Section 2.3 – Construction on Site

WAC 463-60-145
Proposal – Construction on site.

The applicant shall describe the characteristics of the construction to occur at the proposed site including the type, size, and cost of the facility; description of major components and such information as will acquaint the council with the significant features of the proposed project.

(Statutory Authority: RCW 80.50.040 (1) and (12). 04-21-013, recodified as § 463-60-145, filed 10/11/04, effective 11/11/04. Statutory Authority: RCW 80.50.040(1) and Chapter 80.50 RCW. 81-21-006 (Order 81-5), § 463-42-145, filed 10/8/81. Formerly WAC 463-42-210.)

Section 2.3 Construction On Site

2.3.1 Project Overview

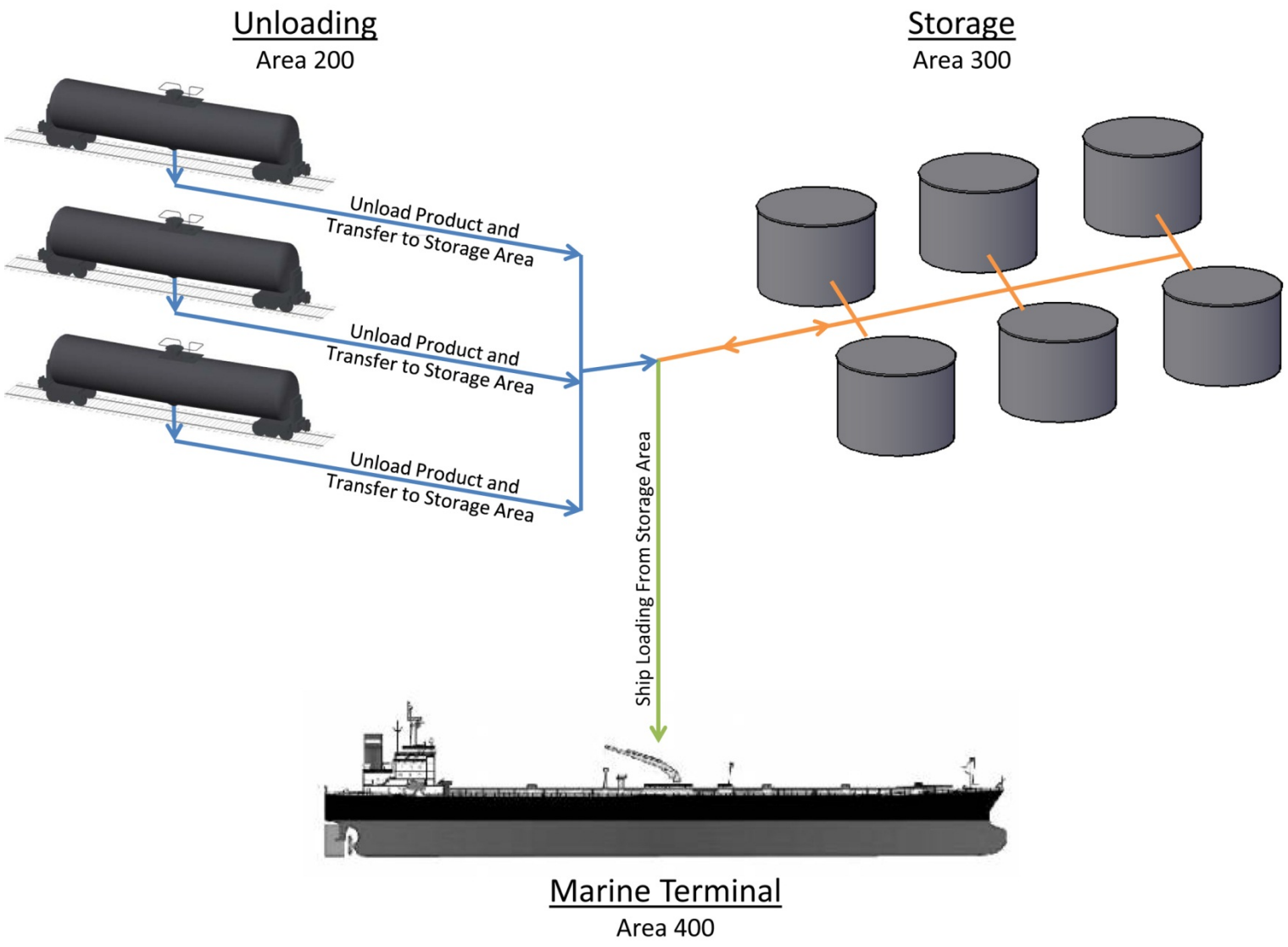
The Applicant is proposing to construct a facility to receive crude oil by rail, store it on site, and load it on marine vessels for shipment to various consumers and end users located primarily on the West Coast. A simplified view of the crude oil flow through the Facility is shown in Figure 2.3-1. Unit trains will arrive at the project site and will be stationed on the Facility rail loops. The trains will be "indexed" through the unloading area (Area 200), where the crude oil will be gravity-drained into the transfer pipeline system (Area 500). The crude oil will be pumped through the transfer pipelines to the crude oil storage tanks (Area 300) where it will be held until the marine vessel loading operation. The storage tanks are also designed to allow blending the various types of crude oil at the Facility to meet customer demands for specific qualities. Marine vessels will arrive and moor at the dock (Area 400) where they will be preboomed. Crude oil will be pumped from the storage tanks to the loading area, and loaded to the marine vessels.

The lease with the Port allows the handling of other petroleum products, including refined products, as well as the ability to unload products at the Marine Terminal. Although allowed by the lease, this request for Site Certification does not include the ability to handle materials other than crude oil or to receive any crude oil or petroleum products at the dock. Should the Applicant decide to undertake these activities, an amendment to the Site Certification Agreement will be pursued with EFSEC.

In addition to the primary components described above, the Facility will include ancillary elements that will support the offloading, storage, and loading operations. The primary and ancillary elements are described in detail below. Table 2.3-1 summarizes the primary and ancillary project elements by Facility area.

Table 2.3-1. Summary of Primary and Ancillary Project Elements

Facility Area	Primary and Ancillary Project Elements
Rail Infrastructure	• Rail facility loops
200 – Unloading and Office	• Rail unloading area • Control rooms\E-houses • Fire Pump and Foam Building • Administrative and Support Buildings
300 – Storage	• Crude Oil Storage Tanks • Secondary Containment Berm • Boiler Building • Pump Basin • Control Room/E-House • Fire Pump and Foam Building
400 – Marine Terminal	• Marine Vessel Loading Hoses and Equipment • Control Room/E-House • Crane Control Room • Dock Safety Unit • MVCU • Vapor Blower Skid • Spill Prevention, Response and Containment Equipment • Dock Improvements
500 – Transfer Pipelines	• Transfer Piping from Area 200 to Area 300 • Transfer Piping to/from Area 300 to Area 400 • Piping from vessel loading to MVCU
600 - West Boiler	• West Boiler Building



BergerABAM	**Figure 2.3-1. Product Flow Diagram**

Primary vehicular access to the proposed project will be to the Administration Building accessible from Old Lower River Road via a private road owned and maintained by the Port. This private road connects with Old Lower River Road approximately 1,000 feet west of the proposed Administration Building. The Storage Area will be accessed from a private drive shared with Farwest Steel from NW Lower River Road. The Storage Area is not anticipated to require full-time staffing and parking will be provided only for routine maintenance. The marine terminal will be accessed by Gateway Avenue and Harborside Drive via a newly constructed driveway. No modifications are proposed to existing public roads accessing this area of the Port. An existing asphalted area at the berths will be used by project personnel during ship loading operations. Although the West Boiler Building at the rail unloading area ordinarily will not be occupied full-time, parking for maintenance vehicles will be provided.

2.3.1.1 Facility Elements Included in the Application for Site Certification

Project Elements Under EFSEC Jurisdiction

The Applicant is seeking site certification for the Facility configuration at full build-out. At full build-out, the Facility will have the capability of loading up to 360,000 barrels/day of crude oil to marine vessels, and will include both the first and second stage facilities as follows:

In a first stage, upon receiving site certification from EFSEC and all federal approvals the Applicant expects to construct the following facilities:

- Two rail loops to receive unit trains
- The unloading building
  - The entire unloading building structure and foundations
  - Two of the unloading tracks, including rail tracks, trenches, pump basins, catwalks/gangways and all piping necessary to support operations
  - One unloading track including only the concrete trench, but no rail or associated piping, gangways or mezzanines
- Administrative and support buildings
  - The administrative building
  - One of the two support buildings
- Storage area including:
  - The entire exterior containment berm sized and designed for 110% of the largest storage tank and the rainfall from a 24-hour, 100-year storm for the entire berm area
  - The four storage tanks designed to handle non-heated pipeline quality crude
  - The intermediate berms necessary to contain the contents of the four tanks installed in the first stage
  - Stormwater facilities to capture stormwater associated with the storage of four of the six tanks.
- Transfer pipelines serving the concurrent unloading of unit trains staged at the 2 unloading tracks described above, and the conveyance to the marine terminal
- Transfer pipelines serving the conveyance of crude oil from the storage area to the marine terminal
- Marine terminal facilities designed to handle the conveyance of crude oil to a marine vessel at full build out.
- All of the berth improvements necessary to support vessel berthing at full build-out

- MVCUs
- Fire-suppression facilities sufficient to meet the suppression needs of the facilities installed

Contingent on evolving market conditions, the Applicant will construct the following additional elements in a subsequent stage:

- In the unloading building
  - The catwalks/gangways and all piping necessary to support operations of the third unloading track which will handle heated non-pipeline quality crude
- Administrative and support buildings
  - The second of the support buildings
- Storage area including:
  - The two tanks that will have the capability to accept heated crude
  - Stormwater facilities to capture stormwater associated with the remaining two of the six tanks.
- Transfer pipelines serving the concurrent unloading of unit trains staged at the 3rd unloading track
- The West Boiler Building (Area 600) and the East Boiler Building, which is part of Area 300
- Fire-suppression facilities sufficient to me the suppression needs of the additional facilities installed

In the future, the facility will incorporate a third rail loop to be constructed by the Port for the facility's exclusive use, serving the third unloading track. This third track will be built by the Port as part of the permitted WVFA project, prior to, concurrently with, or after the construction of the Facility. Until such time that the Facility capacity does not exceed 120,000 barrels per day, this third loop track will be owned and operated by the Port for general use. When the Facility capacity exceeds 120,000 barrels per day, use of the third rail loop will be transferred to the exclusive use of the Facility. The Facility will then also undertake maintenance of this this third loop.

The Applicant expects a 20-year lifetime for the facility. Such timeline may be extended should market conditions warrant. During that lifetime the Applicant requests that site certification be granted for operation and maintenance of all of the above facilities, with the following exception: Maintenance dredging at berths 13 and 14 are part of the Marine Terminal (Area 400). Dredging operations will continue to be conducted by the Port of Vancouver under its existing and future approvals granted by local, state and federal agencies to which such dredging is subject.

2.3.2 Rail Infrastructure

The project site has been selected to take full advantage of dual Class 1 (BNSF and Union Pacific) unit train access at the Port's Terminal 5. The existing rail infrastructure at Terminal 5 is illustrated in Figure 2.3-2.

Up to four unit trains per day on average will be delivered onto the Port's rail network via Class I railroad lines for staging on the rail infrastructure serving the Facility. Trains will arrive at Terminal 5 from the east where they will exit the Class 1 mainlines and enter the Port's industrial rail network and travel to the rail unloading building located on the north side of the Terminal 5 rail loop. The design of the rail infrastructure will accommodate complete unit trains, eliminating the need to break trains into smaller segments requiring multiple switching movements during the unloading process.

To support the staging of unit trains, two new rail lines (track numbers 4106 and 4107), each approximately 7,700 feet in length, will be added to the Terminal 5 rail infrastructure. As shown in Figure 2.3-3, the additional lines will form two complete loops inside the existing rail loops and will begin and end near the Gateway Avenue grade separation. The rail loops will be designed to comply with railroad and federal requirements.

As noted above, at full build-out, to accommodate an average of four unit trains per day and allow simultaneous unloading of up to three unit trains, the Applicant will use the rail loop to be constructed by the Port 5 (Track 4015).

In order to accommodate the two additional rail loops, the configuration of permitted (existing and to be built) WVFA rail facilities and the adjacent loop road will be shifted; the shifting of existing facilities will be performed by others, has been previously permitted, and is not included within this request for Site Certification.

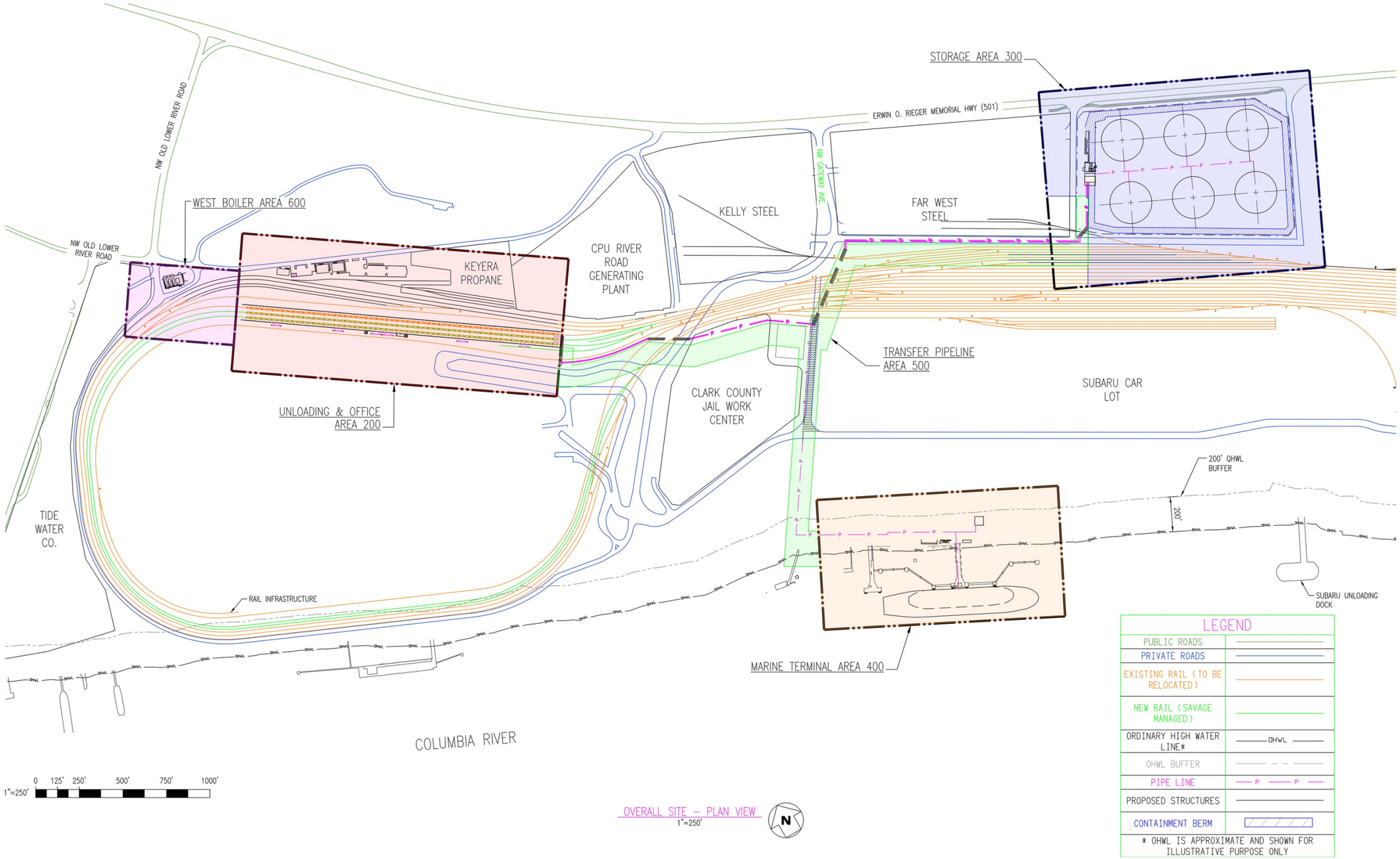


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Figure 2.3-2. Overall Site Plan

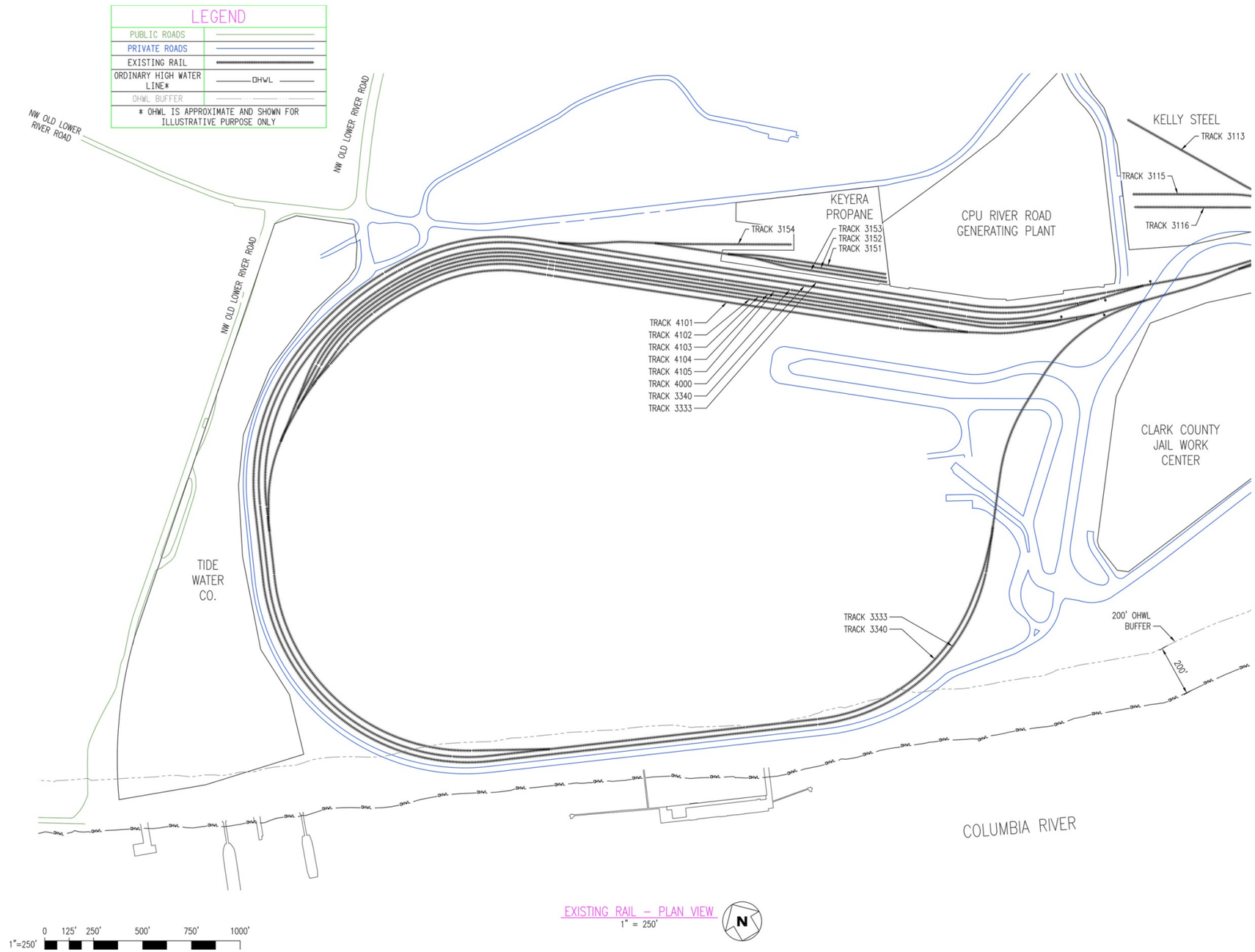

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Figure 2.3-3. Existing Rail Infrastructure

2.3.3 Area 200 – Unloading and Office

2.3.3.1 Rail Car Unloading

General Configuration

The rail unloading elements (Area 200) will be located south of the Administrative and Support Buildings. The rail unloading building will span tracks 4105, 4106, and 4107. Existing rail lines will separate the unloading elements from the Administrative/Support Buildings. These existing rail lines are not part of the Facility. A pedestrian bridge will provide access from the Administrative/Support Buildings to the rail unloading building. Figure 2.3-4 provides a plan view of the arrangement of the rail unloading building with respect to existing rail lines and the Administrative/Support Buildings.

The rail car unloading elements will be designed to receive and unload crude oil unit trains. Two of the unloading tracks will accommodate trains carrying crude oil that can be drained and conveyed without being heated; the third unloading track will accommodate trains carrying crude oil that can be drained and conveyed without being heated as well as crude oil that may need to be heated prior to draining and conveyance to storage.

Each unit train will include approximately 100 to 120 tank cars. Typical unit train length will be approximately 7,800 feet. Tank cars typically hold between 650 and 750 barrels of crude oil.[1] A typical unit train will deliver between 65,000 and 90,000 barrels of crude oil.

The rail car unloading facility is composed of a covered structure through which the trains will be pulled and safely secured where the unloading will occur. The building that houses the rail car unloading functions will be approximately 1,850 feet long by 91 feet wide, with a maximum height of approximately 50 feet. Figure 2.3-7 illustrates cross-sections of the unloading building at the location of the walkway to the Administrative/Support Buildings, and at a typical internal walkway. The structure will consist of a steel frame with sheet metal walls painted a neutral color. The structure will be open on both ends and have sides that stop short of the roofline to allow continuous venting. The structure will have translucent panels for natural lighting as well as interior lighting. The building and its components will be built to applicable building and safety codes as outlined in Section 4.1.

Unloading Piping

The unloading area is designed to accommodate three parallel tracks. Each track will include 30 unloading stations for a total of 90 stations, 30 stations per track. Track 4105 will be able to heat the rail cars by steam, as described in more detail below.

The 30 unloading stations for each track are subdivided into five groups of six unloading stations. Figure 2.3-6 illustrates the typical configuration of rail car unloading. Each unloading station will accommodate one rail car. Each unloading station will include:

- Hoses equipped with dry fit connectors used to gravity drain the crude oil from the tank car to a collection header pipe

[1] A barrel of crude oil contains 42 gallons.

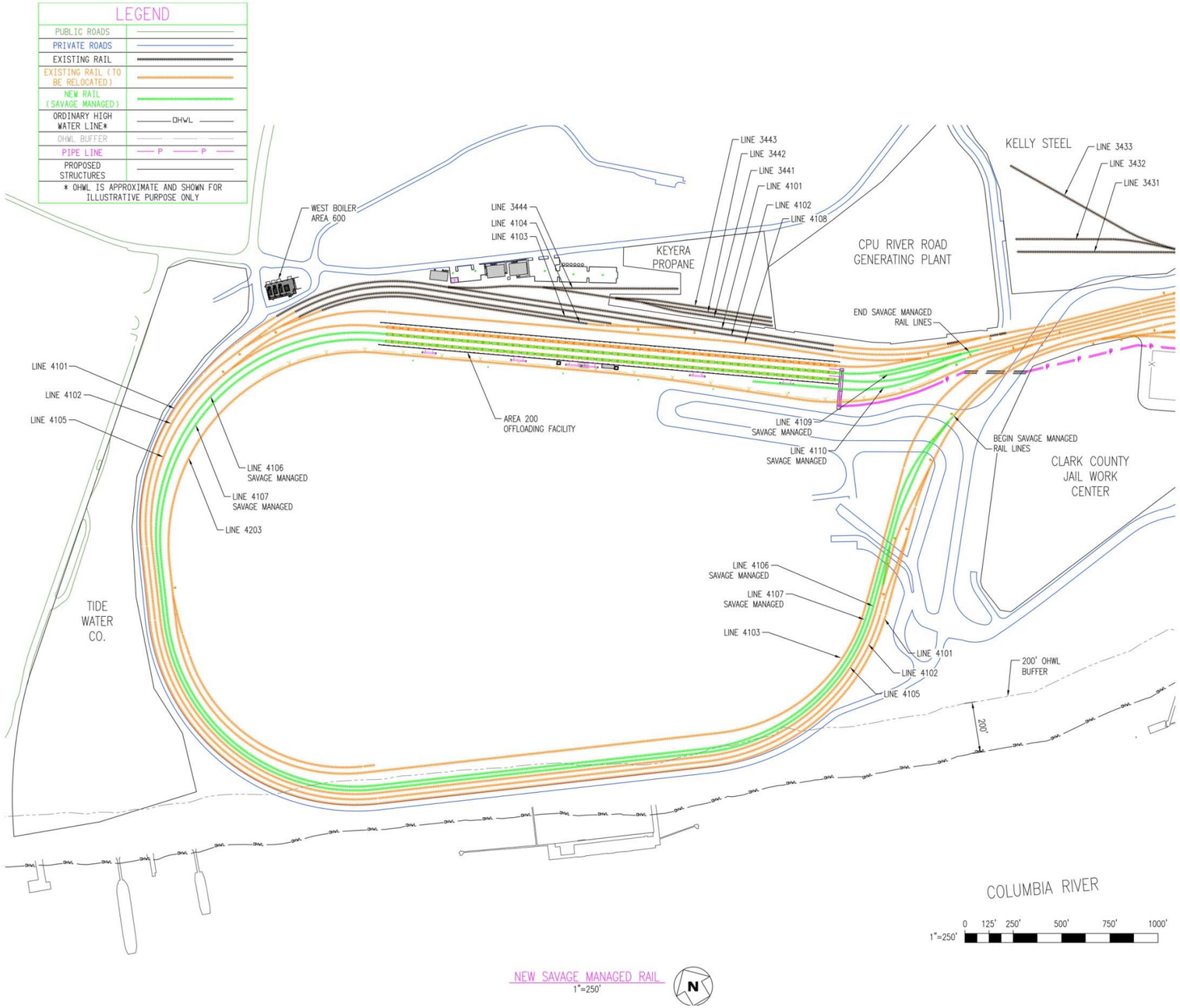

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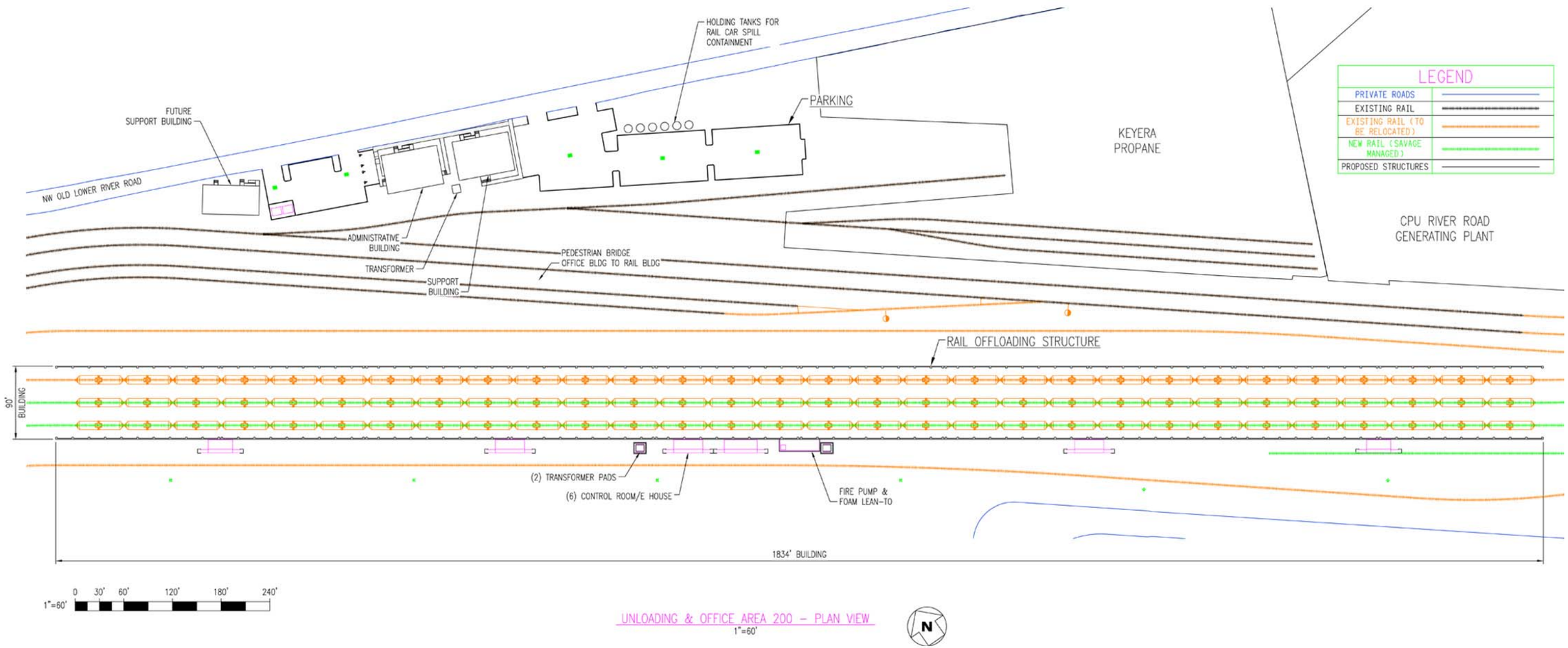
Figure 2.3-4. Rail Improvements



BergerABAM	**Figure 2.3-5. Rail Car Unloading Facility**

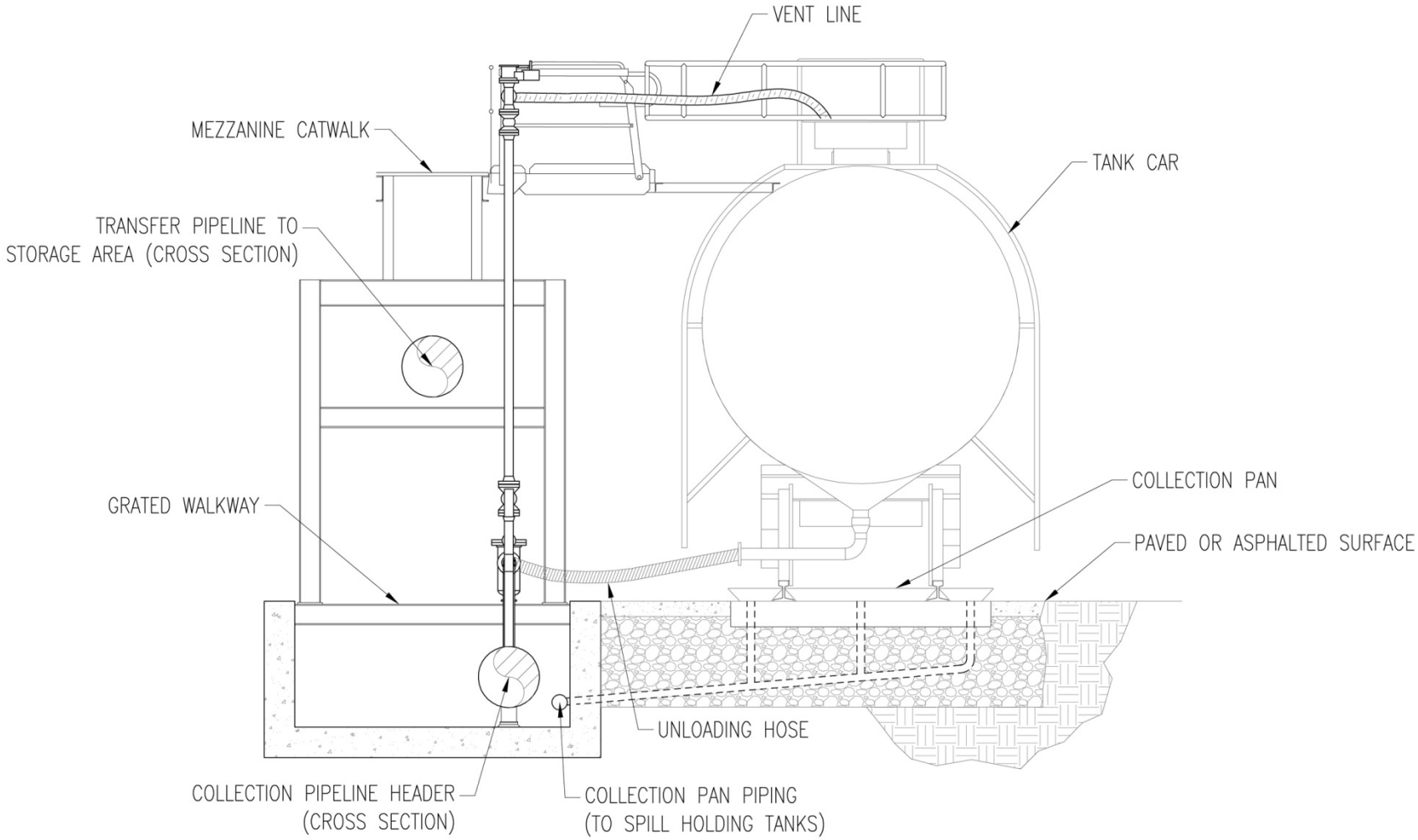


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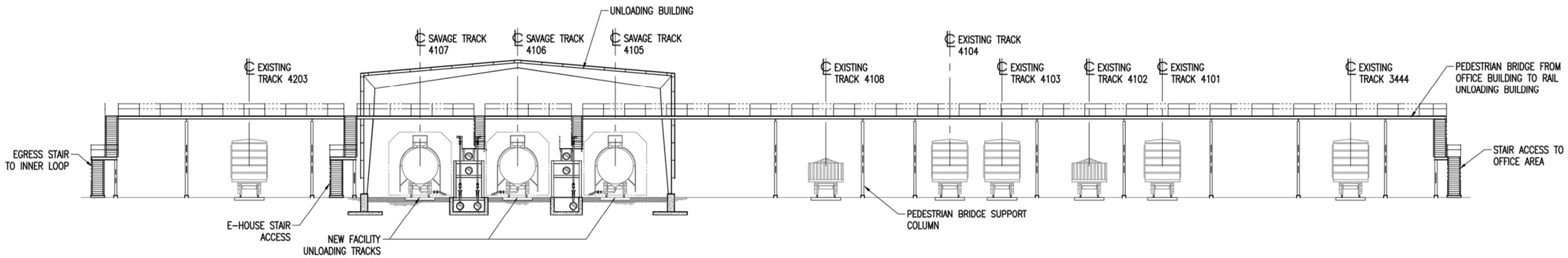
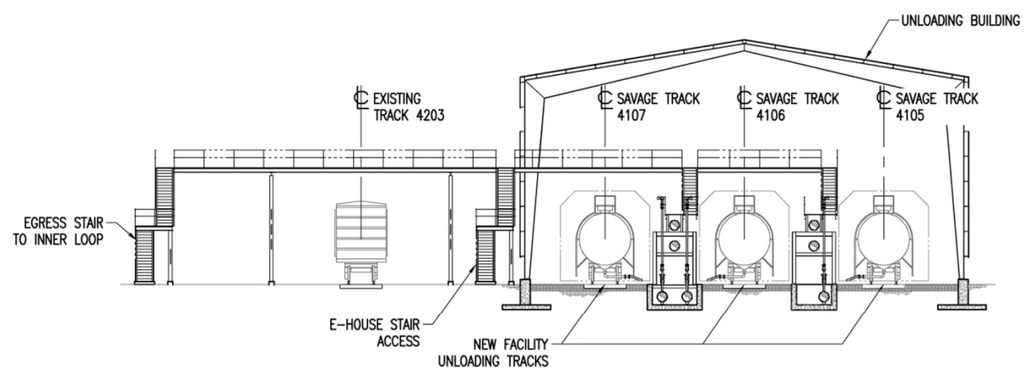
Figure 2.3-6. Rail Car Unloading Facility Cross Section



CROSS SECTION AT PEDESTRIAN BRIDGE



CROSS SECTION AT PEDESTRIAN BRIDGE TO INNER LOOP

BergerABAM	**Figure 2.3-7. Building Cross Section**

- Walkway (gangway) grating to serve as the unloading work platform
- Mezzanine catwalks to access the top of the tank cars
- Collection pans between rails that are piped to a separate line that conveys inadvertent releases to the rail unloading facility containment tanks;
- Paved or asphalted ground surfaces between the unloading rail tracks
- A vent line that allows the tank car to maintain atmospheric pressure as its contents drain

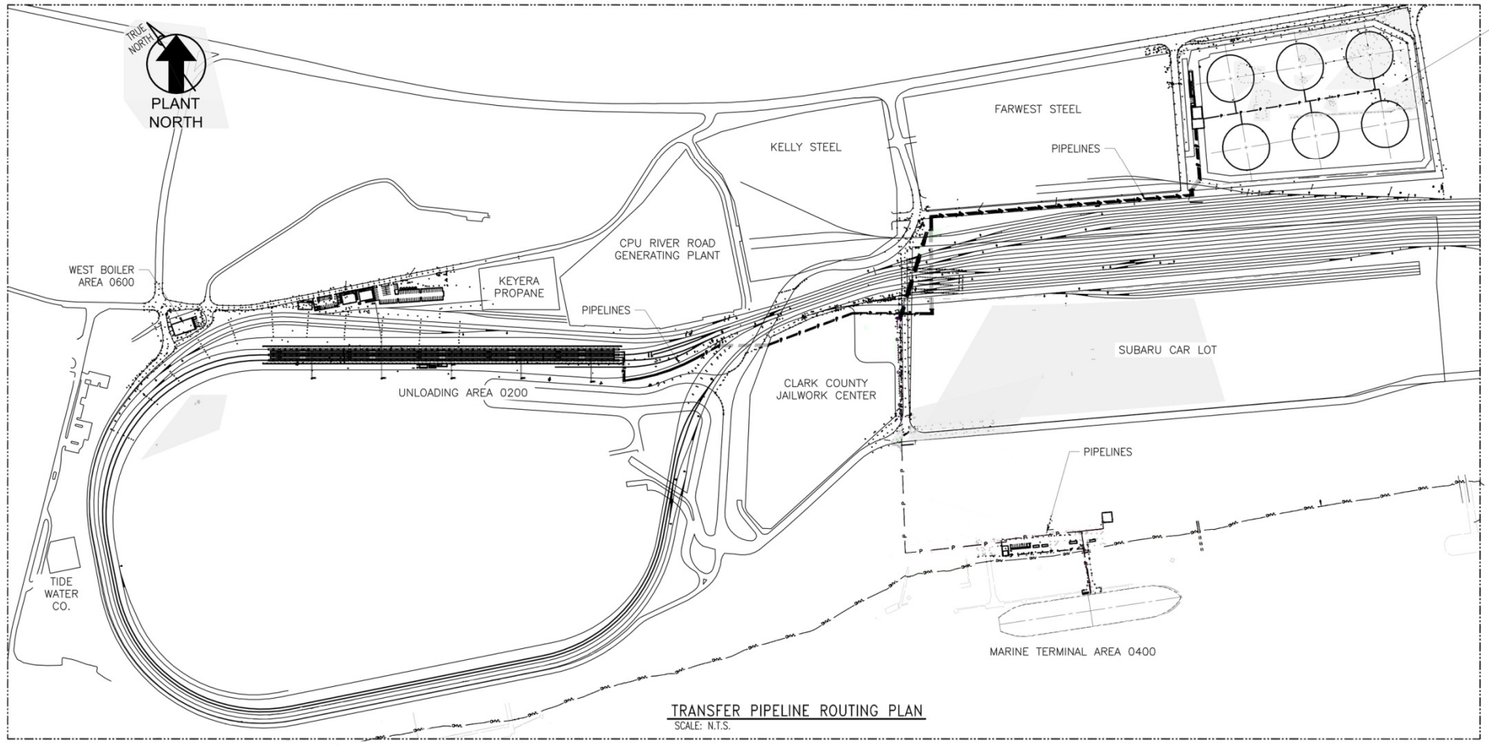
The 30 unloading stations with the ability to heat crude oil unit trains also will be equipped with steam connections to heat the crude oil to decrease its viscosity and allow it to flow more easily. Steam will be produced in the Area 600 Boiler Building (described in section 2.3.6 below) and piped to the unloading facility. Tank cars that receive steam will be fitted with permanent internal steam manifolds at the bottom of the car. Inlet steam hoses will be connected to each car to allow steam to circulate in the manifold, thereby warming the contents of the tank car. Steam condensate exiting the manifolds will be collected via condensate hoses, and piped back to the steam boilers in a closed loop system.

Unloading will be accomplished with a closed-loop system, i.e., the crude oil will be contained in an enclosed system at all times from when it leaves the rail car to when it enters the storage tanks. During the entire unloading process, neither the crude oil nor crude oil vapors will be directly exposed to the atmosphere.

Flexible vent hoses will be manually connected to a valve at the top of the car accessed by a movable gangway. The vent hoses will connect to the collection header. Vapors leaving the collection header as oil flows into the header will travel through the vent hose to the car as the crude oil drains from the car. This prevents vapors from being vented to the atmosphere.

Unloading hoses will be manually connected to the valves on the cars using dry fit connectors, 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. The connector is designed such that crude oil will not flow without a secure connection. Each hose will be equipped with an automatic shutoff valve. Once the dry fit connector has been secured, the crude oil will gravity-drain from the cars to a collection header. The hoses will also have an emergency shutdown (ESD) valve before the collection header. The valve will automatically close during a fire or if an ESD button is depressed in the building. Buttons are located at the bottom of all the stair landings and in between stations on the upper mezzanine.

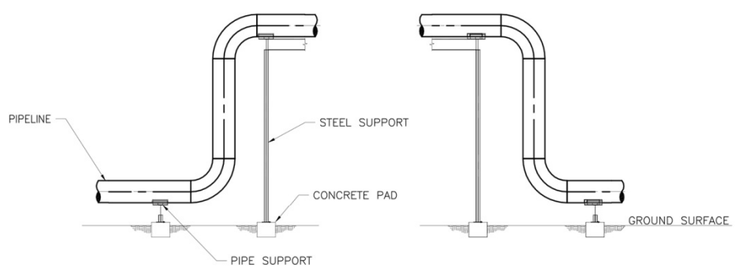
The collection header collects the flow from a grouping of six cars. The collection headers will be housed in below-grade trenches running parallel to the rail tracks. A single 9-foot-wide by 5-foot-deep trench will serve tracks 4106 and 4107; a 9-foot-wide by 5-foot-deep trench will serve track 4105. Although the primary purpose of the trench is to house the product collection header, spill collection line and electrical and data lines, the trench will also act as secondary containment.



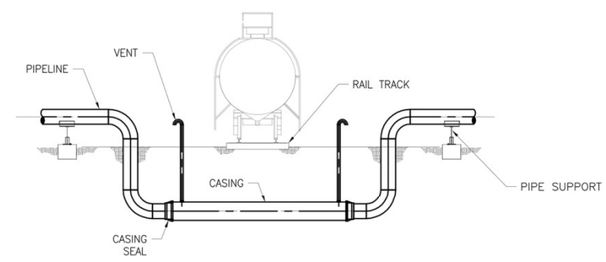
TRANSFER PIPELINE ROUTING PLAN
SCALE: N.T.S.

LEGEND	
PUBLIC ROADS	
PRIVATE ROADS	
EXISTING RAIL	
NEW RAIL	
NEW RAIL (SAVAGE MANAGED)	
OHWL	
PIPE LINE	
STRUCTURES	

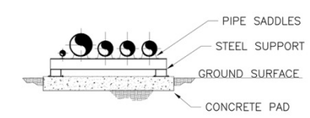
NOTE: OHWL IS APPROXIMATE AND IS SHOWN FOR ILLUSTRATIVE PURPOSES ONLY.



TYPICAL PIPELINE TRACK/ROAD OVERPASS



TYPICAL PIPELINE TRACK/ROAD BELOW GRADE CROSSING



TYPICAL PIPE SUPPORT

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Figure 2.3-8. Transfer Pipeline

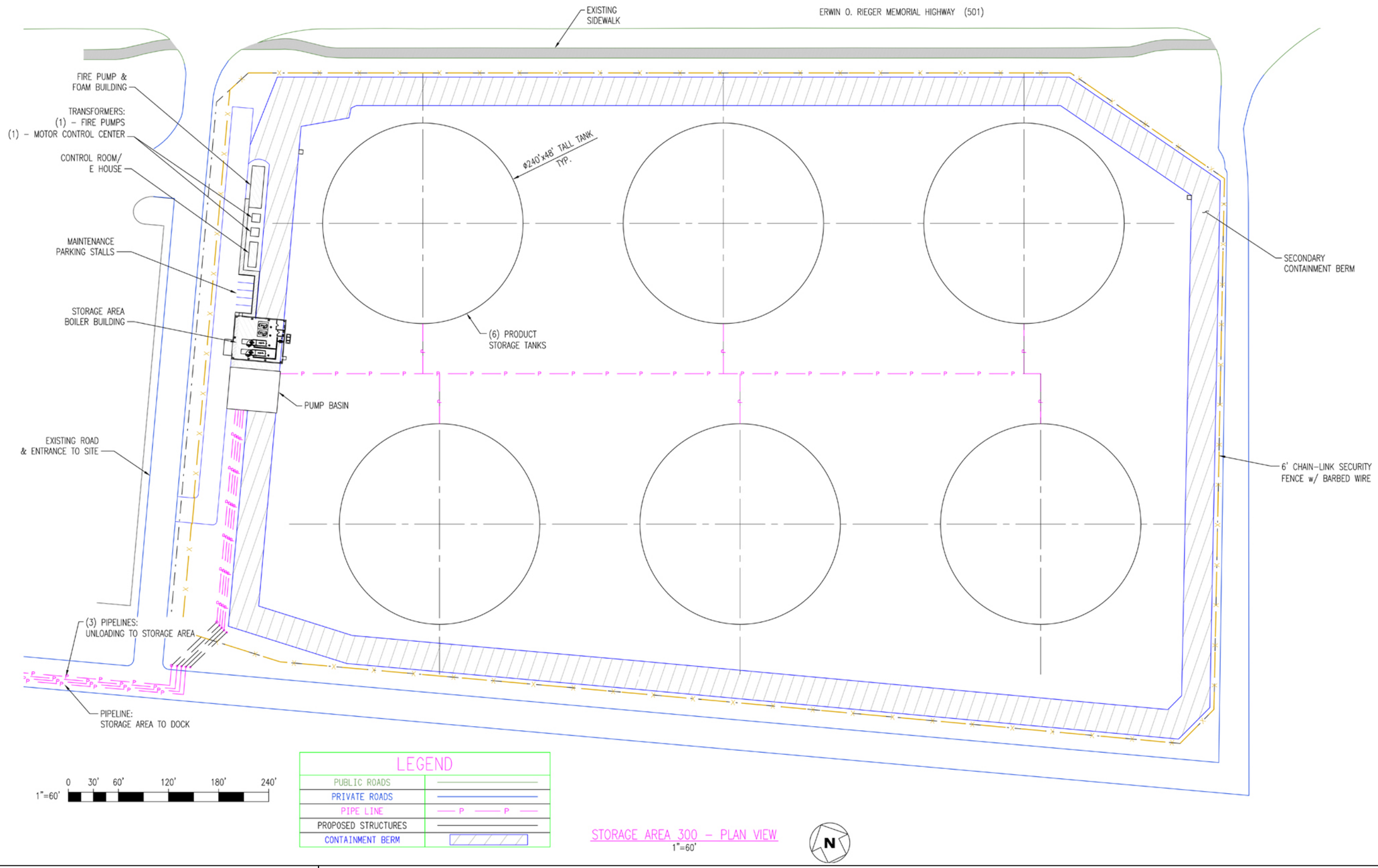

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Figure 2.3-9. Storage Tanks

Each collection header is directly connected to a dedicated pumping station which transfers the crude oil into a 24-inch-diameter transfer pipeline (one per track), which will collect the flow from all five pump basins on that track. As the crude oil flows from the collection header to the pumping stations, it will pass through a basket strainer to remove solids that may be present. The pumping stations monitor volumetric flow rate, crude oil density, and contaminants (sediment and water), and collect regular samples of the crude oil for analysis. The pumps are housed in pump basins beneath the rail unloading building. Each of the five pump basins serving Tracks 4106 and 4107 will measure approximately 15 feet wide by 34 feet long and 15 feet deep. The five pump basins serving track 4105 will measure 10 feet wide by 34 feet long and 15 feet deep. Two pumps will serve each offloading header, with one acting as a primary and the second as an on-line spare on standby. During pumping, the crude oil will not come into contact with the vaults; however, the pump basins will serve as secondary containment. The trenches and pump basins will be constructed of concrete, coated with sealant and include chemical resistant joint sealant.

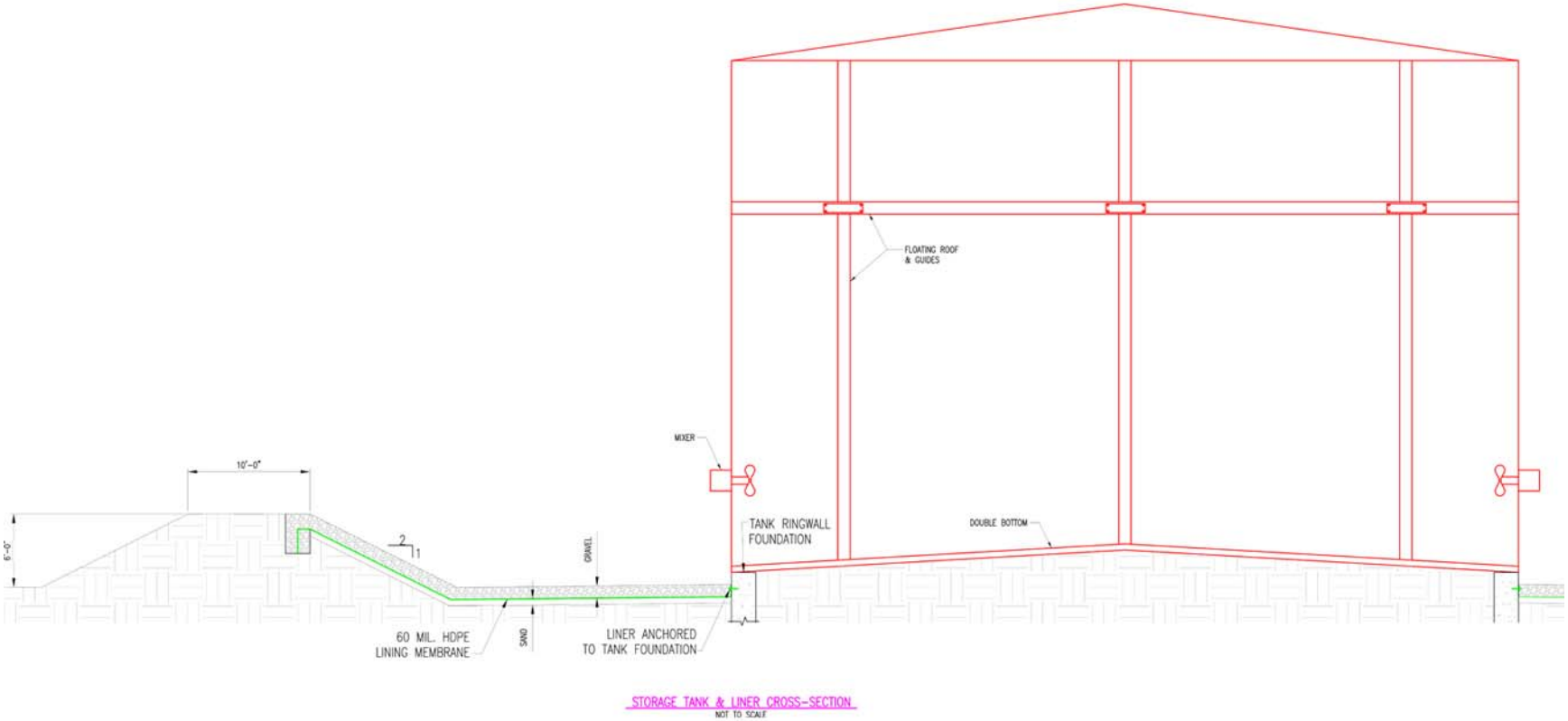
The discharge of all five unloading pumping stations will be combined into one 24-inch-diameter transfer pipeline per track, which will convey the crude oil to the storage tanks in Area 400. This transfer pipeline is part of Area 500 and is described in detail below. There will be a total of two non-heated 24-inch transfer pipelines from the non-heated unloading stations to the storage area inlet manifold. The discharge from the pumping stations with the potential for heating will be combined into a separate heat-traced and insulated, 24-inch transfer pipe to the storage area heated inlet manifold.

Unloading Facility Pedestrian Access

One pedestrian bridge will provide access for workers from the Administrative/Support Buildings, over the existing Terminal 5 rail loops, and to the interior of the rail loop. An additional four pedestrian bridges will allow workers to pass over the unit trains once they are inside the rail car unloading facility. The pedestrian bridges will be grated and a minimum of 3 feet wide to facilitate emergency access.

Rail Car Unloading Facility Spill Holding Tanks

Approximately five holding tanks, with a total capacity of approximately 1,000 barrels, will be constructed adjacent to the administrative/support area. These tanks will be connected, and will provide secondary containment, to a piping system that will receive inadvertent releases captured in the collection pans. The combined volume of the tanks is sized to contain the entire contents of a single tank car. Crude oil captured in a collection pan will flow by gravity into a dedicated line, and will be conveyed from the unloading facility to the containment tanks. The tanks will be covered, constructed of steel, and anchored in accordance with applicable seismic design requirements. The tank contents will be disposed of or recycled at an offsite facility with the ability to handle the waste.



BergerABAM	**Figure 2.3-10. Containment Berm Cross Section**

E-Houses, Transformer, Air Compressor, and Fire Pump and Foam Building

The following elements will be located in Area 200 (see Figure 2.3-2), and will support the unloading operations,

The unloading process will be controlled from six control rooms/E-houses. The integration of the control functions of these E-houses is described in detail in section 2.3.6.1 below. Each of these E-houses will be approximately 825 square feet with a maximum height of 15 feet.

Two transformers will regulate electrical output to the unloading facility. Both will be pad-mounted on 225-square foot pads.

A fire pump and foam building will house an emergency fire pump and fire protection systems associated with the unloading facility. A small storage tank of 500 gallons or less will be located adjacent to the emergency fire pump to hold ultra-low sulfur diesel fuel. The single-story building will have an approximate footprint of 750 square feet. Fire suppression systems associated with the unloading building are described in detail in section 4.1.3.4.

2.3.4 Administrative and Support Buildings

The proposed project will require three approximately 3,400-square-foot office buildings for administrative functions, lockers, restrooms, and other employee support facilities. These elements will be located on the north side of the Terminal 5 loop south of the existing private road. Parking and landscaping will be provided per City standards.

2.3.5 Area 500 – Transfer Pipelines

A combination of above- and belowground steel transfer pipelines will convey crude oil from the rail unloading building in Area 200 to the storage tanks in Area 300 and from the storage tanks to the marine vessel loading system in Area 400. Figure 2.3-9 illustrates the transfer pipeline alignment. At full buildout, the system will include the following:

- Up to three 24-inch-diameter, approximately 1,800-foot-long pipes will collect the crude oil unloaded at the rail unloading stations; one of these pipelines will be electrically heat-traced to ensure that the viscosity of the non-pipeline crude oil will be maintained as it is conveyed out of the unloading building.
- Three 24-inch-diameter, approximately 5,500-foot-long pipelines will connect the rail car unloading facility to the storage tanks in Area 300; one of these pipes will be electrically heat-traced to ensure that the viscosity of the crude oil requiring heating will be maintained from the unloading facility to the storage area.
- Two 24- to 30 inch-diameter, approximately 5,300-foot-long pipelines will connect the storage tanks with the vessel loading system in Area 400.
- One 6-inch-diameter, approximately 5,300-foot-long pipeline will return crude oil from the vessel loading system back to the storage tanks; this pipeline is provided to handle loading process shutdowns and provide pressure relief and prevent pipe hammer in the pipe conveyance system.[2]

[2] Pipe hammer or transient pressure wave is the momentary increase in pressure which occurs in a liquid pipe system when there is 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.

- One 16- to 22-inch-diameter, approximately 600-foot-long pipe will deliver hydrocarbon vapor generated during loading of vessels to the MVCU (described in section 2.3.7).

Piping will be constructed of American Standards Testing and Materials (ASTM) A36 pipe. Aboveground runs of piping will be supported so that the bottom of the piping is approximately 2 feet off the ground on vertical supports located every 20 to 25 feet. The vertical supports will be fixed on small concrete foundations (see Detail B Figure 2.3-15). Where multiple pipes are placed within the routing pipelines may be either laid side-to-side, or stacked. Figure 2.3-8, includes a detail of the typical arrangement of an overhead crossing. Expansion loops will be constructed throughout the transfer pipeline runs to accommodate for thermal expansion of the pipelines during operation. The typical configuration of a pipeline expansion loop is shown in Figure 2.3-8. Where road or rail crossings occur and in other limited areas, the piping will be housed in underground steel casings or raised above ground for standard American Railway Engineering and Maintenance-of-Way Association (AREMA) clearances. If installed underground, the piping will be placed in casings with incorporated leak detection (as shown in Figure 2.3-8). Runs of aboveground pipeline will be standard-walled, to ensure ease of inspection and maintenance, and in accordance with the applicable requirements of WAC 173-180-340 and 49 Code of Federal Regulations (CFR) 195.246 through 49 CFR 195.254. Cathodic protection will be provided for piping to prevent corrosion and piping will be wrapped and coated.

The piping system and associated supports and foundations will be designed to applicable seismic protection standards (as detailed in Section 2.18.2), and will be electrically grounded to protect against the buildup of static electricity during crude oil conveyance. Manual isolation valves will be located on the piping system at the exit of the rail car unloading facility and at the entrance to the storage tank area. Annual hydrostatic testing on over-water portions regulated by U.S. Coast Guard (USCG), API, or other standard per SPCC rule and future SPCC Plan. The pipeline system will be inspected on a routine basis.

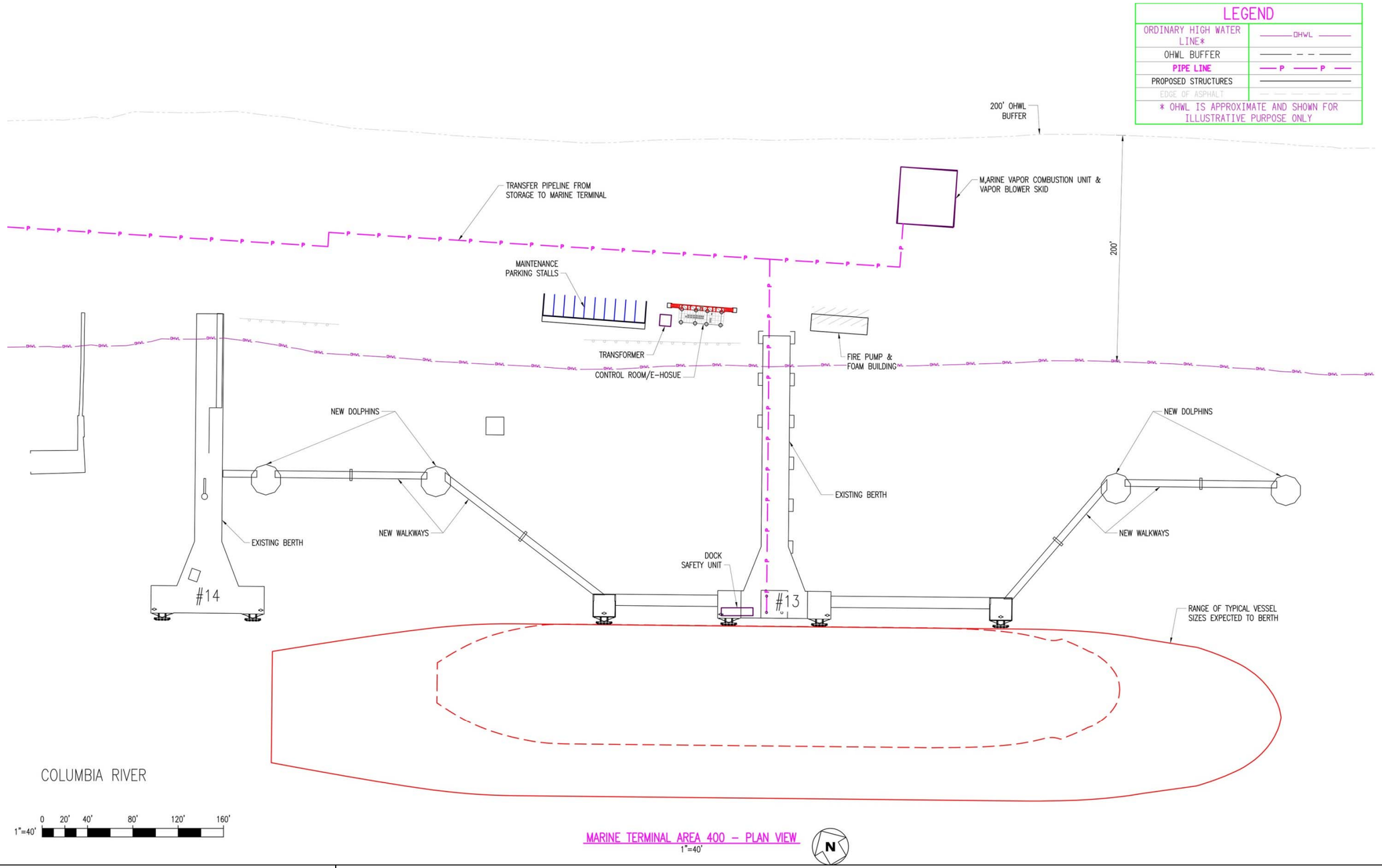


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Figure 2.3-11. Marine Terminal

2.3.6 Area 300 – Storage

Storage Tanks

The crude oil will be stored in up to six double-bottom, internal floating-roof aboveground storage tanks (ASTs) located in Area 300 (see 2.3-9). These tanks will be approximately 48 feet in height and 240 feet in diameter, with a shell capacity of approximately 380,000 barrels each. The maximum amount of product stored in each tank will be approximately 360,000 barrels, to take into account the presence of the internal floating roof and the additional headspace required to allow product movement in the event of seismic conditions. The working capacity of the tanks will be approximately 340,000 bbl[3]. The tanks will be painted white. A typical cross-section of a storage tank is included in Figure 2.3-10.

The ASTs will be erected in the field and constructed per API Standard 650. AST features include a uniformly supported flat bottom, welded carbon steel construction, and control of crude oil temperature and internal tank pressure to API specifications, and will use appropriate live load characteristics for roof design. Two of the tanks may be equipped with steam manifolds constructed into the bottom of the tanks so that the contents of the tanks can be heated to control viscosity during loading and unloading viscosity of oils that may require heating. All of the tanks will be equipped with mixers to prevent crude oil from stratifying during storage.

Each tank will have a fixed roof to keep precipitation from reaching the inside of the tank and an internal floating roof with dual seals to control vapor emissions to the atmosphere. The floating roof will be designed to avoid tipping during operations.

The double-bottomed tanks will include a leak detection system between the tank floors, and will be cathodically protected to prevent corrosion.

Containment Berm

The tanks will be enclosed by a containment berm approximately 6 feet in height. The containment area will be designed with a capacity at least equal to 110 percent of the volume of the largest tank plus precipitation from a 24-hour, 100-year storm event. This capacity reflects the most stringent of Washington spill prevention and control and National Fire Protection Association (NFPA) requirements and exceeds the requirements for secondary containment under 40 CFR 112.7. The 18-inch-high intermediate berms will be installed within the larger area to separate each tank area from the larger containment area.

The entire tank containment area will be lined with an impervious membrane to prevent any spills from leaving the containment area via the ground. Figure 2.3-11 illustrates a typical cross-section of the berm wall and liner system. Stormwater collected in the bottom of the berm will gravity-drain to the berm area sump. The sump will house three pumps to convey the stormwater through a treatment system before it discharges to the existing Port stormwater system. Treatment will consist of a hydrodynamic separator, an oil-water separator, and finally a water quality vault. Prior to pumping water out of the sump to the treatment and stormwater system, a visual inspection will be conducted to detect the presence of an oil sheen. If no oil sheen is detected, the sump pumps will be started manually; the pumps will shut off automatically when

[3] Although the tanks could hold approximately 360,000 bbl, in actual operation internal floating roof tanks are never completely full. The working capacity of the tanks is slightly lower than the total capacity to reflect the maximum volume that each tank will actually hold during operation.

the low level is reached. If oil products are identified through visual inspection, the sump will be emptied to vacuum trucks, and the oily water disposed of or recycled off site at a permitted location. The stormwater collection and treatment system is described in additional detail in section 5.2.

Tank to Dock Product Conveyance Pumps

Crude oil stored in the tanks will be pumped to the dock for transfer to a ship or barge. Four variable speed pumps will pump the crude, with three pumps in operation and one on standby. The pumps will be housed in the tank storage pump basin located on the west side of the storage tank area; the basin will measure approximately 58 by 58 feet square and 12 feet deep. It will be equipped with two sump pumps to evacuate any stormwater that collects in it. Stormwater evacuated from the pit will be routed through the treatment and discharge system associated with the containment berm sump described above.

E-Houses, Transformer, Air Compressor, and Fire Pump and Foam Building

The following elements will be located along the west side of the Storage Area (see Figure 2.3-10), and will provide support to storage operations.

The storage and pumping of crude oil to vessel loading in Area 400 operations will be controlled from a control room/E-house. The integration of the control functions of this E-house is described in detail in section 2.3.6.1 below. This E-house will have a footprint of approximately 1,250 square feet and will be single story.

Two transformers will regulate electrical output to the storage area. Both will be pad-mounted on approximately 210-square-foot concrete pads.

A fire foam skid and fire water pump house will contain an emergency fire pump and fire protection systems associated with the storage operations. A small storage tank of 500 gallons or less will be located adjacent to the emergency fire pump to hold ultra-low sulfur diesel fuel. The fire foam skid will have a footprint of approximately 180 square feet; the fire water pump house will have a footprint of approximately 325 square feet and will be single-story. Fire suppression systems associated with the unloading building are described in detail in section 4.1.3.4.

A building will house a primary and a standby natural gas fired boilers, each with a capacity of 13.2 million British thermal units per hour (MMBTU/hr) to provide steam (one boiler operating) for the heating of two storage tanks. Boilers will be field-erected with a watertube design, where water circulates through the inside of heat transfer tubes while the outside of the tubes is heated by direct contact with the hot combustion gases and radiant heat transfer. Natural gas will be supplied to the boiler buildings from the existing pipeline serving the area. Steam from the boilers will be delivered to the point of use via insulated pipelines. The gas-fired boiler may also provide steam to pipes and ancillary equipment and potential space heating.

The following elements will also be located in Area 400 (see Figure 2.3-11), and will support the marine vessel loading operations. The loading process will be controlled from a control room/E-house. The integration of the control functions of these E-houses is described in detail in section 2.3.7 below. The E-house will be approximately 825 square feet with a maximum height of 15 feet. One transformer will regulate electrical output to the unloading facility. It will be pad-mounted on a 225-square-foot pad. A fire pump and foam building will house an emergency fire pump and fire protection systems associated with the marine terminal. A small storage tank of 500 gallons or less will be located adjacent to the emergency fire pump to hold ultra-low sulfur diesel fuel. The single-story building will have an approximate footprint of 750 square feet.

2.3.7 Marine Terminal

Dock Improvements

Crude oil will be transferred to vessels at berths 13 and 14 (Figure 2.3-12). The berths are existing steel pile-supported docks consisting of two concrete decked access trestles and T-docks, four breasting dolphins connected to the trestles by catwalks, and three mooring dolphins. To obtain an optimal mooring configuration and to meet current seismic standards, a number of modifications will be required at the existing dock to accommodate the Facility.

These modifications include in- and overwater construction as follows.

- Remove two mooring dolphins and two breasting dolphins, including forty-seven 18-inch steel pipe piles, eight 12-3/4-inch steel fender piles, and approximately 1,330 square feet of existing concrete pile cap.
- Remove approximately 3,250 square feet of grated walkway associated with the existing breasting dolphins to be removed. One existing 18-inch steel pipe pile supporting the walkways will also be removed.
- Install four new 27-foot-diameter mooring dolphins (approximately 2,140 square feet combined new, solid overwater coverage), including 40, 36-inch steel pipe piles.
- Add four to eight 24–inch steel pipe piles to the Berth 13 dock platform.
- Add sixteen 24-inch steel pipe piles (all below the ordinary high water mark [OHWM]) to existing bents at Berth 13 access trestle.
- Add six to twelve 36-inch steel pipe piles at the existing trestle abutment at Berth 13, all above the OHWM, including pile cap modifications resulting in an additional 192 square feet of overwater coverage.
- Install structural connection framing consisting of two 24-inch-diameter steel pipes between the Berth 13 platform and the adjacent upstream and downstream breasting dolphins, totaling 920 square feet. Install grated walkways on top of one of the steel pipes adding approximately 690 square feet of new grated walkways (beyond the pile footprint). Install two 24-inch steel pipe piles to support the structural framing system.
- Add approximately 4,035 square feet new grated walkways between mooring and breasting dolphins with four 24-inch steel piles to support the walkways. The existing grated walkways may be reused.

Mooring and Breasting Dolphins and Walkways

The project will remove two existing mooring dolphins and install four new mooring dolphins. The existing mooring dolphins are supported by a combined total of 23, 18-inch-diameter steel pipe piles. One of the existing mooring dolphins that will be removed is located in relatively shallow water, at an elevation of approximately +3 feet CRD. The new mooring dolphins will be located in water depths ranging from approximately -4 feet to -17 feet CRD. Each new mooring dolphin will consist of up to ten 36-inch-diameter steel piles supporting a 27-foot-diameter, cast-in-place concrete pile cap and mooring equipment. The mooring system will incorporate a load monitoring system for the physical tensioning of the mooring lines so that they operate within optimum design considerations and do not stress or break while a vessel is berthed. The new mooring dolphins will be connected to the main structure of the dock by approximately 5-foot-wide grated walkways to allow safe access during vessel mooring; each walkway will be supported by a single 24-inch-diameter steel pipe pile.

Two existing breasting dolphins at Berth 14 will be removed, along with approximately 650 linear feet of existing 5-foot-wide steel grated walkways. The grated walkways that are

removed will mostly be reused and reinstalled if they are determined to be structurally appropriate. The existing breasting dolphins are supported by a combined total of twenty-four 18-inch-diameter steel pipe piles. One section of the walkway is also supported by a single 18-inch-diameter steel pipe pile, which will also be removed.

The existing grated walkways that connect the breasting dolphins east and west of the Berth 13 dock will be replaced with structural framing to physically connect the structures. This framing will be an open design element (not solid) consisting of two interconnected 24-inch pipes. This framing will result in an additional 920 square feet of overwater shading. A length of 5-foot-wide grated walkway will be aligned over one of the pipes. The east span framing will be supported on two 24-inch-diameter steel pipe piles.

Dock design has also taken into consideration worker safety during loading operations by ensuring that access to and from the shore was provided in two separate locations. The dock will include two egress points (one at each of berths 13 and 14) so that all mooring points are accessible by catwalk. Catwalks will be designed to a minimum of four feet wide to assist with emergency evacuations.

Berth 13 Access Trestle

The bents supporting the Berth 13 access trestle will be supplemented with piles for structural support to meet seismic provisions of current building code. The abutment (above the OHWM of the Columbia River) will be supplemented with six to twelve 36-inch-diameter steel pipe piles, while the waterward bents will be supplemented with two or four 24-inch-diameter steel pipe piles at each bent, depending on location. A total of 22 to 28 new piles will be installed to reinforce the trestle, with 16 of these new piles located below the OHWM. To incorporate the new pipe piles at each bent, an additional 192 square feet of shading will result from new concrete pile cap. Additionally, the central platform at the end of the Berth 13 trestle will be supplemented with four to eight 24-inch-diameter steel pipe piles.

In order to drive piles within the footprint of the existing platform, the concrete topping and precast concrete deck panels will be removed to provide sufficient clearance to drive the piles, then reconstructed with cast-in-place concrete.

Dock-Side Loading Equipment

Piping, jib cranes, a moveable gangway, an observation and control platform, dock safety unit, pipe trays, skiff, containment, boom reel, and lighting will be installed on the existing dock that serves berths 13 and 14.

The two 24 to 36-inch pipelines and return line from the Storage Area will be located on the trestle where they will connect with a manifold on the dock. High velocity hoses supported by cranes or a pulley system will be connected to the manifold and used to transfer the crude oil from the piping system to the vessel being loaded. The high velocity hoses will be connected to the grounding grid to protect against the buildup of static electricity. The loading system will incorporate automatic shutoff valves with a maximum 30-second shutoff time. The pipelines serving the dock will undergo annual hydrostatic testing as required by federal standards. A catchment and sump will be constructed at or below the deck level for the containment of inadvertent releases in addition to stormwater that may fall in the catchment area. The containment will be discharged within 1 hour of completion of any transfer by pumping into the return line.

A fence boom will be placed between the vessel location and the shoreline. Floating booms will be deployed after a vessel is at the berth and will connect with the fence boom on the downstream and will be open on the upstream end due to currents.

Marine Vapor Combustion Unit

Marine vessels will generally arrive at the berth empty with inert (nonexplosive) gases occupying the tank. When the vessel tanks are filled with crude oil, the vapors from previous cargo, vapors from the crude being added to the tank, and the inert gases will be forced from the tank. These vapors will be sent to the MVCU system, which will combust the hydrocarbons in the vapors. Piping from the dock will convey the vapors to the MVCUs located north of the access trestle and roadway. Up to eight units will be installed on a 100- by 50-foot concrete slab housing equipment including eight 8-foot-diameter steel stacks approximately 25 feet in height. The MVCU is described in more detail in section 2.12 and 5.1.

2.3.8 Area 600 – West Boiler

The Area 600 West Boiler Building will be located west of the Administration and Support Buildings. This building will have a footprint of approximately 6,000 square feet, and will be approximately 45 feet high. The building will house two primary and one standby natural gas-fired boilers, each with a capacity of 62 MMBTU/hr, to provide up to steam (two boilers operating) for the heating of tank cars during unloading. Boilers will be field-erected with a watertube design, where water circulates through the inside of heat transfer tubes while the outside of the tubes is heated by direct contact with the hot combustion gases and radiant heat transfer. Natural gas will be supplied to the building from the existing pipeline serving the area. Steam from the boilers will be delivered to the point of use via insulated pipelines. The gas-fired boiler may also provide steam to pipes and ancillary equipment and potential space heating.

Boiler System Water Treatment

Potable water from the City will be treated with a standard commercial water softener arrangement. The softened water will then be treated, as needed, with a scale inhibitor similar to Nalco NexGuard 22310, a corrosion inhibitor similar to Nalco Tri-Act 1820, and an oxygen scavenger similar to Nalco 1720. The pH will be adjusted, as needed, using a product similar to Nalco 8735.

Boiler Blowdown Pretreatment

Boiler blowdown will not be treated other than to reduce its temperature below 140ºF prior to discharge into the sanitary sewer system.

2.3.8.1 Control Systems

The primary and secondary control systems of the Facility will manage the flow of product from the unloading facility to the storage tanks and finally to the marine loading facility and control the facility fire protection systems. The primary control system will be located in the E-houses constructed adjacent to the rail car unloading elements. The primary control system will monitor and control the tank car unloading operations and transfer of the product to the storage tanks. The secondary control system will be located adjacent to the dock. This system will control the flow of product from the storage tanks to the marine loading system. The primary control system will be able to override the secondary system. An additional E-house will control the operations of the Area 300 Boiler Building and the adjacent facilities supporting storage operations. Separate fire suppression control and gas detection systems will be provided at areas 200, 300, and 400.

2.3.9 Decommissioning

The project is designed for an anticipated lifetime of 20 years. At the end of the term of the lease, the Port will own the improvements on the lease areas. The Port has the option to request the removal of all or none of the improvements unless mutually agreed to at the time. Based on the nature and extent of removal or retention, the Applicant may pursue an amendment to the Site Certification or if the site no longer operates in such a manner to trigger the need to terminate the agreement as authorized by WAC 463-66-20.

In accordance with WAC 463-72 040, at least ninety days prior to the beginning of site preparation, the Applicant will provide an initial site restoration plan to EFSEC which addresses site restoration occurring at the conclusion of the plant's operating life, or in the event the project is suspended or terminated during construction or before it has completed its useful operating life. The plan will parallel a decommissioning plan, if such a plan is prepared for the project. The initial site restoration plan will be prepared in sufficient detail to identify, evaluate, and resolve all major environmental and public health and safety issues presently anticipated. It will describe the process used to evaluate the options and select measures that will be taken to restore or preserve the site or otherwise protect all segments of the public against risks or danger resulting from the site. The plan will include a discussion of economic factors regarding the costs and benefits of various restoration options versus the relative public risk and will address provisions for funding or bonding arrangements to meet the site restoration or management costs. The provision of financial assurances will include evidence of pollution liability insurance coverage in an amount justified for the project, and a site closure bond, sinking fund, or other financial instrument or security in an amount justified in the plan.

Should the Applicant seek a termination of the Site Certification Agreement at the end of the facility lifetime, in accordance with WAC 463-72-050 the Applicant will submit a detailed site restoration plan within ninety days from the time EFSEC is notified of the termination. The detailed site restoration plan will address the elements required to be addressed in WAC 463-72-040, in detail commensurate with the time until site restoration is to begin.

2.3.10 Capital and Construction Costs

The total estimated capital cost of the Facility will be approximately $110 million, which includes both capital and construction costs.