4.4 Groundwater

Groundwater, often stored in aquifers[1] formed of permeable rock or soil material, provides water for human and environmental well-being. Groundwater quality refers to the physical, chemical, biological, and aesthetic characteristics of water, which are used to measure the ability of water to support aquatic life and human uses. Groundwater quality can be degraded by contaminants introduced by domestic, construction, industrial, and agricultural practices.

This section describes the groundwater resources in the study area. It then describes impacts on groundwater that could result from construction and operation of the Proposed Action and under the No-Action Alternative. This section also presents the measures identified to mitigate impacts resulting from the Proposed Action.

4.4.1 Regulatory Setting

Laws and regulations relevant to groundwater are summarized in Table 4.4-1.

Table 4.4-1. Regulations, Statutes, and Guidelines for Groundwater

Regulation, Statute, Guideline	Description
Federal	
Clean Water Act (33 USC 1251, *et seq*.)	Establishes the basic structure for regulating discharges of pollutants into waters of the United States and regulating quality standards for surface waters but not groundwater.
Safe Drinking Water Act	Requires the protection of groundwater and groundwater sources used for drinking water. Also, requires every state to develop a wellhead protection program.
National Pollutant Discharge Elimination System Permit	Authorized by the Clean Water Act, the permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Surface waters in the study area interacts with groundwater.
State	
Water Quality Standards for Groundwaters of the State of Washington (WAC-173-200)	Groundwater standards intended to preserve a level of quality for groundwater capable of meeting current state and federal safe drinking water standards.
Water Code (RCW 90.03)	Establishes rules for regulating and controlling water rights, and defines beneficial uses.
Regulation of Public Groundwaters (RCW 90.44)	Regulates and controls groundwater. Extends application of surface water statutes (RCW 90.03) to groundwater.

[1] An aquifer consists of underground layers of rock that are saturated with water that can be brought to the surface through natural springs or by pumping.

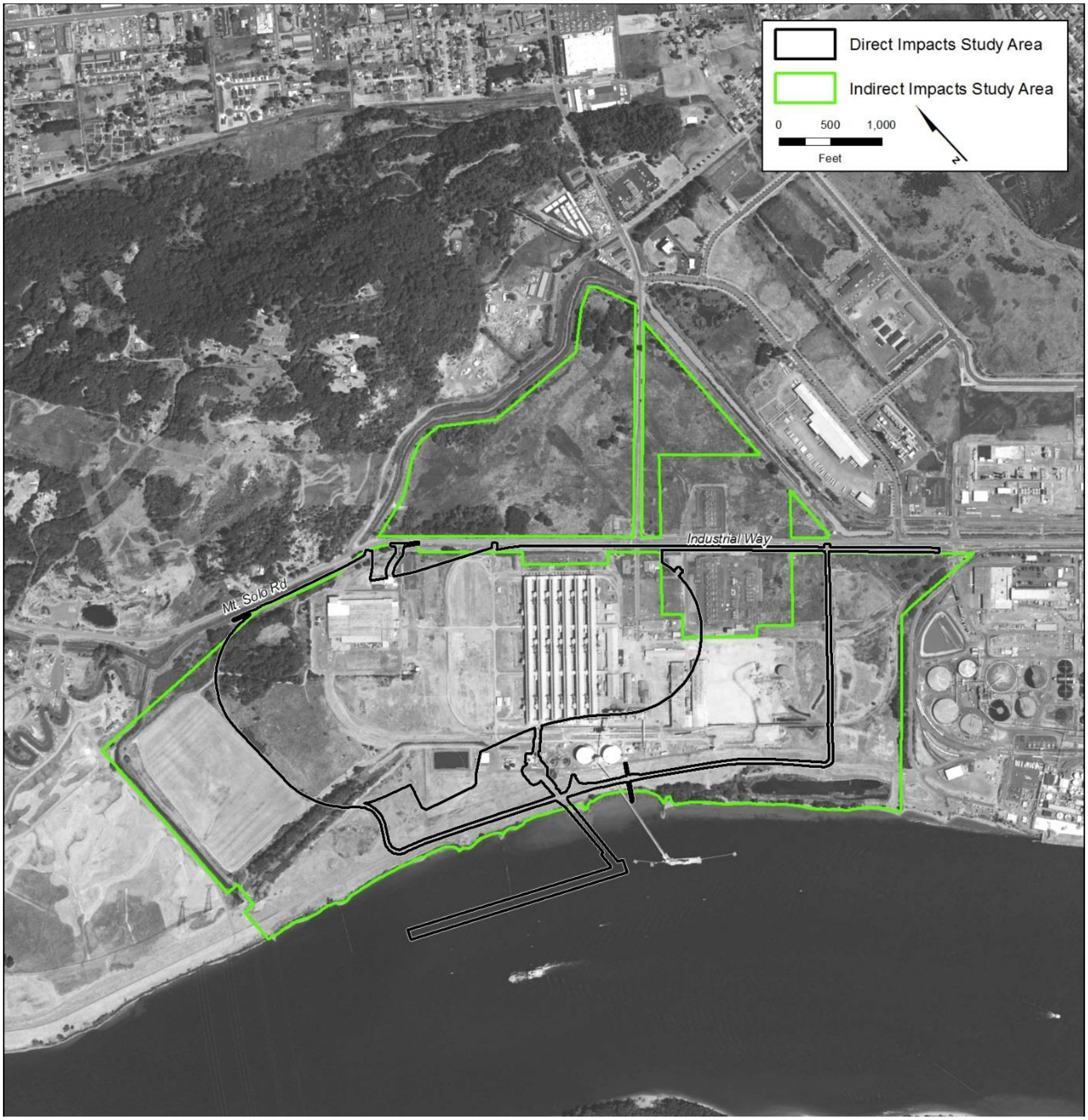
Regulation, Statute, Guideline	Description
Drinking Water/Source Water Protection (RCW 43.20.050)	Requires that the Washington State Department of Health assure safe and reliable public drinking water supplies in cooperation with local health departments and water purveyors.
Model Toxics Control Act (RCW 70.105D)	Requires potentially liable persons to assume responsibility for cleaning up contaminated sites.
State Water Pollution Control Law (RCW 90.48)	Grants Ecology the jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland water, salt waters, water courses, and other surface and groundwater in the state.
Water Resources Act of 1971 (RCW 90.54)	Sets forth fundamental policies for the state to insure that waters of the state are protected and fully utilized for the greatest benefit.
Washington State Oil and Hazardous Substance Spill Prevention and Response (RCW 90.56)	Requires notification of releases of hazardous substances and establishes procedures for response and cleanup.
Model Toxic Control Act Cleanup Regulations (WAC 173-340)	Establishes procedures for investigation and site cleanup actions. Requires potentially liable persons to assume responsibility for cleaning up contaminated sites.
Local	
Cowlitz County Critical Areas Ordinance (CCC 19.15)	Designates critical areas and development regulations to assure the conservation of such areas in accordance with best available science.
Longview Water Supply Protection Ordinance (LMC 17.100)	Establishes a Wellhead Protection Program to minimize the risk of groundwater contamination.

Notes:
USC = United States Code; WAC = Washington Administrative Code; RCW = Revised Code of Washington; Ecology = Washington State Department of Ecology; LMC = Longview Municipal Code

4.4.2 Study Area

The study area for direct impacts on groundwater is the project area. The study area for indirect impacts is the 540-acre Applicant's leased area (Figure 4.4-1).

Figure 4.4-1. Groundwater Study Areas



4.4.3 Methods

This section describes the sources of information and methods used to evaluate the potential impacts on groundwater associated with the construction and operation of the Proposed Action and No-Action Alternative.

4.4.3.1 Information Sources

The following sources of information were used to identify and analyze the potential impacts of the Proposed Action and No-Action Alternative on groundwater in the study area.

- *Remedial Investigation Report* (Anchor Environmental 2007)
- *Former Reynolds Metals Reduction Plant—Longview, Draft Remedial Investigation and Feasibility Study* (Anchor QEA 2014)
- *Millennium Coal Export Terminal Longview, Washington, Water Resources Report* (URS Corporation 2014a)
- *Millennium Coal Export Terminal Longview, Washington, Water Resource Report* (URS Corporation 2014b)
- *Millennium Coal Export Terminal Longview, Washington, Surface Water Memorandum* (URS Corporation 2014c)
- *Millennium Coal Export Terminal Longview, Washington Surface Water Memorandum, Second Supplement to Water Resource Report Water Collection and Drainage* (URS Corporation 2014d)
- *Mint Farm Regional Water Treatment Plant, Preliminary Design Report, Part 2A, Hydrogeologic Characterization* (City of Longview 2010)
- Other scientific literature as cited in this section

4.4.3.2 Impact Analysis

The following methods were used to evaluate the potential impacts of the Proposed Action and No-Action Alternative on groundwater. Although the indirect impacts study area includes the extent of the Applicant's leased area, impacts on groundwater would be limited to the project area and along the Reynolds Lead railroad within the watershed. For direct impacts, the analysis assumes best management practices were incorporated into the design, construction, and operation of the Proposed Action.

Potential groundwater impacts have been evaluated regarding groundwater discharge and recharge, groundwater quality, and groundwater withdrawal. The assessment of impacts is based on the assumption that the Proposed Action would include the following actions and authorizations.

- National Pollution Discharge Elimination System (NPDES) Construction Stormwater Permit and Industrial Stormwater Permit for stormwater discharges.
- Remediation of any existing soil and groundwater contamination in the Applicant's leased area prior to and concurrently with project construction.
- Long-term monitoring as part of the remediation of the existing groundwater contamination to verify remedy effectiveness and natural attenuation of groundwater contamination.

4.4.4 Existing Conditions

This section describes the existing environmental conditions in the study area related to groundwater that could be affected by the construction and operation of the Proposed Action and No-Action Alternative.

4.4.4.1 Groundwater Resources

The study area is in Water Resource Inventory Area (WRIA) 25, also known as the Grays-Elochoman watershed. This watershed encompasses approximately 296,000 acres and is defined by five subbasins: Grays River, Skamokawa Creek, Elochoman River, Abernathy/Germany Creek, and the Coal Creek/Longview Slough. The project area is within the Longview-Kelso basin, a topographic and structural depression formed by the Cascadia subduction zone (Anchor 2013 in URS Corporation 2014a). The Longview-Kelso basin is composed of unconsolidated alluvium (silt, fine-grained sand, and clay) underlain by alluvium (coarse-grained sand and gravel). Groundwater resources in the study areas include an upper alluvium aquifer (i.e., shallow aquifer) and a deeper confined aquifer from which industries, small farms, and domestic well users withdraw groundwater. An aquifer is the underground soil or rock through which groundwater can easily move.

The amount of groundwater that can flow through soil or rock depends on the size of the spaces in the soil or rock and how well the spaces are connected. Aquifers that consist of gravel, sand, sandstone, or fractured rock such as limestone are relatively permeable (or porous) materials and allow water to flow through. A confining, impervious unit consisting of clay and silt ranging in thickness from approximately 100 to 200 feet separates the two aquifer systems below the project area. The confining unit becomes appreciably thinner beyond the project area, to the north and east near residential areas. Shallow groundwater is hydraulically connected with the Columbia River. Preliminary hydrogeologic investigations conducted for the City of Longview indicate that shallow, unconfined groundwater does not contribute significantly to the deeper aquifer as the lower aquifer is primarily recharged by deeper aquifers below the Columbia River (Anchor QEA 2014). The project area is not considered a significant source of groundwater recharge by infiltration because of the low recharge rates of the soil in the study area (URS Corporation 2014c).

Shallow Aquifer

Groundwater in the shallow aquifer is found at depths less than 5 feet below the ground surface (bgs) (Anchor QEA 2014). Groundwater flow in the shallow aquifer in the study area is complex due to the competing influences of the Consolidated Diking and Improvement District (CDID #1) system and, to a lesser extent, the tidally influenced Columbia River (Anchor QEA 2014). Groundwater and stormwater discharged to the CDID #1 ditches are pumped from these ditches by the CDID #1 to maintain surface-water levels below those in the Columbia River. Water from CDID #1 is discharged to the Columbia River. A CDID #1 pump station is located near the southwest corner of the project-area boundary.

Deep Aquifer

The deep aquifer is approximately 200 feet bgs, with sand coarsening to gravel to a depth of 400 feet bgs (Anchor QEA 2014). The deep aquifer is a source of drinking water in the study area. Recharge to the deep aquifer in the project area is expected to be driven primarily by deeper aquifers below the Columbia River and insignificantly from shallow, unconfined aquifers (Anchor QEA 2014). Discharge from the deep aquifer is from seepage back to the Columbia River, direct discharge to the shallow aquifer, and pumpage from wells (URS Corporation 2014a).

Mint Farm Regional Water Treatment Plant

The Mint Farm Regional Water Treatment Plant is approximately 6,000 feet east of the eastern boundary of the project area. While the direct impacts study area does not extend to the Mint Farm Regional Water Treatment Plant, the indirect impacts study area includes the treatment plant, and both the direct and indirect impacts study areas include the treatment plant's Wellhead Protection Area (i.e., the 5-year Wellhead Protection Plan Source Area); thus, the Mint Farm Regional Water Treatment Plant is considered. The wellhead protection area is based on the extent of the Columbia River recharge of the deep aquifer flows according to the hydrological investigations performed for the Mint Farm Regional Treatment Plant. The treatment plant consists of four 4,000-gallons-per-minute (gpm) groundwater wells and supplies the City of Longview and the Beacon Hill Water and Sewer District with municipal water. The plant draws from the deep aquifer, recharged by the Columbia River. Kennedy/Jenks Consultants (2010) completed a water quality and environmental risk assessment as part of the preliminary design report for the Mint Farm Regional Water Treatment Plant. The risk assessment included sampling and water quality analysis of the groundwater from the deeper aquifer of six wells. This study found no chemicals in the groundwater above human health screening levels. Kennedy/Jenks Consultants (2012) repeated the water quality analysis from the same wells in November 2012 and found manganese and iron at levels above the Washington State Department of Health secondary water quality standards and arsenic in one of the wells but at levels below thresholds established by the U.S. Environmental Protection Agency (EPA) for drinking water quality standards. Groundwater gradients and monitoring well locations at the Mint Farm Regional Water Treatment Plant are shown in Figures 4.4-2 and 4.4-3.

4.4.4.2 Surface Water Interaction with Groundwater

This section addresses how and where surface water interacts with groundwater in the study areas.

Columbia River

The Columbia River flows along the entire south/southwest boundary of the project area. Tidal influences on groundwater tend to propagate farthest in the coarse-grained deep aquifer and, to a much lesser degree, in the shallow aquifer (Anchor QEA 2014).

Consolidated Dike Improvement District #1 Ditch System

The CDID #1 system was developed to control local flooding and depress the groundwater elevation in lower elevation areas (including the project area) near the Columbia River. Specifically, the system was designed to protect life, property, and environment from external flooding and internal flooding (flooding due to storm runoff from lands adjacent to and inside the levee system). Water levels in the CDID #1 ditches are maintained below the water surface elevation of the Columbia River, which influences groundwater flow direction in the shallow aquifer. At the project area this results in a flow of shallow groundwater away from the Columbia River (to the north, east, and west) (Figure 4.4-4) and toward the CDID #1 ditches (Anchor QEA 2014), except for one localized area: groundwater flow south of the axis of the Columbia River levee is toward the Columbia River (Anchor Environmental 2007). Groundwater that discharges into the CDID #1 ditches and stormwater that is collected in the CDID #1 ditches are actively pumped by the CDID #1 system to the Columbia River through a network of pump stations and valves to maintain water levels below the level of the Columbia River.

Figure 4.4-2. Shallow Aquifer Groundwater Gradients and Monitoring Well Locations

Figure 4.4-3. Deep Aquifer Groundwater Gradients and Monitoring Well Locations

Figure 4.4-4. Groundwater Gradients and Flow Direction

SOURCE: Drawing prepared from Alta Survey dated November 11, 2010. Aerial image from November, 2010.
VERTICAL DATUM: NAVD88, Feet.

NOTE:
1. All elevations were measured in October 2011.
2. Groundwater and surface water elevation measurements collected between 0936 and 1448 on October 22, 2011.
3. Groundwater collected by measuring from point of known elevation (top of casing) to the water surface with an electronic depth-to-water indicator.
4. Surface water collected by measuring from point of known elevation to the water surface with an electronic depth-to-water indicator.

Source: Anchor Environmental 2007

LEGEND:
- Applicant's Leased Area
- Approximate Ordinary High Water Line
- CDID UP△ Surface Water Measurement
- Groundwater Flow Direction
- Groundwater Elevation Contour in Feet
- 4.14 Groundwater or Surface Water Elevation (NAVD88)
- G2S ⊕ Shallow Groundwater Well
- RL-1D ⊠ Deeper Groundwater Well
- R-1S/R-1D ⊠ Paired Shallow/Deeper Groundwater Well

0 500
Feet

Some groundwater from the deep aquifer may be discharged into the CDID #1 ditches because an upward vertical gradient also exists in areas near the ditches, causing groundwater in the deep aquifer to move upward into the shallow aquifer (Anchor Environmental 2007).

Drainage Basins and Stormwater System

The on-site drainage system collects, treats, and discharges stormwater under the Applicant's Individual Industrial NDPES Permit WA-000008-6 for the existing bulk product terminal. Stormwater is collected from 12 drainage basins and is discharged as treated stormwater to CDID #1 ditches and the Columbia River via four outfalls (Section 4.2, *Surface Water and Floodplains,* Figure 4.2-3). A fifth outfall, Outfall 004, has been closed since 1991. The major collection and treatment systems, drainage basins, outfalls, and discharge locations currently managed under the NPDES program are described in more detail in the *SEPA Surface Water and Floodplains Technical Report* (ICF 2017a), and in Section 4.2, *Surface Water and Floodplains*.

4.4.4.3 Groundwater Quality

Local groundwater quality in the study area has no identified pollutant concentrations above human health screening levels for drinking water. Samples taken from the study area identified manganese, iron, and arsenic levels above the Washington State Department of Health secondary water quality standards but at levels below thresholds established by the U.S. Environmental Protection Agency (EPA) for drinking water quality standards. These levels were found to be naturally occurring and are characteristic of the regional water supply aquifer (Anchor QEA 2014a).

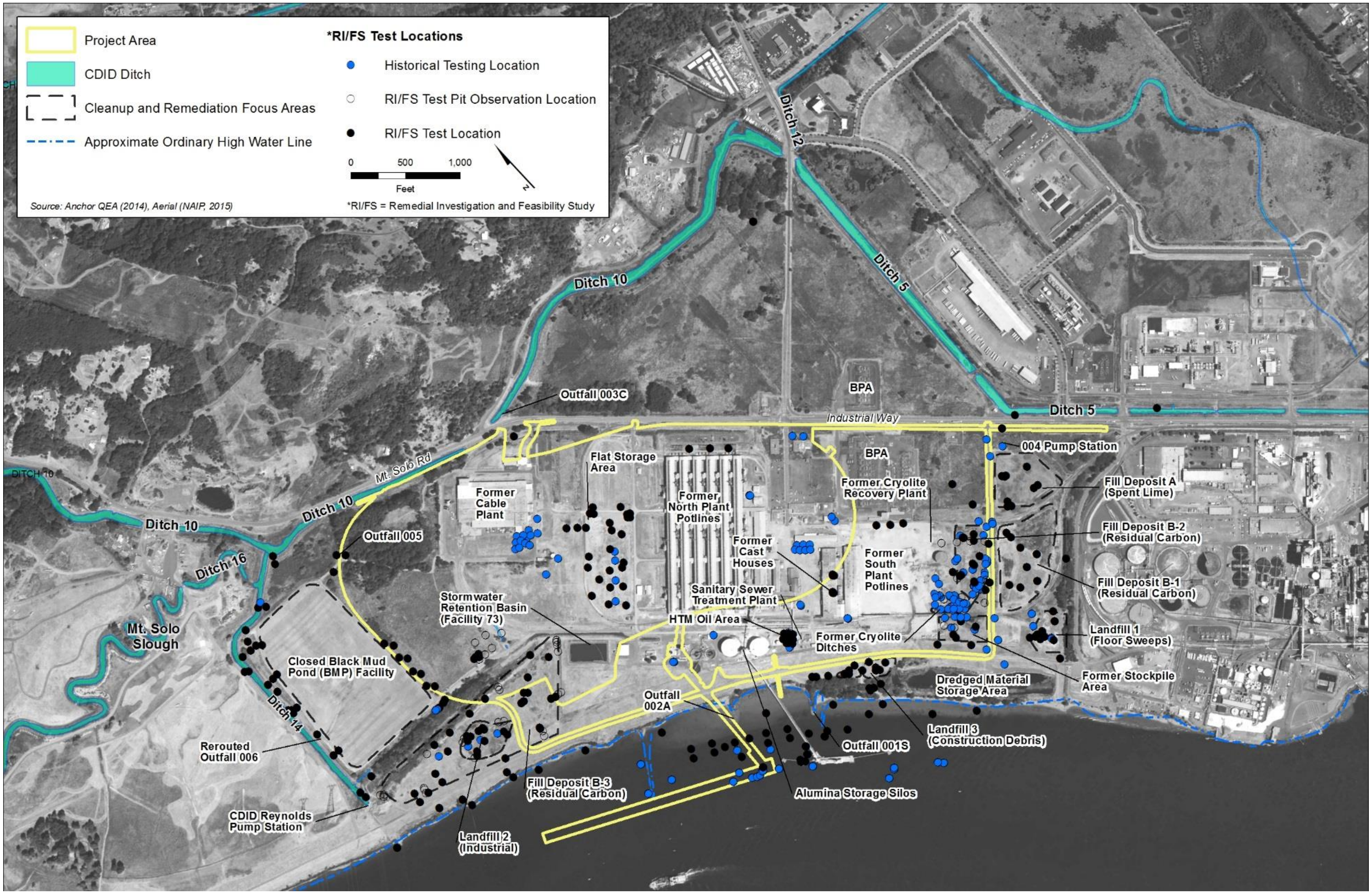
Groundwater Contamination

Historical operations in the study area have included the operation of various facilities, including an aluminum production facility, a cable plant, cryolite recovery, and industrial landfills (Figure 4.4-5).[2] Chapter 3, Section 3.6, *Hazardous Materials*, provides a history of contamination in the study areas. In the project area, groundwater samples show presence of cyanide, fluoride, polycyclic aromatic hydrocarbons, heavy metals and petroleum hydrocarbons.

In January 2015, a remedial investigation/feasibility study (RI/FS) (Anchor QEA 2014) was prepared per the requirements of the Washington State Model Toxics Control Act (MTCA), which is administered by the Washington State Department of Ecology (Ecology). The RI/FS provides a detailed description of cleanup and remedial actions in the study area (Anchor QEA 2014). Figure 4.4-5 shows the locations of previous cleanup and removal activities and remedial investigation focus areas.

[2] Landfills include six areas referred to as Landfills and Fill Deposits that were associated with the operation of the Reynolds aluminum smelter and were used for depositing such things as industrial waste, residual carbon, construction debris, floor sweeps and spent lime. Cleanup of these features is ongoing as a separate project.

Figure 4.4-5. Remedial Investigation Environmental Testing (Geologic, Hydrogeologic, and Geochemical) Locations



Source Areas and Chemicals of Concern (Deep and Shallow Aquifers)

Cyanide

Groundwater cyanide concentrations in the study area are very low and have been decreasing over time. Free cyanide concentrations in all samples taken in the western portion of the study areas were below the groundwater screening level of 0.2 milligram per liter.

Groundwater cyanide concentrations in samples collected in the eastern portion of the study area have also been decreasing over time. One groundwater sample, located near the Former Stockpile Area in the southeast corner of the study area in Figure 4.4-5, exceeded the groundwater Maximum Contaminant Level in 2006, but concentrations decreased significantly by the 2011 and 2012 sampling events. Free cyanide[3] concentrations in most of the eastern portion of the study area were below the groundwater screening level.

Fluoride

Fluoride concentrations in most of the Applicant's leased area are below groundwater screening levels. The exceptions are the shallow groundwater located in or immediately adjacent to Landfills 1 and 2 and fill deposits A, B-1, B-2 and B-3. Surface-water monitoring suggests that the fluoride present in the shallow groundwater is not affecting water quality in the adjacent CDID Ditches 10, 5, or 14 (Anchor QEA 2014).

Carcinogenic Polycyclic Aromatic Hydrocarbons

Carcinogenic polycyclic aromatic hydrocarbon (CPAH) concentrations from the western portion of the Applicant's leased area do not exceed groundwater screening levels. In the eastern portion of the Applicant's leased area, and outside the project area boundaries, CPAH concentrations were below groundwater screening levels in all locations except for wells located immediately within or adjacent to fill deposits. Three localized areas (purple circles on Figure 4.4-6) include wells located immediately adjacent to Landfill 1 and Fill Deposit B-2. CPAH concentrations in wells located farther downgradient were lower than the groundwater screening level and the surface water screening level.

Polychlorinated Biphenyls

No polychlorinated biphenyls (PCBs) were detected in any of the groundwater samples analyzed.

Heavy Metals

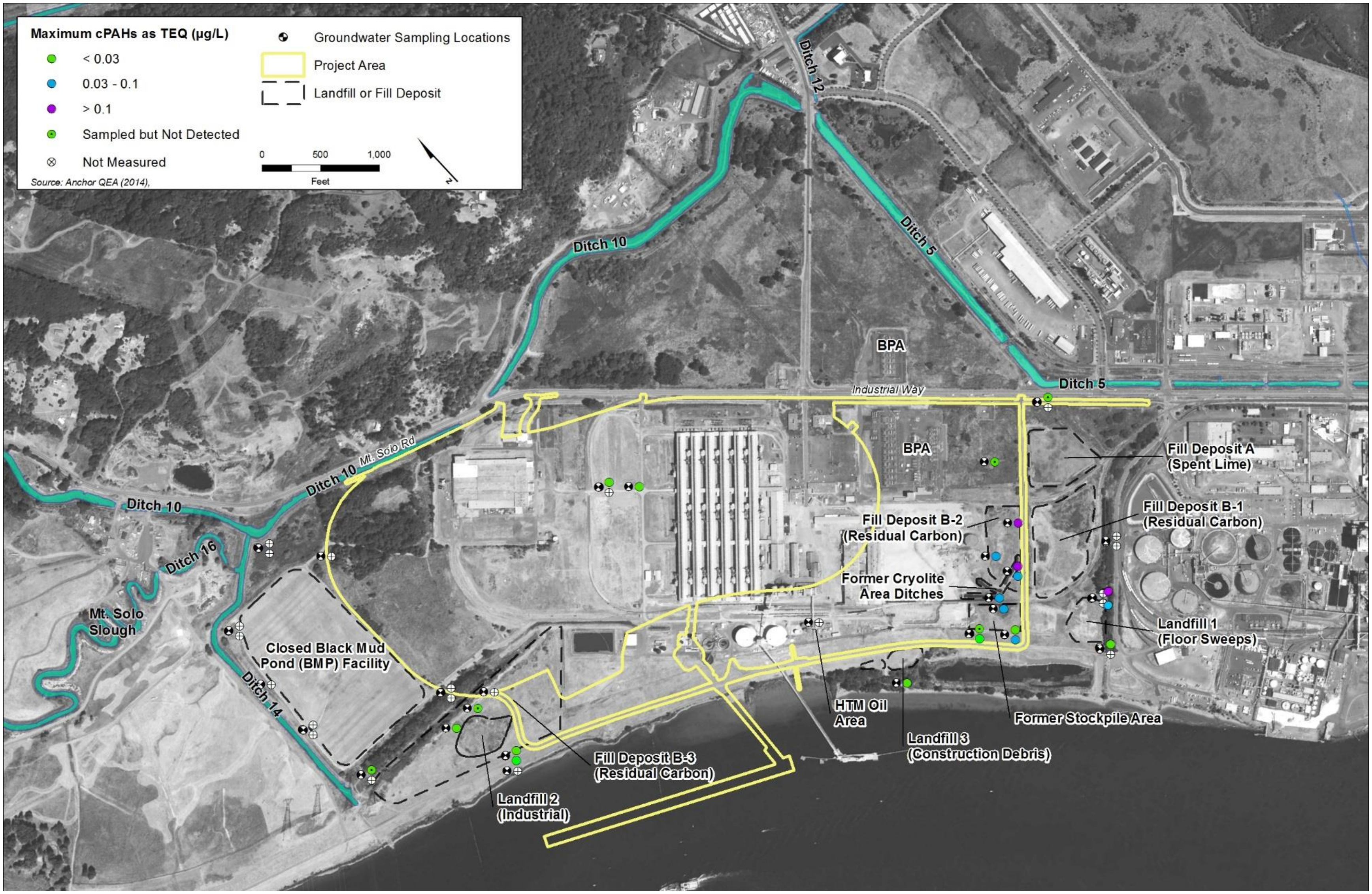
Test findings indicate that groundwater heavy metals concentrations are below applicable screening levels.

Volatile Organic Compounds

No volatile organic compounds were detected in any of the groundwater samples analyzed.

[3] Free cyanide refers to the sum of hydrogen cyanide (HCN) and cyanide ion (CN^-) in a sample. Free cyanide is bioavailable and toxic to organisms in aquatic environments.

Figure 4.4-6. 2007–2012 Groundwater Testing Results (Total CPAHs as Toxic Equivalents)



Total Petroleum Hydrocarbons

The RI/FS testing program included analysis for total petroleum hydrocarbons (TPHs) in the HTM Oil Area (Figure 4.4.-5). All samples collected were below groundwater screening levels.

Distribution of Chemicals of Concern

Fluoride and cyanide levels found in the shallow groundwater within or immediately adjacent to Landfills 1, 2, and 3 have limited mobility and are not affecting downgradient groundwater (Anchor QEA 2014). Groundwater contaminated with fluoride and cyanide could occur during leaching when soils or solid media come into contact with the groundwater. However, the upward hydraulic gradients in the shallow aquifer cause dispersion of fluoride and cyanide and prevent migration into the north-south groundwater flows. This subsequently protects groundwater, surface water, and the Columbia River and limits fluoride and cyanide from traveling to the CDID #1 ditches. Fluoride and cyanide concentrations have been decreasing over time, since the closure of the former Reynolds Metal Company facility (Reynolds facility). It is unlikely that fluoride and cyanide in the study area affect the surrounding groundwater (Anchor QEA 2014).

Final Cleanup Actions

A draft MTCA Cleanup Action Plan for the study area, released in January 2016, describes the proposed cleanup actions that would protect human health and the environment, meet state cleanup standards, and comply with other applicable state and federal laws. Cleanup standards would be consistent with the current and anticipated future land use. Ecology's comment period on the draft MTCA Cleanup Action Plan ended March 18, 2016, and issuance of a final plan is pending. Although a final Cleanup Action Plan has not been determined, this section discusses the site-specific cleanup action requirements applicable to all the cleanup alternatives.

Table 4.4-2 shows the proposed cleanup levels, remediation levels, and conditional points of compliance for groundwater to be implemented as part of the Cleanup Action Plan (Anchor QEA 2014). Cleanup levels were based on MTCA equations or Applicable or Relevant and Appropriate Requirements (ARARs) to protect groundwater resources for the highest beneficial use (i.e., drinking water) (Anchor QEA 2014).

Table 4.4-2. Groundwater Cleanup Standards

Chemical of Potential Concern	Groundwater Cleanup Level	Protection Basis	Point of Compliance
Fluoride (dissolved)	4 mg/L	State Drinking Water MCL	Conditional point of compliance at property line and groundwater-ditch boundary
Free cyanide (dissolved)	200 µg/L	State Drinking Water MCL	Wells adjacent to where remedial action will occur
CPAHs	0.1 µg/L	MTCA Method A Standard Value	
TPH-D	500 µg/L	MTCA Method A Standard Value	
TPH-O	500 µg/L	MTCA Method A Standard Value	

Notes:
Source: Anchor QEA 2014
mg/L = milligrams per liter; MCL = Maximum Contaminant Level; µg/L = micrograms per liter;
CPAHs = carcinogenic polycyclic aromatic hydrocarbons; MTCA = Model Toxics Control Act; TPH-D = total petroleum hydrocarbon – diesel; TPH-O = total petroleum hydrocarbon – oil

4.4.4.4 Water Rights for the Project Area

The project area land owner, Northwest Alloys, holds several historical water rights to extract groundwater from the deep aquifer. The Applicant has a ground lease with Northwest Alloys that includes use of water rights. When issued, the total instantaneous withdrawal volume allowance under these water rights was 23,150 gpm and the total annual withdrawal allowance was 31,367 acre-feet per year (AFY) (Table 4.4-3). It is estimated the Applicant has an existing demand of 1.53 million gallons per day or approximately 1,063 gpm (Chaney pers. comm.). This is within the volume of the water rights that were issued in 1941, 1966, and 1967.[4] However, water rights relinquish back to the State of Washington if water rights are not used for 5 consecutive years without good cause (RCW 90.14.160). If the historical water rights have been relinquished, new water rights would need to be applied for by the Applicant or Northwest Alloys under the normal regulatory process.

[4] The Applicant is responsible for maintaining water rights. The EIS process did not verify whether water rights are current.

Table 4.4-3. Northwest Alloys' Water Rights Claims and Certificates

Record Number	Certificate Number	Withdrawal Instantaneous (gpm)	Withdrawal Annual (AFY)	Priority Date
Claims				
G2-006572CL	-	2,500	2,340	1941
G2-006573CL	-	2,500	2,340	1941
G2-006574CL	-	2,500	1,614	1941
Certificates				
G2-*02244CWRIS	01571	2,500	4,033	1966
G2-*08309CWRIS	06184	2,500	4,000	1966
G2-*08310CWRIS	06185	2,500	4,000	1966
G2-*08367CWRIS	06186	3,000	4,800	1966
G2-*08368CWRIS	06187	3,000	4,800	1966
G2-*09127CWRIS	06427	2,150	3,440	1967
Total		**23,150**	**31,367**	

Notes:
Source: URS Corporation 2014b.
gpm = gallons per minute; AFY = acre-feet per year

4.4.5 Impacts

This section describes the potential direct and indirect impacts related to groundwater that would result from construction and operation of the Proposed Action and the No-Action Alternative.[5]

4.4.5.1 Proposed Action

This section describes the potential impacts that could occur in the study areas as a result of construction and operation of the Proposed Action. All wastewater and stormwater generated in the project area and potentially discharged from the project area after treatment would be evaluated and characterized by the state. Once the water to be discharged has been accurately evaluated and characterized by the state, the specific standards for water discharged from the project area are then defined and the type of NPDES permit would be determined and issued.

Construction site preparation activities would involve preloading and installation of vertical wick drains to aid in the consolidation of low consistency silt and low-density sand (i.e., unconsolidated materials). Wick drains would direct groundwater from the shallow aquifer upward toward the surface during preloading, where it would discharge. Water discharged from the wick drains would be captured, tested for contaminants, and treated prior to discharge to any surface waters.

Process water supply for construction and operation of the Proposed Action would come from two sources: the on-site water management system during the wet season, and onsite groundwater wells during the dry season. Process water uses on the project area would include dust control, equipment

[5] Acreages presented in the impacts analysis were calculated using Geographic Information System (GIS), thus, specific acreage of impacts are an estimate of area based on the best available information.

washdown, and cleanup. Water for dust suppression would be applied on the main stockpiles, within unloading and conveying systems, and at the docks.

Construction activities that could impact groundwater include the following.

- Disturbance of surface soils during construction
- Release of hazardous and non-hazardous materials during construction
- Disturbance of previously contaminated sites
- Use of groundwater for dust control

Operational activities that could affect groundwater include the following.

- Alteration of surface runoff patterns
- Use of groundwater for dust control, equipment washdown, and cleanup

Construction—Direct Impacts

Construction-related activities associated with the Proposed Action could result in direct impacts as described below. As explained in Chapter 2, *Project Objectives, Proposed Action*, *and Alternatives,* construction-related activities include demolishing existing structures and preparing the site, constructing the rail loop and dock, and constructing supporting infrastructure (i.e., conveyors and transfer towers).

Affect Groundwater Recharge during Construction

Construction of the Proposed Action would involve preloading and installing vertical wick drains that would direct groundwater from the shallow aquifer upward toward the surface during preloading, where it would discharge. Ground-disturbing activities (excavations, grading, filling, trenching, backfilling, and compaction) could temporarily disrupt the existing drainage and groundwater recharge patterns in the study area. The study area is not considered a major source of groundwater recharge of the deep aquifer. During construction, drainage and groundwater recharge patterns are expected to be similar to those of the existing conditions, with wick drain effluent and runoff directed to collection and treatment facilities and minimal infiltration to groundwater of the deep aquifer. Therefore, construction of the Proposed Action would not be expected to have a measurable impact on groundwater recharge patterns of the deep aquifer.

The shallow water aquifer in the project area is only minimally recharged by stormwater through surface infiltration due to the low recharge rates of soils in the study area (URS Corporation 2014c). During construction, impervious surfaces would be sloped to convey stormwater to collection sumps on the project area. The collected stormwater would then be conveyed to water collection facilities and discharged through a monitored internal outfall to existing facilities in the project area for treatment prior to discharge to the Columbia River (Outfall 002A). Therefore, construction of the terminal at the project area would be expected to slightly reduce groundwater recharge in the shallow aquifer. For more information on the NPDES Construction Stormwater Permit for the Proposed Action, see Section 4.5, *Water Quality*, and the *SEPA Water Quality Technical Report* (ICF 2017b).

Degrade Groundwater Quality during Construction

Any construction-related contaminant released on the ground could infiltrate and temporarily degrade groundwater quality if the contaminant were to reach groundwater. This would be a concern primarily for the shallow aquifer but not the deep aquifer because there is a confining, impervious soil unit consisting of clay and silt that separates the two aquifer systems, and the deep aquifer is primarily recharged by deeper aquifers below the Columbia River (Anchor QEA 2014) rather than surface infiltration. Poured concrete, cement, mortars, and other cement- or lime-containing construction material could alter the pH of stormwater, which could infiltrate the ground and affect the shallow aquifer water quality. Petro-chemicals could also be released through leaks and spills, which could infiltrate the ground and potentially reach groundwater. However, the likelihood of a large contaminant spill would be low with implementation of the best management practices that would be required as part of the NPDES Construction Stormwater Permit. In addition, cleanup efforts would begin immediately after a contaminant release, to prevent large amounts of contaminant from reaching groundwater and impairing water quality. By using prevention measures and best management practices, construction is not expected to degrade groundwater as a result of a contaminant release and no long-term effects are anticipated. Best management practices would include, but would not be limited to the following.

- **BMP C153.** Material delivery, storage and containment would be used to prevent, reduce, or eliminate the discharge of pollutants to the stormwater system or watercourses from material delivery and storage.
- **BMP C154**. A concrete washout area would be constructed near the entrance to the project area to prevent or reduce the discharge of pollutants to groundwater or stormwater from concrete waste.

Site preparation activities would involve preloading and installation of vertical wick drains to aid in the consolidation of low consistency silt and low-density sand (i.e., unconsolidated materials). Wick drains would direct groundwater from the shallow aquifer upward toward the surface during preloading, where it would discharge. These activities could take place adjacent to areas where known groundwater contamination exists, and the contaminated groundwater could penetrate these areas. However, the permeability of the soil materials affected by preloading would be relatively low, and thus, would not be particularly susceptible to the infiltration of contaminated groundwater. Water discharged from the wick drains would be captured, tested for contaminants, and properly managed, and, if allowable, it would be treated prior to discharge to any surface waters. By adhering to best management practices, construction is not expected to degrade groundwater as a result of preloading and vertical wick drains and no long-term effects are anticipated.

Construction of the Proposed Action could encounter previously contaminated areas currently identified in the MTCA Cleanup Action Plan, which could degrade groundwater quality. However, with the exception of two small areas—the eastern corner of the Flat Storage Area and the northeastern portion of Fill Deposit B-3 (Figure 4.4-5)—cleanup actions are not recommended in the draft Cleanup Action Plan within the project area. For the Flat Storage Area and Fill Deposit B-3, construction and remediation activities would be coordinated to prevent spread of contamination or environmental impacts. Fluoride and cyanide levels found in shallow groundwater have limited mobility and do not affect downgradient groundwater or surface water quality. Therefore, construction of the Proposed Action is not expected to degrade groundwater as a result of disturbing previously contaminated areas.

Construction of the Proposed Action would be unlikely to affect the wellfield at the Mint Farm Industrial Park, which is located upgradient and approximately 1.14 miles (6,000 feet) away from the project area. However, the project area is in Zone 2 of the Mint Farm Industrial Park's wellhead protection and sanitary control areas (Figure 4.4-7).[6] The wellfield draws water from the deep aquifer, which is protected by a confining, impervious soil unit consisting of clay and silt that separates the two aquifer systems, and the deep aquifer is primarily recharged by deeper aquifers below the Columbia River. So it would be unlikely that contaminants from a spill would reach the groundwater withdrawn by the wellfield.

Affect Groundwater Supply during Construction

Construction of the Proposed Action would require groundwater from on-site wells for dust suppression. The maximum amount of water that would be used for dust suppression is estimated to be 40,000 gallons per day (44.8 AFY). Combined with demand from existing activities in the project area of 1,994 AFY, the total demand for groundwater during construction would be approximately 2,039 AFY. As stated previously, Northwest Alloys holds water rights that originally authorized extraction from on-site wells of approximately 23,150 gpm or 31,367 AFY. The EIS does not verify the amount of Northwest Alloys' water rights; verification will occur outside of the environmental review process. Water demand for construction-related activities and existing operations would together represent approximately 6.5% of the original Northwest Alloys' groundwater extraction rights, which would be an increase of approximately 2% over current groundwater extraction. Therefore, construction of the Proposed Action would have a negligible impact on groundwater supply.

Excavation activities could intersect groundwater in low-lying areas, which could result in temporary fluctuations in shallow groundwater in the immediate area. Dewatering effluent would be pumped to temporary containment tanks for settling, where it would be tested for pollutants before being discharged to receiving waters. If pollutants are encountered during testing, dewatering would be suspended and Ecology would be notified. Contaminated water would be treated before being discharged to receiving waters.

Construction—Indirect Impacts

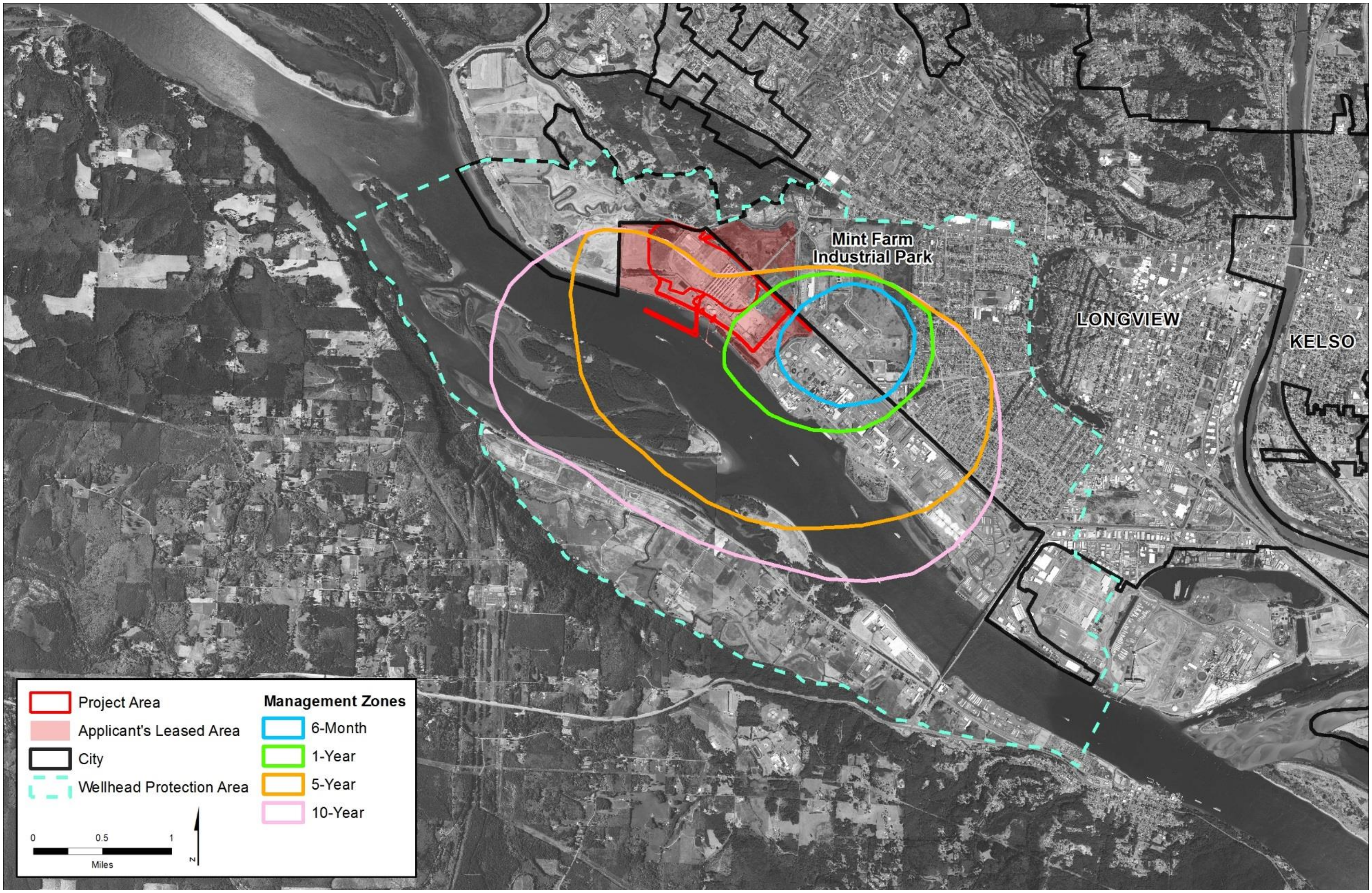
Construction of the Proposed Action would not result in indirect impacts on groundwater because construction would be limited to the project area and would not occur later in time or be farther removed in terms of distance than the direct impacts.

Operations—Direct Impacts

Operation of the Proposed Action would result in the following direct impacts. Operations-related activities are described in Chapter 2, *Project Objectives, Proposed Action, and Alternatives*.

[6] In Washington State, wellhead protection areas are based on horizontal time-of-travel rates for groundwater. Zone 2 areas are based on a 5-year time-of-travel for groundwater.

Figure 4.4-7. City of Longview Wellhead Protection Area



Affect Groundwater Recharge during Operations

Operation of the terminal could permanently reduce infiltration due to soil compaction and new impermeable surfaces, such as coal stockpile pads, roads, or buildings.[7] The project area would occupy some of the existing drainage basins in the project area (Figure 4.2-3), effectively eliminating a portion of the runoff presently handled under the Applicant's existing NPDES Industrial Stormwater Permit.

The Applicant would be required to obtain an NPDES Industrial Stormwater Permit for stormwater collection and discharge. However, the project area is not an important source of groundwater recharge due to relatively impermeable soils (URS Corporation 2014c). In addition, runoff is currently collected in a ditch system and operating the proposed terminal would not substantively change these conditions; the primary source of shallow groundwater recharge in the project area would continue to be the Columbia River, and the direction and volume of groundwater recharge from the Columbia River is expected to be relatively constant. Overall, operation of the terminal under the On-Site Alternative is not expected to substantially change shallow groundwater recharge volumes or patterns in the project area.

Operations would not be expected to measurably affect groundwater recharge for the deeper aquifer because the deep aquifer is primarily recharged by deeper aquifers below the Columbia River (Anchor QEA 2014).

Degrade Groundwater Quality during Operations

Contaminants and coal dust generated during operations could degrade groundwater quality if contaminated runoff were to infiltrate the ground and reach groundwater. However, as described under the previous impact discussion, the project area is not considered a significant source of groundwater recharge through infiltration because of the low recharge rates of the soil characteristics in the study area (URS Corporation 2014c), limiting contaminant movement into the ground. In addition, runoff from the study area, and contaminants within that runoff, would be directed to on-site drainage systems, treated, and possibly reused on site or discharged in accordance with an NPDES Industrial Stormwater Permit for the export terminal. Water reused on site would be brought to Washington State Class A Reclaimed Water standards (URS Corporation 2014c). Excess water not reused on site would be further treated and tested prior to being routed to outfalls regulated by an NPDES Permit and discharged to the Columbia River. Discharge of water to the Columbia River during operation of the Proposed Action would mostly occur during the rainy season from fall through spring when excess surface water would be more likely to be generated on site.

Furthermore, as discussed in Section 4.5, *Water Quality*, the following project design and best management practices would be part of the Proposed Action design to maximize the protection of surface-water quality (and thus, groundwater via infiltration).

- Enclosed conveyor galleries (approximately one-third of the conveyors would be enclosed).
- Enclosed rotary unloader building and transfer towers.

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[7] The project area covers 190 acres which is currently mostly developed with impervious surfaces. During operations, all area within the 190 acres is considered impervious for water management.

- Washdown collection sumps for settlement of sediment.
- Regular cleanout and maintenance of washdown collection sumps.
- Containment around refueling, fuel storage, chemicals, and hazardous materials.
- Oil/water separators on drainage systems and vehicle washdown pad.
- Requirement that all employees and contractors receive training, appropriate to their work activities, in the best management practices.
- Design of docks to contain spillage, with rainfall runoff and washdown water contained and pumped to the upland water treatment facilities.
- Design of systems to collect and treat all runoff and washdown water for on-site reuse (dust suppression, washdown water or fire system needs) or discharge off site.

Since water collected during operations would be treated before reuse or discharge to the Columbia River and would be unlikely to infiltrate, groundwater quality would not likely be affected by operation of the Proposed Action.

The potential for coal dust to affect groundwater would be relatively low because of the low permeability of the soils in the study area (URS Corporation 2014c), the propensity for soil to filter out coal dust suspended in water, and treatment of on-site stormwater runoff. It would be unlikely that coal dust would come into contact with groundwater.

The potential for toxic constituents of coal to reach groundwater is also relatively low. Toxic constituents of coal include CPAHs and trace metals, which are present in coal in variable amounts and combinations dependent on the type of coal. The coal type, along with mineral impurities in the coal and environmental conditions determine whether these compounds can be leached from the coal (see Section 4.5, *Water Quality*, for coal constituents of Powder River and Uinta Basin coal). The potential risk for exposure to toxic chemicals contained in coal would be relatively low as these chemicals tend to be bound in the matrix structure and not quickly or easily leached. See Section 4.5, *Water Quality*, and Chapter 5, Section 5.7, *Coal Dust*, for more information.

Operation of the Proposed Action is not expected to encounter or disturb previously contaminated areas being addressed by the MTCA Cleanup Action Plan. If contaminated areas are encountered, remediation activities would be carried out in accordance with relevant regulations and coordinated to avoid exposure to the environment.

Overall, operation of the proposed coal export terminal is not expected to degrade groundwater quality due to the low recharge rates of soil in the project area. Surface runoff treatment would minimize any infiltration of contaminant-laden runoff into the ground.

Affect Groundwater Supply during Operations

Process water, i.e., water that would be used during operations for dust control, and equipment washdown would be supplied from two sources: the on-site water management system during the wet season and on-site groundwater wells during the dry season.

The on-site water management system would provide process water in the following ways.

- Stormwater and surface water (washdown water) would be collected from the stockpile areas, rail loop, office areas, docks, and other paved surfaces in the project area and directed to a series of vegetated ditches and ponds, then to a collection basin or sump.
- The collected water would be pumped to an onsite treatment facility consisting of retention pond(s) with flocculent added to promote settling as required.
- The water would then be pumped to a surface storage pond. The surface storage pond would have an approximate capacity of 3.6 million gallons (MG), including a reserve of 0.36 MG for fire suppression.

Approximately 1,200 gpm during the wet season and 2,000 gpm during the dry season (approximately 2,034 AFY) would normally be required for dust suppression. On-site groundwater wells would provide approximately 635 gpm (1,025 AFY) to maintain minimum water levels in the storage pond to meet process water demands during the dry season. Water from the storage pond could also be used for the fire hydrant, sprinklers and deluge systems, watering of landscaping and other non-recyclable uses. Northwest Alloys holds water rights that originally authorized extraction of 23,150 gpm up to a total volume of 31,367 AFY. The EIS does not verify the amount of Northwest Alloys' water rights; verification will occur outside of the environmental review process. Combined with the groundwater demand from existing activities in the study area (approximately 1,994 AFY), operation of the Proposed Action would require approximately 3,019 AFY, an increase of approximately 51% over existing groundwater demands. The total demand accounts for less than 10% of the maximum pumping limit allowed under original water rights. Therefore, operation of the Proposed Action would have a negligible impact on groundwater supply. The Applicant would ensure that water rights are current before withdrawing any water for construction or operations; water rights would be maintained for ongoing groundwater use during operation of the Proposed Action. If stormwater is collected and used for a beneficial use, a Water Right Permit would be required in accordance with Chapter 90.03 RCW.

Operations—Indirect Impacts

Operation of the Proposed Action would result in the following indirect impacts on groundwater related to facility operations in the direct impacts study area and increased rail traffic (up to 240 unit trains[8] arriving and departing per month) on the BNSF Spur and Reynolds Lead within the direct and indirect impacts study areas. Operations-related activities are described in Chapter 2, *Project Objectives, Proposed Action*, *and Alternatives*.

Degrade Groundwater Quality during Operations

The Proposed Action likely would not affect groundwater at the wellfield at the Mint Farm Industrial Park because the wellfield draws water from the deep aquifer and, as previously mentioned, there is a confining impervious layer of clay and silt separating the two aquifers. Therefore, it would be unlikely contaminants from a spill during operations would reach the groundwater aquifers tapped by the wellfield. The majority of the study area is located in Zone 2

[8] A unit train is a train in which all cars carry the same commodity and are shipped from the same origin to the same destination. Proposed Action-related unit trains would consist of approximately 125 rail cars and three locomotives.

of the Mint Farm Industrial Park's wellhead protection and sanitary control areas (Figure 4.4-7). Although it would be highly unlikely a contaminant would reach the deep aquifer, should a spill or contaminant release occur during operations, cleanup would occur rapidly. In addition, surface water generated within the study area would be collected and reused on site or treated before being discharged to the Columbia River, further minimizing the potential for contaminants to infiltrate the ground.

Degrade Groundwater Quality as a Result of a Train Collision or Derailment

Spills of fuel or other potentially hazardous materials could occur along the rail spur if rail cars were to collide and/or derail within the study area. Materials released onto the ground as a result of a fuel spill could degrade groundwater quality. As discussed in Chapter 3, Section 3.6, *Hazardous Materials*, if a release of hazardous materials or fuel spill occurred, the rail operator would implement emergency response and cleanup actions as required by Occupational Safety and Health Administration rules (29 Code of Federal Regulations [CFR] 1910.120), the Washington State Oil and Hazardous Substance Spill Prevention and Response regulations (Revised Code of Washington [RCW] 90.56), and/or the Model Toxic Control Act Cleanup Regulations (Chapter 173-340 Washington Administrative Code [WAC]). In addition, Federal Railroad Administration accident reporting requirements (49 CFR 225) include measures to prevent a spill of fuel or other potentially hazardous material from affecting groundwater quality through quick response, containment and cleanup. A spill or release of hazardous materials or fuels would not be expected to affect groundwater.

4.4.5.2 No-Action Alternative

Under the No-Action Alternative, the Applicant would not construct the coal export terminal and would continue with current operations in the project area. The project area could be developed for other industrial uses including an expanded bulk product terminal or other industrial uses that would not require a permit from the U.S. Army Corps of Engineers (Corps) (i.e., would not affect waters of the United States). Because existing industrial import and export activities would be expanded, potential impacts on water quality of groundwater would be similar to those described for the Proposed Action regarding potential oils and grease spills from equipment or other raw materials shipped from the coal export terminal. An NPDES Industrial Stormwater Permit would be required to regulate stormwater discharges to the Columbia River, which would maintain water quality of groundwater.

Any new or expanded industrial uses would trigger a new NPDES or modified permit. Upland buildings could be demolished and replaced for new industrial uses. Ground disturbance would not result in any impacts on waters of the United States and would not require a permit from the Corps. Any new impervious surface area would generate stormwater, but all stormwater would be collected and treated to meet state and federal water quality requirements prior to discharge to the Columbia River. Groundwater recharge in the study area is primarily from the Columbia River, thus maintaining water quality in the Columbia River would be expected to maintain water quality of groundwater within the study area.

4.4.6 Required Permits

The following required permits would be required for groundwater.

- **Cowlitz County Critical Areas Permit—Cowlitz County**. The Cowlitz County Critical Areas permit would be needed to address compliance with the County's Critical Areas Ordinance related to the presence and protection of Critical Aquifer Recharge Areas located on site.
- **Clean Water Act Section 401 Water Quality Certification—Washington State Department of Ecology.** This certification would be required to ensure impacts from construction and operation of the Proposed Action to groundwater quality would not violate state water quality standards.
- **National Pollution Discharge Elimination System Construction Stormwater Permit—Washington State Department of Ecology.** The NPDES Construction Stormwater Permit would be required for stormwater discharges during construction of the Proposed Action. All wastewater and stormwater generated in the project area and potentially discharged from the project area after treatment would be evaluated and characterized by the state. Once the water to be discharged has been accurately evaluated and characterized by the state, the specific standards for water discharged from the project area would be defined and the type of NPDES permit would be determined and issued.
- **National Pollution Discharge Elimination System Industrial Stormwater Permit—Washington State Department of Ecology**. The NPDES Industrial Stormwater Permit would be required for stormwater discharges related to operation of the Proposed Action. All wastewater and stormwater generated in the project area and potentially discharged from the project area after treatment would be evaluated and characterized by the state. Once the water to be discharged has been accurately evaluated and characterized by the state, the specific standards for water discharged from the project area would be defined and the type of NPDES permit would be determined and issued.
- **Water Rights—Washington State Department of Ecology.** The Applicant will need to ensure the original water rights are valid and in good standing prior to using those rights. If the water rights are valid, it is the Applicant's or Northwest Alloys' responsibility to maintain those water rights in good standing. If these water rights are partially or fully relinquished, the Applicant must apply for and obtain the necessary water rights to legally put water to beneficial use at the project site. If stormwater is collected and reused for a beneficial use, a Water Right Permit would be required in accordance with Chapter 90.03 RCW.

4.4.7 Proposed Mitigation Measures

This section describes the proposed mitigation measures that would reduce impacts related to groundwater from construction and operation of the Proposed Action. These mitigation measures would be implemented in addition to project design measures, best management practices, and compliance with environmental permits, plans, and authorizations that are assumed as part of the Proposed Action.

4.4.7.1 Applicant Mitigation

The Applicant will implement the following measure to mitigate impacts on groundwater.

MM WQ-1. Locate Spill Kits Near Main Construction and Operation Areas

The Applicant will locate spill response kits throughout the project area during construction and operations. The spill response kits will contain response equipment and personal protective equipment appropriate for hazardous materials that will be stored and used during construction and operations. Site personnel will be trained in the storage, inventory, and deployment of items in the spill response kits. Spill response kits will be checked a minimum of four times per year to ensure proper-functioning condition, and will otherwise be maintained and replaced per manufacturer recommendations. Should a spill response kit be deployed, the Applicant will notify Cowlitz County and Ecology immediately. The Applicant will submit a map indicating the types and locations of spill response kits to Cowlitz County and Ecology for approval prior to beginning construction and operations.

4.4.8 Unavoidable and Significant Adverse Environmental Impacts

Compliance with laws and implementation of mitigation measures and design features described above would reduce impacts on groundwater. There would be no unavoidable and significant adverse environmental impacts on groundwater.