

All temporary construction features, equipment, and excess materials would be removed at the end of the construction period. Surface restoration measures would be completed within 14 days following the completion of ground-disturbing activities. Disturbed ground would be seeded or alternatively stabilized consistent with the approved Project design. Some temporary stormwater control elements may remain onsite until the site is fully stabilized.

Table 2-3. Construction Best Management Practices by Proposed Facility Element

Best Management Practices	Rail Infrastructure	Unloading and Office Area (Area 200)	Storage Tanks (Area 300)	Marine Terminal (Area 400)	Transfer Pipelines (Area 500)	Boiler Building (Area 600)
Installation of silt fencing	X	X	X	X	X	X
Installation of high-visibility fencing		X	X		X	
Installation of sediment pond		X	X			
Use of straw wattles			X	X	X	
Use of inlet protection	X	X	X	X	X	X
Stabilization of construction entrance		X	X			X
Use of temporary seeding/mulching			X	X	X	X
Installation/use of concrete washout berms		X	X			
Implementation of the Stormwater Pollution Prevention Plan	X	X	X	X	X	X

Source: BergerABAM 2014a

2.3.2.2 Ground Improvements

A variety of ground improvement methods would be implemented at the proposed Facility site to mitigate potential liquefaction-induced settlement, lateral spreading, and lateral deformations caused by a seismic event. The purpose of the ground improvements is to limit the potential for damage resulting from seismically induced liquefaction consistent with Facility structural and safety requirements. Approximately 160,000 cubic yards of aggregate materials and approximately 18,000 tons of cement would be required for ground improvements. Some or all of the following ground improvement systems could be used during construction of the proposed Facility.

- **Vibroreplacement** is the construction of dense aggregate columns (stone columns) by means of a crane-suspended downhole vibrator, to reinforce soils and densify granular soils. Vibroreplacement stone columns are constructed with either the wet top feed process or the dry bottom feed process.
- **Dry soil mixing** is a ground-improvement technique that improves the characteristics of soft, high-moisture-content clays, peats, and other weak soils, by mechanically mixing them with a dry cementitious binder to create *soilcrete*.
- **Wet soil mixing**, also known as the deep mixing method, is a ground-improvement technique that improves the characteristics of weak soils by mechanically mixing them with cementitious binder slurry.
- **Jet grouting** is a grouting technique that creates in situ geometries of soilcrete (grouted soil), using a grouting monitor attached to the end of a drill stem.
- **Wick drains** are a ground-improvement technique that provide drainage paths for porewater in soft compressible soil, using prefabricated geotextile filter-wrapped plastic strips with molded channels.
- **Driven piles** are deep foundation elements driven to a design depth or resistance and are a common construction technique for addressing weak soils.
- **Spread footings** are shallow foundation elements that are constructed by excavating a footing footprint, layering base materials, concrete forming and pouring, and backfilling. Spread footings are a common construction technique for addressing weak soils.

The ground-improvement methods proposed by the Applicant for each of the proposed Facility areas are described in Table 2-4.

Table 2-4. Proposed Ground Improvements at the Facility Site

Proposed Facility Element	Proposed Ground Improvements
Storage Tanks (Area 300)	Stone columns would be installed with a vibroreplacement method beneath each tank. Columns would be 3 feet in diameter and spaced approximately 8 feet apart (on center) in a square grid configuration. Depths of the columns would vary from 35 to 43 feet below ground surface (bgs), depending on soil condition. To address the poor soil conditions underlying Tank 1, the base design in this area would be supplemented with 2 additional rings of stone columns to a depth of 30 feet. Stone columns would also be installed beneath the transfer pipelines within the berm in the storage area (Area 300). Columns would be 3 feet in diameter and spaced approximately 8 feet apart (on center). Depths of the columns would vary from 25 to 47 feet bgs, depending on soil condition.

Table 2-4. Proposed Ground Improvements at the Facility Site

Proposed Facility Element	Proposed Ground Improvements
Marine Terminal (Area 400)	A combination of stone columns, deep soil mixing, and jet grouting along the transfer pipeline alignment and at the marine terminal abutment. Deep soil mixing panels would be 55 feet long and 6 feet wide, spaced 35 feet apart, and would extend to a depth of approximately 45 feet. Vertical support of the pipe-rack foundation would be provided by jet grout columns beneath the deep soil mixing panels. The jet grout columns would be 8 feet in diameter and would extend approximately 32 feet beneath the deep soil mixing panels. The shoreline area would be stabilized against liquefaction by a buttress of stone columns installed between the deep soil mixing panels and the top of the bank. Stone columns would be 3 feet in diameter, spaced 8 feet apart (on center), and extend to the dense soils approximately 78 feet bgs. Ground improvements near the marine terminal abutment would include a block of jet grout columns installed just landward of the ordinary high water mark, in an area 160 feet long and 72 feet wide, parallel to the river. Jet grout columns would be 6 feet in diameter and installed to a depth of approximately 78 feet. Just landward of this jet grout block, ground improvements combining deep soil mixing and jet grout would be constructed to support marine terminal (Area 400) facilities.
Transfer Pipelines (Area 500)	Ground improvements would be constructed at anchor points to ensure transfer pipelines are supported. Spread footings would be used and would have depths of 5 or 10 feet. The shallower depths would be used for nonanchor footings and the deeper depths for anchor footings.

Source: BergerABAM 2015b

2.3.2.3 Stormwater Management System

A permanent stormwater management system would be constructed to serve the proposed Facility. This system would be constructed during site grading and construction of the proposed Facility surface and subsurface elements. The system would consist of inlets, pipelines, manholes, and vaults. No permanent above-grade surface water conduits would be created. The proposed Facility would discharge collected runoff to existing Port stormwater systems, which discharge to existing permitted downstream Port-operated outfalls that discharge to the Columbia River. All surface water runoff collected in the stormwater management system would be treated prior to discharge to the Port's existing discharge conveyance system. Additional information on the Applicant's proposed stormwater system and pretreatment methods are presented in Section 3.3.3.1.

The Applicant proposes to design the permanent stormwater management system in accordance with Vancouver Municipal Code (VMC) 14.024, 14.025, and 14.026; Washington State Department of Ecology (Ecology) administrative codes for stormwater and spill prevention, preparedness, and response; and Ecology's Stormwater Management Manual for Western Washington. Stormwater discharges from the site would be governed by permits granted by EFSEC, specifically National Pollutant Discharge Elimination System (NPDES) Individual Industrial permits for construction and operational stormwater.

2.3.2.4 Construction Water Supply

Water used during construction would be purchased from either the City or the Port. Water uses would include dust suppression, concrete curing, hydrostatic testing, miscellaneous construction support, and restroom facilities. The average water demand during construction is conservatively estimated at 20,000 gallons per day (gpd) with a peak demand of approximately 500 gpm. In addition, approximately 20 million gallons of water would be required for hydrostatic testing and flushing of the pipeline and tank facilities. Water would be provided to the site through existing pipeline systems. The Applicant would coordinate with the City and/or Port for construction water and adhere to all applicable regulations requiring backflow devices and metering of construction water.

2.3.2.5 Hydrostatic Testing

Prior to commissioning the proposed Facility, the pipeline systems and storage tanks would be hydrostatically tested. The pipeline systems would be filled with potable water and then pressurized to check for leaks. Any leaks identified during the testing process would be repaired and the tank or pipeline segment would be retested before final commissioning. Water used to test the pipeline systems would then be pumped to the first storage tank, which would then be filled with additional water and hydrostatically tested. Once the testing process for the first tank has been completed, the water would be used for hydrostatic testing of the remaining tanks and supplemented as required. At the completion of the testing process, the hydrostatic test water would be analyzed and treated to comply with the NPDES Industrial Construction Stormwater Permit and NPDES Construction Stormwater Permit before discharge to the stormwater system. The test water would be released at a controlled rate from onsite storage facilities and monitored to ensure safe conveyance through the downstream system.

2.3.2.6 Commissioning

During commissioning, all systems and components of the proposed Facility would be checked, inspected, and tested to verify that every operational component is functioning properly. A construction management program would be followed to ensure that the proposed Facility is constructed to the specifications of approved construction drawings. Preoperational commissioning tests would be carried out in accordance with industry standards and applicable regulations. At a minimum, preoperational commissioning tests would include:

- Hydrostatic testing of piping systems, transfer pipelines, and storage tanks
- Testing and certification of the dock safety unit and MVCU in accordance with the provisions of 33 Code of Federal Regulations (CFR) 154, Subpart E
- Testing of fire and alarm systems in accordance with applicable fire and building safety codes

2.3.2.7 Use and Storage of Hazardous Materials

Hazardous materials that would be used during construction of the proposed Facility include:

- Construction vehicle fuel (e.g., gasoline, diesel, kerosene)
- Welding gases
- Oil (e.g., transformer, lubricating)
- Nonchlorinated solvents and thinners
- Paints
- Antifreeze
- Coatings and sealants
- Batteries

This list would be finalized when the Applicant-prepared Construction and Operation Spill Prevention, Control, and Countermeasure (SPCC) plans in Appendix D are finalized.

2.3.3 Construction of Specific Facility Elements

2.3.3.1 Onsite Rail Infrastructure

The Applicant plans to construct a new, approximately 4,900-foot-long rail track (4101) on the outside of the existing loop tracks. The Applicant also plans to shift approximately 1,500 feet of existing tracks 4106 and 4107 to allow for track tie-ins into the railcar unloading facility. Minor grading of the rail alignment in these areas may occur. Soils would be compacted to ensure ground stability. Approximately 12 inches of finely graded, compacted granular material (subballast) would be placed as necessary. After the subballast has been placed, specialized construction equipment would be used to construct the track.

The track would consist of railroad ballast (rock), 115-pound hardened steel continuously welded rails (mounted on either 8-foot × 6-inch or 8-foot × 3-inch crossties), and other miscellaneous materials. A specialized piece of construction equipment called a tamper would be used to raise the track through the ballast, and the ballast would be compacted under the crossties. The track surface would be smoothed to a tolerance of $^{1}/_{16}$ inch. The ballast would then be shaped to form a uniform ballast section. Crossties would be concrete except at crossings where timber would be used. A stockpile for the track material would be located at one of the proposed laydown areas. The material would be distributed by truck to the final location and placed using construction equipment mounted on rails. For construction of the reduced-width access loop road, the pavement would be cut to the new width and the removed asphalt would be recycled.

2.3.3.2 Administrative and Support Buildings (Area 200)

The administrative and support buildings in Area 200 would be constructed on concrete slabs supported by steel piers. When completed, the buildings would be painted with nonreflecting neutral colors.

2.3.3.3 Railcar Unloading Facility (Area 200)

The construction of the aboveground components of the railcar unloading facility would occur after construction of the foundation and other belowground components is completed. The foundation would consist of steel pile supports under the trenches and spread footings elsewhere. Deep pilings would be driven to a depth of 75 feet to support the railcar unloading trenches. Area 200 support buildings and the railcar unloading facility would be constructed on spread footing foundations at 2 feet and 4.5 feet deep, respectively. After foundation installation is completed, the pipeline trenches and pump basins would be excavated and the concrete for the trenches and pump basins would be poured.

2.3.3.4 Storage Tanks (Area 300)

The storage tanks would be constructed using welded carbon steel and would be erected in the field. The Applicant intends to construct the storage tanks consistent with American Petroleum Institute (API) Standard 650.[12] The storage tank foundations would be constructed to uniformly support the tank bottoms. Following site grading and subsurface preparation, storage tank foundations would be poured. Sand and gravel material would be laid throughout the storage tank area, and the surrounding berm constructed. The berm around the storage tank area would be constructed from materials excavated from other areas during construction of the pipeline trenches and during general grading of the storage tank area. Supplemental berm construction material would be obtained from offsite sources. Materials excavated from areas with potential contamination would be tested prior to use in berm construction. Contaminated materials would not be used for berm construction and would be disposed of in accordance

12 API. Requirements for Welded Tanks for Oil Storage. Available online at http://www.api.org/~/media/Files/Publications/Whats%20New/650%20e12%20PA.pdf.

with local, state, and federal hazardous materials regulations and in compliance with Port management procedures. An impervious high-density polyethylene (HDPE) membrane liner would be installed to cover the berm and storage area.

Ground improvements in the storage area (Area 300) would occur below each storage tank and the transfer pipelines located within the containment berm. Stone columns would be installed with a vibroreplacement method beneath each tank. Columns would be 3 feet in diameter and spaced approximately 8 feet apart (on center) in a square grid configuration. Depths of the columns would vary from 35 to 43 feet below ground surface, depending on soil condition. To address poor soil conditions underlying one of the tanks, the base design would be supplemented with two additional rings of stone columns to a depth of 30 feet. The storage tanks would be constructed on a concrete ringwall foundation supported by the stone columns. Stone columns would also be installed beneath the transfer pipelines within the berm in the storage area (Area 300). Columns would be 3 feet in diameter and spaced approximately 8 feet apart (on center). Depths of the columns would vary from 25 to 47 feet below ground surface, depending on soil condition.

Multiple cranes would be used at the site for construction of the storage tanks. A 100- to 150-ton crane would be used to move the tank sections into place. The Applicant intends to test the various elements of the storage tank assembly during the construction process in accordance with API 650 standards, including radiographic examination of storage tank shell butt welds, vacuum box testing of storage tank floor seams, and hydrostatic or vacuum box testing of storage tank shells.

2.3.3.5 Marine Terminal (Area 400)

Construction of the marine terminal would involve improvements to the existing dock and berthing facilities at Berths 13 and 14 (Figures 2-13 and 2-14). The proposed modifications to Berths 13 and 14 are also being reviewed by the US Army Corps of Engineers (USACE) through an application for Department of the Army authorization under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The Applicant submitted an application to the USACE on February 12, 2014, describing seismic and safety upgrades, installation of concrete anchors to existing steel piles, minor configuration modifications to existing mooring facilities, and installation of a transfer pipeline on one of the mooring facility piers (Berth 14) (USACE 2015). As of the publication date of this Draft EIS, the permit application was still under review.

According to the Applicant, the dock and berth improvements at the marine terminal would include the following in-water and overwater construction activities:

- Removal of a single breasting dolphin, including 11 of the 12 existing 18-inch steel pipe piles, four 12¾-inch steel fender piles, approximately 400 square feet of existing concrete pile cap, and approximately 1,370 square feet of grated walkway.
- Reinforcement of existing infrastructure, including the 18-inch steel pipe piles supporting Berth 13; two breasting dolphins; and two mooring dolphins. This reinforcement would include the removal and replacement of the decking and pile caps to accommodate the reinforcement work.
- Replacement of the existing steel trusses and grated steel walkways between the Berth 13 platform and the adjacent upstream and downstream breasting dolphins with larger structural steel trusses and new grated steel walkways.
- Addition of approximately 750 square feet of new retractable/movable-rotatable grated walkways between two existing mooring dolphins and the shoreline to provide safe access for line handling.

Figure 2-13. Aerial View of the Existing Marine Terminal

Source: Washington State Joint Aquatic Resources Permit Application Form

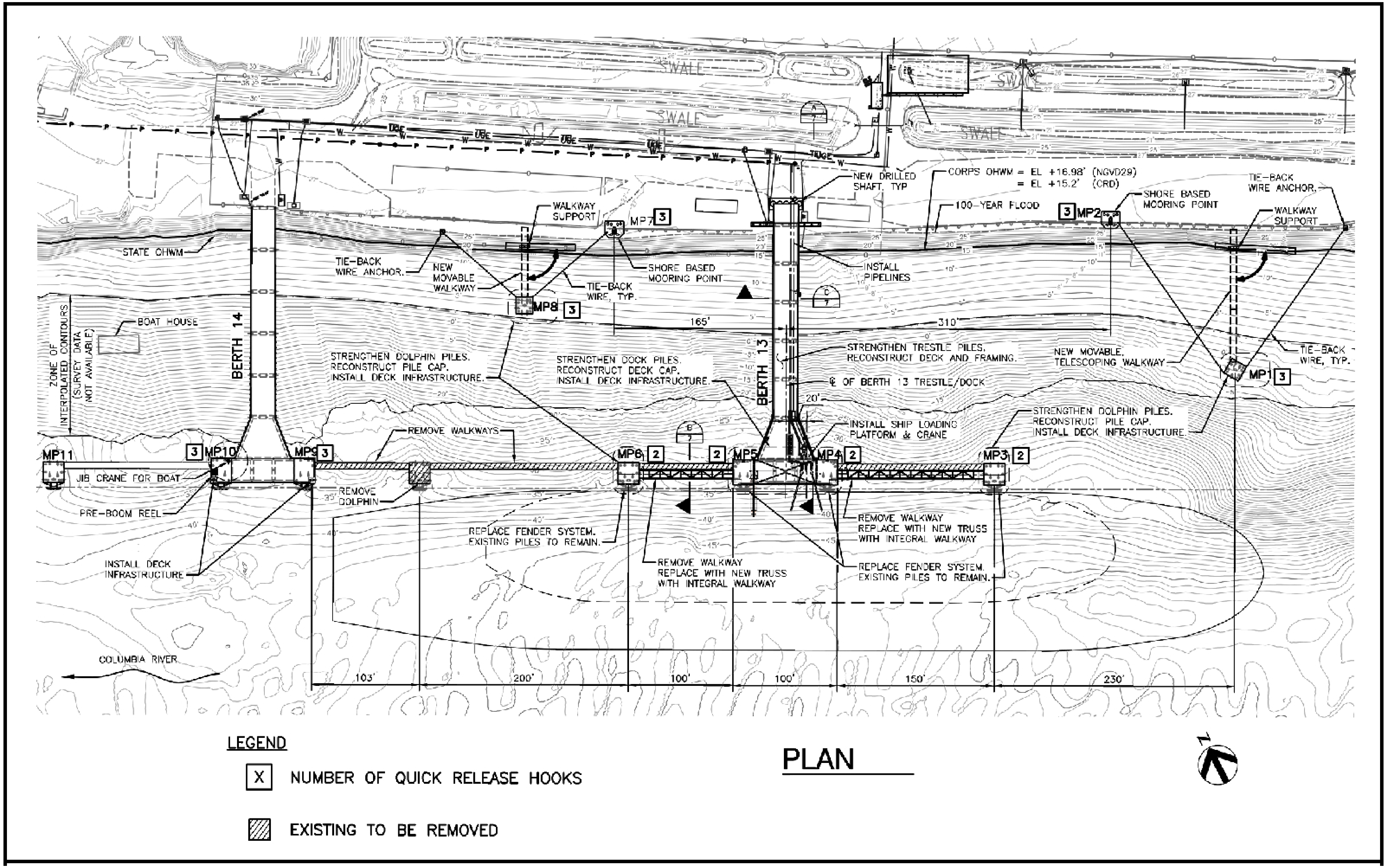

Figure 2-14. Site Plan for the Marine Terminal

Source: Adapted from Washington State Joint Aquatic Resources Permit Application Form

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In-water construction would be completed with typical waterborne construction equipment from construction barges. At a minimum, the construction equipment would include:

- Barge(s) to accommodate cranes and materials (typical barge dimensions are 150 feet × 60 feet)
- Cranes
- Work skiff(s)
- Tug(s)
- A vibratory pile driver
- Concrete pumps or buckets
- Air compressors and generators
- Typical handheld equipment including concrete saws, welding and cutting torches, saws, chainsaws, drilling equipment, and an underwater chainsaw
- A dump truck or wheeled excavator for material removal on the dock
- Emergency response and safety equipment

The Applicant's marine construction contractor would mobilize labor and equipment to the site. Laydown areas for materials and equipment would be located landward of the ordinary high water mark (OHWM). In-water and overwater demolition activities would consist of removing existing breasting dolphin and associated walkways along with the existing deck and pile caps from those areas of the structure requiring seismic upgrades. Demolition would generally proceed by removing existing concrete caps and then removing the associated piles for each structure. Piles would be removed by vibratory extraction, by pulling them directly with a crane mounted on a barge, or by cutting them off at or below the river bottom. Any voids left in the river bottom following pile removal would be filled in naturally by ongoing river sediment transport. Removed piles would be stored temporarily on a barge before being recycled. The Applicant proposes that all pile installation and removal would occur within an in-water work window of November 1 to February 28 to minimize potential impacts to native fish species, particularly to Endangered Species Act–listed salmonids and Pacific eulachon (Columbia River smelt) in the proposed Facility study area (see Section 3.6.3.1 for further discussion of work windows).

The existing 18-inch-diameter steel piles associated with the Berth 13 dock, along with the two associated breasting dolphins and two mooring dolphins, would be improved. All improvements would occur within the pile. Ground anchors would be installed at the base of the existing piles, and a smaller-diameter steel pile and concrete would be installed in the existing piles. To accommodate the work, the existing concrete deck and pile caps would be removed to expose the tops of the piles. After deck removal, the inside of the piles would be inspected and any interior sediment removed (these piles were originally installed with partially closed ends so substantial sediment accumulation is not anticipated). Pile ends would be drilled open to allow installation of the ground anchors. The ground anchors would likely consist of steel threaded rods that would be inserted into the river bottom and secured with concrete grout. A new steel pile would then be placed inside each existing pile and concrete grout pumped into the pile. Steel braces would be installed between the piles beneath the dock. The pile cap and decks would be reconstructed with poured in-place concrete and/or structural steel framing, depending on the location. Concrete pile caps would be formed using watertight forms.

Figure 2-15 shows the existing walkways at Berths 13 and 14. Walkways and trusses for the proposed dock modifications would be manufactured offsite and brought to the site for installation. The deck would be constructed with steel framing and steel grids with a poured-in-place concrete deck and would be larger than the existing walkways. The existing grated walkways and associated support trusses that connect the breasting dolphins east and west of the Berth 13 dock would be replaced with larger steel trusses to physically connect the structures and provide additional strength. The trusses would be constructed of square or tubular pipe in an open web design that would allow daylight to penetrate the structure. This framing would add approximately 920 square feet of overwater structure. New 5-foot exterior-width steel grated walkways would be installed on top of the trusses, providing a 36-inch pedestrian passageway.

Figure 2-15. Existing Walkways at Berths 13 and 14

Source: EFSEC site photo

As currently proposed, the marine terminal would not require the installation of any additional permanent piles below the OHWM of the Columbia River. The installation of up to 40 temporary 18- to 24-inch-diameter, open-ended steel pipe or H-piles to support the guides for the concrete formwork may be required. Temporary piles would be installed using vibratory methods. During the installation process, each pile would be lifted by a crane, lowered into place at the mudline, and driven to the required depth by a vibratory hammer. The crane and vibratory hammer would be located on a derrick barge, and the piles and materials would be stored on a supply barge. A tugboat may also be required. Installation and removal of these piles would be conducted during an in-water work window.

Overwater construction would generally proceed immediately after work on the piles is complete. This construction would include the installation of piping, jib cranes, a movable gangway, an observation and control platform, a dock safety unit, pipe trays, lights on the Berth 13 trestle and dock, and installation of on-deck infrastructure (e.g., a hanging fendering system, bollards, handrails, and a retractable walkway). Both the 36-inch transfer pipeline from the storage tank area and the 6- to 12-inch return pipeline would be located on the trestle and would connect with a manifold on the dock. Petroleum-rated hoses would connect to a manifold and would be used to transfer crude oil from the pipeline system to the marine vessel during loading. The hoses would be supported by a pulley or crane system and connected to the grounding grid to inhibit the buildup of static electricity. The loading system would incorporate automatic shutoff valves with a maximum 30-second shutoff time. Overwater construction would not be limited to an in-water work window.

Ground improvements in the marine terminal (Area 400) would occur along the transfer pipeline alignment and at the marine terminal abutment (Figures 2-16 and 2-17). Ground improvements beneath the pipeline areas (landward of the OHWM) would include a combination of stone columns, deep soil mixing, and jet grouting. Soil liquefaction potential would be minimized beneath the pipeline alignment through the installation of deep soil mixing panels. The panels would be 55 feet long, 6 feet wide, and spaced 35 feet apart, and would extend to a depth of approximately 45 feet. Vertical support of the pipe-rack foundation would be provided by jet grouting columns beneath the deep soil mixing panels. The jet grout columns would be 8 feet in diameter and would extend approximately 32 feet beneath the deep soil mixing panels. The shoreline area would be stabilized against liquefaction by a buttress of stone columns. The stone columns would be installed between the deep soil mixing panels and the top of the bank. Stone columns would be 3 feet in diameter and spaced 8 feet apart (on center), and would extend to the dense soils approximately 78 feet below the ground surface (BergerABAM 2015b).

Ground improvements would also occur near the marine terminal abutment, where the pipeline support transitions from foundations bearing on improved soils to pipe-racks supported by the dock structure. A block of jet grout columns would be installed just landward of the OHWM, in an area 160 feet long and 72 feet wide, parallel to the river. Jet grout columns would be 6 feet in diameter and installed to a depth of approximately 78 feet. An illustration of these preliminary ground improvement concepts is shown in Figure 2-17. Column spacing would be designed to achieve soil replacement ratios between 40 and 100 percent. Just landward of this jet grout block, ground improvements combining deep soil mixing and jet grout would be constructed to support the marine terminal (Area 400) facilities. A temporary batch plant would be installed in the marine terminal area, near the jet grouting operation. The batch plant would consist of a cement silo, batch plant mixer, and high-pressure pumps to convey the grout to the location of use. Dry grout materials would be delivered and stored at the site. Water for mixing the grout would be sourced from the City of Vancouver.

The Applicant has committed to implement the following BMPs to reduce the potential for spoils to enter the Columbia River and to properly handle spoil materials associated with ground-improvement activities (BergerABAM 2015b):

Sheet piles. Sheet piles would be installed approximately 1 to 2 feet landward of the OHWM to act as a barrier to grout migration waterward of the OHWM. The sheet piles would be installed to a depth of approximately 40 feet below the ground surface using a vibratory hammer.

Sequencing. The first row of jet grout columns landward of the temporary sheet pile wall would be installed first to act as a barrier to potential grout migration during the installation of subsequent jet grout columns landward of the OHWM. This would reduce the potential for later grout installations to migrate through seams in the wall, or under the wall, toward the Columbia River.

Containment. Earthen berms, sheeting, straw wattles, or shallow trenches would be used to isolate the work area and contain spoils exiting the grouting hole to prevent their entry into the Columbia River. In addition, in-ground containment would be achieved by the installation of a temporary sheet pile wall between the river and the ground-improvement treatment area. The sheet pile wall would be installed with vibratory methods landward of the OHWM.

Spoils handling. Spoils would be extracted from the containment area by vacuum pumps. Spoils may be loaded to trucks to be removed from the site, or may be handled onsite to separate solids from liquids for additional treatment and disposal. If handled onsite, spoils would be removed and placed in a temporary holding area, such as lined ponds or tanks; these would temporarily hold spoils until they can be treated as necessary and disposed of. Holding ponds would be constructed in previously disturbed locations and away from sensitive resources. Holding areas would be lined to prevent the migration of high pH water into the ground.

Treatment. High pH water would be pumped from these holding areas or tanks into portable water quality treatment systems and neutralized. Following neutralization, the water would be discharged in a manner similar to other construction site groundwater that has been treated to the appropriate water quality standards.

Disposal. Remaining solid materials in holding areas or tanks would be tested as necessary and disposed of in accordance with applicable regulations if they classify as hazardous waste. If the solids do not classify as hazardous waste they would be used onsite (for construction of the storage area [Area 300] containment berm for example), or would be disposed offsite at an appropriate location.

Monitoring. A preliminary Water Quality Protection and Monitoring Plan has been prepared and submitted to EFSEC; the monitoring provisions of this plan will continue to address how activities are monitored to identify potential surface water exceedances (Appendix D.5). The plan will be revised to address protection measures specific to ground-improvement construction activities, which are described above.

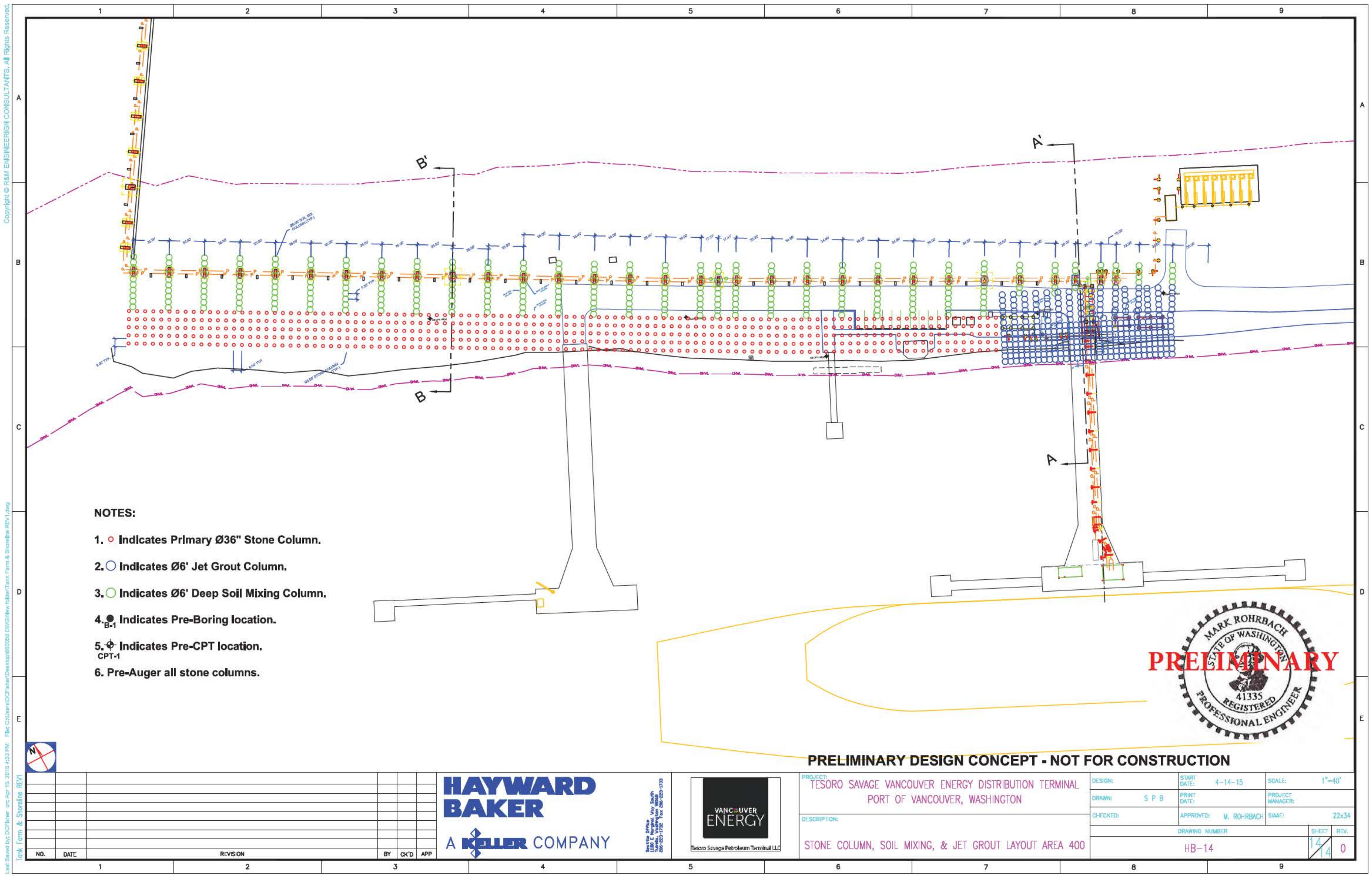

Figure 2-16. Stone Column, Soil Mixing, and Jet Grout Laydown Area

Source: Hayward Baker Inc. 2015

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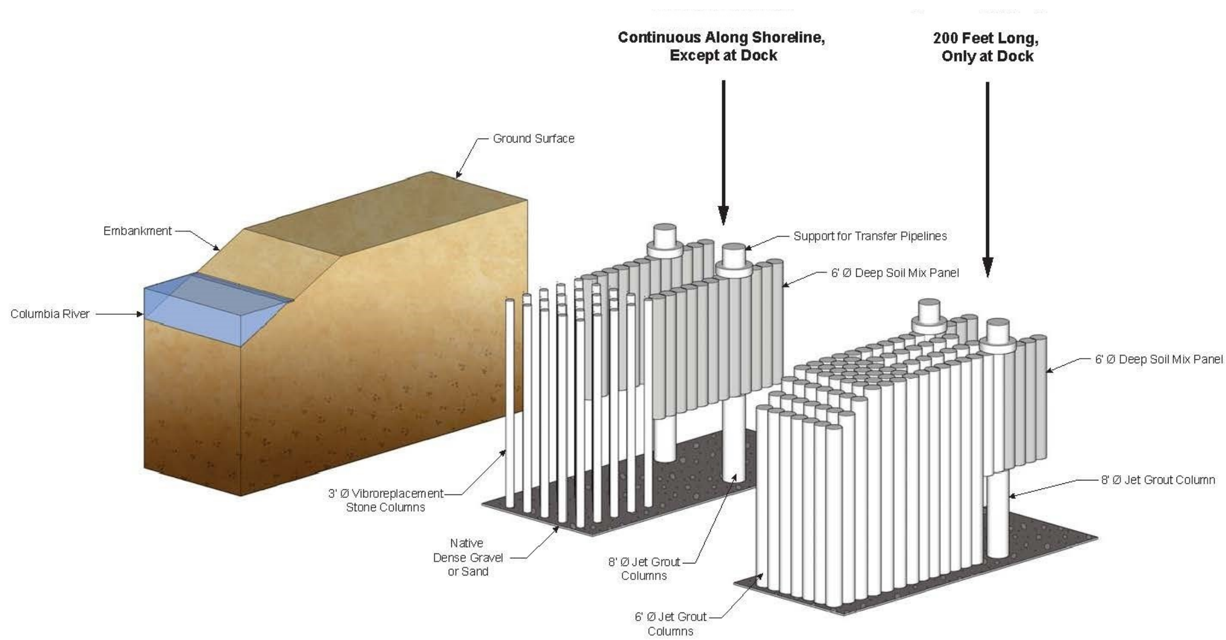

Figure 2-17. Illustration of Preliminary Ground Improvement Concepts

Source: Appendix C

2.3.3.6 Transfer Pipelines (Area 500)

The prefabricated pipe segments used to construct the transfer pipelines would be delivered to the site prior to pipeline construction. Supports for the aboveground transfer pipeline segments would consist of piles or stone column–supported concrete foundations. Pipe segments would be installed and welded together in the field.

The Applicant has proposed to construct the transfer pipelines in accordance with the following specifications:

- Piping would be constructed consistent with American Standards Testing and Materials (ASTM) A53 or A106.
- Transfer pipelines and the associated pumping systems would be equipped with flow and pressure sensors to identify pipeline or pump failures. Pressure relief valves would be included on the pipeline and pump to avoid overpressure situations.
- Transfer pipelines would be equipped with manual and automatic isolation valves at the exit and entrance to the railcar unloading area, the storage tank area, and the marine vessel loading area. These valves would include 30-second shutoff capabilities to stop the flow of product in the event of an anomalous flow and pressure condition related to an inadvertent release or in response to operations personnel triggering a shutoff.
- Most transfer piping would be installed aboveground to facilitate inspections and maintenance. Where road or rail crossings occur, the pipeline would be housed in underground steel casings or raised aboveground using standard American Railway Engineering and Maintenance-of-Way Association (AREMA) clearances. Pipelines at each railroad, highway, or road crossing would be designed and installed to withstand the dynamic forces exerted by anticipated traffic or rail loads.

- Secondary containment with leak detection would be provided for pipeline segments installed belowground. Aboveground pipeline segments would be single-walled to ensure ease of inspection and maintenance. Pipeline sections located belowground would be cathodically protected and coated to prevent corrosion.
- The pipeline system and associated supports and foundations would be designed to applicable industry seismic protection codes and standards and would be electrically grounded to protect against the buildup of static electricity during crude oil conveyance.
- To support transfer pipelines, 10-foot-deep spread footings would be installed at anchor points. Five-foot-deep spread footings would be used for support in nonanchored sections of the pipelines.

2.3.3.7 Boiler Building (Area 600)

An existing 10-inch natural gas pipeline conflicts with the location of the boiler building and would be relocated prior to construction (see Section 2.4.1.6). The boiler building would be constructed on a 1-foot-deep spread footing. Ground improvement would not be necessary in this area.

2.3.4 Onsite Connected Actions

2.3.4.1 Realignment of Natural Gas Supply Line

An existing 10-inch natural gas transmission line owned by NW Natural conflicts with the location of the proposed boiler building in Area 600. Approximately 500 to 1,000 linear feet of new 10-inch-diameter natural gas pipeline would be constructed to replace the segment located on the site of the proposed boiler building. The replaced pipeline segment would be abandoned in place. Installation of the new pipeline segment would involve trench excavation, pipeline installation, trench backfilling, and roadway resurfacing, and would be conducted by the current owner/operator of NW Natural. The new section of natural gas pipeline would be hydrostatically tested prior to being placed in operation. In addition, the existing 2-inch service line to the boiler building would be upgraded to a 4-inch-diameter service line for natural gas supply at the boiler building.

2.4 OPERATION AND MAINTENANCE ACTIVITIES

2.4.1 Operations and Maintenance of the Proposed Facility

2.4.1.1 Unit Train Arrival and Departure

As described in Section 2.1, an average of four crude oil unit trains per day would arrive at the proposed Facility. Each unit train would include up to 120 tank cars, each with a crude oil capacity of up to 750 bbl, two buffer[13] cars, and three locomotives. A typical unit train length would be approximately 7,800 feet. According to the Applicant, the unloading operation for a single unit train would take approximately 12 to 14 hours to complete. Unit trains staged on each of the three unloading tracks could be unloaded at the same time.

13 Buffer cars, which are empty railcars that serve to separate the locomotives from cars carrying crude oil, are required by federal regulations.

Railroad-operated unit trains arriving at the Terminal 5 loop would travel clockwise to the railcar unloading facility. Appropriately trained personnel at the unloading facility would take control of the unit train from the railroad, precisely position (spot) the train, and block the wheels. An unloading facility operator would review the bill of lading provided by the railroad to verify the contents of each railcar. The trains would then be "indexed"[14] through the unloading area 30 tank cars at a time using one of the three unloading tracks. Once a unit train pulls into an unloading bay, the first 30 tank cars would be connected, unloaded, and disconnected. The train would then advance and be repositioned to unload the next 30 tank cars. This process would be repeated four times for each 120-car unit train.

After unloading, an operator would verify the amount of product on the bill of lading from the railcar against the inventory change in the receiving tank. The operator would then notify the railroad that unit train unloading has been completed and return control of the unit train to the railroad at the appropriate location designated by the operator prior to departure.

Two diesel switching locomotives built by General Motors would be used for switching services. The switching locomotives would be used to remove and temporarily stage railcars identified as having potential deficiencies that prevent them from release back to the railroad. Deficient railcars would be emptied, disconnected from the unit train, and repositioned to other tracks for temporary storage until they are repaired onsite or moved to an offsite location for repair.

According to the Applicant, all tank cars used to transport crude oil to the proposed Facility would meet the new DOT-117 tank car standards to reduce vulnerability to breaching or failure during derailments (see Section 4.2.4.2 for details on DOT-117 tank cars).

2.4.1.2 Crude Oil Unloading

Unit trains would be unloaded at the railcar unloading facility. At least one railcar unloading facility operator would be required to monitor railcar unloading operations for each unit train. The operator would wear protective clothing, including a hard hat, goggles, protective work gloves, and outerwear. Before an individual railcar is unloaded, the operator would connect a grounding cable to the railcar. The operator would also inspect the railcar, the unloading equipment, and the surrounding area to ensure that normal operating conditions are in place. The operator would then remove the railcar bottom outlet cap, connect the transfer hose to the railcar fitting, open the railcar and pipeline valves, open the railcar manifold, and turn on the pump at the appropriate header pumping station.

The crude oil received at the railcar unloading facility would be gravity-drained from the tank car to a collection header via unloading hoses. Before railcar unloading, a vacuum breaker would be connected to the railcar to maintain a standard negative 0.5 pound per square inch (psi) pressure during unloading. Flexible vent hoses would be connected to a valve at the top of the car and also to the collection header. To prevent vapors from venting to the atmosphere, vapors leaving the collection header would travel through the vent hose back into the car as the crude oil drains from the car.

Unloading hoses would be manually connected to the valves on the cars using dry-fit connectors, with one hose per tank car. Dry-fit connectors are designed so that the crude oil in the hose cannot come into contact with the atmosphere and to ensure that crude oil cannot flow without a secure connection. Dry-fit connectors require the operator to lock the connector into place to allow product flow to begin. When disconnected, all product on either side of the connector remains within the transfer hose or railcar. Each

14 Indexing refers to the process of moving a train through the proposed unloading facility. That process would involve 30 cars at a time. When a train enters the unloading bay, the first 30 cars would be connected, unloaded, and disconnected. The train would then advance and be positioned to unload the next 30 cars. This process would occur four times during the unloading process for a single 120-car unit train.

hose would be equipped with an automatic shutoff valve. The shutoff valve would automatically close in the event of a fire or when an Emergency Shutdown (ESD) button is depressed in the railcar unloading facility. ESD buttons would be located at the bottom of all the stair landings and between stations on the upper mezzanine of the railcar unloading facility. It is estimated that an employee would take 30 to 60 seconds from detection of release to activate an ESD button or other shutoff device.

Each railcar when loaded would have a small vapor space (relative to the total volume of the tank) that would contain volatile organic compounds (VOCs) and other gases. During unloading, air must enter the railcar tank to replace the draining crude oil. A vacuum breaker would be installed prior to unloading to allow air to enter but not be released from the tank. A vent line would also be attached to recirculate vapors for the unloading line back into the tank, effectively eliminating the release of fugitive VOCs and the potential for fire and explosion. While accidental equipment failure could occur, a negative pressure (vacuum) is generated by the draining oil so vapor release is unlikely. During unloading, a vent line would also lead to the top of the railcar tank and vapor generated in the unloading line would be recirculated back into the tank. The negative pressure caused by the draining oil would limit or prohibit any of the gases from entering the atmosphere and becoming available for ignition. Because this system is designed and operated to prevent release of flammable vapors, the potential for fire and explosion would be effectively eliminated.

Within the railcar unloading facility, each collection header would be directly connected to a dedicated pumping station that transfers crude oil into a transfer pipeline (one per track). As crude oil flows from the collection header to the pumping stations, it would pass through a basket strainer to remove any solids. The solids would be sampled and tested to determine if they are hazardous, and would be disposed of appropriately as either hazardous waste or solid waste.

The pumping stations monitor volumetric flow rate, crude oil density, and contaminants (sediment and water), and collect regular samples of crude oil for analysis. Two pumps would serve each collection header with one serving as the primary pump and the second serving as an online standby pump. Pumps would be located in pump basins beneath the railcar unloading facility. Five pump basins would serve tracks 4106 and 4107, and another five pump basins would serve track 4105. The pump basins would also serve as secondary containment. Upon completion of transfer of crude oil, the operator would turn off the pump and valves, remove the hose, rebolt the railcar dome hatch, and close and tighten the railcar bottom outlet cap.

For lower viscosity crude oils, heating is not required to facilitate unloading, transfer, storage, and loading. Higher viscosity crude oils require heating throughout the crude oil transfer process. To accommodate higher viscosity crude oils, the 30 unloading stations on track 4105 would be equipped with steam connections for crude oil heating to approximately 150°F. The steam used to heat the crude oil would be produced in the boiler building (Area 600) and piped to the railcar unloading facility. The tank cars that deliver high-viscosity crude oil are fitted with permanent internal steam manifolds at the bottom of the car. At the railcar unloading facility, inlet steam hoses would be connected to each car to allow steam to circulate in the manifold and warm the contents of the tank car. Steam that condenses in the manifolds would be collected through condensate hoses and transferred through pipes back to the boilers.

2.4.1.3 Crude Oil Transfer

For transport from the railcar unloading facility to the storage tanks, the crude oil contained in all five pumping stations within the railcar unloading facility would be delivered via one transfer pipeline per track. The two nonheated 24-inch transfer pipelines would move crude oil from the nonheated unloading stations to the storage area inlet manifold. The crude oil contained in the pumping stations with heating capability would be combined into a separate heat-traced and insulated 24-inch transfer pipeline and transferred to the storage area heated inlet manifold.

For transport from the crude oil storage tanks to the marine terminal, crude oil would be pumped through one 36-inch transfer pipeline for loading onto marine vessels. Crude oil stored in the tanks would be pumped to the dock for transfer to moored vessels. Between three and six variable speed pumps would pump the crude oil, at least one of which would be on standby.

The transfer pipeline system would be equipped with valves to direct crude oil flow directly from the railcar unloading facility to the marine terminal to allow for the occasional topping off of vessel loads and would potentially allow the proposed Facility to begin limited operation during the construction of the storage tanks. Only crude oils that do not require heating would be transferred in this manner. Loading crude oil directly from unit trains to vessels would take longer than loading crude oil from the storage tanks.[15]

2.4.1.4 Crude Oil Storage

Crude oil would be stored in six storage tanks, two of which would be capable of storing and heating crude oil. Each storage tank would have an operational crude oil storage capacity of approximately 340,000 bbl. These six storage tanks would allow the proposed Facility to receive and store an average of 360,000 bpd. Additionally, the six tanks provide the proposed Facility the flexibility to receive and segregate crude oil from multiple Facility customers. Since two of the tanks would be capable of storing and heating crude oil, there would also be flexibility to store a range of crude oils with variable viscosities. The operation of six storage tanks also provides additional storage capacity in the event of unexpected delays in crude oil deliveries or in vessel loading or arrivals.

2.4.1.5 Vessel Docking and Loading

The marine terminal would be able to accommodate one tanker vessel for loading at a time. The Applicant has indicated that the most common vessel expected to call at the marine terminal would be a medium-sized tanker with a crude oil cargo capacity of 319,925 bbl (Handymax). Tankers servicing the terminal would require at least 15 hours to load to full capacity. However, vessels would dock for approximately 24 hours based on the time needed to secure and release the vessels and to accommodate the lower fill rates used during initial and final loading.

A marine vessel arriving for loading would use two docking assist tugs for docking. The two docking assist tugs would meet the vessel at the approximate location of the confluence of the Columbia and Willamette rivers and secure alongside the vessel. The vessel pilot would then guide the vessel on a slow approach using the proposed Facility's docking assist system[16] to bring the vessel alongside the dock gently. The vessel pilot would typically stop the vessel approximately 2 feet away from the berth and use the tugs to push it along the port side to the dock with the bow pointing upstream. Under the pilot's direction the vessel would be gently maneuvered and firmly secured with mooring lines to the dock and mooring dolphins. Once the vessel is secured in place, the docking assist tugs would be released. The docking assist tugs would not stand by the marine terminal during loading operations unless a severe weather event occurs, as described in the Terminal Operations Manual.

The dock shore gangway would then be lowered to the deck to permit safe access for operations staff. Once the vessel is secured at the dock, a full wrap boom would be placed around the vessel to contain

15 The direct transfer loading rate would be about 50 percent slower than the storage tank area transfer rate.

16 Docking assist systems are computerized systems that monitor vessel maneuvers including approach speed.

potential accidental oil spills. Once the boom is in place, the "Terminal Person in Charge" (TPIC) would board the vessel to conduct a safety inspection with the vessel Chief Officer "Vessel Person in Charge" (VPIC). The cargo and vapor hoses would be connected under the supervision of senior vessel crewmembers. After completion of cargo and vapor hose connections, the TPIC and VPIC would conduct a pretransfer meeting to coordinate all aspects of the crude oil transfer including startup, transfer rates, topping off, completion of loading, and any safety or security concerns including signals for shutdowns should other preestablished means of communication fail.

Once it is determined that normal and safe operating conditions are in place, the vessel would then be loaded with crude oil from the storage tank area. Crude oil would be transferred from the transfer pipeline system to the receiving marine vessel at Berth 13. The transfer system would be designed to allow for an approximate maximum transfer rate of 32,000 bbl/hour, although this rate would be variable to adjust to the type of vessel being loaded and the specific loading phase. In the event of a shutdown in the loading process, the crude oil would be returned to the storage tanks through a return pipeline. The return pipeline would also be used to provide pressure relief and prevent pipe hammer if required during a shutdown of transfer operations. The transfer pipeline and the return pipeline would be located on the trestle at Berth 13 and would connect with a manifold on the dock. The crude oil would be transferred from the manifold to the marine vessel through petroleum-rated hoses supported by a pulley or crane system. The loading system would have automatic shutoff valves with a maximum 30-second shutoff time. A catchment area at or below the deck level in the marine terminal would have a 3 bbl holding capacity. The contents of the containment would be discharged within 1 hour of completion of any transfer by pumping into either the return pipeline or a tank truck for disposal. The vessels berthing at the marine terminal would be required to have onboard fire suppression systems and an agreement in place with the Maritime Fire Safety Association (MFSA), a private organization that provides marine firefighting response capabilities in the event of a shipboard fire. See Section 4.3.7 for additional information on the MFSA.

The Applicant has indicated the transfer piping system would be designed to allow crude oil unloaded at the railcar unloading facility to be directly transferred to the marine terminal for loading onto vessels. This would allow greater flexibility during loading operations and could allow the proposed Facility to begin limited operation during the construction of the storage tanks. Transfer of crude oil directly from the railcar unloading area to vessels would result in longer vessel loading times because the transfer rate would be less than half of the transfer rate for transfer from the storage tanks. Assuming that trains are consecutively staged, it is estimated that it would take 22 to 24 hours to unload four trains to fully load a 46 MDWT vessel using this transfer method.

On completion of loading, the vessel would be evaluated by an independent third-party cargo surveyor, and crude oil quantities would be reviewed, confirmed, and documented. The loading and vapor hoses would then be drained, disconnected, and fully blanketed before being retrieved by proposed Facility operators. The vessel manifolds would then be fully closed and secured, and the containment booms around the vessel would be removed. After inspection confirms normal vessel operating conditions, a pilot would board the vessel and direct the two assist tugs to begin undocking the vessel. The mooring lines would be released from the dock and retrieved by the vessel, and the tugs would pull the vessel away from the berth and position it to be pointing downriver. Once the vessel starts to make headway downriver, the tug boats would be released and the vessel would proceed.

Marine vessels would typically arrive with their cargo tanks filled with a combination of inert gases pumped into the tanks to reduce fire and explosion hazards and combustion of vapors from previous cargoes. During loading these cargo tanks would be filled with crude oil and the vapor mixture previously filling the tanks would be displaced. These displaced vapors would be collected and transferred to the MVCU system (comprising eight separate units), which would combust the hydrocarbons in the vapors.

To initiate combustion, the vapors would be mixed with small amounts of natural gas and air delivered by blowers. Gases resulting from combustion in the MVCU would be expelled through a stack.

Vessels will require some engine power at dock. While at dock, vessels would run ultralow sulfur diesel generators, and vessel boilers would be used to maintain the temperature of heated cargo.

Ballast Water Management

Tankers arriving at the proposed Facility would be in ballast to maintain vessel stability. The vessel ballast tanks would contain clean seawater that has either been treated through an onboard ballast water treatment system or collected during a mid-ocean ballast exchange. The Applicant plans to manage ballast water discharge consistent with federal and state regulations,[17] which prohibit discharge of untreated ballast water into the waters of the United States and waters of the state unless the ballast water has been subject to a mid-ocean ballast water exchange. Ballast water exchange reduces the risk of transferring aquatic invasive species (AISs) from one location to another. Oceanic ballast water exchange can be highly effective for preventing discharge of high-risk AISs to freshwater environments by destroying potential AISs through exposure to saltwater (Gray et al. 2007 as cited in Oregon Department of Environmental Quality [ODEQ] 2015). If appropriately treated or subjected to a mid-ocean ballast water exchange and determined to be free of oil, ballast water would be discharged into the Columbia River during vessel loading.

Vessel Booming Operations

The Applicant has prepared a preliminary Prebooming Transfer Plan for vessel booming operations at the proposed Facility (see Appendix D.3: Appendix M). Floating booms would be deployed prior to marine vessel loading operations to contain materials accidentally discharged to surface water. The floating boom would consist of a fence boom and river boom that would completely enclose the vessel (Figure 2-18). The fence boom would be secured with tide slides and fixed in place with wires hung from the berth structure. The floating boom would be deployed using an aluminum skiff. Once in place, the floating boom would be anchored at the upriver end to hold the boom position during vessel loading operations. The booming system would be designed with connections for a rapid oil skimmer designed for use in the river currents expected at the proposed Facility. The Applicant proposes to position the following equipment dockside at the marine terminal in support of the prebooming requirements during vessel-loading operations (BergerABAM 2014a):

- One 1,200-foot fence boom comprising 100-foot sections that are 18 inches high. Sections would be attached using the ASTM Universal Slide aluminum connector.
- One 1,000-foot containment boom in 100-foot sections. This boom would have 12 inches of freeboard and a 6-inch skirt. The outer fabric would be 26-ounce polyvinyl chloride (PVC) and the flotation logs would be in 3-foot lengths to accommodate placement on a reel for deployment and recovery. The end connectors would be ASTM Universal Slide aluminum connecters.
- One 2,000-foot containment boom in 100-foot sections. This boom would have 12 inches of freeboard with a 6-inch skirt. The outer fabric would be 26-ounce PVC and the flotation logs would be in 6-foot lengths to accommodate placement in a 20-foot intermodal storage (conex) box on shore. The end connectors would be ASTM Universal Slide aluminum connecters.

17 Federal regulations are at 33 CFR 151.2025; state regulations are at WAC 220.150 and at Oregon Revised Statute (ORS) 783.620-640.

- A hydraulically controlled aluminum boom reel designed to contain the 1,000-foot containment boom, with an override so that the boom can be deployed if necessary without hydraulic power.
- One 200-horsepower (hp) aluminum skiff with a minimum length of 24 feet and a 6-foot beam for stability. The tow post would be a minimum of 3 feet forward of the turning axis to ensure mobility while towing the boom. The boat would have a center console and cab to provide weather shelter for the crew.
- Two rapid response NOFI brand skimmer systems (i.e., “Harbor Busters”) capable of operating in shallow waters and in currents of up to 3 knots. Each system would come on a reel in a container on a flatbed trailer, towable by a ¾-ton or 1-ton pickup truck. Each container would house the reel and the diesel power pack to deploy and retrieve the boom. They would also house two portable leaf blowers for inflating the boom as it is deployed. This type of boom can contain up to 95 bbl of oil in the separator bag.
- Two model 13/30-fuzzy disc skimmers, including diesel hydraulic power pack, hydraulic hoses, and discharge lines.

Prebooming would occur when the shift supervisor and boom boat captain determine that existing and predicted weather and river conditions are such that booms can be deployed and operated in a safe and/or effective manner. If existing or forecast weather or river conditions are determined to be unsafe or unsuitable for effective booming operations, booms would not be deployed and already deployed booms would be removed from the vessel. The Applicant has prepared a preliminary Safe and Effective Threshold Determination Report to establish the environmental conditions during which it would be safe and effective to deploy oil boom around vessels prior to and during oil transfer operations (see Appendix D.3: Appendix K). Based on an analysis of historical records for waves, currents, wind, and precipitation near the proposed Facility site, the Applicant has determined that prebooming operations would be safe and/or effective only if environmental conditions do not exceed the following threshold values:

- Water current speed > 1.5 knots
- Wave heights > 2 to 2.5 feet
- Sustained wind speed greater than 30 knots (~35 miles per hour)
- Low visibility resulting from fog, heavy precipitation, or snow
- Freezing or icy conditions
- Presence of large floating/barely submerged debris

The Applicant has determined that surface current speeds in the vicinity of the marine terminal could exceed 1.0 knot on a frequent basis all months of the year, could occasionally exceed 3 to 5 knots during spring flood flows on the Columbia River, and would preclude effective prebooming for a substantial portion of the year (see Appendix D.3: Appendix K). Additional discussion of prebooming requirements is presented in Section 4.3.8 and additional mitigation measures pertaining to prebooming are presented in Section 4.9.

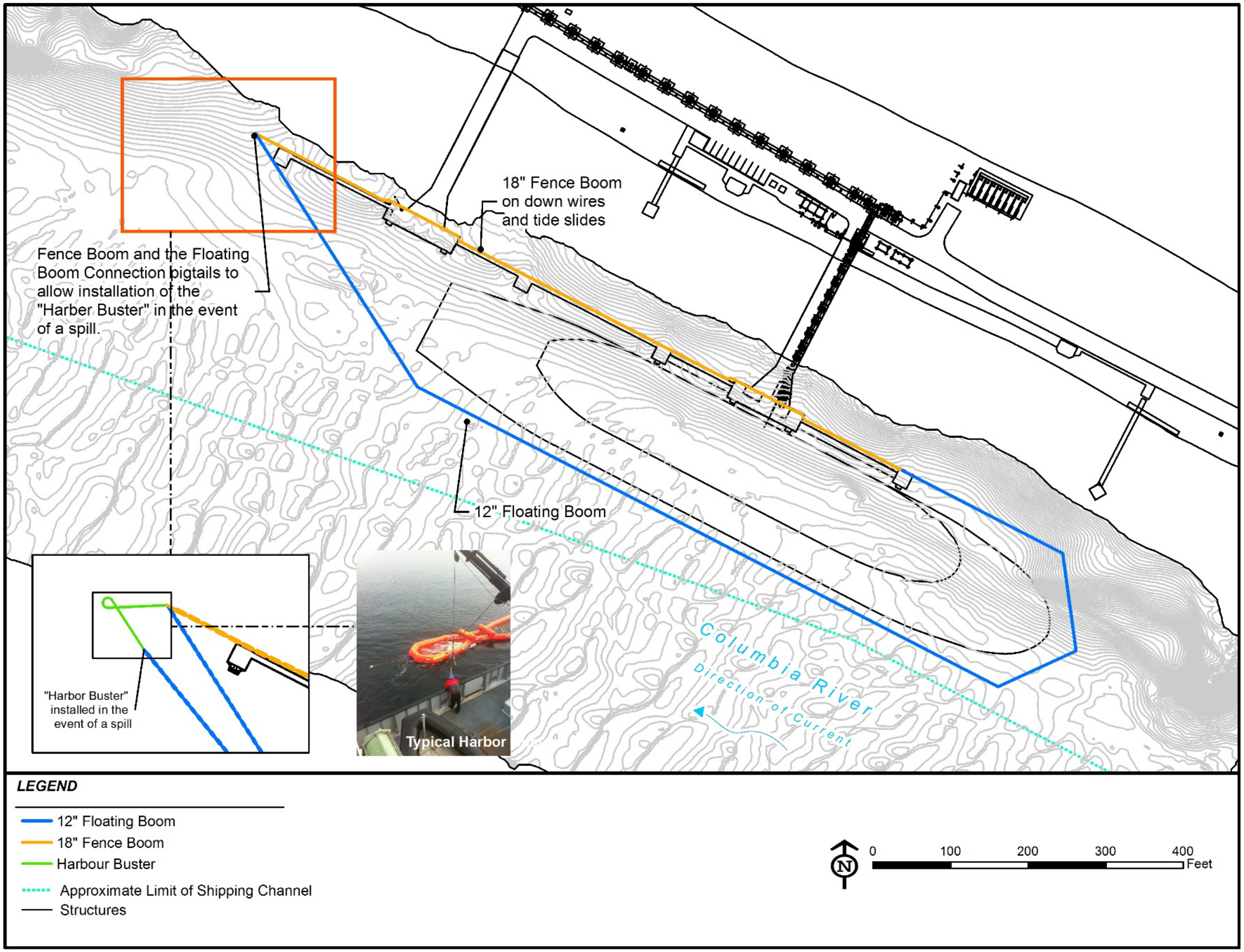

Figure 2-18. Preliminary Prebooming Diagram

2.4.1.6 Utilities

Stormwater Management System

Onsite operations, including unloading, pumping, transfer, and storage of crude oil and miscellaneous materials, would be conducted in covered facilities designed to keep stormwater from entering the structures and mixing with industrial activities. Transfer of crude oil at the dock would be completed with a closed piping system where oil transfer would not be exposed to stormwater.

A stormwater control structure and oil-water separators located within the containment area of the storage tank area would complete initial treatment of stormwater. The oil-water separators would discharge to manually controlled pumps that in turn would discharge to water quality filter vaults for treatment of turbidity, heavy metals, and VOCs prior to discharge to the Port's existing discharge conveyance system. During storm events, the pumps are turned on manually and turn off automatically. Each time, the pumps must be turned on manually, with the manual on-switch located where visual inspection for oil sheen is required.

Parking and access areas would be designed with a combination of catch basin filters and filter vaults to treat stormwater runoff prior to discharge to the Port's existing discharge conveyance system.

The proposed Facility would discharge collected runoff to the following existing Port stormwater systems:

- Terminal 5 stormwater system
- Terminal 4 stormwater system
- Terminal 4 infiltration swales

Each of these systems discharges into existing permitted downstream Port-operated outfalls (Figures 3.3-1 through 3.3-3 in Section 3.3).

Water Supply

The proposed Facility would require potable water for domestic use, process uses, and emergency fire suppression. Existing water distribution facilities owned and operated by the City of Vancouver are adjacent to or located on the site (Figure 2-19). Potable water for the proposed Facility is limited to the amount needed to serve general kitchen and restroom facilities at the administrative and support buildings (Area 200), sanitary water needs inside the storage building (Area 300), and landscaping irrigation at the unloading and office area (Area 200), storage area (Area 300), marine terminal (Area 400), and boiler building (Area 600). The maximum daily potable water demand is equivalent to the need for 10.3 gpm. The annual water usage would vary based on ambient air temperatures and rainfall, with lower temperatures and higher rainfall requiring less irrigation water. Table 2-5 shows a breakdown of the potable water uses and rates.

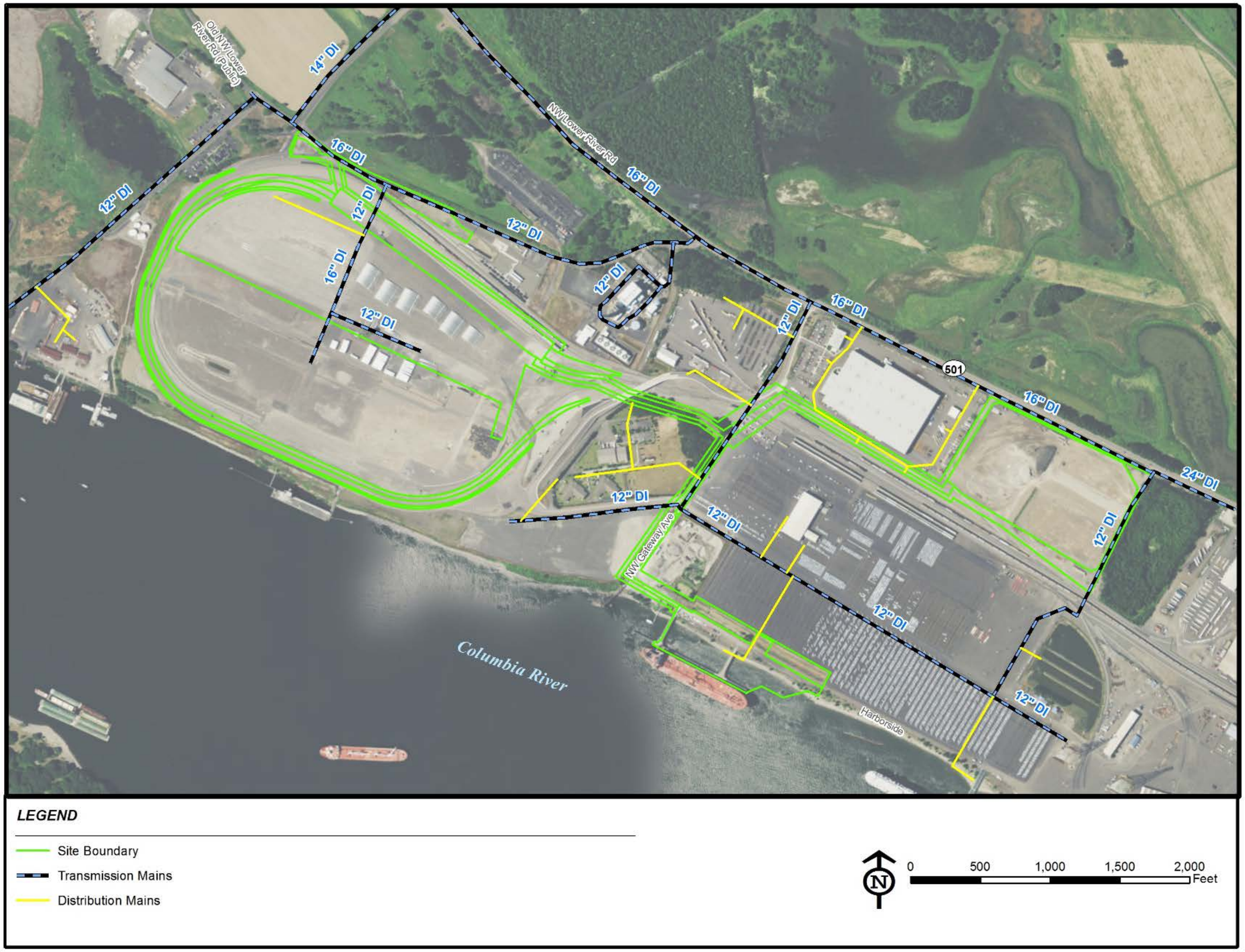

Figure 2-19. City of Vancouver Water Distribution Network

Table 2-5. Potable Water Uses and Rates

Potable Water Uses	Average Water Use (gpd)	Maximum Water Use (gpd)
Administrative and support buildings (Area 200)[a, b]	5,400	6,250
Storage area (Area 300)[b]	5,000	6,750
Marine terminal (Area 400): future domestic[c]	800	1,250
Boiler building (Area 600): landscaping irrigation	500	650
Total Potable Water	11,700	14,900

Source: BergerABAM 2014b

Notes:

a The volume of 35 gpd for industrial factory sewer rates is based on Table G2-2, Design Basis for New Sewage Works (Ecology 2008) with an additional 15 gpd.

b Assumption of 116 employees using facilities in the administrative and support buildings (Area 200), 4 employees in the storage area (Area 300) with other sanitary uses, and 10 employees in the marine terminal (Area 400) with other sanitary uses.

c Potable water use is conservatively inflated in the storage area and marine terminal (Areas 300 and 400, respectively) for possible reallocation of staffing resources over time.

gpd = gallons per day

Process water use at the proposed Facility would include water required for the boiler, at the miscellaneous parts and equipment wash area, and for cooling water used during operation of the fire suppression pumps. The boiler plant in Area 600 would provide steam to heat viscous crude oil. Most of the process water used to make steam would be maintained in a closed loop system. The anticipated maximum process water demand is approximately 75,200 gpd (Table 2-6).

Table 2-6. Process Water Uses and Usage Rates

Industrial Process	Average Water Use (gpd)	Maximum Water Use (gpd)
Miscellaneous parts/equipment wash[a]	2,400	5,000
Fire pump[b]	100	200
Storage area (Area 300) fire pump[b]	100	200
Marine terminal (Area 400) fire pump[b]	100	200
Boiler building (Area 600)	48,400	69,600
Total Process Water	51,100	75,200

Source: BergerABAM 2014b

Notes:

a Pressure washer rated at 5 gpm, with conservative usage assumptions.

b Averaged considering 2-6 weekly 30-minute maintenance cycling at 35 gpm, and annual pump testing.

gpd = gallons per day

Wastewater Discharge

The proposed Facility would generate approximately 24 gpm of domestic and process wastewater from its operations (Table 2-7). Wastewater from the proposed Facility discharged into the City's sanitary sewer would be conveyed to the city's Wastewater Treatment Plant (WWTP), located approximately 1 mile east of the storage building (Area 300) at 2323 West Mill Plain Boulevard. The City owns the conveyance pipeline system, treatment plant, and associated outfall. The treatment plant and outfall are regulated under the Municipal NPDES Individual Permit WA0024350.

Table 2-7. Domestic and Process Wastewater Sources

Wastewater Stream	Average Daily Flows (gpd)	Maximum Daily Flows (gpd)
Domestic Wastewater		
Area 200 administrative and support buildings	5,300	6,100
Area 300 storage building[a]	500	750
Area 400 (marine terminal) domestic use[a]	500[b]	750[b]
Total domestic wastewater	6,300	7,600
Domestic wastewater to sanitary sewer	5,800	6,850
Process Wastewater		
Area 200 (unloading and office area)		
Miscellaneous part/equipment wash	2,400[c]	5,000[c]
Fire pump cooling water	100[c]	200[c]
Area 300 (storage area)		
Pump basin sump effluent	100[d]	7,000[d]
Fire pump cooling water	100	200
Marine terminal (Area 400) fire pump cooling water	100[c]	200[c]
Boiler building (Area 600) effluent	16,200	19,900
Total process wastewater	19,000	32,500
Total process wastewater to sanitary sewer	16,400	27,100

Source: BergerABAM 2014

Notes:

a Waste flows from this basin are calculated assuming (at this time) that the basin is not covered. Average day flows were calculated distributing the annual rainfall total of 38.9 inches per year to determine gpd. Maximum rainfall was calculated using the 100-year storm rainfall event of 4.5 inches per day.

b Process water discharged to stormwater system for treatment or stored onsite and hauled offsite for disposal.

c Domestic wastewater stored onsite and hauled offsite for disposal.

d Wastewater production at the storage area (Area 300) and marine terminal (Area 400) increased over assumed employee concentrations of 4 and 10, respectively, to allow for staffing reallocation in the future.

gpd = gallons per day

Domestic Wastewater

Domestic wastewater would be generated from administrative and support buildings (Area 200) and from the storage building (Area 300). The wastewater would consist primarily of domestic waste from the kitchen/break room, restroom facilities, and shower areas. No pretreatment would occur at these locations. Domestic wastewater sources would be connected to the existing public sanitary sewer via a combination of new gravity and pressure sewer lines. Discharge to the City sewer would occur at two locations:

- A wastewater source just north of the administrative and support buildings (Area 200) would discharge into an existing 18-inch-diameter gravity sewer.

- A second wastewater source just south of the storage tanks (Area 300) would discharge into an existing 18-inch-diameter gravity sewer.

Personnel at the marine terminal (Area 400) would use portable toilets located in that area. The sanitary waste from the marine terminal would be hauled offsite.

Process Wastewater

All process wastewater discharged from the proposed Facility into the City's sanitary sewer system would be pretreated to comply with the City's pretreatment program. Depending on the source, process wastewater would be handled using one or more of the following methods:

- Treated and discharged to stormwater;
- Pretreated and discharged to the City's sanitary sewer; or
- Collected, stored onsite, and hauled to an approved disposal location.

Miscellaneous part and equipment washing would be conducted in a designated area located at the railcar unloading facility and administrative offices (Area 200). Washwater would be generated from a single 5-gpm pressure washer and would be collected and conveyed to the containment tanks at the railcar unloading facility. Contents of the containment tanks would be discharged to a mobile vacuum truck and taken to an approved facility for recycling or disposal.

The transfer pipelines would have a concrete basin equipped with a sump pump for dewatering and removing effluent and discharge. Effluent and discharge contained by the concrete basins would be transferred to a mobile vacuum truck and taken to an approved facility for recycling or disposal.

Fire pump cooling water (in the unloading and office area [Area 200], storage area [Area 300], and marine terminal [Area 400]) would be discharged once a week during a 30-minute maintenance cycle. This water would be discharged from the unloading and office area (Area 200), the storage tanks (Area 300), and marine terminal (Area 400) into containment tanks, the sanitary sewer, and stormwater system, respectively.

The boiler is expected to produce continuous blowdown when in operation, with discharge flow rates fluctuating depending on steam demand. Blowdown temperature at the boiler plant would be lowered to permit allowable levels with a cooling system that uses potable water as the coolant. Coolant water would be mixed along with the boiler blowdown. Boiler blowdown water and water softener backwash wastewater would be discharged to a small sanitary sewer pump station necessary to convey wastewater from the boiler building to the discharge location near the administrative and support buildings (in Area 200).

Natural Gas and Electricity

Natural gas service would be obtained from NW Natural. An existing 2-inch service line is in place for service to the boiler building (Area 600; Figure 2-20). This line would be upgraded to a 4-inch-diameter service line for natural gas supply at the boiler building. The existing service line to the JWC would be extended farther south toward Berths 13 and 14 to provide gas for the MVCU system. The natural gas service would be interruptible, allowing for shutdowns in the boiler area or marine terminal area if required.

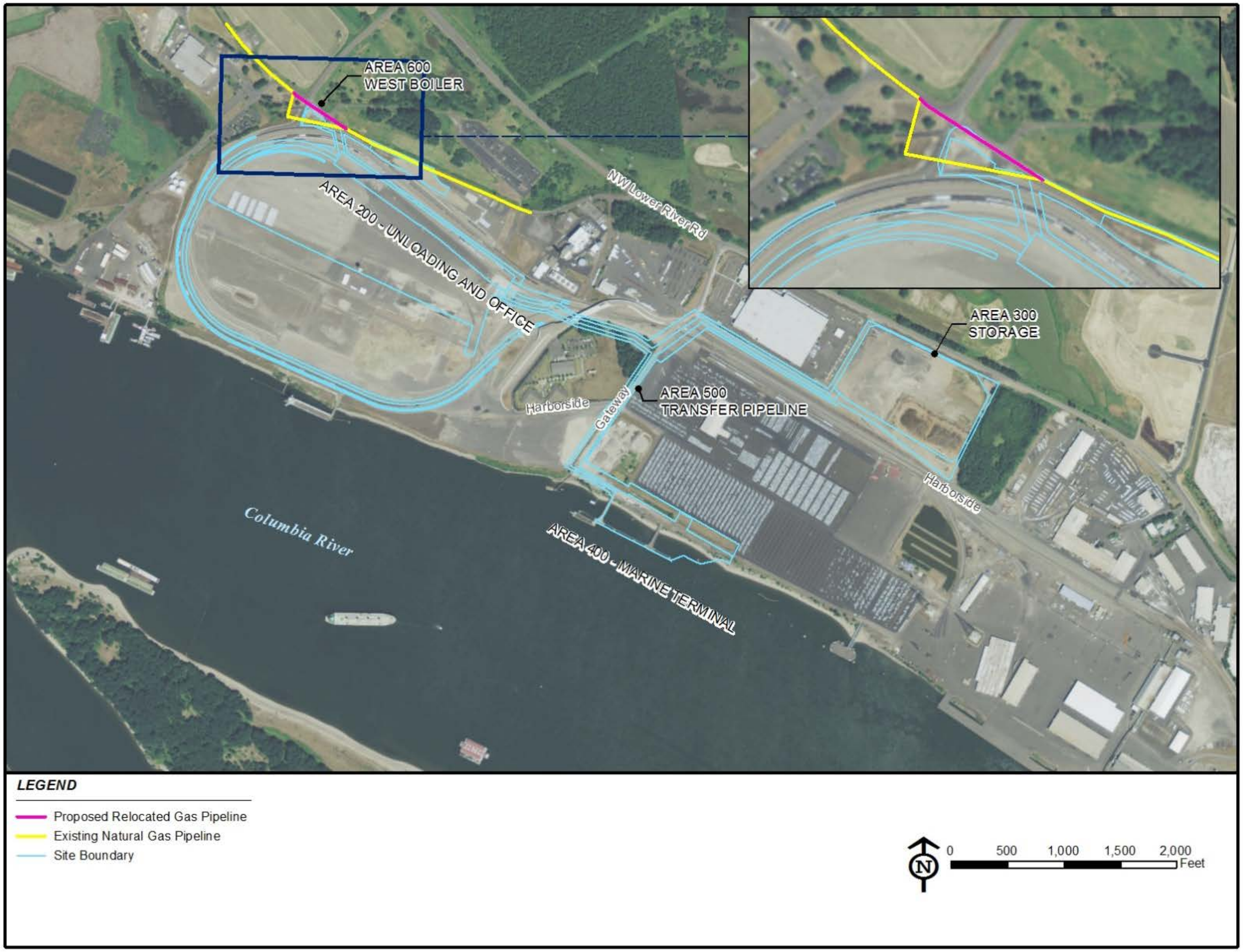

Figure 2-20. Location of Natural Gas Supply Line

During operations, the maximum hourly gas usage is estimated to be:

- 0.1852 million standard cubic feet (MMscf)/hour at the boiler building, assuming all unloading area boilers are operating; and
- 0.0305 MMSCF/hour at the marine terminal for assist gas for the eight MVCUs (total).

The proposed Facility would obtain electrical service from CPU, either through interconnection with the existing CPU distribution system or through interconnection with a CPU substation to be constructed in the JWC vicinity.[18]

In the event of a power failure for any reason, leased portable power generators (i.e., emergency engines) would be activated to operate critical safety, security, and environmental equipment. The emergency engines would be fueled by ultralow sulfur diesel or biodiesel.

2.4.2 Operational Inspection and Maintenance Activities

The Applicant has proposed to operate, maintain, and inspect the proposed Facility in compliance with applicable industry standards and generally applicable federal and state regulations, including an Oil Spill Contingency Plan prepared under the Oil Pollution Act of 1990 (OPA 90) and WAC 173-182 (Appendix D.4). Inspection checklists would be filled out and records of inspections maintained by the proposed Facility manager. Typical daily, monthly, and annual inspections are summarized in Table 2-8.

The Applicant proposes to conduct inspections, maintenance, and tests in accordance with the following generally applicable state and federal regulations:

- WAC 173-180: Facility oil handling standards;
- WAC 173-182: Oil spill contingency plan; 33 CFR 155: Oil or Hazardous Material Pollution Prevention Regulations for Vessels; and
- 40 CFR 112: Oil Pollution Prevention.

Inspections of onsite response equipment would be carried out to include inspections of booming equipment during semiannual boom deployment exercises, deployment of response boats every other month, and inventory and inspections of other miscellaneous equipment. The equipment inspection and deployment exercises would be recorded in a Response Equipment Log and maintained by the proposed Facility manager. The operability of this equipment would be confirmed at least annually through testing and drills. Any inventory discrepancy or inoperable equipment would be replaced or repaired when detected. Equipment would be maintained according to manufacturer specifications. The inspection checklist and maintenance schedule and the operational status of all equipment would be maintained for a minimum of 5 years.

18 This CPU substation has been planned to serve multiple customers at the Port and is not a connected action in relationship to the Proposed Action.

Table 2-8. Summary of Regular Proposed Facility Inspection Activities

Inspection Frequency	Inspection Activities
Daily	• Tank gauges, temperature, and meter readings are recorded daily. Tank levels and product inventory are maintained on a continuous basis with an automatic tank gauging system or manually, and reconciled daily. • Receiving tanks are gauged and valves set prior to receipt of product from the unloading and office area (Area 200). Verbal contact is required to initiate transfer. All transfer information is recorded in the proposed Facility receipt log, on file at the terminal office. • Proposed Facility operators conduct visual inspection of the tank farm, all pumps and valves, sheds, office, fire protection equipment, oil-water separators, oil spill response equipment, cathodic protection systems, and safety systems and equipment. A complete inspection of dock, pipelines, transfer equipment, and tankage is performed prior to marine transfers. A pretransfer conference and Declaration of Inspection is completed in accordance with 33 CFR § 156. • Stormwater retained within the tank berms is inspected and released pursuant to spill prevention control and countermeasure regulations. Records of all stormwater discharge events are retained onsite. • Tank gauges and meters are calibrated as needed.
Monthly	• A safety inspection is conducted under direction of the proposed Facility manager. • Applicant Facility operators inspect and maintain proposed Facility spill response equipment at the dock. • Tank inspections are conducted in accordance with API Standard 653 (tank inspection, repair, alteration, and reconstruction). • Secondary containment units are evaluated at the same time as tank inspections. During inspection, discrepancies in any of the items are noted and reported to the proper Facility personnel.
Twice Annually	• Response equipment is checked for the following in accordance with 40 CFR § 112, Appendix F: 1. Inventory (item and quantity) 2. Storage location 3. Accessibility (time to access and respond) 4. Operational status/condition 5. Actual use/testing (last test date and frequency of testing) 6. Shelf life (present age, expected replacement date) • Oil spill cleanup material and emergency response equipment would be inventoried and tested every 6 months or immediately after a spill.
Annually	• The fire extinguishers are inspected and tested. • The dock hoses and the marine pipelines to the dock are pressure tested in accordance with 33 CFR § 156. • Additional preventive maintenance conducted on a scheduled basis includes inspection/cleaning/lubing of valves and inspection of tank roofs.
Every 10 Years (per API 653)	• Radiographic examination of aboveground crude oil storage tank shell butt welds. • Vacuum box testing of aboveground crude oil storage tank floor seams. • Hydrostatic or vacuum box testing of aboveground crude oil storage tank shells.

API = American Petroleum Institute, CFR = Code of Federal Regulations

2.4.3 Operational Security

The Applicant has proposed to conduct a Facility Security Assessment and prepare an operations Facility Security Plan pursuant to the Maritime Transportation Security Act of 2002, 33 CFR § 105, that would be approved by the Port and US Coast Guard (USCG). The proposed Facility Security Plan would be submitted to USCG's Captain of the Port 60 days prior to beginning operations at the marine terminal. The contents of the plan would be developed based on the final design and operational parameters of the proposed Facility and would include the following proposed security actions, subject to USCG approval:

- All unloading, storage, internal pipelines, and valves would be contained and monitored within the proposed Facility restricted area.
- Restricted areas would be monitored and fenced.
- Security gating would be provided at the rail loop access at the Gateway overpass.
- Security lighting would be installed throughout the proposed Facility.
- The proposed Facility site would be monitored using a security video camera system.

The northern side of the WVFA rail loop facilities is currently fenced to prevent public access. Parking for operations and maintenance staff would be provided at the administration and support buildings (Area 200). All visitors, such as vendor equipment personnel, maintenance contractors, material suppliers, and all others, would require permission for access prior to entrance. All proposed Facility personnel would be required to obtain and carry Transportation Worker Identification Credentials (TWICs).

2.5 DECOMMISSIONING ACTIVITIES

The operational lifetime of the proposed Facility is assumed to be 20 years. According to the Applicant, the parties to the lease between the Port and the Applicant have agreed that at the end of the lease term, the Port will own the improvements on the lease area or may require the Applicant to remove some or all of the improvements. In addition, the parties to the lease have agreed that if the Port elects not to approve a lease extension, the Port would be responsible for decommissioning.

For purposes of this EIS, it is assumed that decommissioning would consist of removal of most of the aboveground structures to allow site redevelopment by another tenant. Prior to demolition, proposed Facility elements would be cleaned and residues would be handled, contained, and disposed of in accordance with appropriate waste handling regulations and requirements. A summary of the proposed Facility elements that would likely be removed at decommissioning is provided in Table 2-9. Aboveground elements of the proposed Facility would be demolished. Steel structures, piping, and equipment would be cut and removed from the site. It is likely that most steel from the site would be recycled. Aboveground concrete structures would be demolished, and demolition debris would be removed from the site for disposal at an approved location and recycled.

Belowground piping would be decommissioned and would be left in place. Site elevations would be established, and ground stabilization covers would be applied consistent with surrounding land use and future industrial use of the site. The proposed Facility would be deenergized and utilities would be disconnected, although the utility infrastructure would remain in place. A summary of the proposed Facility elements that would likely be retained at decommissioning is provided in Table 2-10.

The Applicant’s decommissioning of the proposed Facility must comply with the terms of the Site Certification Agreement, and its associated site restoration activities must comply with WAC 463-72. WAC 463-72 establishes requirements for site restoration at the conclusion of the proposed Facility’s operating life or if the project is terminated before then. The Applicant must submit an initial site restoration plan before it starts site preparation and must periodically review that plan through the life of the project and notify EFSEC of the results. The Applicant must also submit a detailed site restoration plan prior to project termination. EFSEC may also require the submission of site restoration plans any time during development, construction, or operation of the Project.

Table 2-9. Summary of Project Elements Removed at Facility Decommissioning

Facility Area	Primary and Ancillary Project Elements
Unloading and Office Area (Area 200)	• Aboveground structures, unloading equipment, and transfer piping associated with railcar unloading facility • Control rooms and E-houses • Fire pump and foam building • Pedestrian access ways to unloading structures
Storage Area (Area 300)	• Crude oil storage tanks • Storage building • Control room and E-House • Fire pump and foam building
Marine Terminal (Area 400)	• Marine vessel loading hoses and dockside equipment • Control room and E-House • Crane control room • MVCU and vapor blower skid • Spill prevention, response, and containment equipment • Fire pump and foam building
Transfer Pipelines (Area 500)	• Aboveground portions of piping from Areas 200 to 300 • Aboveground portions of piping from Areas 300 to 400 • Aboveground portions of piping from vessel loading to MVCU
Boiler Building (Area 600)	• Boiler building • Piping that carries steam to the unloading and office area (Area 200)

MVCU = marine vapor combustion units

Table 2-10. Summary of Project Elements Retained at Proposed Facility Decommissioning

Facility Area	Primary and Ancillary Project Elements
Rail Infrastructure	• Rail facility loops and associated infrastructure
Unloading and Office Area (Area 200)	• Rail infrastructure • Belowground sumps and vaults • Administrative and support buildings • Parking and landscaping • Stormwater collection and conveyance system
Storage Area (Area 300)	• Secondary containment berm and liner • Pump basin • Stormwater collection and treatment system • Subsurface ground improvements
Marine Terminal (Area 400)	• Dock improvements • Stormwater collection and treatment system • Subsurface ground improvements
Transfer Pipelines (Area 500)	• Belowground sections under existing rail and road • Subsurface ground improvements
Utilities	• Aboveground and belowground utilities

The initial site restoration plan would be prepared in sufficient detail to identify, evaluate, and resolve identified environmental, public health, and safety issues. It would describe the process used to evaluate alternatives and to select measures that would restore or preserve the site or otherwise protect the public from risks associated with the site. The plan would include a cost-benefit analysis of various restoration options and would address provisions for funding or bonding arrangements to meet restoration costs. Financial assurances would include evidence of pollution liability insurance coverage in an amount justified for the restoration, and a site closure bond, sinking fund, or other financial instrument or security.

2.6 RAIL OPERATIONS

The proposed Facility would receive crude oil from unit train loading facilities located outside the state of Washington. Once operational, the proposed Facility could receive crude oil from any source with rail access to the Port (Figure 2-21). However, according to information provided by the Applicant, its customers would likely source crude oil primarily from mid-continent North American locations, including the Bakken formation that covers parts of North Dakota and Montana and Saskatchewan, Canada.

Currently, 20 existing and proposed crude oil unit train loading terminals in North Dakota and Montana load between 10,000 and 200,000 bpd of Bakken crude oil (North Dakota Pipeline Authority 2014, BNSF 2015):

- Bakken Oil Express, Dickinson, ND
- Manitou Rail Facility, Ross, ND
- COLT Hub, Epping, ND
- Van Hook Crude Facility near New Town, ND
- Musket Crude Oil Rail Terminal, Dore, ND
- Savage Bakken Petroleum Services Hub, Trenton, ND
- Hess Rail, Tioga, ND
- BakkenLink Rail Hub, Fryburg, ND
- Enbridge, Berthold, ND
- Global Basin Transload, Beulah, ND
- EOG Resources Inc. Transload Facility, Stanley, ND
- Enserco, Gascoyne, ND
- Dakota Plains, New Town, ND
- High Sierra, Donnybrook, ND
- Crestwood COLT Hub, Epping, ND
- Great Northern Midstream, Fryburg, ND
- Plains, Ross, ND
- Global/Basin Transload, Stampede, ND
- Savage Services, Trenton, ND
- Northstar Transloading, Fairview, MT

Forty-six other existing crude oil unit train loading terminals load crude oil from various sources throughout the United States including seven facilities in Wyoming, two facilities in Colorado, two facilities in New Mexico, eight facilities in Texas, one facility in Oklahoma, one facility in Louisiana, one facility in Florida, one facility in Illinois, one facility in Missouri, five facilities in California, four facilities in Washington, one facility in Oregon, and 12 facilities in various states on the East Coast (BNSF 2015).

Two crude oil unit train loading terminals that could be used to source diluted bitumen (dilbit) were identified in Alberta, Canada (USDG Crude Oil Loading Facility in Hardisty and Canexus Bruderheim Facility in Bruderheim) (BNSF 2015). Neither these nor other loading facilities in Canada were specifically analyzed in this Draft EIS due to the uncertainty of specific source locations.

Existing Class 1 railroads owned and operated by BNSF[19] would likely be used to deliver loaded unit trains to the proposed Facility and to deliver empty trains back to the loading facilities. Union Pacific has operating rights over portions of the BNSF track and could also potentially deliver crude oil to the proposed Facility. However, as stated earlier, because BNSF owns or controls the rail infrastructure in the Bakken region, and rail transport agreements and rates tend to favor a single carrier, EFSEC has assumed that BNSF would be the likely rail transporter of crude oil to the proposed Facility.

More than 3,000 miles of railroad tracks are located in Washington. Rail infrastructure across the state includes main and branch lines, industrial spurs, and rail yards. BNSF connects the Williston Basin region with the Pacific Northwest using either the former Great Northern Railroad route in the northern Williston Basin including the loading facilities near Williston or the former Northern Pacific Railroad route in the southern Williston Basin near Dickinson, North Dakota. Both routes converge at Shelby, Montana, and continue west to Spokane, Washington. The precise routing of individual unit trains to the proposed Facility would be determined by BNSF depending on the location of the unit train loading facility and track usage and condition at the time of delivery.

Figure 2-22 shows the routes that may be used to transport crude oil to the proposed Facility in Washington and to transport empty unit trains back to the unit train loading facilities in North Dakota. The Applicant has indicated that the Columbia River Alignment would likely be used for crude oil delivery since it is the only low-elevation route (with no significant grades) through the Cascade Mountains and it allows direct transport to the proposed Facility at the Port. Return transport of empty unit trains could use one of three potential routes: the Columbia River Alignment, the Stampede Pass Alignment, or the Stevens Pass Alignment. For the purposes of analysis in this Draft EIS, the Stampede Pass Alignment is the assumed return route.

2.6.1 Rail Operations at the Port of Vancouver

Unit trains would enter the Port’s industrial rail network from the BNSF mainline and continue west across Port property to the proposed Facility at existing Port Terminal 5. The unit trains would then be positioned on the appropriate onsite rail loop and placed under the control of the proposed Facility operator for the duration of unloading and returned to the railroad prior to departure.

Proposed Facility operators would take control of the unit trains just before the vehicle traffic overpass at the Terminal 5 loop track entrance. They would move the unit trains onto the loop track and index the tank cars through the unloading facility. Following unloading, the railroad carrier would be notified that the unit train is ready for departure and the unit train would be moved to the departure tracks to the east of the Terminal 5 loop where the Class 1 railroad carrier would regain control of the unit train.

19 Union Pacific also has operating rights over portions of the BNSF track and could potentially deliver crude oil to the proposed Facility.

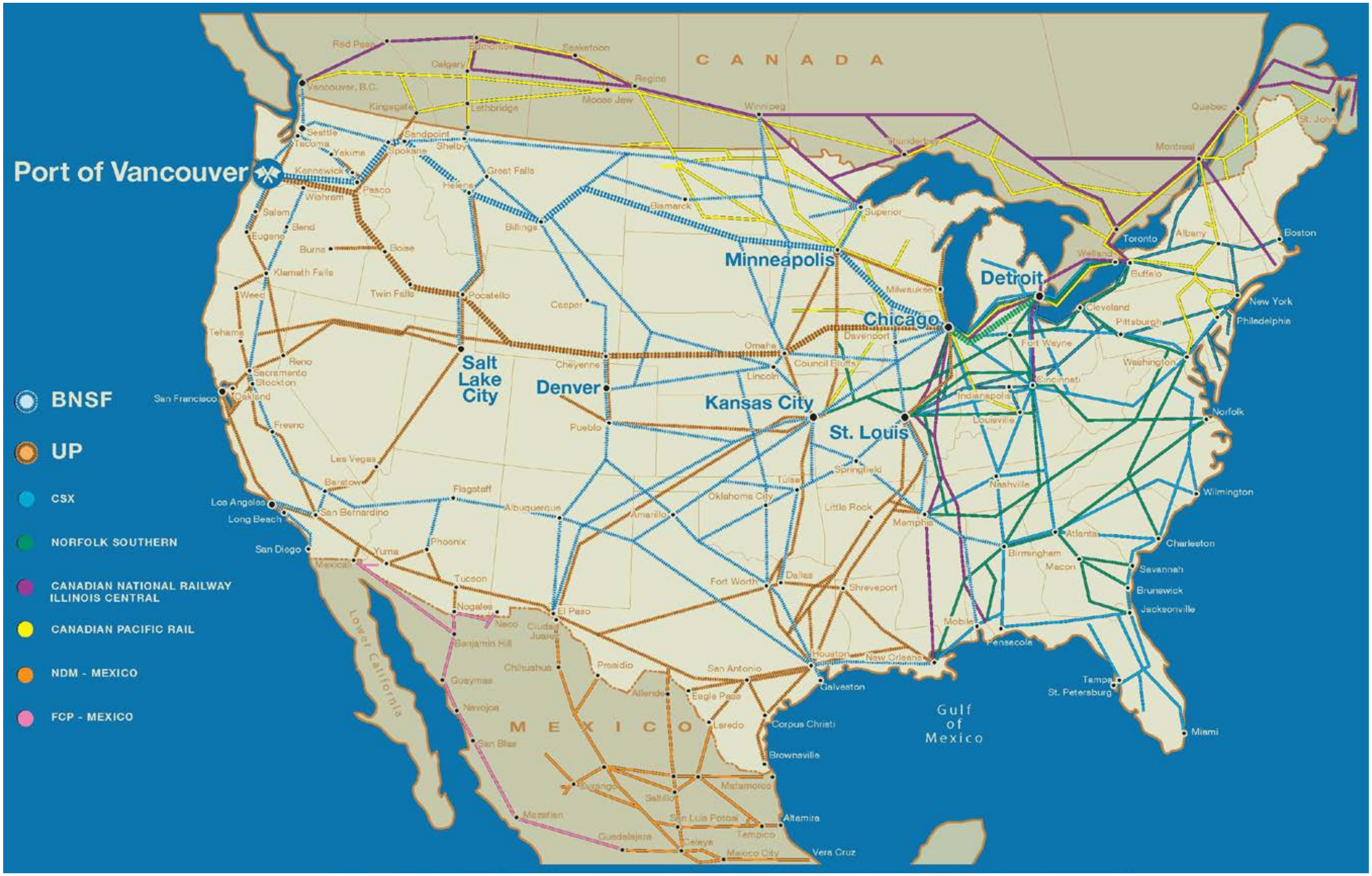

Figure 2-21. North American Rail System Connected to the Port of Vancouver

Source: Port of Vancouver 2013

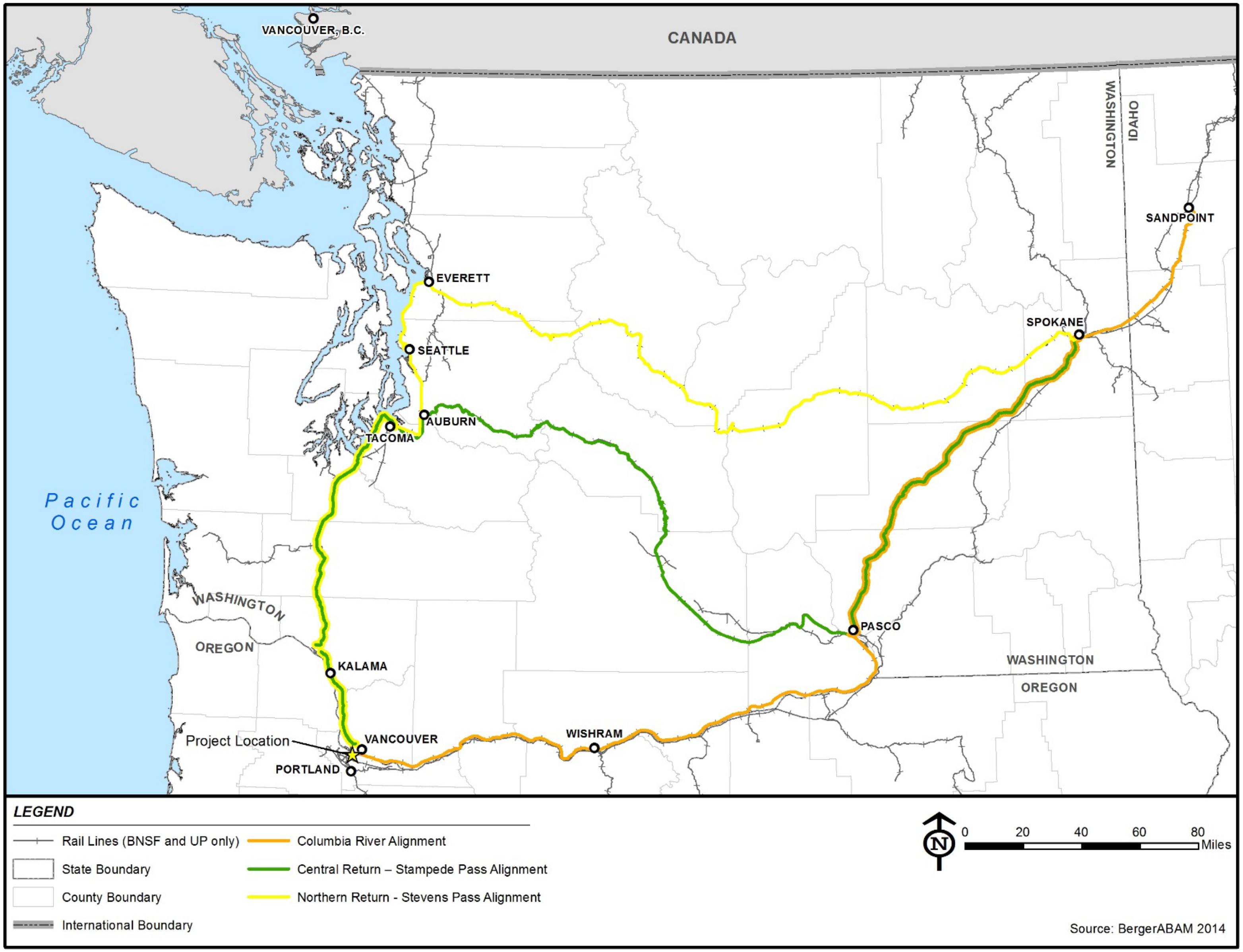

Figure 2-22. Rail Routes in Washington State

2.7 VESSEL OPERATIONS

Vessels arriving to load crude oil at the proposed Facility would likely be either self-propelled vessels (tankers) or articulated tug barges (ATBs). Typical vessels would be medium-sized tankers with cargo capacities similar to the storage capacity of individual storage tanks at the terminal. These vessels are approximately 600 feet long and 105 feet wide (Handymax) with an operating draft of 41 feet and a crude oil cargo capacity of 319,925 bbl (Table 2-11 and Figure 2-23). ATBs consist of a tanker barge that is directly coupled to a tugboat that pushes the barge from a notch in the stern of the barge. Large oceangoing ATBs have cargo capacities of up to 327,000 bbl of oil.

Figure 2-23. Typical Medium-Sized Tanker

Source: Capt. Marc Bayer, Tesoro (BergerABAM 2014a)

Although the Handymax vessels (46,000 metric deadweight tons [MDWT]) are the type of vessel that would most commonly be used, all of the vessel types in Table 2-11 may be used to transfer crude oil frm the proposed Facility. For the purposes of this Draft EIS, approximately 15 percent of the vessels used to transport crude oil are assumed to be 105,000 to 115,000 MDWT oil tankers and approximately 5 percent are assumed to be 160,000 to 165,000 MDTW oil tankers (BergerABAM 2015a). The large “supertankers” that carry crude oil from the Alaska pipeline terminal to various West Coast refineries are too large to navigate the Columbia River.

OPA 90 phased in the use of double-hulled vessels in US waters for both US and foreign-registered vessels. After January 1, 2015, all tankers and ATBs serving US ports are required to have double hulls.

Table 2-11. Dimensions of Articulated Tug Barges and Tanker Vessels Anticipated to Serve Proposed Facility

Type	ATBs	Oil Tanker					
Vessel Class	27,500 MDWT	46,000 MDWT	75,000 MDWT	115,000 MDWT	125,000 MDWT	142,000 MDWT	160,000 MDWT
Length overall (LOA) [feet]	587.4	601.1	748.0	816.8	869.0	894.7	899.0
Length between perpendiculars [feet]	583.1	570.9	718.5	784.1	825.0	847.0	866.1
Beam [feet]	74.0	105.6	105.64	143.7	136	151.6	157.5
Ballast Condition (for upriver transit)							
Freeboard [feet]	23.8	42.7	44.5	48.4	50.0	54.3	49.8
Draft [feet]	16.2	19.0	20.5	20.5	21.5	32.0	28.0
Displacement [mt]	17,083	23,900	35,325	50,472	47,850	76,300	78,671
Loaded Condition (for downriver transit)							
Freeboard [feet]	9.8	20.7	22.0	25.9	28.5	43.3	34.8
Draft [feet]	30.2	41.0	43.0	43.0	43.0	43.0	43.0
Deadweight [mt]	27,181	46,172	64,100	94,200	86,821	90,700	103,000
Displacement [mt]	32,885	56,368	77,996	112,872	111,299	122,469	125,751
Cargo capacity at max draft including FWA (bbl)	327,000	319,925	449,772	667,777	614,337	642,428	731,513

Source: BergerABAM 2014a

ATB = articulated tug barge, bbl = barrels, FWA = Fresh Water Allowance, MDWT = metric deadweight tons, mt = metric tons

Vessels arriving at the proposed Facility would enter the Columbia River and transit upriver about 106 RMs to the marine terminal (Area 400). The width of the Columbia River varies from up to 5 miles across at its mouth (the “bar”) to nearly 1.1 miles wide at the proposed Facility. The Lower Columbia River operates similarly to a two-lane highway. Unlike Puget Sound or San Francisco Bay, which have many combinations of routes and directions that vessels may take, an inbound or outbound vessel can occupy only one set pathway on the Lower Columbia River navigation channel. The channel has one 300-foot inbound and one 300-foot outbound vessel traffic lane. The designated channel widens beyond 600 feet near the Columbia River bar and is also wider in defined vessel turning areas and anchorages along the entire stretch of the river to accommodate the flow of vessel traffic.

Channel depths are maintained at 55 feet below mean lower low water (MLLW) over the bar and at 43 feet below MLLW from RM 3 to the approximate location of the proposed Facility. As a safety measure, pilots implement a 2-foot-underkeel clearance requirement for vessels navigating the channel, which allows for fully laden drafts up to 41 feet. However, occasionally the river levels run below MLLW, depending on the season and dam and lock operations upriver, and draft restrictions limiting vessels from becoming fully laden during that time are implemented. Vessels with a freshwater draft of less than 36 feet are generally able to transit the bar and river in acceptable weather conditions. Federal regulations enforced by the USCG provide that the larger vessels expected to service the proposed

Facility would have absolute right-of-way while navigating the Columbia River over vessels less than 66 feet in length or those engaged in fishing activities.[20]

All oil tanker vessels serving the proposed Facility would be required to use a vessel pilot service[21] to enter, transit, and exit the Columbia River.[22] Marine pilots are trained and licensed mariners responsible for safely guiding ships in prescribed areas. The Columbia River Bar Pilots provide pilot services for crossing the Columbia River bar, and the Columbia River Pilots provide pilot services for navigating the main channel. ATBs are not required to use pilots but the largest ATBs often choose to use a pilot since the size of the tug-barge combination is equivalent to a medium-sized ship.

The Columbia River Bar Pilots would board the inbound vessel near the Columbia River Entrance Buoy and navigate past the bar to the Astoria Megler Bridge (Figure 2-24). Command would then be transferred to a Columbia River Pilot, who would navigate the vessel to the proposed Facility. The process would be reversed for return transit downriver.

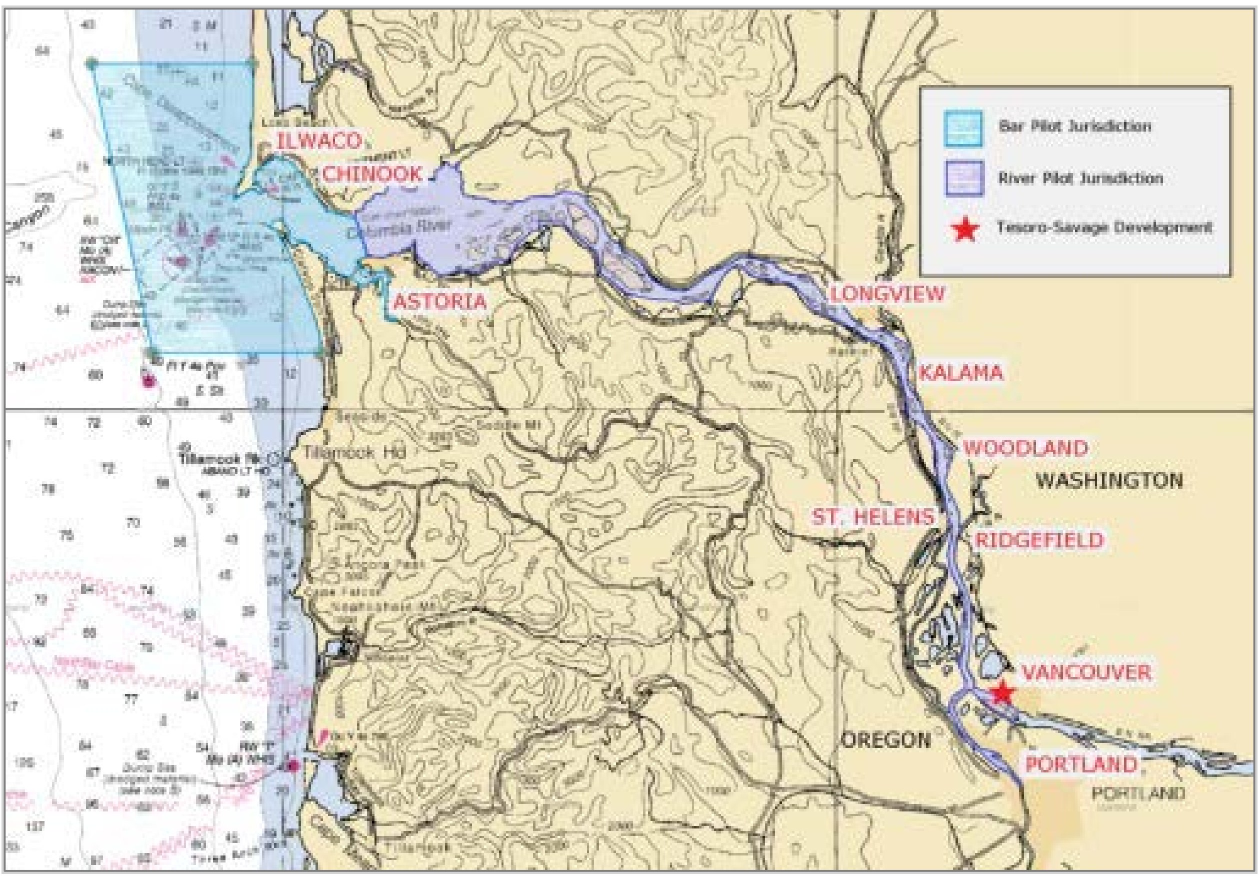

Figure 2-24. Columbia River Bar and Channel State Pilotage Districts

Source: WorleyParsons 2014

20 33 CFR 83.09 and 83.13

21 With the exception of ATBs.

22 Vessels navigating along the Columbia River, including the Columbia River Bar and Lower Columbia River, are subject to pilotage laws and rules set by the State of Oregon (ORS Title 58).

Commercial vessels must provide advance notice of arrival and vessel specifications to the pilots, who would then arrange to board the inbound vessel. Before a bar or river pilot assumes command of a vessel, the pilot would seek positive confirmation of the following:

- Is the channel safe for passage considering available underkeel clearance, availability of assist tugs, environmental conditions, and the condition of the vessel?
- Can the pilot access the vessel safely?
- Is a river or bar pilot available for the transition?

The USCG has designated Regulated Navigation Areas pursuant to 33 CFR Part 165B in the Columbia and Willamette rivers. The only Regulated Navigation Area that would apply to vessels arriving at or departing from the proposed Facility is the Columbia River Bar Regulated Navigation Area. This Regulated Navigation Area provides the USCG with the ability to close the bar to vessel traffic when necessary. Additionally, the Columbia River Bar Pilots impose experience-based bar restrictions as needed. The Columbia River Bar Pilots estimate that, on average, the Columbia River bar experiences closures or restrictions roughly 11 days per year. Closures may range from a few hours to a full day depending on conditions and vessel traffic.

Prior to arrival at the mouth of the Columbia River, vessels would be required to provide a 96-hour advanced notice to proposed Facility emergency contingency plan contractors and, additionally, would require a clearance for arrival from the USCG. The USCG provides the background checks and evaluations of the vessel to make sure its licensing and inspections are up to date. Vessel traffic on the Columbia River is monitored through the Lower Columbia Vessel Traffic Information System (VTIS), which is used by pilots, vessel and tug operators, the US Army Corps of Engineers (USACE), and the USCG to collectively monitor vessel traffic, manage anchorages, and maintain awareness of current conditions (Columbia River Pilots 2014). The VTIS provides real-time displays of the Columbia River through continuously updated vessel information, including position, course, and speed, that is automatically transmitted by a vessel's Automatic Identification System.[23] The VTIS integrates weather monitors, water level gauges, recent National Oceanic and Atmospheric Administration (NOAA) river charts, and USACE soundings to provide current river conditions to operating vessel pilots.

Vessel communications along the Columbia River follow protocols set by the USCG and local authorities. Communications are conducted through radio or other communication devices. During times of limited visibility, federal regulations require commercial vessels to use foghorns capable of being heard more than 2 miles away to communicate the vessel's presence to anyone else occupying the navigation channel. The MFSA monitors continuous VHF-FM radio coverage between Astoria and Portland that allows vessels to be in constant communication with the MFSA and other monitoring parties. The MFSA also has dedicated tactical and command frequencies for reporting vessel emergencies (MFSA 2014).

Vessels arriving at the marine terminal (Area 400) would begin docking operations under Columbia River Pilot authorization and command in a turning basin[24] located just upriver from the marine terminal. Docking assist tugs would be used for the berthing and departure of vessels. Tug assistance would be contracted through the vessel's agent or company, and the agent would be responsible for providing the

23 The International Maritime Organization requires an Automatic Identification System to be fitted aboard ships of 300 gross tons or more, and all commercial passenger ships regardless of size.

24 A turning basin is a wider body of water located in a ship canal or at a port to allow cargo ships to turn and reverse their direction of travel. For a complete 180-degree turnaround, the width of the basin must be more than the length of the longest vessel normally traversing the waterway. Onboard bow thrusters or tugboats may assist in maneuvering the ship.

pilot with all necessary information. The pilot requires information regarding the nominated tug company and the equipment and safe working load maximums. The pilot would be in direct communication with the tug operator prior to handing over control of the vessel.

2.7.1 Anchorages

Anchorages are typically used for vessels waiting for berths to be vacated. Eleven designated anchorage areas along the Lower Columbia River and bar can receive deep-draft vessels (Table 2-12). General vessel guidelines for anchorage procedures, notifications, and communications are specified in the Lower Columbia Region Harbor Safety Committee's anchorage guidelines.

Table 2-12. Designated Anchorages Along the Columbia River

Designated Anchorage	RM Location	Accommodations		
		Maximum Vessel Draft (feet)	Typical Number of Anchorages	Special Requirements
Astoria North Anchorage	RM 14 to 17.8	45	6	Vessels over 760-foot LOA or 120-foot breadth may require tug standby.
Astoria South Anchorage	RM 15 and 18.2	45	4	Vessels over 600-foot LOA may require tug standby.
Longview Anchorage	RMs 64 and 66	40	5	Vessels over 650-foot LOA require a tug standby.
Cottonwood Island Anchorage	RMs 66.7 and 71.2	40	13	Vessels over 650-foot LOA need securing by a stern buoy or need to have a tug standby. Only used as a "last resort" anchorage area.
Prescott Anchorage	RMs 72.1 and 72.5	65	1	Generally vacant and accommodates one large, deeply laden vessel on an "as needed" basis determined by the Columbia River Pilots.
Kalama Anchorage	RMs 73.2 and 76.2	40	6	Has a turning basin with no LOA restrictions. Vessels over 650-foot LOA require securing by a standby tug.
Woodland Anchorage	RMs 83.6 and 84.3	40	6	Vessels over 600-foot LOA require securing by a standby tug.
Henrici Bar Anchorage	RMs 91.6 and 93.9	33	8	Vessels over 600-foot LOA require securing by a standby tug.
Vancouver Lower Anchorage	RMs 96.2 and 101	40	14	Vessels not allowed to anchor between RMs 100.16 and 100.45 because of pipeline. Vessels over 600-foot LOA require securing to stern buoy or standby tug.
Kelly Point Anchorage	RMs 101.6 and 102	50	1	Short-stay capacity for vessels of any size but all vessels must have a standby tug.
Vancouver Upper Anchorage	RMs 102.57 and 105.2	50	7	Vessels over 650-foot LOA required to use stern buoy.

Source: Lower Columbia Region Harbor Safety Committee 2013

LOA = length overall, RM = river mile

2.7.2 Bunkering

Some vessels calling at the proposed Facility would require fueling before heading to their destination. "Bunkering" is the term for the transfer of fuel oil to replenish the fuel for larger vessels. Bunkering operations are strictly regulated by federal and state laws to enforce procedures designed to prevent spills, protect the environment, and protect the safety of operators during transfer. Bunker oil traditionally has been heavy, higher sulfur residual fuel oil. Vessel bunkering occurs in the Columbia River at berths and designated anchorages including anchorages in Astoria, Longview, Cottonwood Island, Kalama, Woodland, Willow Bar, and Hayden Island (Lower Columbia Region Harbor Safety Committee 2013).

Vessels would not be bunkered at the proposed Facility. Since no storage or vessel fueling capabilities are planned as part of the proposed Facility and the Applicant has stated that it would not permit bunkering at the proposed Facility dock, it is assumed that bunkering would occur elsewhere. Vessels calling at the proposed Facility would likely bunker at the refineries receiving crude oil shipments in the Puget Sound and California, or at anchorages in Puget Sound, California, Alaska, or Hawaii, depending on the destination of the specific vessel involved (Appendix J). This assumption is consistent with findings reported in Ecology's (2015a) study that stated "tank ships probably will not bunker in the Columbia River due to their regular trade to California and Puget Sound."

2.7.3 Delivery of Crude Oil to Terminals and Refineries

Crude oil handled by the proposed Facility would be loaded onto marine vessels for transfer to terminals and refineries in California, Washington, Alaska, and Hawaii seeking to replace declining crude oil supplies from California and Alaska. Currently operational US West Coast refineries capable of receiving crude by vessel are listed in Table 2-13 and shown in Figure 2-25. The California crude oil marine receipt and distribution system also includes marine terminals (not necessarily associated with a specific refinery) that can offload to pipeline distribution systems that deliver crude oil to refineries. Therefore, other inland refineries could ultimately also receive crude oil that has been transshipped through the proposed Facility by the Applicant's customers.

The export of domestically produced crude oil has been significantly restricted since the 1970s by numerous federal laws and regulations including the Energy Policy and Conservation Act of 1975 and the resultant Short Supply Control Regulations adopted and administered by the Bureau of Industry and Security regulations on Short Supply Controls at 15 CFR 754.2. Generally, US crude oil exports are prohibited, although under a number of exemptions and circumstances crude oil exports are allowed. For example, the president has authority to allow certain crude oil exports if an exemption is determined to be in the national interest. The president's national interest determination must, at a minimum, consider (1) whether the export will diminish the quantity or quality of petroleum available in the United States, (2) the results of an environmental review, and (3) whether the export might cause sustained material oil supply shortages or significantly increase oil prices above world market levels (Brown et al. 2014). At the current time given the dramatic increase in discovered oil reserves in the US, there are ongoing industry and congressional initiatives to consider repealing the crude oil export ban.

Unlike crude produced domestically, oil from Canada is not affected by the US ban on exports, although a license to reexport foreign crude is required. As mentioned previously, the Applicant would not purchase or own the crude oil received, stored, and loaded to vessels at the proposed Facility, and would not arrange for rail or vessel transportation of crude oil. The Applicant would unload customer crude oil, stage it in the onsite tanks, and load it into customer vessels. While two of the six tanks would be dedicated for use by Tesoro, the corporate entities owning the crude oil in those two tanks (Tesoro) and entity operating the proposed Facility (the Applicant) would be different.

Laden vessels departing from the proposed Facility would exit the Columbia River and enter the Pacific Ocean. Once vessels pass a “line” between the northern and southern jetties at the Columbia River mouth, they are considered to be at sea and as such are subject to the International Regulations for Preventing Collisions at Sea. No designated offshore shipping routes exist, although tank ships laden with crude oil typically operate at least 50 nautical miles offshore (NOAA 2014).

Table 2-13. Currently Operational US West Coast Refineries Capable of Receiving Crude by Vessel

Refinery	Port Location	Approximate Distance from the Proposed Facility (nautical miles)[a]	Location on Figure 2-25
Tesoro Refineries			
Tesoro Refining Martinez Refinery	Martinez, CA	650	1
Tesoro Refining Carson and Wilmington Refineries[b]	Long Beach, CA	1,000	2
Tesoro Refining Los Angeles Refinery	Los Angeles, CA	1,000	3
Tesoro Corporation Anacortes Refinery	Anacortes, WA	300	4
Tesoro Petroleum Barbers Point	Kapolei, HI	3,000	5
Tesoro Petroleum Kenai Refinery	Kenai, AK	1,500	6
Other Refineries			
Shell Martinez Refinery	Martinez, CA	650	7
Phillips 66 San Francisco Refinery	San Francisco, CA	650	8
Chevron Richmond Refinery	Richmond, CA	650	9
Valero Benicia Refinery	Benicia, CA	650	10
Chevron El Segundo Refinery	El Segundo, CA	950	11
Exxon Mobil Torrance	Torrance, CA	950	12
Phillips 66 Los Angeles Refinery	Long Beach, CA	1,000	13
Paramount Petroleum Long Beach	Long Beach, CA	1,000	14
Valero Wilmington Refinery	Los Angeles, CA	1,000	15
Paramount Petroleum Bakersfield	Bakersfield, CA	1,000	16
Shell Puget Sound Refinery	Anacortes, WA	300	17
Phillips 66 Ferndale Refinery	Ferndale, WA	350[c]	18
BP Cherry Point Refinery	Blaine, WA	350[d]	19
TrailStone Group Tacoma Refinery	Tacoma, WA	350[e]	20
Petro Star Inc. Valdez Refinery	Valdez, AK	1,300[f]	21
Chevron USA Honolulu	Honolulu, HI	3,000	22
Chevron Kapolei Refinery	Kapolei, HI	3,000[g]	23
Hawaii Pacific Energy, LLC Kapolei Refinery	Kapolei, HI	3,000[h]	24

Notes:

a Values rounded to nearest 50th mile.

b The Carson and Wilmington refineries currently operate as separate entities; however, Tesoro is applying for a permit to integrate the operations under the Los Angeles Refinery Integration and Compliance Project (South Coast Air Quality Management District [SCAQMD] 2014).

c Phillips 66 2014

d BP 2015

e Oil & Gas Journal 2013

f Oil & Gas Journal 2014

g Petro Star 2015

h Oil & Gas Journal 2013

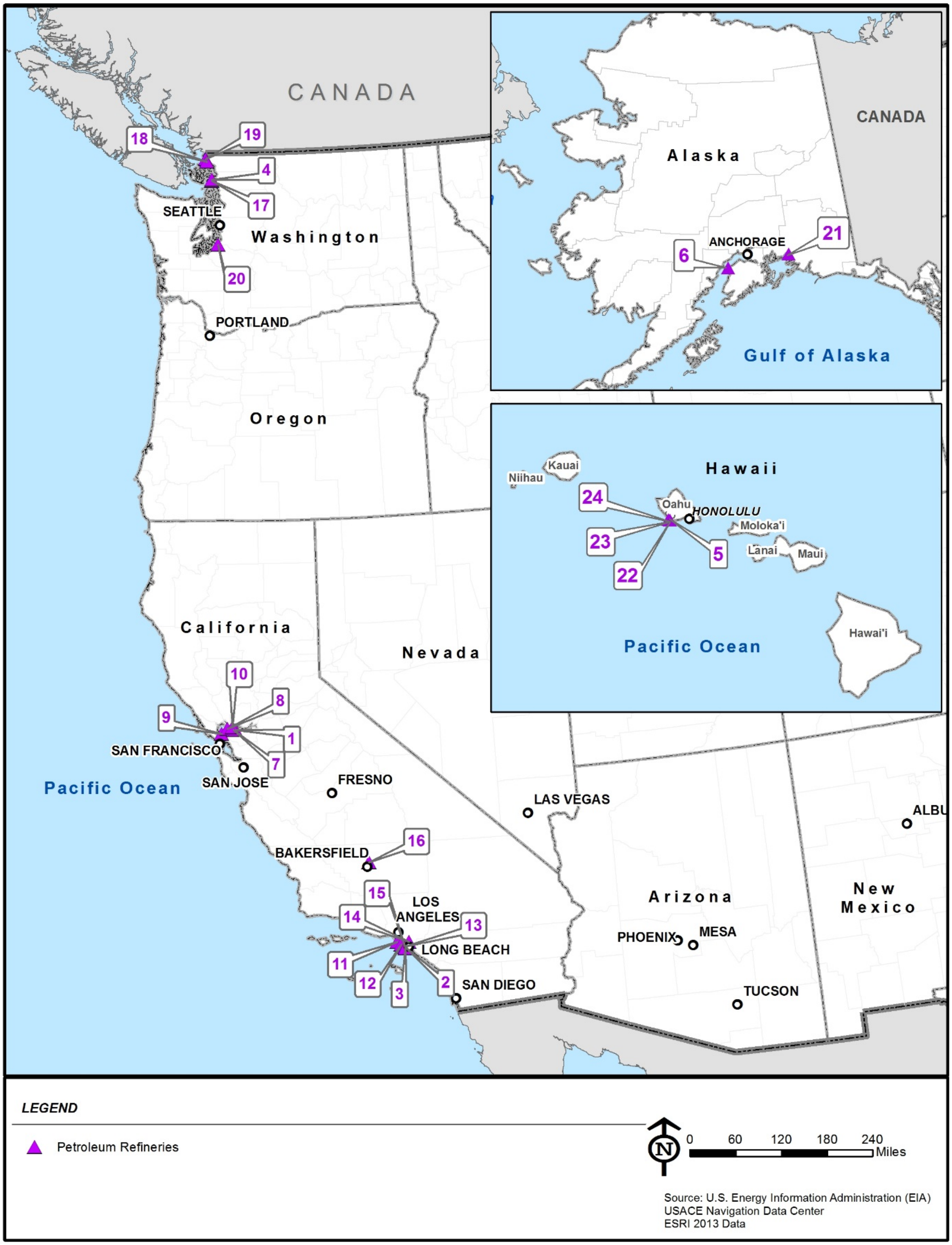

Figure 2-25. Locations of Refineries and Terminals Capable of Receiving Crude by Vessel

2.8 ALTERNATIVES TO THE PROPOSED ACTION

As required by the State Environmental Policy Act (SEPA), reasonable alternatives to the Proposed Action as well as the No Action Alternative are assessed in this section of the Draft EIS. A reasonable alternative under SEPA is an action that could feasibly attain or approximate a proposal's objectives, but at a lower environmental cost or decreased level of environmental degradation (WAC 197-11-786). Reasonable alternatives to the proposed Facility could include design alternatives, location options on the site, different operational procedures, and alternative project sites.

As described in Section 1.6, the Applicant's objective is to construct and operate a facility that would provide the service of transloading mid-continent North American crude oil to allow shipment of crude oil to refineries located primarily on the West Coast of the United States.

2.8.1 Development and Evaluation of Alternatives

Different types of action alternatives were considered during the development and evaluation of alternatives to the Proposed Action including alternative methods of transporting crude oil from mid-continent sources to West Coast refineries (including refineries in Alaska and Hawaii), alternative sites in Washington that have the potential to accommodate a similar project, and alternative onsite Facility configurations, operations, and component designs.

As alternatives were identified, they were measured against the following criteria:

- Does the alternative feasibly attain or approximate the Proposed Action's objectives?
- Does the alternative provide a lower environmental cost or decreased level of environmental degradation than the Proposed Action?

Each alternative was analyzed to determine if the alternative met or failed to meet these criteria. An alternative that failed to meet either one of these criteria was eliminated from further consideration.

2.8.2 Alternatives Considered

2.8.2.1 Delivery of Crude Oil by Tanker Trucks

Tanker trucks could potentially be used to transport mid-continent crude oil directly to the Port for shipment to West Coast refineries. Tanker trucks used to transport crude oil typically can hold 220 to 250 bbl per load and consist of the tank truck and a tank trailer (Fritelli et al. 2014).

For delivery to the proposed Facility at the Port, a tanker truck unloading facility would replace the proposed railcar unloading facility. The siting of the truck unloading facility would need to consider the potential impact to existing rail infrastructure and use at the Port. Tankers could be hauled as "doubles" with two tankers per hauling semi-truck, carrying 400 to 500 bbl per load. To maintain the Applicant's proposed receipt capacity of 360,000 bpd, approximately 720 to 900 double-tanker truck calls per day would be required, resulting in between 1,440 and 1,800 one-way truck trips daily (both delivery and return trips). With deliveries spread over a 24-hour period, this amount would equate to 60 to 75 tanker truck trips per hour (or approximately one truck trip every minute, 24 hours per day, 7 days a week) to and from the proposed Facility. Factoring in the requisite number of deliveries per day, and considering that unloading takes approximately 30 minutes per tanker truck, the unloading facility would have to accommodate continuous unloading of 30 trucks per minute. Based on the size of tanker trucks, associated access roads, and egress, and the need for containment areas and sufficient crude oil collection and transfer systems, a tanker truck unloading facility capable of handling 360,000 bbl of crude oil per day would occupy a minimum of 2.3 acres.

It is likely that tanker truck availability is sufficient to support the delivery of 360,000 bpd to the West Coast. For example, in 2011, about 1,000 tanker trucks were transporting approximately 200,000 bbl of crude oil every day from the Bakken field (Oil and Gas Journal 2011). If additional truck capacity is needed, it could be purchased on the open market. However, the use of such a large fleet of tanker trucks would likely impact roadways and traffic patterns in the vicinity of the crude oil source locations and in the vicinity of either the Port. Increased traffic impacts would likely include increases in noise levels, air emissions, and reductions in transportation safety. A tanker truck emits two-thirds more greenhouse gas for every ton-mile than a freight train (US Environmental Protection Agency [EPA] 2014), although emission rates for new trucks will likely drop significantly in the coming years, which may offset the environmental advantages of rail in some instances (Federal Highway Administration 2009). In addition, the use of heavy trucks would increase roadway maintenance requirements.

At the Port, a tanker truck unloading facility would need to be constructed in an area that would not impede rail operations; this could be constructed in various locations at the proposed Facility site. The tanker truck unloading facility would require approximately 2.3 acres as opposed to 6.8 acres for the railcar unloading facility. Assuming the tanker truck unloading facility were developed in a previously disturbed area similar to the railcar unloading facility, the associated environmental impacts at the proposed Facility site would be similarly minor for most resources.

An addition of approximately 720 to 900 tanker trucks per day on local roadways and state and federal highways would increase the likelihood of an accident resulting in a potential spill of crude oil. Historically, the largest spills in most inland areas are from overturned tanker trucks (Ecology 2015). Tanker trucks present a greater risk of spill events because so many individual trucks would be required to move large quantities of crude oil. Additionally, these trucks would be forced to share roadways with smaller automobiles, cross train tracks, and navigate diverse pathways. Increased truck traffic resulting from increased oil transport would present hazardous driving conditions, particularly on roads not designed to handle heavy truck traffic (US Government Accountability Office 2014). Each of these factors contributes to an increased risk of accident for a single truck compared to a unit train following an established freight route. The Fraser Institute reviewed incident rates as reported by Transport Canada (Williams et al. 2012) for transportation of petroleum products by pipeline, rail, and road in the period 2005–2009, and concluded that road transportation resulted in nine times more incidents per billion ton miles transported than rail.

Transportation of crude oil by tanker truck to the proposed Facility for subsequent shipment to West Coast refineries (including Alaska and Hawaii) is a feasible alternative to the Proposed Action because it is capable of attaining or approximating the proposal’s objectives. However, this alternative would not provide a lower environmental cost or decreased level of environmental degradation than the Proposed Action due to increases in noise levels, air emissions (two-thirds greater greenhouse gas emissions), and reductions in transportation safety. Therefore, this alternative was not considered reasonable and was eliminated from further consideration in the Draft EIS.

2.8.2.2 Delivery of Crude Oil to the Proposed Facility by Barge

Under this alternative, a facility to unload crude oil from trains, store it in tanks, and load it onto barges would be constructed and operated at the Port of Kennewick. At the proposed Facility at the Port of Vancouver, the crude oil would arrive by barge to be unloaded, stored, and reloaded onto oceangoing vessels. This alternative would eliminate the use of approximately 227 miles of the Columbia River segment of the rail system and replace it with barge transport of crude oil between those two locations. This alternative would also eliminate the need for a railcar unloading facility and associated loop track improvements at Terminal 5.

River barges traveling the Columbia River typically have capacities between 30,000 and 65,000 bbl (EFSEC and US Forest Service 1998). The actual loaded volume would likely be less than the maximum capacity to allow sufficient barge draft on a daily basis. At a capacity of 30,000 bbl of crude oil, approximately 12 river barges would traverse the Columbia River each day from the barge loading terminal at the Port of Kennewick to the proposed Facility at the Port of Vancouver. Each day, approximately 12 empty barges would make the return to the Port of Kennewick. Barges would pass through several locks on the route from Kennewick to Vancouver (Figure 2-26).

The Applicant determined that the Twin Tracks Industrial Park at the Port of Kennewick (Figure 2-27) could accommodate a barge-loading facility and a development area similar in size to the proposed Facility at the Port of Vancouver.

The facilities located at the Port of Kennewick would include:

- A railcar unloading facility capable of handling an average of four unit trains per day with the capacity to receive on average 360,000 bbl of crude oil per day.
- A transfer pipeline system to convey the unloaded crude oil to a storage area and from the storage area to a barge-loading terminal.
- A storage area similar to the one in the Proposed Action to provide product storage capabilities to service multiple clients (i.e., six tanks capable of storing 380,000 bbl, two of which would be heated).
- A terminal to allow loading of the crude oil to river barges, including a new berth.
- Dock safety and MVCUs for the barge-loading terminal.

The following elements would be constructed at the Port of Vancouver:

- A modified transfer pipeline system (Area 500) to convey the crude oil unloaded from barges to the storage area (Area 300) and back to the marine terminal (Area 400) for loading to oceangoing vessels.
- The storage area (Area 300).
- A modified marine terminal (Area 400) for loading of oceangoing vessels, including an additional berth (and associated piping and facilities) for mooring and unloading of barges.
- Administrative and support facilities in Area 200.
- A modified boiler building (Area 600) to assist with barge unloading of more viscous crude oils.
- A summary of the facilities required for this alternative at the two ports is provided in Table 2-14. The table also provides a comparison of this alternative to the Proposed Action and demonstrates that this alternative would not have a lower environmental cost or decreased level of environmental degradation compared to the Proposed Action.

Delivery of crude oil to the proposed Facility by barge would not provide a lower environmental cost or decreased level of environmental degradation when compared to the Proposed Action because it would require an increase in surface facilities at the Port by 38 acres (for a total of 83 acres of surface impact), and construction and operation at two sites rather than one. A second unit train unloading, aggregation, storage, and loading process would need to occur at Kennewick. As such, this alternative was not considered reasonable and was therefore eliminated from further consideration in the Draft EIS.

Table 2-14. Summary of Crude Oil Delivery by Barge Alternative

Port of Vancouver Facility (changes from Proposed Facility)	Port of Kennewick Facility Improvements	Net Change from Proposed Facility
Site facilities reduced from 47.4 acres to 38 acres by elimination of rail components.	New 45-acre transloading facility similar to the Proposed Action.	Increase in surface facilities by 38 acres for a total of 83 acres of surface impact. Construction and operation at 2 sites rather than 1.
Reduced rail travel for 4 unit trains per day by 227 miles along the section of track that parallels the Columbia River between Pasco and the proposed Facility. Eliminates 4 unloaded unit trains traveling from Vancouver northward to Auburn, across Stampede Pass, and back to Spokane.	12 loaded barges would travel 227 miles of the Columbia River each day to the proposed Facility at the Port of Vancouver, and 12 empty barges would make the return trip daily.	Exchanges transport of crude oil by rail for transport of crude oil by barge for the 227 miles between Pasco and Vancouver. Adds barge transport in addition to rail transport as a Project component.
Eliminates use of existing rail loop and proposed rail loops. Eliminates construction of railcar unloading and associated facilities. Adds barge unloading and associated facilities.	Requires construction of a railcar unloading and associated facilities. Adds barge loading and associated facilities.	Results in a second unloading, aggregation, storage, and loading process (at the Kennewick facility)
Eliminates potential impacts from 4 unit trains along 227 miles of track from Pasco to Vancouver and northward to Auburn, across Stampede Pass, and back to Spokane.	Results in potential impacts from barge transport along the Columbia River between Pasco and Vancouver.	Reduces rail transportation impacts, but adds barge transportation impacts along the Columbia River.

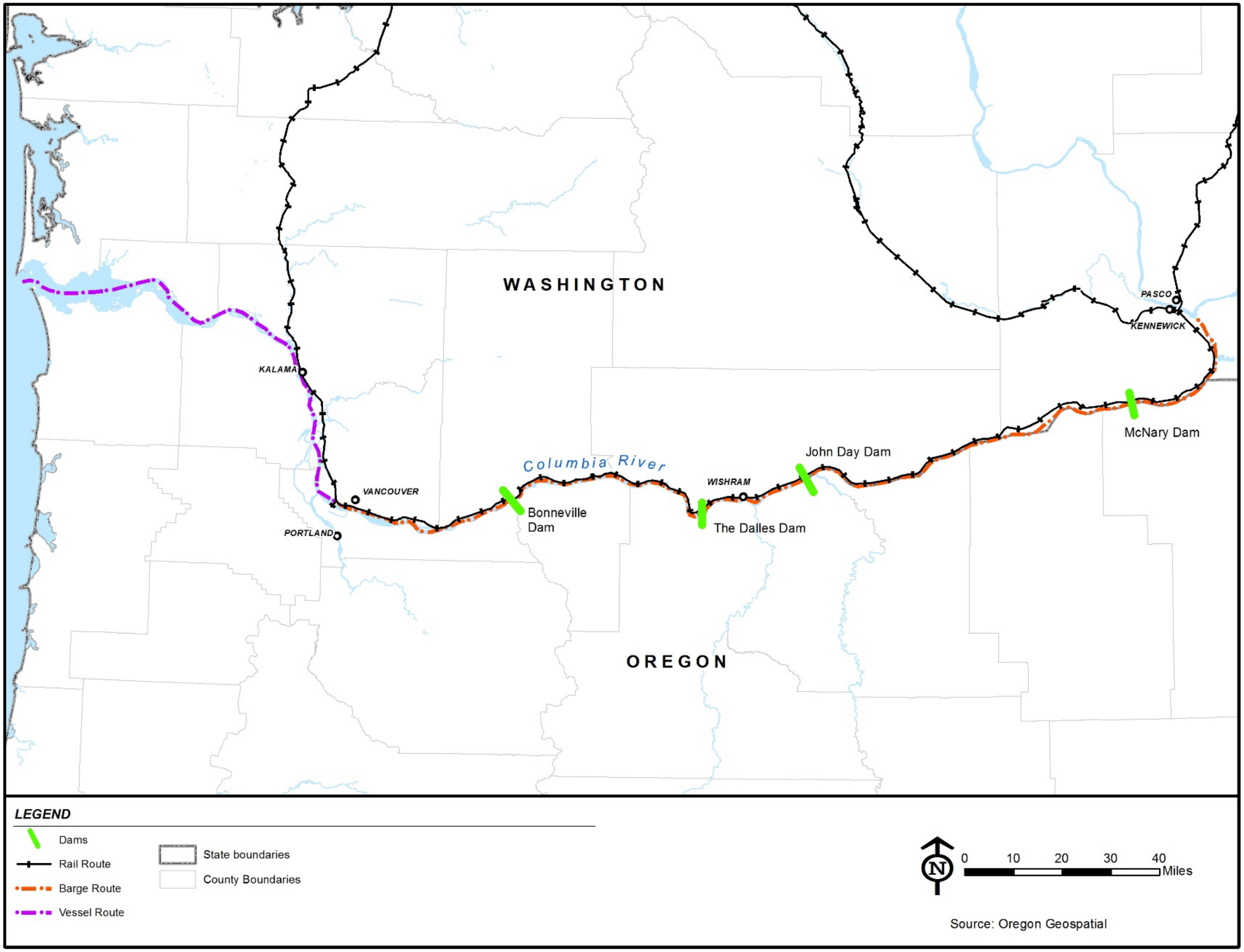

Figure 2-26. Alternative Delivery of Crude Oil by Barge from Kennewick to Port of Vancouver

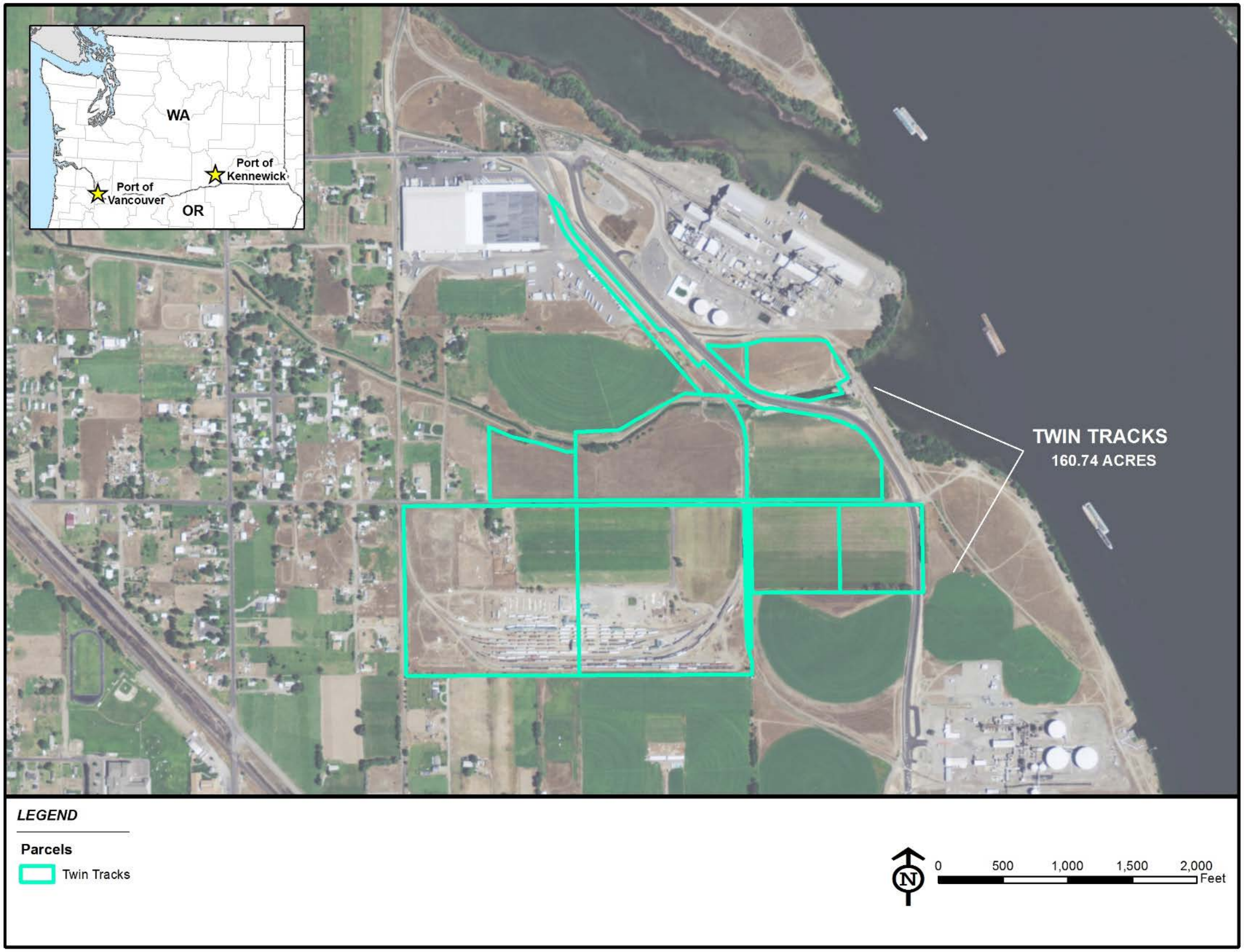

Figure 2-27. Twin Tracks Industrial Park at the Port of Kennewick

2.8.2.3 Alternative Site Locations

Under this alternative, other site locations in Washington that could accommodate a facility similar to the proposed Facility were considered. Alternative locations were required to meet the following three site characteristics to be considered feasible:

1. The site should have an existing deep-draft marine terminal with a minimum depth of 43 feet to accommodate all vessel types proposed for use by the Applicant.
2. The site should be connected with or in close proximity to a Class 1 rail system.
3. The site should be in a location with sufficient available land to accommodate the needed rail infrastructure, unloading facilities, storage capacity, and conveyance requirements for a facility similar to that proposed by the Applicant (approximately 47.4 acres).

Twelve ports were identified in Washington that could potentially meet the criteria listed above (Figure 2-28 and Table 2-15). Of these 12, three (Ports of Vancouver, Kalama, and Longview) met the initial siting characteristics of a deep-draft marine terminal, proximity or connection to a Class 1 rail system, and the availability of sufficient land. A brief description of the Kalama and Longview site locations is presented below:

Kalama. A 70-acre site is available at the Port of Kalama, which is accessible from a BNSF spur, but it is not currently developed to accommodate unit trains. A previous development proposal for this site investigated the potential to add rail infrastructure to accommodate unit trains (URS Corporation 2007); however, the proposal depended on the filling of approximately 1.3 acres of wetlands to accommodate parts of the rail infrastructure. Rail capacity at Kalama has been identified as constrained due to grain trains leaving and entering the main BNSF lines at Kalama whereby considerable main line capacity is consumed by trains slowly entering and departing the main lines to/from export grain facilities (BST Associates 2011).

Longview. A 49-acre site at the Port of Longview East Industrial Park is available for the development of an industrial facility, but an existing marine dock at the site is used by an existing grain terminal and would not be available for use by another tenant, requiring the development of a new marine terminal. In addition rail capacity at Longview has been identified as constrained due to yard operations at Longview Junction whereby considerable main line capacity is consumed by trains stopped to work in yard areas (BST Associates 2011).

Although the ports of Kalama and Longview could potentially provide suitable locations for a similar facility and may feasibly attain or approximate some proposed Project objectives, neither location would provide a lower environmental cost or decreased level of environmental degradation than the Proposed Action. Preliminary investigations indicate that development of a facility at the Port of Longview would likely result in greater impacts than the Proposed Action.

Constructing a facility similar to the proposed Facility at the ports of Kalama or Longview could potentially be feasible based upon the initial siting criteria, but would likely result in greater impacts than the Proposed Action due to the need for filling wetlands at the Kalama site and the requirement for a new marine terminal at the Port of Longview. Rail capacity at both of these ports is also constrained. For these reasons, alternative sites for the proposed Facility were eliminated from further study in the Draft EIS.

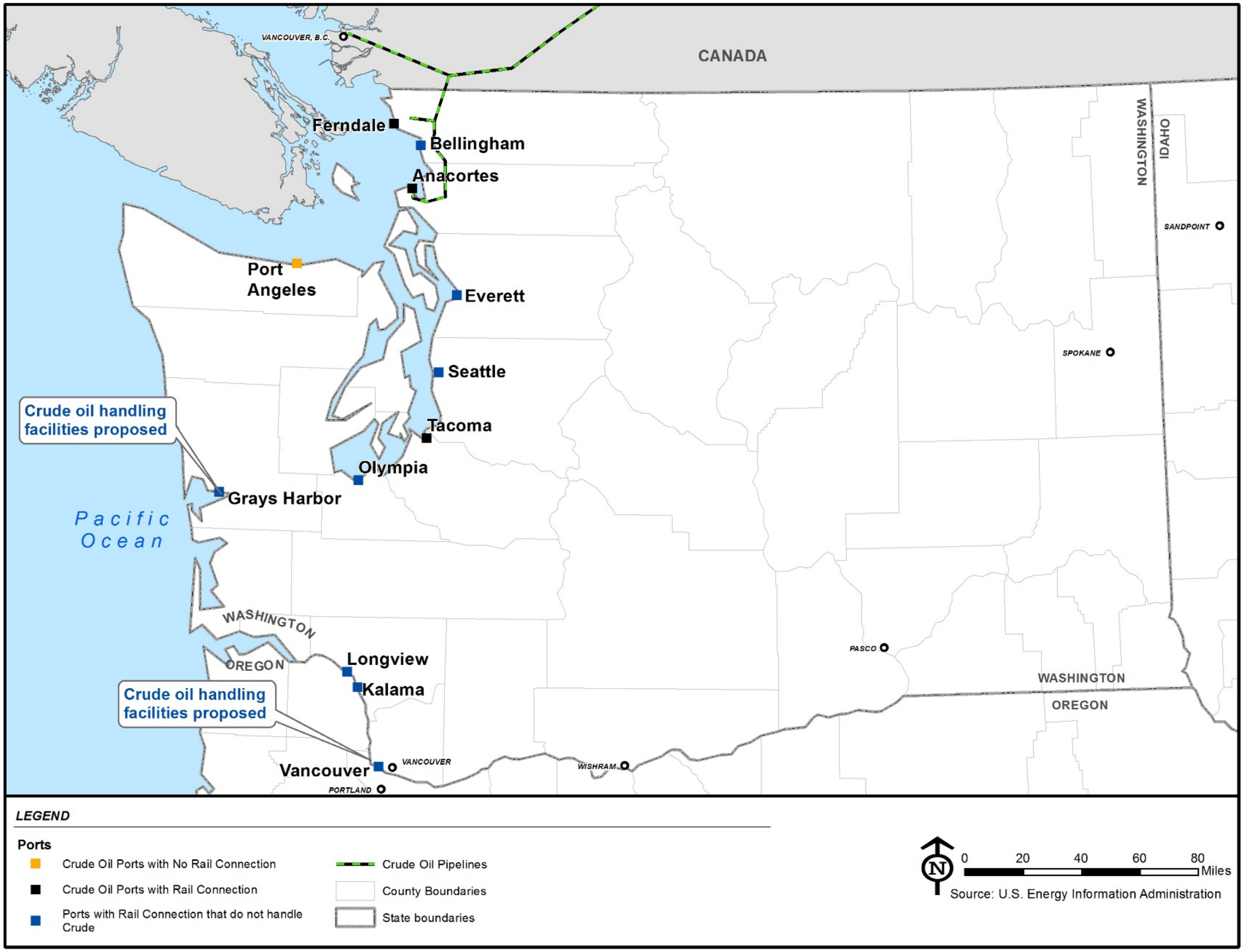

Figure 2-28. Deepwater Ports in Washington

Table 2-1. Characteristics of Alternative Port Sites Considered

Criterion #1 Located within Washington	Criterion #2 Water Depth at Marine Terminal (feet)	Criterion #3 Connection/Close Proximity to Class I Rail	Criterion #4 Availability of Land to Accommodate Facility and Unit Trains	Criteria Met?	Additional Relevant Information
Ferndale	40	Yes	Information not available	No	• Not a public port • BP Cherry Point refinery has crude-by-rail connection • Phillips 66 refinery currently developing crude-by-rail connection • Receives pipeline deliveries of crude oil
Anacortes	37.5	Yes	Marine parcel of negotiable size available for lease	No	• Port receives crude feedstock via pipeline from Canada, by rail from North Dakota and the central United States, and by tanker from Alaska and foreign sources • Tesoro refinery has crude-by-rail connection • Shell refinery has proposed crude-by-rail connection • Situated farthest from the crude production areas with respect to rail transportation
Bellingham	32	Yes	Lacks the area necessary to implement unit train handling	No	• Port depth insufficient to accommodate most crude oil vessels • Situated far from the crude production areas with respect to rail transportation
Port Angeles	36.5	No	Information not available	No	• Current oil deliveries are made by pipeline
Everett	40	Yes	Currently available industrial property parcels too small; lacks the area necessary for unit train facilities	No	• Port has existing Class 1 railroad and appropriate depth to accommodate crude oil tankers • Situated far from the crude production areas with respect to rail transportation
Seattle	50	Yes	No adequately sized parcels with marine access currently available for lease at the port	No	• Specialized in containerized intermodal activities, and does not have the necessary infrastructure to accommodate unit trains or otherwise handle crude oil
Tacoma	51	Yes	No available properties for a new facility	No	• TrailStone Refinery has crude-by-rail connection • Targa Sound terminal has proposed expansion

Table 2-1. Characteristics of Alternative Port Sites Considered

Criterion #1 Located within Washington	Criterion #2 Water Depth at Marine Terminal (feet)	Criterion #3 Connection/Close Proximity to Class I Rail	Criterion #4 Availability of Land to Accommodate Facility and Unit Trains	Criteria Met?	Additional Relevant Information
Olympia	39	Yes	Inadequate land available for development	No	• Olympia Port Commission not amenable to a crude-by-rail project
Grays Harbor	41	Yes	Potentially suitable sites are currently proposed for development, and are not available to the Applicant	No	• Multiple terminals are proposed (Imperium, Grays Harbor Rail, Westway), but none yet exist to service the area
Kalama	43	Yes	A 70-acre site potentially available for development	Yes	• Rail capacity constrained due to slow-moving grain trains leaving/entering the main BNSF lines at Kalama • Site is accessible from a BNSF spur, but is not currently developed to accommodate unit trains • Unit train capacity dependent on filling wetlands to accommodate infrastructure
Longview	43	Yes	A 49-acre site is potentially available for development	Yes	• The existing marine dock at the site services an existing grain terminal, and would not be available for use by another tenant • Rail capacity constrained due to stopped trains in yard areas
Vancouver	43	Yes	The Applicant signed a lease with the Port of Vancouver to develop the site	Yes	• One existing terminal (NuStar) • Proposed Vancouver Energy Terminal (proposed Project)

BNSF = Burlington Northern Santa Fe

2.8.2.4 Onsite Alternatives

Alternative site layouts for required facilities, alternative facility elements, and alternative facility designs have been evaluated. All alternatives considered in this section are within the Port and on the proposed site.

Storage Tanks Site Alternative

The proposed Facility layout was developed with consideration of existing tenants and the development of other future Port projects. The layout of the transfer pipeline system considered the location of storage tanks and the marine terminal. A potential alternative site location for the storage tank area to the west of the rail loop at Terminal 5 was identified. This area is owned by the Port, is available for lease, has sufficient acreage to accommodate the storage tank area, is closer to the Columbia River but farther from the marine terminal location (Berths 13 and 14), and is currently undeveloped. Construction of the storage tank area in this location would not represent a lower environmental cost or decreased level of environmental degradation because it is farther from the marine terminal location and is closer to the Columbia River. Other proposed Facility elements were sited with consideration given to existing easements and utilities and to allow continued access to existing and future adjacent activities. Alternative sites for the storage tanks were not carried forward for further analysis in the EIS.

Railcar Unloading Facility Alternative

During development of the proposed Facility design, both a covered and an uncovered railcar unloading facility were considered. An uncovered unloading area would require additional stormwater capture, treatment, and discharge facilities, resulting in additional ground disturbance. Therefore, construction and operation of an uncovered railcar unloading facility would not represent a lower environmental cost or decreased level of environmental degradation. This alternative was therefore not carried forward for further analysis in the EIS.

Industrial/Sanitary Wastewater Discharge Alternative

The proposed Facility would be located within the service area and sanitary sewer service basin of the City of Vancouver WWTP, and would use the WWTP. As an alternative, the proposed Facility would construct and use an independent wastewater treatment system, which would require an additional area and ground disturbance. Construction and operation of an independent wastewater treatment system would not represent a lower environmental cost or decreased level of environmental degradation. This alternative was therefore not carried forward for further analysis in the EIS.

Stormwater Treatment Alternative

The Port has existing capture and treatment infrastructure with the capacity to capture and treat stormwater from the proposed Facility. Construction of new stormwater facilities to serve the proposed Facility would require additional ground disturbance and a new stormwater outfall to the Columbia River. Construction and operation of new stormwater facilities would not represent a lower environmental cost or decreased level of environmental degradation. This alternative was therefore not carried forward for further analysis in the EIS.

Marine Terminal Alternative

An alternative to modifying Berths 13 and 14 would be to construct a new marine terminal, which would require the installation of a large number of piles within the river or the construction of a headwall structure, creating a new overwater surface and modification to the shoreline. New facilities would also likely involve dredging, loss of aquatic habitat, and modification of adjacent aquatic habitat from shading by new overwater structures. Construction and operation of a new marine terminal would not represent a lower environmental cost or decreased level of environmental degradation. This alternative was therefore not carried forward for further analysis in the EIS.

Reduced Capacity Alternative

A reduced capacity alternative for the proposed Facility was considered. A reduction in the volume of crude oil transported through the proposed Facility could reduce rail and vessel traffic to and from the Port, thereby reducing potential impacts associated with unit train and vessel operations.

An alternative with 25 percent less throughput capacity would likely result in approximately three unit trains per day arriving and departing the proposed Facility, and a 50 percent reduction would likely result in approximately two unit trains per day arriving and departing the proposed Facility. A 25 percent reduction in throughput capacity would likely not reduce the number of vessels associated with the proposed Facility from one vessel per day, which instead may not be filled to capacity, but a 50 percent reduction may reduce the number of vessels to one every other day.

The facilities at the Port that would be required to support fewer than four unit trains per day (such as unloading facilities and transfer pipelines) could be reduced from those planned for the Proposed Action. However, the Applicant has indicated that to accommodate periodic surges in capacity needs due to unplanned fluctuations in the timing of rail deliveries and marine vessel loading, the same facilities and storage capacity needs described for the proposed Facility would still be required. For example, the entrance to the Columbia River may shut down for numerous days over the course of the winter due to severe weather and unsafe crossing conditions. Since these closures would impact marine vessel arrival and loading, but would not necessarily impact rail traffic to the proposed Facility, the storage has been sized to accommodate these temporary unexpected surges in storage needs (Corpron and Makarow, pers. comm., 2015).

A reduced capacity alternative would not represent a lower environmental cost or decreased level of environmental degradation at the Port site compared to the Proposed Action because the same proposed Facility elements would be built at the site. A reduced capacity alternative could reduce the number of train deliveries to the proposed Facility with an associated decrease in potential impacts from train transportation. While the potential for a major spill from trains or vessels would likely decrease somewhat due to a decrease in the number of project-related trains and vessels in a reduced capacity alternative, the likelihood of a major spill is very low in either case and the risk is not eliminated in either case. As a result, a further reduction in project-related traffic would not represent a substantial lowering of potential environmental cost or a substantial decrease in the level of potential environmental degradation associated with the proposed Project. Therefore a reduced capacity alternative has not been carried forward for detailed analysis in the EIS.

2.8.2.5 No Action Alternative

Under the No Action Alternative, the governor would deny the Applicant's request to construct and operate the proposed Project at the Port. The WVFA project would be completed as permitted. Under this alternative, the following scenarios could occur:

- **No development.** It is possible that no facility would be constructed during the 20-year timeframe for the proposed Facility, with no improvements to the site with the exception of continuation of current maintenance.
- **A different industrial facility.** With the completion of the WVFA project, the Port would likely seek other tenants to develop an industrial facility to use the existing unit train rail infrastructure and vessel berthing facilities at the marine terminal. Such a facility would likely be designed and operated to handle dry and/or liquid bulk commodities, but of unknown type or quantity. Based on current operations at the Port, these commodities could include grain, sand and gravel, lumber, metal, or petroleum products.

Under the No Action Alternative, the current demand by West Coast refineries for mid-continent North American crude oil would continue. This demand would require continued transport of crude oil by existing transportation modes (including pipelines, tanker trucks, and rail) from sources to refineries, or from sources to new or expanded crude-by-rail terminals in other West Coast locations.

2.8.3 Alternatives Carried Forward for Detailed Analysis

The comprehensive review of alternatives did not identify any alternatives that were found to be reasonable alternatives to the Proposed Action. All of the action alternatives considered and evaluated were found to fail one or more of the evaluation criteria described in Section 2.8.1. Therefore, all of the action alternatives considered were eliminated from further detailed evaluation in the Draft EIS. The Proposed Action and the No Action Alternative were carried forward for detailed analysis in this Draft EIS.

2.9 BENEFITS OR DISADVANTAGES OF RESERVING PROJECT APPROVAL FOR A LATER DATE

If EFSEC were to postpone making a recommendation to the governor regarding the proposed Facility, the direct, indirect, and cumulative impacts associated with construction and operation of the Facility at the Port would be delayed. If this were to occur, the socioeconomic benefits from increased employment and tax revenue associated with construction and operation of the proposed Facility would also be delayed. A postponement could allow additional time for recommendations in the 2014 Marine and Rail Oil Transportation Study to be implemented prior to proposed Facility operation. A postponement could allow emergency response organizations and agencies (e.g., Ecology, ODEQ, USCG, and EPA) more time to update affected geographic response plans (GRPs) and other emergency response plans (e.g., Columbia River MFSA plans) to better determine the actions and equipment needed to respond to an oil spill, fire, or explosion at the proposed Facility or along the proposed rail and vessel routes. However, a postponement could also reduce the urgency to update relevant GRPs and emergency response plans.

If a recommendation to the governor by EFSEC were to be postponed, West Coast refineries would continue to source crude oil from existing mid-continent supply locations to replace declining supplies from California and Alaska. Some of this crude oil would continue to be transported to receiving refineries by rail using some of the rail routes that would be used by unit trains traveling to and from the proposed Facility. Postponing a recommendation could allow Class 1 railroads more time to implement Positive Train Control (PTC) technology systems on applicable railway lines (see Section 4.2.4.2 for additional information on PTC).

2.10 AREAS OF CONTROVERSY AND UNCERTAINTY

The proposed development of a crude oil terminal at the Port has been met with support and opposition from different stakeholders. Approximately 31,074 comments were received from private citizens, environmental organizations, public agencies, and tribal representatives during the scoping period. These comments addressed numerous areas of controversy and uncertainty including issues such as climate change, national energy policy, the volatility of crude oils, and the risks of oil spills, fire, and/or explosion at the proposed Facility site or along rail or vessel transportation routes. Many of the comments focused on concerns over the safety and inherent risks associated with the transportation of crude oil by rail. Additional comments pertained to possible health effects, geological hazards, the response capabilities of police, fire, and emergency medical services, and potential impacts to threatened and endangered species and tribal resources.

The assessment of potential impacts from the proposed Facility and associated rail and vessel transportation includes some level of uncertainty because it includes predictions of future events, some with very low probabilities of occurrence. The vessel and rail oil spill risk analyses (the full reports are provided in Appendices J and E, respectively) use historical data to predict the likelihood of a future vessel or rail accident and potential resulting oil spill. These predictions used best available data and statistical analyses to estimate potential frequencies and volumes of oil spills. Because the frequency and severity of an actual spill, explosion, or fire in the future cannot be predicted, such analysis includes an unavoidable degree of uncertainty.

Similarly, the seismic risk analysis (Appendix C) used proposed Facility plans (including engineering drawings), site-specific test results, publicly available hazard data, and relevant information from published reports, maps, and websites to estimate the potential impact of a large seismic event at the proposed Facility and along rail and vessel transportation routes. Because the frequency and severity of future seismic events cannot be predicted, such analysis includes an unavoidable degree of uncertainty. One final area of uncertainty is the actual performance of new or retrofitted DOT-117 tank cars and their ability to resist breaching or failure during derailments.

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