Section 3.3 Water

The Facility will connect to the City's existing water distribution network and construct necessary water service connections to receive potable water, process water, and emergency fire suppression water.

3.3.1 Surface Water Resources (Movement/Quality/Quantity)

The project site is generally flat and includes a total vertical relief of 12 feet (MacKay Sposito dated July 17, 2013). As described in section 3.5.3.1, a significant complex of wetlands, associated with the southern end of Vancouver Lake, is located to the north of the project site, but is functionally separated from the site by SR 501. Approximately 148 acres of wetlands providing water quality functions are located to the northwest of the project site. The Parcel 1A wetland is located to the east of the Facility and is separated from it by a private access road. The Parcel 2 wetland mitigation site is located north of Area 200 and is separated from the site by a private Port road. The project site is bounded by the Columbia River directly to the south.

With the exception of the Columbia River, there are no wetlands, streams or other jurisdictional surface water conveyances at the site. No other water features, such as ditches or wet areas, have been noted on site. Site soils consist of artificial fill material, typically consisting of sand and silt. Much of this surface material was derived from suction dredging, when Columbia River channel sand was piped on shore for dewatering and grading. Most of the project site has been filled, paved, and/or capped in association with previous development and cleanup activities, thereby providing significant stabilization of surface soils.

Manmade surface water conveyance features at the site consist of an existing sediment pond located southwest of the proposed Area 200 unloading and office area. The sediment pond is a temporary construction feature and will be filled in the near future since the Terminal 5 site has been largely stabilized following grading, rail, and roadway construction projects, both ongoing and constructed within the past few years. Excess surface water currently flows through shallow concentrated flow to the existing underground stormwater conveyance pipelines and through the Terminal 5 West water quality ponds before discharging to the Columbia River through an existing outfall.

The USGS Oregon Water Science Center reports an average annual rainfall of 38.9 inches at the Simmons Rain Gage Weather Station No. 139 at 16001 North Simmons Road in Portland. Over the ~~41.5~~44.9-acre site, the volume of precipitation will total approximately 135 acre-feet per year.

3.3.1.1 Impacts to Surface Water

As noted above, except for the Columbia River, no natural surface water features exist at the site; therefore, no impacts will occur to surface water features as a result of the construction and operation of the Facility. Construction will occur in and over the Columbia River as part of the proposed dock improvements described in section 2.3. Impacts of the proposed in-water construction are described in section 3.4. The only other naturally occurring surface water features within a half-mile of the site consist of the wetland complex associated with the southern edge of Vancouver Lake. These wetlands are not hydraulically connected to surface water at the site, and are physically separated from the site by SR 501. Stormwater will be managed on site in accordance with local and state regulations and, therefore, impact to surface

water is mitigated through the use of on-site stormwater management BMPs as discussed in section 2.11. The Port manages three stormwater treatment ponds within a half-mile of the site: the Terminal 5 water quality ponds, Terminal 4 water quality ponds, and Parcel 8 water quality pond. Discharges from the site will be contributed only to Terminal 5 ponds and discharges will be treated to basic water quality standards in accordance with the discharge requirements of the Port and the Port's NPDES Municipal Phase II Stormwater General Permit as discussed in section 2.11.

As noted above, the site topography is relatively flat and already developed; minimal surface grading will be necessary to prepare the site for construction activities and no surface soils or natural vegetation will be stripped. Ground-moving activities will focus on excavating soils in Area 200 for the construction of the piping trenches associated with the rail unloading area, tank foundations, soil improvement facilities, and the installation of the administrative and support buildings. Excavated soils, if determined suitable by testing, will be used as fill for the construction of the containment berm in Area 300.

Protecting surface water during construction will focus on erosion control resulting from the interaction of surface water conditions with active ground disturbances. A site-specific construction SWPPP will be developed and implemented. A preliminary ~~construction~~ operations SWPPP is included in this Application in Appendix C; this preliminary SWPPP was developed based on the preliminary design in place when this Application was submitted. A final construction SWPPP will be submitted for review and approval before any facility-related ground disturbance begins. The construction SWPPP will detail~~s~~ specific applications in which BMPs will be installed to prevent and mitigate any construction-related impacts to surface water. ~~Construction-related BMPs are further identified in the SWPPP.~~ A final operations SWPPP will be submitted for review prior to the beginning of Facility operations.

Stormwater from the Facility site is currently collected, treated, and released to the Columbia River through existing outfalls permitted under existing NPDES permits. A complete description of the existing stormwater systems in place is provided in section 2.11 of this Application and in the preliminary stormwater report in Appendix F. This project will reduce the amount of impervious surface coverage and convert a portion of the existing pollution-generating impervious area to non-pollution-generating roof areas. All stormwater and wastewater discharges are connected to existing permitted collection and treatment systems and outfalls as described in sections 2.9 and 2.11 of this Application.

Stormwater will be discharged from the site in accordance with the existing NPDES permits which dictate effluent water quality. On-site stormwater management techniques and BMPs will increase the level of treatment, convert existing polluting generating surfaces to non-polluting surfaces and reduce the quantity of stormwater discharged from the site. The Applicant is discharging to existing collection systems owned by the Port. Actual outfall water quality, and discharge rates will be impacted by other tenants, the Port, and operations and maintenance of the downstream conveyance systems.

Mitigation Measures

A permanent stormwater management system will be constructed to serve the Facility; this system will be constructed during site grading and construction of the Facility surface and subsurface elements. The permanent stormwater management system is described in section 2.11.2, and is designed in accordance with VMC 14.024, 14.025, and 14.026 and Ecology's

administrative codes for stormwater and spill prevention, preparedness, and response and the Ecology stormwater manual. The final design and stormwater report will be prepared and submitted for approval by EFSEC prior to construction.

Surface water quality will be protected through the use of the BMPs designed and constructed in accordance with Ecology's stormwater manual. BMPs, such as oil water separators, hydrodynamic separation, particulate filters, biofiltration swales, and permanent vegetation, will be used in the permanent Facility installation to protect surface water. Once all permanent stormwater BMPs are in place, operations-related impacts to surface water will be minimized through the use of operational BMPs and operational procedures.

The most serious risk – although it is unlikely with the mitigation measures in place – to surface water quality will be an accidental crude oil release during an exceptionally high rainfall event. Numerous spill prevention and control systems have been included in the design of the Facility (see section 2.10). Containment rail drip pans, pumps, and containment sump tanks will be provided for the rail unloading area; the capacity of the containment systems will be sufficient to contain and store the entire volume of a single rail car staged within the unloading building. The tank farm will be surrounded by a containment berm 6 feet high with a full impervious liner capable of containing 110 percent of the largest tank and a 100-year 24-hour rainfall event. Spill, containment will be designed to meet or exceed API, EPA, NFPA, City and other applicable requirements. Tank monitoring, inspection, and testing will be in accordance with API 653, the industry standard for the inspection of aboveground petroleum storage tanks.

The transmission pipeline will be constructed of welded steel pipe, designed specifically for oil conveyance. Safety measures built into the design include thickened pipe walls, pipeline expansion for thermal and/or seismic movement, pressure and temperature sensors, and emergency shutoff valves. The pipeline will largely be constructed aboveground, on concrete foundations, with the exception of a few portions that will be constructed underground to accommodate existing rail and road crossings. The above-grade portion of the pipeline will be subject to visual inspection for leaks and secondary containment with leak detection will be provided for pipe installed underground~~double-walled pipe will be used underground with monitoring to detect any leaks~~, see Sections 2.10, 2.11 and Appendices B.2 and C for additional spill control and prevention measures.

Spill containment measures along the pipeline alignment (Area 500) will comply with 40 CFR 112.7 by providing secondary containment, inspections, and contingency planning. The most likely spill events are small releases of less than 5 gallons resulting from nicks, corrosion pinholes, or gasket seal failures. An example of secondary containment that can address these discharges is to confirm or retrofit all stormwater inlets within the contributory drainage area of the pipeline alignment with spill control devices to contain small oil leaks or spills.

All facility piping systems and storage tanks will be hydrostatically tested prior to being placed into operation. Hydrostatic test water for the pipeline will be acquired from the City's water system. Test water will be discharged to existing storm drain conveyance systems in accordance with the stormwater permit issued for the project.

BMPs have been described in the preliminary SWPPP included in Appendix C of this Application, and will be finalized based on the final Facility design and submitted to EFSEC for review prior to ~~construction~~operation. Flow control, controlling the rate at which stormwater is released to surface waters from the site, is not required for the Facility because all site

stormwater runoff will be conveyed to the Columbia River through a manmade non-erodible conveyance system. The Columbia River is listed as a flow-control-exempt receiving water per section 2.5.7 and Appendix I-E volume 1 of the Ecology stormwater manual. A comprehensive strategy for spill prevention and control will also be implemented as described in detail in section 2.10 of this Application.

With the mitigation measures in place, stormwater discharges from the Facility will meet state and local water quality standards.

3.3.2 Runoff/Absorption

3.3.2.1 Existing Runoff/Absorption Conditions

As discussed in section 3.3.1.1, site soils are filled, paved, and/or capped in association with previous development and cleanup activities. Existing runoff largely flows to existing manmade conveyances, pipelines, and treatment units. Based on the nature of the existing development on the site and the industrial nature of the existing sites, it is assumed that stormwater currently does not infiltrate.

Stormwater runoff from the Marine Terminal (Area 500) is part of an existing 25-acre drainage basin that is treated through two water quality bio-swales and then flows into two infiltration swales.

3.3.2.2 Impacts to Runoff/Absorption

The site is currently considered to be fully impervious. Construction will improve this existing condition by converting approximately 2.21 acres of impervious area to landscaping and approximately 10.78 acres from pollution-generating impervious to non-pollution-generating roof area. Landscaping and screening will be constructed in accordance with the City's requirements, primarily where Facility elements are situated adjacent to frontage areas along SR 501. Landscaping and stormwater areas will be constructed to allow infiltration where possible.

Currently the MVCU is proposed to impact a portion of the treatment bio-swale described above in 3.3.2.1. The impact to the existing treatment facility will be mitigated by installing a filter strip to treat the proportional amount of impacted land area. Runoff contributing to the infiltration facilities will be maintained. Proposed mitigation will add additional treatment facilities increasing the water quality prior to infiltration.

The Facility as proposed will decrease the total amount of impervious surfaces and add additional impervious areas and treatment facilities. Overall, natural absorption and infiltration from the Facility will be increased.

Construction stormwater will be managed in accordance with the conditions of the State General Construction Stormwater Permit. Construction stormwater BMPs will be utilized to control erosion and sediments on the site. Additional detail on construction BMPs are included in the preliminary SWPPP located in Appendix C. Selected construction stormwater BMPs will provide water treatment and will discharge stormwater to the existing on-site conveyance systems. Construction stormwater will not be routed to infiltration facilities.

3.3.2.3 Mitigation Measures

The designed BMPs are expected to minimize erosion and control sedimentation. Construction-phase erosion and sedimentation control BMPs, as described in sections 2.11 and 5.3 of this

Application, will be implemented to mitigate the impacts of soil disturbance. Permanent operations-phase runoff control and water quality treatment will be implemented to mitigate any impacts from the project.

3.3.3 Floodplains

3.3.3.1 Existing Conditions

Portions of the site are within the 100-year floodplain and floodway of the Columbia River. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps #53011C0363D and 364D include the project area. The maps indicate that most of the area is located in Zone X and outside the Special Flood Hazard Area representing the 100-year floodplain. The 100-year flood elevation is designated as 30 feet NAVD 88 and extends generally to the top of the bank along berths 13 and 14 in Area 400. In addition, an isolated floodplain is located in Area 300, as shown on FEMA Map Number 53011C0364D, and in a portion of Area 500. Figures 3.3-1 and 3.3-2 indicate the mapped floodplain. The Port filled Area 300 as authorized by City permit GRD2012-00025 and the area is now above the 100-year flood elevation. The floodplain within Area 500 is completely surrounded by land above the 100-year flood elevation, which separates it from overland flooding from the Columbia River or Vancouver Lake.

The project is located within the inundation area of the 500-year flood event. The entire upland portion of the site is located above the 100-year floodplain and therefore also out of the 5- and 50-year floodplain.

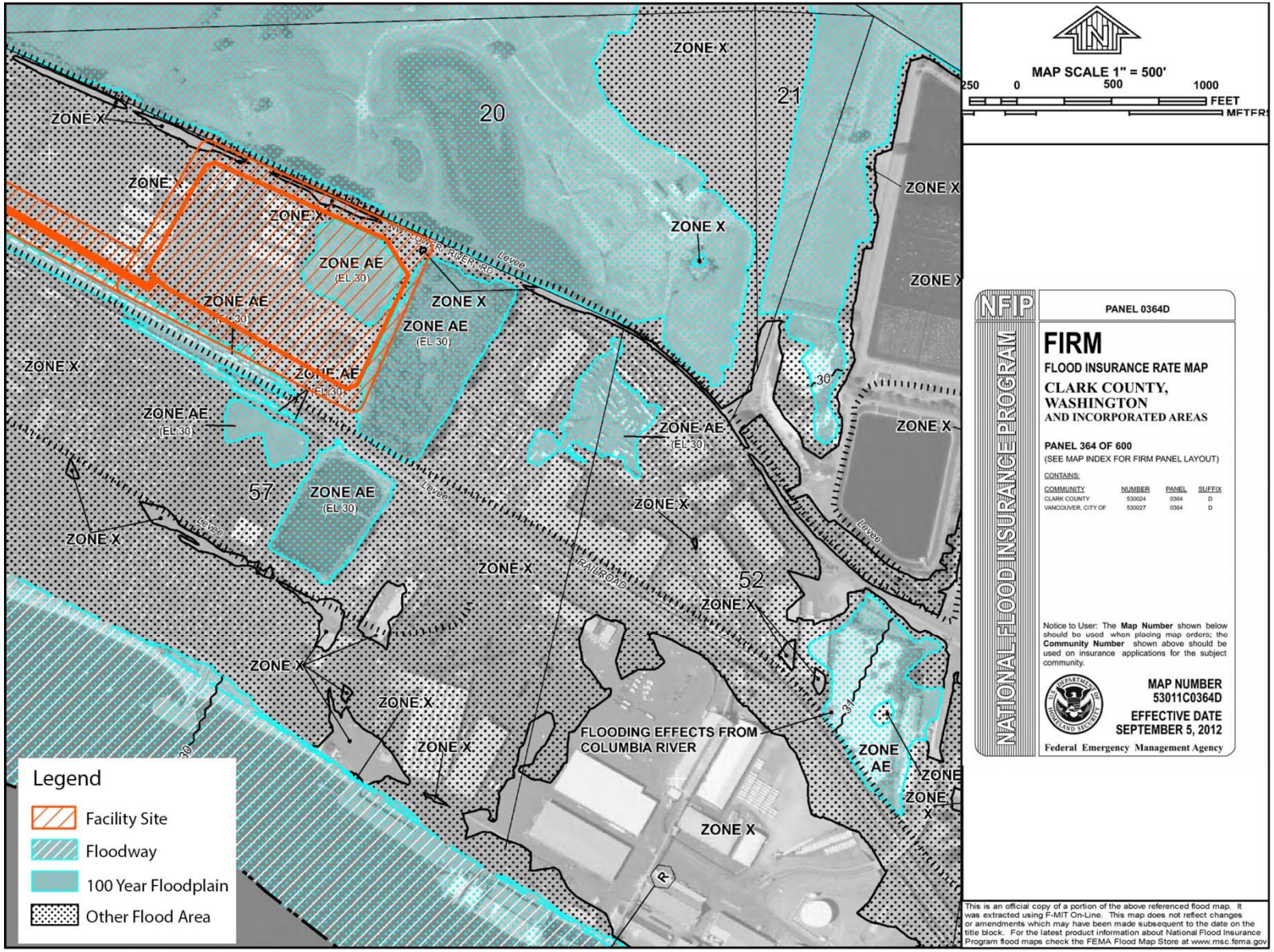

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Figure 3.3-1. Mapped Floodplains - West

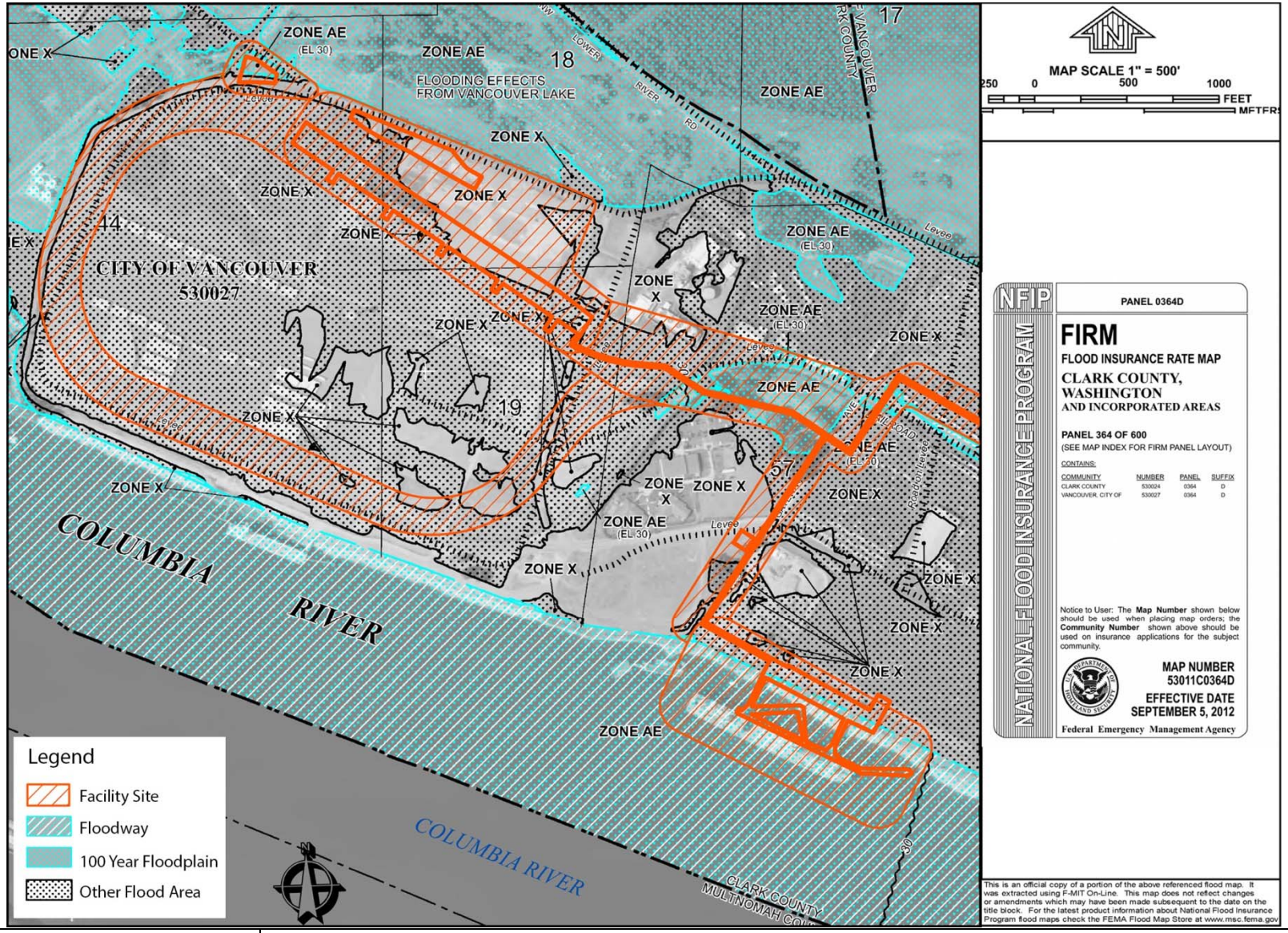

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Figure 3.3-2. Mapped Floodplains - East

3.3.3.2 Potential for Flooding and Protective Measures

There are no impacts to the site for the 5- and 50-year flood events.

Within Area 200, the below-grade trenches will be watertight eliminating inundation concerns during the 100-year flood, or from seasonal shallow groundwater.

Portions of the proposed pipeline route and improvements at existing berths 13 and 14 will be located within the 100-year floodplain. No fill is proposed within the 100-year floodplain, and there will be no potential to affect upstream or downstream properties through increases to the base flood elevation.

Where the pipeline route lies in the floodplain, the pipeline will be elevated aboveground. Because the floodplain is isolated from overland flows from the Columbia River it will not be subject to flowing water and no risk from floods is anticipated for this element. Regardless, the pipeline will be designed by a professional engineer to withstand potential impacts from flooding.

Berths 13 and 14 in Area 400 are existing pile-supported structures located in the Columbia River. The existing and planned improvements will be located with deck elevations above the 100-year flood elevation and have been (or will be) designed by a professional engineer to withstand the forces imposed by flooding conditions.

All or portions of the proposed structures located in Area 400 will be located in the 100-year floodplain. These include a dock transformer pad, control room/E-house and fire pump and foam building. These structures will be elevated so that the floor is at least 1 foot above the base flood elevation. They will also be anchored to resist movement and designed with utilities and other connections that are designed to withstand flood events consistent with the requirements of VMC 20.740.120 Frequently Flooded Areas.

Floodwaters are anticipated to inundate the facilities with approximately 1-foot of water during the 500-year event and a maximum of 3 feet in the lowest areas. The Facility will be designed to maintain integrity in these worst-case flood conditions. The containment berm around the product storage tanks provides protection against inundation. The unloading facility is located within the inundation area of the 500-year flood plain. Flood waters inundating the unloading area would fill the below-grade trenches and rail drip pans. In order to prevent the contamination of flood water, operating procedures will require that any crude oil spill, including minor leaks and drips be contained and affected surfaces cleaned promptly limiting the amount of any residue that could comingle with flood waters inundating the rail drip pans, containment piping, and below-grade trenches.

In the event of flood events exceeding the 100-year or 500-year flood stages, the Applicant will monitor the rate of flood water rise and suspend threatened Facility operations prior to the flooding occurring.

3.3.4 Groundwater Resources

The hydrogeologic setting controls the availability, quantity, and quality of groundwater resources at the project site. This section presents an overview of the hydrogeologic units, potential impacts from the project, and mitigation options.

A hydrogeologic unit is any geologic unit that controls groundwater occurrence or the movement of groundwater based on the hydrologic properties of the material. Within the Portland Basin, eight hydrogeologic units have been identified (Swanson et al. 1993). These units are further subdivided based on regionally continuous contacts between units of different textures and hydrologic characteristics into two sedimentary subsystems (Upper Sedimentary Subsystem and Lower Sedimentary Subsystem) and an older rock subsystem. The very productive Upper Sedimentary Subsystem contains most water supply wells and is the primary aquifer system for drinking water. The Upper Sedimentary Subsystem is composed of unconsolidated material associated with Quaternary alluvium deposits, catastrophic flood deposits, and the Troutdale Formation. These units are composed of coarse-grained materials, predominantly sands and gravels, and are permeable and productive.

The relatively flat groundwater surface and flow direction along the banks of the Columbia River are influenced by tidal fluctuations, precipitation events, supply well pumping, and upstream dam releases. The effect of the relatively flat groundwater surface and the hydraulic connection of the aquifer to the Columbia River results in diurnal fluctuations of groundwater flow direction at the site. The aquifer response to river stage is slightly offset near the bank and decreases with distance from the river. When the river stage increases with high tide, groundwater flow direction is from the river into the aquifer. Conversely, when the river stage decreases with low tide, groundwater flow direction is from the aquifer into the Columbia River. However, net groundwater flow is from the aquifer to the Columbia River.

Within the Facility site, groundwater quality has been impacted by the historical industrial operations that have occurred. Alcoa owned and operated an aluminum smelter and fabrication facility at the project site for approximately 55 years. Alcoa conducted a cleanup of the site and limited groundwater contamination is currently found within the site. The COCs identified at the site by Ecology include VOCs, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), cyanide, fluoride, and petroleum hydrocarbons. Multiple site investigations into the nature and extent of contamination at the site indicate that groundwater contamination occurred as a result of waste disposal activities on the site. The groundwater contamination detected in the vicinity of the East Landfill area includes trichloroethene above state and federally designated human health-based risk levels. The current cleanup action includes monitored natural attenuation that will continue until groundwater cleanup standards are achieved.

The site and surrounding areas are within the City's water service boundary. The City receives its water from the Orchards, Troutdale, and Sandy River Mudstone aquifers. The EPA designated the aquifers used by the City for drinking water as a sole-source aquifer in July 2006 (EPA 2006). The aquifer will continue to be the source of water supply as demands increase. The City has designated the entire area within the City's boundaries as a CARA, as specified by its Water Resources Protection Ordinance (VMC 14.26). The project site falls within this boundary. The ordinance requires minimum standards to protect critical aquifers, establishes compliance standards for business and industry to manage hazardous materials, and creates special protection areas around City wellheads. Section 3.3.5 discusses the City water supply and well locations.

3.3.4.1 Impacts

Municipally supplied water obtained from the City is planned to be the source of water for the site. The water will be obtained from the existing City water system; no new groundwater wells

will be constructed to serve the Facility, either at the site or elsewhere. Therefore, there are no anticipated adverse impacts to existing ground water sources resulting from City supply of potable, process and emergency fire suppression water.

Some foundations and utility and pipeline excavations for the project may require dewatering of the excavations during the construction process. Groundwater extraction during construction will result in the temporary drawdown of groundwater in the areas immediately surrounding the work site. Because the excavations are shallow (the majority under 5 feet) the extraction of groundwater will have a negligible long-term effect on groundwater abundance and availability. Because of the presence of contaminated groundwater on the site, there is the potential that contaminated groundwater may be extracted during construction dewatering.

Groundwater that is pumped out of the excavations will be stored on site in mobile water tanks and analyzed and managed in accordance with local, state and federal regulations prior to reuse, infiltration or disposal. If conditions and water quality allow bypass of the mobile water tanks may occur. Potential options for management of groundwater from the excavations will depend on the chemical and physical qualities of the water and are expected to include:

- Discharge to surface areas for infiltration.
- Discharge to the stormwater system if the water meets the quality criteria per the construction stormwater permit issued for the project (see section 5.3).
- Discharge to the City's sanitary sewer if contaminants are present at concentrations that meet the City's criteria as regulated in the VMC 14.10.080.
- Collection and offsite disposal by a licensed commercial facility if contaminants are present at concentrations greater than the criteria for discharge to the sanitary or stormwater systems.

It is unlikely that the project's water withdrawals related to construction activities will have a direct effect on groundwater quantity, quality, and flow direction in the immediate area below the proposed facilities. Therefore, impacts to groundwater resources are considered negligible.

3.3.4.2 Mitigation

Disposal will be conducted in accordance with the stormwater permit issued for the project. If dewatering wells are necessary, well points used for construction dewatering will be completed in accordance with WAC 173-160 Minimum Standards for Construction and Maintenance of Wells. If groundwater extracted for construction dewatering is directed to the City's sanitary sewer it will be disposed in accordance with VMC 14.12 Discharge of Industrial Wastes to the Industrial Wastewater Pretreatment Facility.

3.3.5 Public Water Supplies

As stated above, the City receives its water from the Orchards, Troutdale, and Sandy River Mudstone aquifers. The City's water rights total 108 MGD. Current maximum day demands are approximately 55 MGD. Current source development efforts by the City allow the City to provide a current capacity without storage of 80.6 MGD. There is 24.5 million gallons of storage within the City's water supply and an additional two emergency interties with Clark Public Utilities (CPU).

The City uses its sources and reservoirs to satisfy all of the water demands on its system. The present municipal water supply has an additional 25.6 MGD of capacity above its current maximum day demand.

3.3.5.1 Proposed Water Usage

Water consumption at the Facility is anticipated to result in a maximum day demand of approximately 60 gpm. Water consumption consists of approximately 78,900 gpd of process water, and 8,500 gpd of domestic potable water, and 2,200 gpd of irrigation water during a maximum day demand. Additional information related to Facility water use is included in section 2.6 of this Application. The City has reviewed estimated water demands and provided a letter (Appendix E) confirming adequate source and distribution capacity to meet the water demands of the Facility.

3.3.5.2 Water Supply During Construction

Construction water will be purchased from the City; the uses include spraying roads for dust control, concrete curing, hydrostatic testing, miscellaneous construction support, and restroom facilities for an estimated construction and support crew of 250 people. The water demand during construction is conservatively estimated at 20,000 gallons per day, with a peak demand of approximately 500 gallons per minute. Water will be provided to the site through existing pipeline systems. The contractor will coordinate with the City for construction water and all applicable regulations requiring backflow devices and metering of construction water. Additional information related to construction water is included in section 2.6 of this Application.

In addition to the average daily needs during construction, a minimum of 20 million gallons of water will be required for hydrostatic testing and flushing of the pipeline and tank facilities. Testing and commissioning will be sequenced to minimize the use of water for a single test. To the maximum extent possible, commissioning water will be utilized in multiple facilities to reduce water consumption. Water used for flushing and testing the tank and pipeline facilities will be treated and discharged to onsite stormwater facilities according to the discharge limits required in the State Construction General Stormwater Permit.

3.3.5.3 Future Conditions

The water demand for the Facility is assumed to be constant from year to year. The water use figures presented in the Application for site certification represent full capacity ~~build-out~~ and operational capacity.

3.3.5.4 Impacts to Public Water Supplies

Based on the City's current excess source capacity described above in 3.3.5 of 25.6 MGD and excess water right of 53 mgd, the proposed Facility impact of approximately 87,400 gpd represents 0.3 percent of the available capacity. City-wide long-term growth is not anticipated to be affected by the water demands of this project.

A wellhead protection map is included in the preliminary stormwater report in Appendix F. The project is not located within a wellhead special protection area, defined by the City in VMC 14.26 as a 1,900-foot diameter around a City- or CPU-owned drinking water well. The closest City well to the project site is Water Station #3 located near Washington and 41st Street approximately 1.9 miles to the northeast of Area 300. The Port well #2 is located approximately 1.3 miles southeast of Area 300 near the United Grain Terminal. CPU maintains the South Lake Wellfield approximately 1.5 miles northeast of Area 300 near the intersection of Fruit Valley Road and NW 61st Street.

3.3.5.5 Mitigation Measures

Mitigation for the use of and impact on the public water system includes payment of system development charges, connection fees, and utility rates. These fees and rates are to support capital and operating expenses of the water system.

3.3.6 Private Water Supplies

The Clark County GIS wellhead protection mapping system was used to determine the existence of any wells in the vicinity of the Facility. This research identified five wells within 1 mile of the site. Two of the wells are classified as a Group B Public Water System. One is classified as a Group A Public Water System. The remaining two are classified as an unclassified Water System. All wells were identified as drilled wells. Where depth information was available, the two wells located east of the site were drilled at depths of 40 to 50 feet, while the wells to the west were drilled at depths of 130 to 135 feet. There is an additional Port well (PW-20) located at Terminal 5, which has been used in the past for water needs during construction projects at Terminal 5. This well yields a flow of between 600 and 1,500 gallons per minute.

3.3.6.1 Impacts

The Facility will purchase its water supply from the City. The development of new water sources or wells is not required for this Facility. Relative to the existing system demands and total City water rights, the project is not anticipated to have an effect upon the private water supplies in the vicinity of the project site.