Millennium Bulk Terminals—Longview NEPA Environmental Impact Statement

NEPA Groundwater Technical Report

Prepared for:

U.S. Army Corps of Engineers, Seattle District
4735 East Marginal Way South
Seattle, WA 98134

Prepared by:

ICF International
710 Second Avenue, Suite 550
Seattle, WA 98104

September 2016

ICF International. 2016. *Millennium Bulk Terminals—Longview, NEPA Environmental Impact Statement, NEPA Groundwater Technical Report*. September. (ICF 00264.13.) Seattle, WA. Prepared for U.S. Army Corps of Engineers, Seattle District.

Contents

Tables

Figures

Acronyms and Abbreviations

AFY	acre-feet per year
Applicant	Millennium Bulk Terminals—Longview, LLC
ARARs	Applicable or Relevant and Appropriate Requirements
BMPs	best management practices
BNSF	BNSF Railway
CDID	Consolidated Diking and Improvement District
CFR	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
cPAH	carcinogenic PAHs
CRB	Columbia River basalt
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
LMC	Longview Municipal Code
LVSW	Longview Switching Company
gpm	gallons per minute
MCL	maximum contaminant level
MTCA	Model Toxics Control Act
NEPA	National Environmental Policy Act
NPDES	National Pollutant Discharge Elimination System
PAH	polycyclic aromatic hydrocarbon
PCBs	polychlorinated biphenyls
Reynolds facility	Reynolds Metals Company facility
RCW	Revised Code of Washington
RI/FS	Remedial Investigation/Feasibility Study
SEPA	Washington State Environmental Policy Act
SPL	spent potliner
TPH	total petroleum hydrocarbons
UP	Union Pacific
USC	United States Code
WAC	Washington Administrative Code
WRIA	Water Resource Inventory Area

Chapter 1
Introduction

This technical report assesses the potential impacts on groundwater associated with the proposed Millennium Bulk Terminals—Longview project (On-Site Alternative), Off-Site Alternative, and No-Action Alternative. For the purposes of this assessment, groundwater refers to subsurface waters held in soils or interstitial spaces of rocks. This report describes the regulatory setting, establishes the method for assessing potential impacts on groundwater, presents the historical and current groundwater conditions in the study areas, and assesses potential impacts.

1.1 Project Description

Millennium Bulk Terminals—Longview, LLC (Applicant) proposes to construct and operate an export terminal in Cowlitz County, Washington, along the Columbia River (Figure 1). The export terminal would receive coal from the Powder River Basin in Montana and Wyoming and the Uinta Basin in Utah and Colorado via rail shipment, then load and transport the coal by ocean-going ships via the Columbia River and Pacific Ocean to overseas markets in Asia. The export terminal would be capable of receiving, stockpiling, blending, and loading coal by conveyor onto ships for export. Construction of the export terminal would begin in 2018. For the purpose of this analysis, it is assumed the export terminal would operate at full capacity by 2028. The following subsections present a summary of the On-Site Alternative, Off-Site Alternative, and No-Action Alternative.

1.1.1 On-Site Alternative

Under the On-Site Alternative, the Applicant would develop an export terminal on 190 acres (project area). The project area is located within an existing 540-acre area currently leased by the Applicant at the former Reynolds Metals Company facility (Reynolds facility), and land currently owned by Bonneville Power Administration. The project area is adjacent to the Columbia River in unincorporated Cowlitz County, Washington near Longview city limits (Figure 2).

The Applicant currently and separately operates at the Reynolds facility, and would continue to separately operate a bulk product terminal on land leased by the Applicant. Industrial Way (State Route 432) provides vehicular access to the Applicant's leased land. The Reynolds Lead and the BNSF Spur rail lines, both operated by Longview Switching Company (LVSW), provide rail access to the Applicant's leased area from the BNSF Railway Company (BNSF) main line (Longview Junction) located to the east in Kelso, Washington. Ships access the Applicant's leased area including the bulk product terminal via the Columbia River and berth at an existing dock (Dock 1) operated by the Applicant in the Columbia River.

Figure 1. Project Vicinity

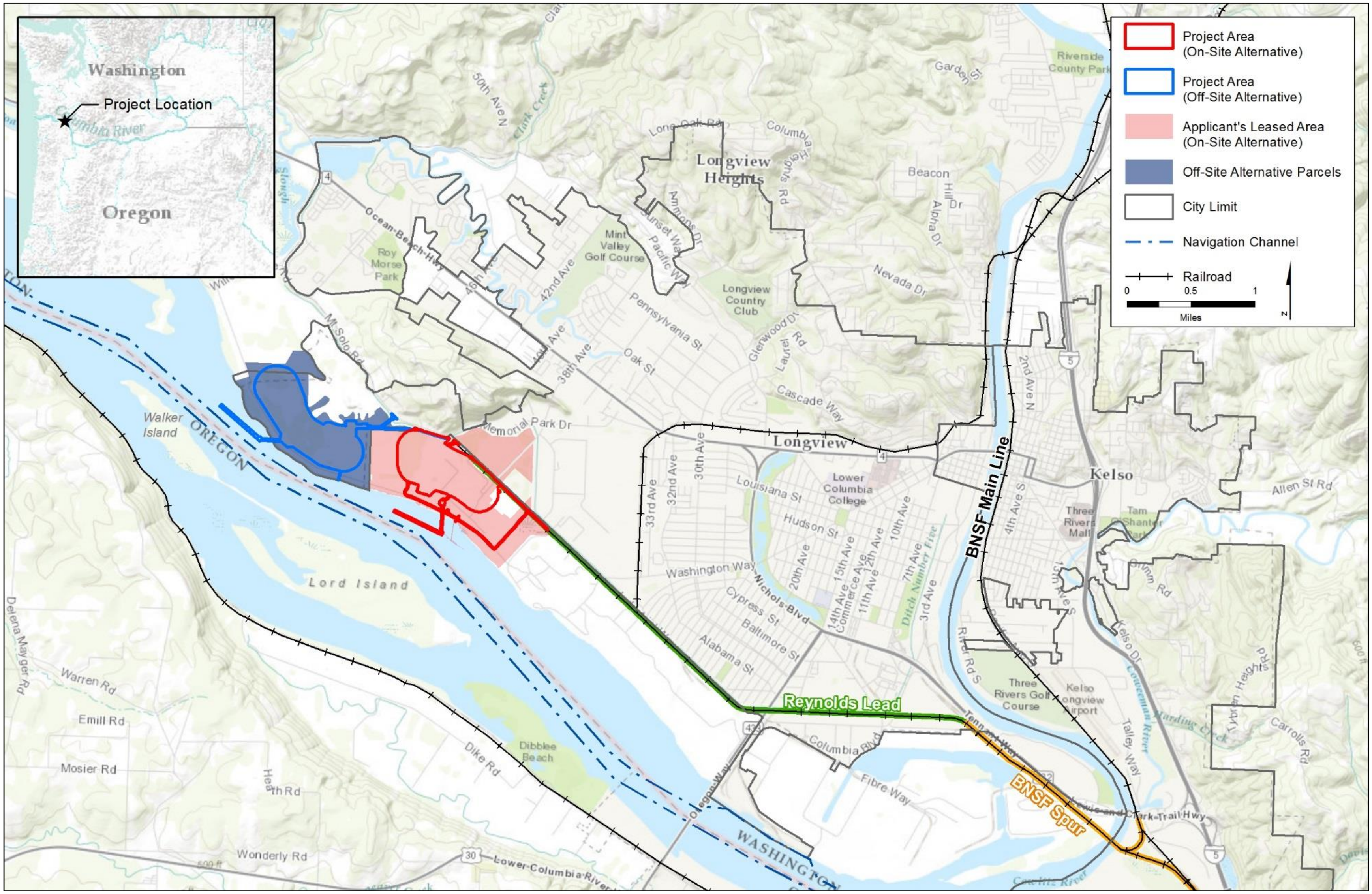
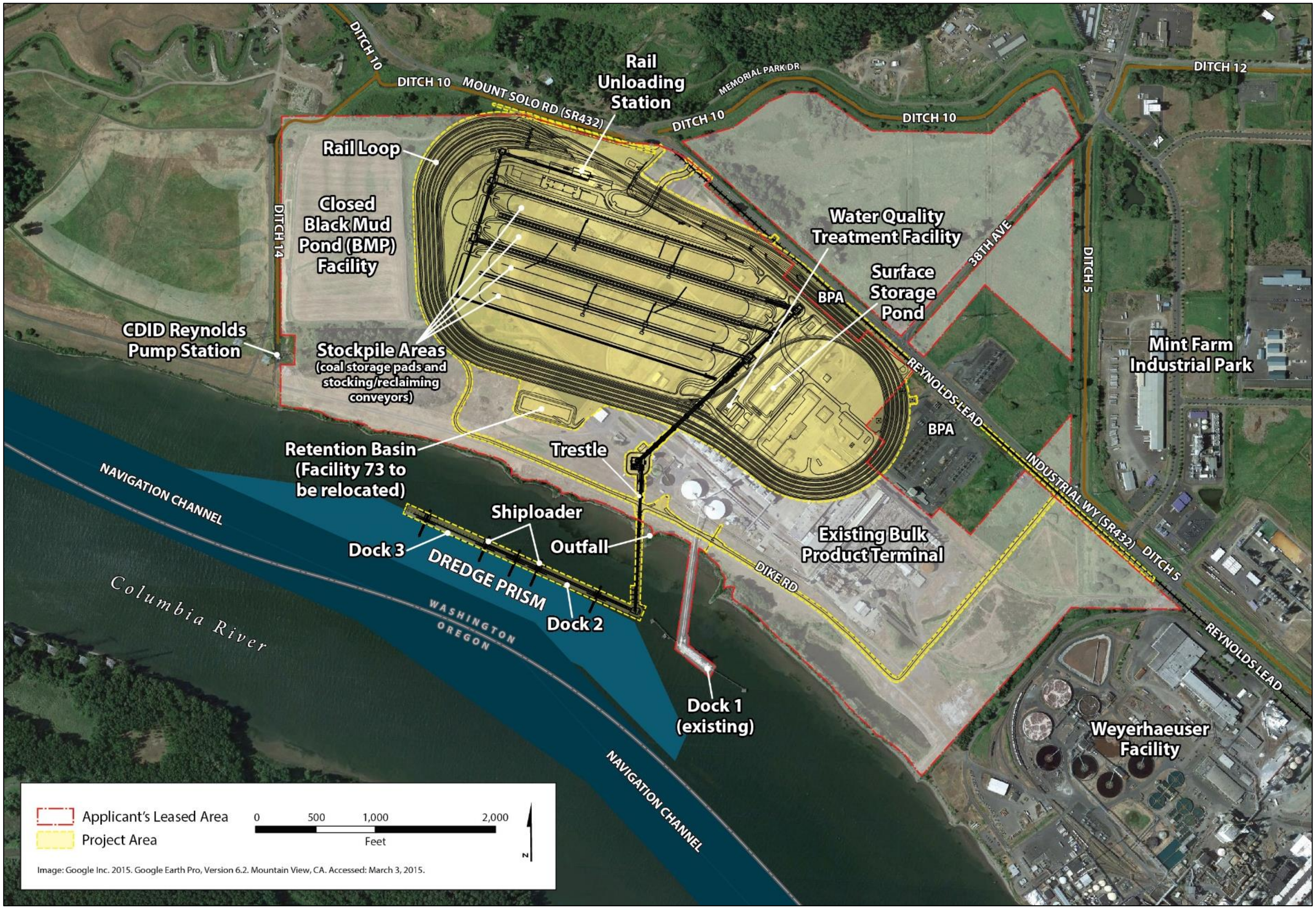


Figure 2. On-Site Alternative



Under the On-Site Alternative, BNSF or Union Pacific Railroad (UP) trains would transport coal in rail cars from the BNSF main line at Longview Junction to the project area via the BNSF Spur and Reynolds Lead. Coal would be unloaded from rail cars, stockpiled and blended, and loaded by conveyor onto ocean-going ships at two new docks (Docks 2 and 3) on the Columbia River for export to Asia.

Once construction is complete, the export terminal would have an annual throughput capacity of up to 44 million metric tons of coal. The export terminal would consist of one operating rail track, eight rail tracks for the storage of rail cars, rail car unloading facilities, stockpile areas for coal storage, conveyor and reclaiming facilities, two new docks in the Columbia River (Docks 2 and 3), and ship-loading facilities on the two docks. Dredging of the Columbia River would be required to provide access to and from the Columbia River navigation channel and for berthing at the two new docks.

Vehicles would access the project area from Industrial Way (State Route 432). Ships would access the project area via the Columbia River and berth at one of the two new docks. Trains would access the export terminal via the BNSF Spur and the Reynolds Lead. Terminal operations would occur 24 hours per day, 7 days per week. The export terminal would be designed for a minimum 30-year period of operation.

1.1.2 Off-Site Alternative

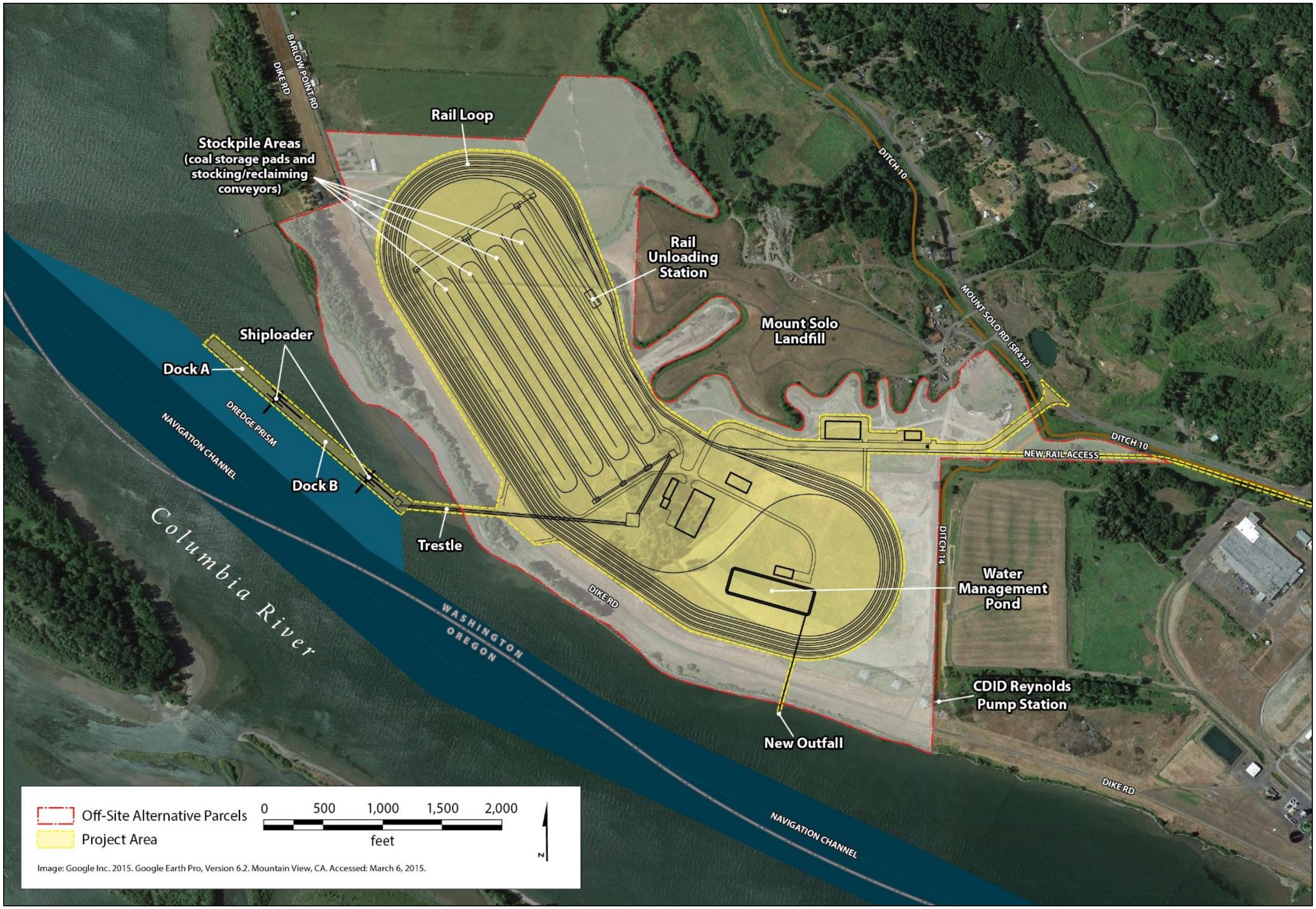
Under the Off-Site Alternative, the export terminal would be developed on an approximately 220-acre site adjacent to the Columbia River, located in both Longview, Washington, and unincorporated Cowlitz County, Washington, in an area commonly referred to as Barlow Point (Figure 3). The project area for the Off Site Alternative is west and downstream of the project area for the On-Site Alternative. Most of the project area for the Off-Site Alternative is located within Longview city limits and owned by the Port of Longview. The remainder of the project area is within unincorporated Cowlitz County and privately owned.

Under the Off-Site Alternative, BNSF or UP trains would transport coal from the BNSF main line at Longview Junction over the BNSF Spur and the Reynolds Lead, which would be extended approximately 2,500 feet to the west. Coal would be unloaded from rail cars, stockpiled and blended, and loaded by conveyor onto ocean-going ships at two new docks (Docks A and B) on the Columbia River. The Off-Site Alternative would serve the same purpose as the On-Site Alternative.

Once construction is complete, the Off-Site Alternative would have an annual throughput capacity of up to 44 million metric tons of coal. The export terminal would consist of the same elements as the On-Site Alternative: one operating rail track, eight rail tracks for the storage of rail cars, rail car unloading facilities, stockpile areas for coal storage, conveyor and reclaiming facilities, two new docks in the Columbia River (Docks A and B), and ship-loading facilities on the two docks. Dredging of the Columbia River would be required to provide access to and from the Columbia River navigation channel and for berthing at the two new docks.

Vehicles would access the project area via a new access road extending from Mount Solo Road (State Route 432) to the project area. Trains would access the terminal via the BNSF Spur and the extended Reynolds Lead. Ships would access the project area via the Columbia River and berth at one of the two new docks. Terminal operations would occur 24 hours per day, 7 days per week. The export terminal would be designed for a minimum 30-year period of operation.

Figure 3. Off-Site Alternative



1.1.3 No-Action Alternative

Under the No-Action Alternative, the U.S. Army Corps of Engineers would not issue the requested Department of the Army permit under the Clean Water Act Section 404 and the Rivers and Harbors Act Section 10. This permit is necessary to allow the Applicant to construct and operate the proposed export terminal.

The Applicant plans to continue operating its existing bulk product terminal located adjacent to the On-Site Alternative project area, as well as expand this business whether or not a Department of the Army permit is issued. Ongoing operations would include storing and transporting alumina and small quantities of coal, and continued use of Dock 1. Maintenance of the existing bulk product terminal would continue, including maintenance dredging at the existing dock every 2 to 3 years. Under the terms of an existing lease, expanded operations could include increased storage and upland transfer of bulk products utilizing new and existing buildings. The Applicant would likely undertake demolition, construction, and other related activities to develop expanded bulk product terminal facilities.

In addition to the current and planned activities, if the requested permit is not issued, the Applicant would intend to expand its bulk product terminal business onto areas that would have been subject to construction and operation of the proposed export terminal. In 2014, the Applicant described a future expansion scenario under No-Action Alternative that would involve handling bulk materials already permitted for off-loading at Dock 1. Additional bulk product transfer activities could involve products such as a calcine pet coke, coal tar pitch, cement, fly ash, and sand or gravel. While future expansion of the Applicant's bulk product terminal business might not be limited to this scenario, it was analyzed to help provide context to a No-Action Alternative evaluation and because it is a reasonably foreseeable consequence of a Department of the Army denial.

1.2 Regulatory Setting

Various jurisdictions have responsibility for the protection and regulation of groundwater. These jurisdictions and the regulations, statutes, and guidelines that apply to groundwater are summarized in Table 1.

Table 1. Regulations, Statutes, and Guidelines for Groundwater

Regulation, Statute, Guideline	Description
Federal	
National Environmental Policy Act (42 USC 4321 *et seq.*)	Requires the consideration of potential environmental effects. NEPA implementation procedures are set forth in the President's Council on Environmental Quality's Regulations for Implementing NEPA (49 CFR 1105).
U.S. Army Corps of Engineers NEPA Environmental Regulations (33 CFR 230)	Provides guidance for implementing the procedural provisions of NEPA for the Corps. It supplements CEQ regulations 40 CFR 1500–1508.

Regulation, Statute, Guideline	Description
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 discharging pollutants into waters of the United States. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Surface water in the study area interacts with groundwater.
State	
Washington State Environmental Policy Act (WAC 197-11, RCW 43.21C)	Requires state and local agencies in Washington to identify potential environmental impacts that could result from governmental decisions.
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 (90.02 RCW) to groundwater.
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.
Drinking Water/Source Water Protection (RCW 43.20.050)	Requires 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, watercourses, and other surface and groundwater in the state.
Water Resources Act of 1971 (RCW 90.54)	Sets fundamental policies for the state to insure waters of the state are protected and fully utilized for the greatest benefit.
Washington State Oil and Hazardous Substance Spill Prevention and Response (90.56 RCW)	Requires notification of releases of hazardous substances and establishes procedures for response and cleanup
Model Toxic Control Act Cleanup Regulations (Chapter 173-340 WAC).	Establishes procedures for investigation and site cleanup actions. Requires potentially liable persons to assume responsibility for cleaning up contaminated sites

Regulation, Statute, Guideline	Description
Local	
Cowlitz County SEPA Regulations (CCC Code 19.11)	Provide for the implementation of SEPA in Cowlitz County.
Cowlitz County Critical Areas Ordinance (Cowlitz County Code 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
City of Longview Critical Areas Ordinance (Off-Site Alternative Only) (Longview Municipal Code 17.10)	Identifies resource lands of long-term significance; designates and protects critical resource areas, including wetlands, geologically hazardous areas, critical aquifer recharge areas, fish and wildlife habitat, and frequently flooded areas.

NEPA = National Environmental Policy Act; CFR = Code of Federal Regulations; USC = United States Code; RCW = Revised Code of Washington; SEPA = Washington State Environmental Policy Act; WAC = Washington Administrative Code; EPA = U.S. Environmental Protection Agency; Ecology = Washington State Department of Ecology, LMC = Longview Municipal Code

1.3 Study Area

The study areas for the On-Site Alternative and Off-Site Alternative are described below.

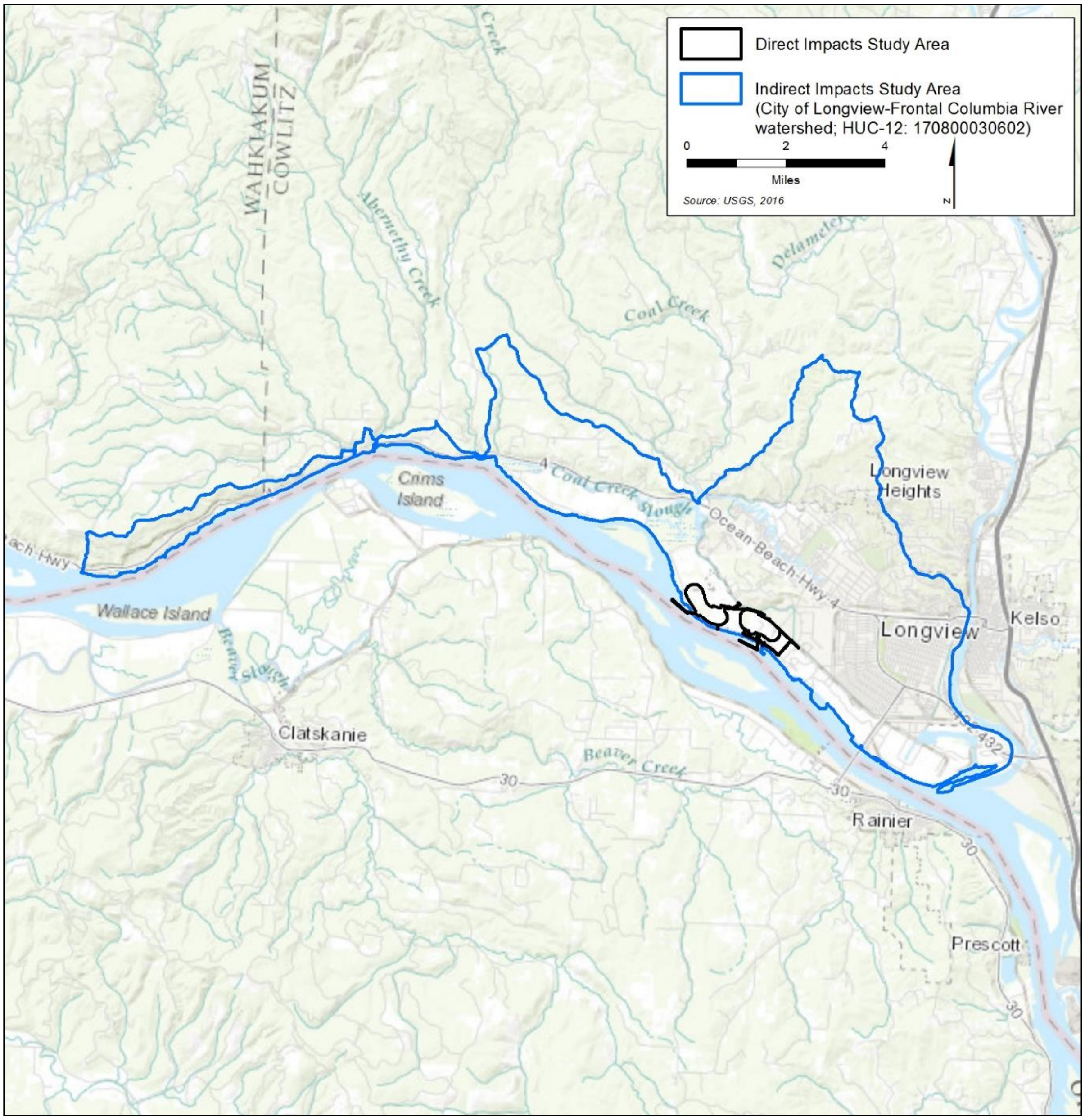
1.3.1 On-Site Alternative

The study area for direct impacts on groundwater is the project area for the On-Site Alternative. The study area for indirect impacts is the City of Longview-Frontal Columbia River (Hydrologic Unit Code [HUC]-12: 170800030602) (Figure 4).

1.3.2 Off-Site Alternative

The study area for direct impacts on groundwater is the project area for the Off-Site Alternative. The study area for indirect impacts City of Longview-Frontal Columbia River (Hydrologic Unit Code [HUC]-12: 170800030602) (Figure 4).

Figure 4. Groundwater Study Areas for the On-Site Alternative and Off-Site Alternative



Chapter 2
Affected Environment

This chapter describes the methods for assessing the affected environment and determining impacts, and the affected environment in the study areas as it pertains to groundwater resources.

2.1 Methods

This section describes the methods used to characterize the affected environment and assess the potential impacts related to hazardous material under the On-Site Alternative, Off-Site Alternative, and No-Action Alternative.

2.1.1 Data Sources

The following sources of information were used to characterize and evaluate groundwater conditions in the study areas.

- *Remedial Investigation Report* (Anchor Environmental, LLC 2007)
- *Former Reynolds Metals Reduction Plant—Longview, Draft Remedial Investigation and Feasibility Study* (Anchor QEA 2014a).
- *Millennium Coal Export Terminal Longview, Washington, Affected Environment Analysis 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)
- *Millennium Coal Export Terminal Longview, Washington, Off-Site Alternative – Barlow Point, Appendix M, Water Resource Report* (URS Corporation 2014e).
- City of Longview, Mint Farm Regional Water Treatment Plant, Preliminary Design Report, Part 2A, Hydrogeologic Characterization, March 2010.)
- Other scientific literature as cited within the text.

2.1.2 Impact Analysis

This impact analysis evaluates the changes the On-Site Alternative, Off-Site Alternative, and No-Action Alternative could have on existing groundwater conditions and how existing groundwater conditions could affect the project areas. Although the indirect impact study area includes the extent of the City of Longview-Frontal Columbia River watershed (Hydrologic Unit Code [HUC]-12: 170800030602), impacts to groundwater were determined to be limited to the project area and along the rail line that accesses the project area within the watershed. For direct impacts, the analysis assumes Best Management Practices (BMPs) were incorporated into the project design, operations of the facility, and during construction.

Potential groundwater impacts have been evaluated with respect to several general parameters, including groundwater discharge and recharge, groundwater quality, and groundwater withdrawal and how the On-Site Alternative, Off-Site Alternative, and No-Action Alternative may affect these parameters. The assessment of impacts is also based on regulatory controls and the assumption the On-Site Alternative or Off-Site Alternative would include the following elements.

On-Site Alternative:

- An individual National Pollutant Discharge Elimination System (NPDES) permit for stormwater discharges during construction and operations.
- Remediation of any existing soil and groundwater contamination in the project 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.

Off-Site Alternative:

- An individual NPDES permit for stormwater discharges for construction and operations (both an NPDES Construction Stormwater General and Industrial Stormwater Permit).

For the purpose of this analysis, construction impacts are based on peak construction period and operations impacts are based on maximum throughput capacity (up to 44 million metric tons per year).

2.2 Affected Environment

The affected environment related to groundwater in the study areas is described below.

Groundwater can be described as water that is collected or flows beneath the Earth's surface, filling the porous spaces in soil, sediment, and rocks. Groundwater largely originates from rain or melting snow and ice, and is the source of water for aquifers, springs, and wells (Washington State Department of Ecology 2014a). An aquifer is the underground soil or rock through which groundwater can easily move. The amount of groundwater able to 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 consisting of gravel, sand, sandstone, or fractured rock such as limestone are made of materials permeable (or porous) and allow water to flow through the formation. Aquifers that contain materials such as clay or shale have many small pores that are not well connected and are considered impermeable with restricted groundwater flow (U.S. Geological Survey 2001). An unconfined aquifer is recharged directly by infiltration of precipitation or surface water (e.g., rivers). Confined aquifers are overlain by low-permeability material that limits the vertical flow of water into or out of the aquifer. Landowners access groundwater from wells that tap into an aquifer. Most groundwater is better protected from quick contamination than surface water, depending on a contaminant's ability to permeate the overlying soils or rock.

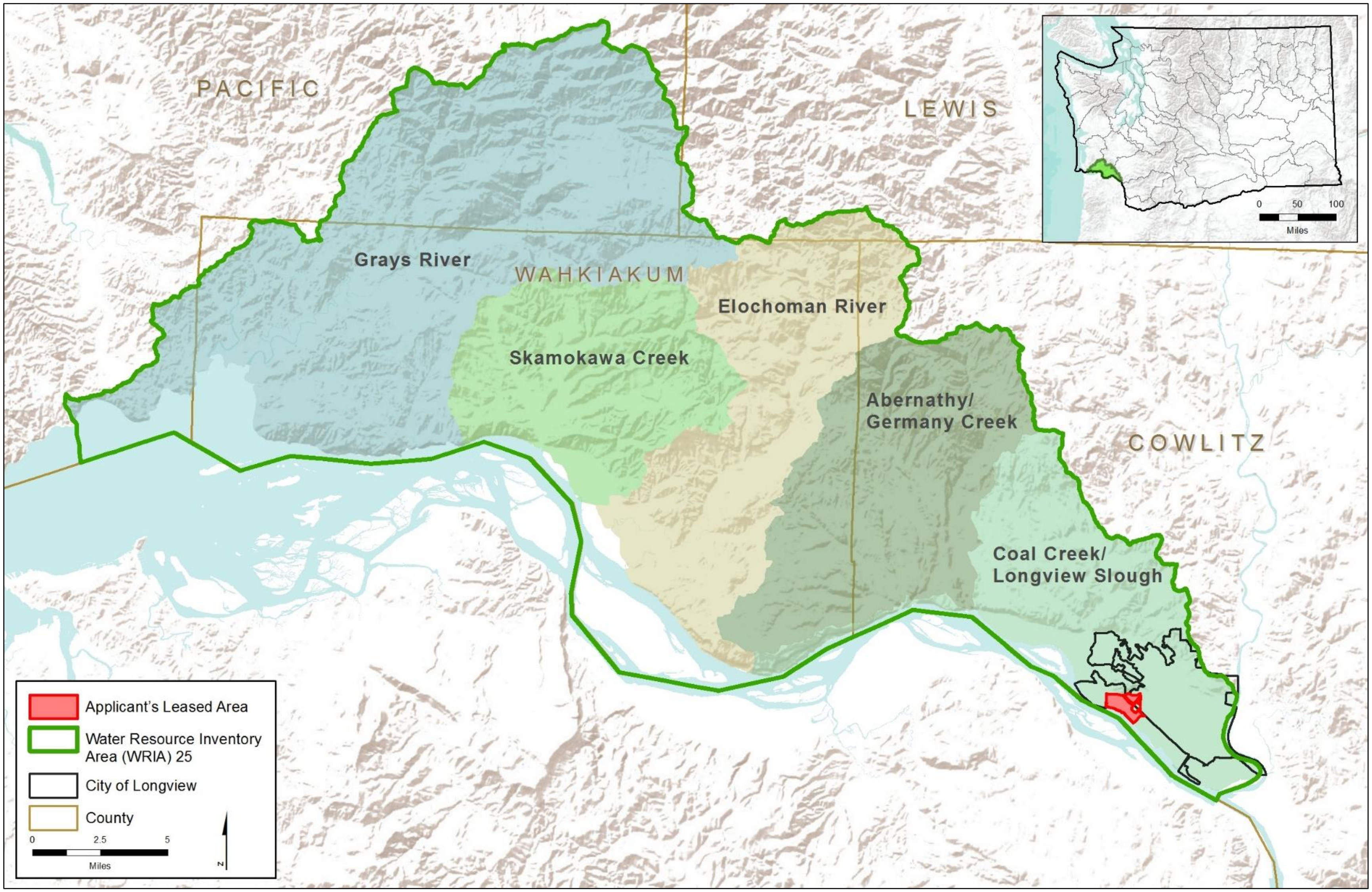
2.2.1 Regional Setting

The project area and Applicant's leased area are within 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 Coal Creek/Longview Slough subbasin. (HDR and EES 2006). Figure 5 depicts the Grays-Elochoman watershed, the five subbasins, and the project areas for the On-Site Alternative and Off-Site Alternative, within the Coal Creek/Longview Slough subbasin.

The principal hydrogeological units that yield the largest quantities of groundwater to wells within WRIA 25 are the unconsolidated sediments (Alluvium Unit) that occur in the valleys of the Cowlitz and Grays river systems and along the Columbia River (HDR and EES 2006). This unit consists of unconsolidated to poorly consolidated Quaternary-age sand, gravel, and silt that form undissected terrace deposits and floodplain deposits within major river and stream valleys. The thickness of this unit is highly variable, commonly ranging from less than 5 feet to more than 100 feet (Lower Columbia Fish Recovery Board 2001).

Other water-bearing units present in this watershed include tertiary continental sedimentary rocks and the Columbia River basalt (CRB) group. The tertiary continental sedimentary rocks are composed of mainly moderately to well indurated fluvial (river/stream deposits) sediments, consisting of sandstone, conglomerates, and siltstones, volcaniclastic sediments, and minor paldual (swamp/marsh) and lacustrine (lake) deposits. The tertiary continental sedimentary rocks occur in the eastern portion of the watershed and can reach more than 2,000 feet thick. The CRB group represents the distal portions of a series of continental flood basalt flows that emanated from linear vent systems in northeastern Oregon, southeastern Washington, and western Idaho between approximately 6 and 17 million years ago. The total thickness of this group is highly variable, ranging from 50 feet to more than 400 feet (Lower Columbia Fish Recovery Board 2001).

Figure 5. Watershed Map



2.2.1.1 Coal Creek/Longview Slough Subbasin

The project areas are within the Coal Creek/Longview Slough subbasin. The principal aquifers mapped in this subbasin are the alluvium and the CRB group. The alluvial aquifer is most extensive in the lower elevations of the subbasin, along streams and their tributaries. The sediments that compose the alluvial aquifer are generally highly permeable. Groundwater in the alluvial aquifer is generally unconfined. Production wells, which produce groundwater for human consumption, are screened in the alluvial aquifer and generally have high yields (to greater than 1,000 gallons per minute [gpm]). The alluvial aquifer is recharged in part by the Columbia and Cowlitz Rivers and tributaries such as Coal Creek (Lower Columbia Fish Recovery Board 2001).

The CRB group is present in the higher elevations of the Coal Creek subbasin. This aquifer is recharged by precipitation, seasonal gains from rivers and streams, and inflow from deeper bedrock aquifers. The number of wells completed in aquifers in the CRB group is unknown; however, groundwater use values presented in the *WRIA 25/26 Grays-Elochoman and Cowlitz Watershed Planning Documents Level 1 Assessment* indicate that significant water withdrawal from the basalt water-bearing zones is not currently occurring. The bulk of the groundwater withdrawal in the Coal Creek/Longview Slough subbasin is currently occurring from the alluvial aquifers where most of the population resides (Lower Columbia Fish Recovery Board 2001).

2.2.2 Local Setting

The project areas for the On-Site Alternative and Off-Site Alternative are located on the northeast shore of the Columbia River. The project areas are situated within the Longivew-Kelso basin, a topographic and structural depression formed by the Cascadia subduction zone (Anchor QEA 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 groundwater) and a deeper confined aquifer from which industries, small farms, and domestic well users withdraw groundwater. Shallow groundwater is present in the upper 25 to 100 feet of alluvium and is in direct hydraulic communication with the Columbia River. Preliminary hydrogeologic investigations conducted for the City of Longview indicate that shallow, unconfined groundwater does not significantly contribute to the deeper aquifer as the lower aquifer is primarily recharged by deeper aquifers below the Columbia River (Anchor QEA 2014b).

2.2.2.1 Shallow Aquifer

Groundwater in the shallow aquifer is found at depths less than 5 feet below the ground surface (bgs) (Anchor QEA 2014b). 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 2014). Groundwater and stormwater discharged to the CDID #1 ditches are actively pumped from the ditches by the CDID #1 to maintain surface-water levels below those in the Columbia River. Water from the CDID #1 ditches is discharged to the Columbia River. Near the project areas, a CDID #1 pump station is located near the southwest corner of the On-Site Alternative Applicant's leased area boundary (Figure 2) (southeast corner of the Off-Site Alternative project area boundary [Figure 3]).

2.2.2.2 Deep Aquifer

The deep aquifer is located at an approximate depth of 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. The City of Longview conducted a pumping test at a production well for the Mint Farm Regional Water Treatment Plant, located approximately 6,000 feet east of the eastern boundary of the On-Site Alternative Applicant's leased area (Figure 2), to characterize the deep aquifer. The test results indicate that the Columbia River recharges the deep aquifer at the Mint Farm site and suggest similar recharge of the deep aquifer in the project areas. Overall, recharge to the deep aquifer in the project areas is expected to be primarily driven by deeper aquifers below the Columbia River and insignificantly from shallow, unconfined aquifers (Anchor QEA 2014b). 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 2014b).

2.2.2.3 Columbia River

The Columbia River flows along the entire south/southwest boundary of both project areas and water levels fluctuate with the tides. The mean annual flow of the Columbia River, measured at the Beaver Army Terminal at river mile 53.8 near Quincy, Oregon, is approximately 236,000 cubic feet per second. The river's annual discharge rate fluctuates with precipitation, snowmelt, and reservoir releases, ranging from 63,600 cubic feet per second in a low water year to 864,000 cubic feet per second in a high water year (U.S. Geological Survey 2014). Tributaries to the Columbia River basin are primarily snow-fed (i.e., precipitation falls mainly as snow). These tributaries typically have low winter flows and strong spring and summer peaks with snowmelt, which concentrates about 60% of the natural runoff to the Columbia River during May, June, and July (URS Corporation 2014b). Tidal influences tend to propagate farthest in the coarse-grained deep aquifer and to a much lesser degree within the shallow aquifer (Anchor QEA 2014a).

2.2.2.4 CDID #1 Ditch System

The CDID #1 is a secondary permittee on the Cowlitz County/Kelso/Longview Municipal NPDES permit. The CDID #1 system is a series of levees and ditches. It consists of approximately 35 miles of drainage ditches for the purpose of flood protection from external flooding (rivers), internal flooding (storm drainage runoff), and flooding from lands adjacent to the levee system (groundwater). Additionally, the U.S. Army Corps of Engineers (Corps) constructed a CDID #1 flood control levee in the 1920s along the Columbia River shoreline at the southern boundary of the On-Site Alternative project area, referred to herein as the Columbia River levee (Figure 2). This levee is part of the larger network of levees designed to protect properties in the Longview area from Columbia River flooding (Anchor QEA 2014a).

The CDID #1 ditch system surrounding the project areas controls flooding and maintains water levels in the CDID #1 ditches below the water surface elevation of the Columbia River, which subsequently influences groundwater flow in the shallow aquifer. The CDID #1 ditch system also discharges to the Columbia River through a network of pump stations and valves. As a result of the CDID #1 ditch system, coupled with the higher water surface elevation of the Columbia River, groundwater flows away from the river (to the north, east, and west) and toward the CDID #1 ditches (Anchor QEA 2014a), except for one localized area: groundwater flow south of the axis of the Columbia River levee is toward the Columbia River (Anchor Environmental 2007). 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 CDID #1 ditches, causing groundwater in the deep aquifer to move upward into the shallow aquifer (Anchor Environmental 2007).

2.2.2.5 Project Area for the On-Site Alternative

As discussed above, the On-Site Alternative project area is located on the northeast shore of the Columbia River. At the project area, groundwater movement in the shallow aquifer is relatively slow. Groundwater in the shallow aquifer flows north from the Columbia River levee then proceeds northwest toward the regional CDID #1 ditch system (Figure 6) (Anchor Environmental 2007). In areas farther from the CDID #1 ditches, shallow groundwater, fed by precipitation, moves downward into the deep aquifer. In areas near the CDID #1 ditch system, groundwater in the deep aquifer moves upward into the shallow aquifer. The levee recharges the shallow groundwater to the north, while the Columbia River recharges the groundwater south of the levee. Discharge of the shallow aquifer occurs from seepage back to the Columbia River, CDID #1 ditch system extraction, evapotranspiration, and pumping from shallow wells (URS Corporation 2014a).

Localized groundwater recharge and quality in the project area are influenced by the Columbia River, the CDID #1 ditch system, and the on-site drainage ditch system in the Applicant’s leased area. The project area is not considered a significant source of groundwater recharge through infiltration due to the hydrology discussed below under *Drainage Basins and Stormwater System*.

Similar to the shallow aquifer, groundwater in the deep aquifer flows from the Columbia River levee northward, then proceeds northwest toward the CDID #1 ditch 14 (Figure 6) (Anchor Environmental 2007). The one exception to this localized flow of deep groundwater away from the Columbia River (at least seasonally) is an area south of the levee where it flows toward the river.

As discussed above, shallow groundwater that is recharged from precipitation moves downward into the deep aquifer if it is not intercepted by the CDID #1 ditches. However, in areas near the CDID #1 ditches an upward vertical gradient exists, 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 ditch system collects all stormwater runoff in the Applicant’s leased area. The system includes 12 drainage basins and five outfalls, which the Applicant manages under the NPDES permit (WA-000008-6) for the existing bulk product terminal. The outfalls discharge treated stormwater to the CDID #1 ditches and the Columbia River. One of the five outfalls, 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 the following sections, based on the *Millennium Coal Export Terminal Longview, Washington Surface Water Memorandum* (URS Corporation 2014c), and shown on Figures 7 and 8.

Figure 6. Groundwater Gradients and Flow Direction for the On-Site Alternative

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

Figure 7. Water Management System in the Project Area for the On-Site Alternative

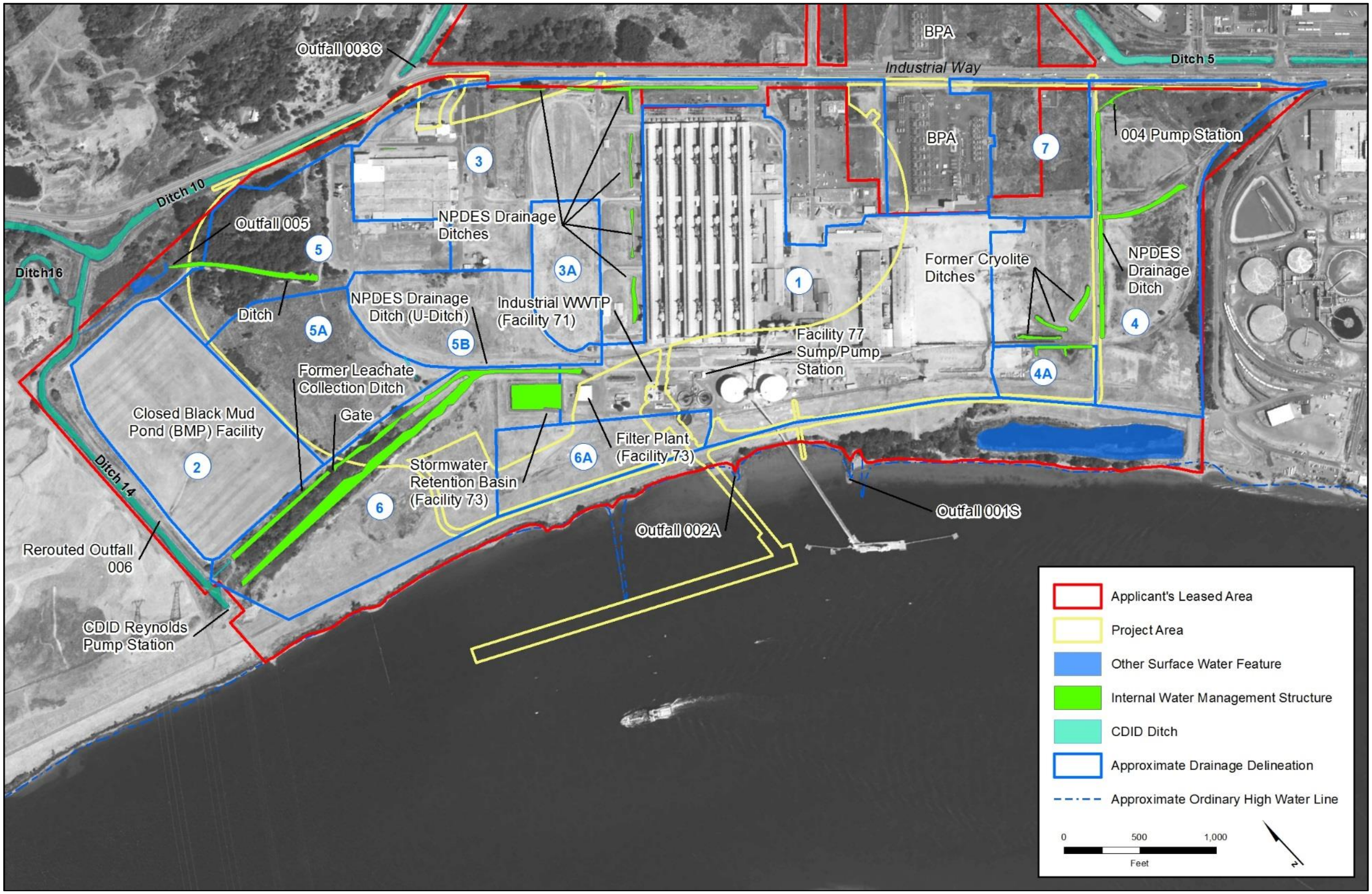
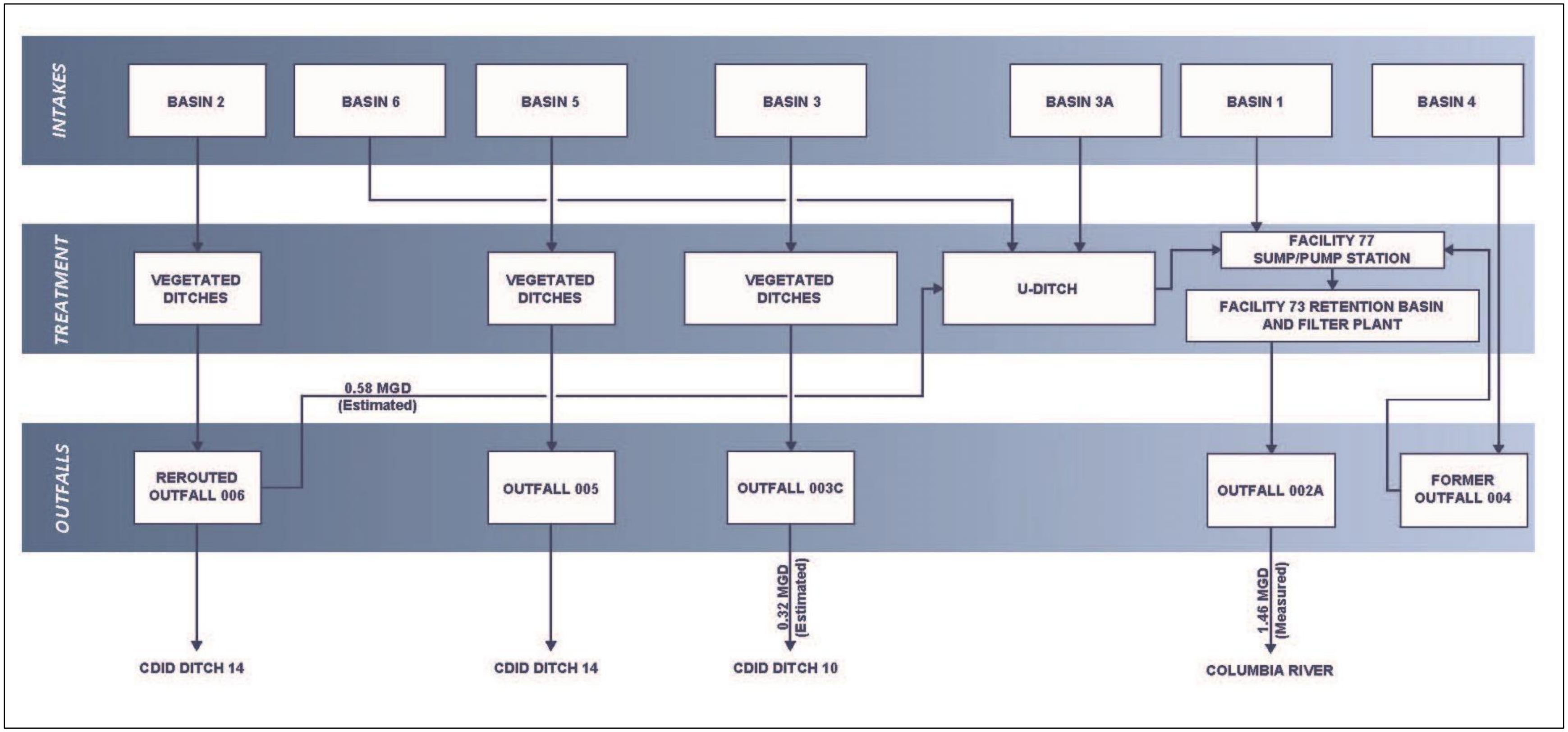


Figure 8. Schematic of Stormwater Flow in the Project Area for the On-Site Alternative



Basins 1 and 3a

Waters collected from Basins 1 and 3a (approximately 89 and 9 acres, respectively) are collected from facility pumps and ditches and directed to the Facility 77 Sump/Pump Station. An average of approximately 99 million gallons per year of stormwater from Basins 1 and 3a is routed into Facility 77, treated through Facility 73, and then pumped through Outfall 002A to the Columbia River.

Basin 2

Basin 2 (approximately 40 acres) collects stormwater runoff from the top of the cap of the closed Black Mud Pond facility into a sump, where it is routed through a pump station to drainage ditches that gravity flow via the U-Ditch into Facility 77. Approximately 17 million gallons per year (97% of the stormwater runoff from Basin 2) are routed into Facility 77. During heavy storm events, stormwater from off the closed Black Mud Pond facility cap may overflow the Outfall 006 Sump/Pump Station (Figure 7) and flow to CDID #1 Ditch 14. No discharge has been observed through Outfall 006 since the sump/pump station was installed in 2012. Waters collected at Facility 77 are directed to Facility 73 for treatment and then discharged to the Columbia River through Outfall 002A.

Basins 3 and 5

Stormwater generated in Basins 3 and 5 (27 acres and 62 acres, respectively) discharge by gravity drainage to the CDID #1 Ditches 10 and 14, respectively. Ditches 10 and 14 are located at the north and west edges of the Applicant's leased area, respectively. An average of approximately 72 million gallons per year of stormwater flows to the CDID #1 ditches from these areas.

Basin 4

Waters collected from the cryolite area ditches (see *Cryolite Area Ditches* below) are directed to a pump and sent to Facility 71 (Industrial Wastewater Treatment Plant) for treatment. Treated water exiting Facility 71 is then discharged through internal Outfall 002B to Facility 77 where it is comingled with other waters and routed to treatment at Facility 73, eventually discharging to the Columbia River via Outfall 002A.

Stormwater runoff generated in Basin 4, other than in the cryolite area ditches, drains to gravity ditches that convey the flows to Pump Station 004, which discharges to Facility 77. An average of approximately 30 million gallons per year of stormwater from Basin 4 is collected and eventually discharges to the Columbia River via Outfall 002A.

Basins 4A, 5A, 5B, 6A, and 7

Stormwater from Basins 4A, 5A, 5B, 6A, and 7 may pond in these areas and then evaporate or infiltrate into the soil. These basins represent a combined area of approximately 71 acres and generate approximately 37 million gallons per year of stormwater.

Basin 6

Minor amounts of stormwater from Basin 6 may pond locally and evaporate or infiltrate into the soil. During storm events, stormwater from Basin 6 (an area of approximately 40 acres), is collected in the U-Ditch and conveyed to the Facility 77 Sump/Pump Station. An average of approximately 21 million gallons per year of stormwater from Basin 6 is conveyed to Facility 77. Process water and stormwater collected at Facility 77 is treated through Facility 73 and then discharges to the Columbia River through Outfall 002A.

Facility 71

Facility 71, installed in 1988, is the site's industrial wastewater treatment system.[1] Treated wastewater from Facility 71 is discharged through Internal Outfall 002B to the Facility 77 Sump/Pump Station and is then comingled with the other waters, treated through Facility 73, and discharged through Outfall OO2A to the Columbia River.

Facility 73 (Stormwater Treatment System)

Facility 73, the stormwater treatment system, is used to achieve water quality standards required by the existing NPDES permit (WA-000008-6). Facility 73 is located in the southwest portion of the Applicant's leased area and consists of a 1.98-million-gallon retention basin (Figure 7), oil and grease removal, multi-media filters, and a discharge pump station (Pump Station C). The retention basin is sized to handle flows up to 6,000 gpm (8.64 million gallons per day). The retention basin is equipped with an oil and grease removal system. Flows exiting the retention basin are discharged through a 20-inch line to Pump Station C. Pump Station C includes three alternating pumps with a combined discharge capacity of 6,000 gpm under peak flow conditions. Pump Station C pumps the water through an 18-inch line where an in-line turbidity monitor located downstream measures the outgoing water's turbidity. If the turbidity reading is below the turbidity set point, the water in the 18-inch line discharges into the 30-inch Outfall 002A line and then to the Columbia River. If the turbidity reading is above the turbidity set point, a solenoid valve routes the water through multimedia filters before tying back into the 18-inch line for discharge to the Outfall 002A line.

Facility 77 (Sump and Pump Station)

Facility 77 is a large central collection sump and pump station that is the primary stormwater discharge point for the majority of all basins within the southern property of the Applicant's leased area (except for Basins 3 and 5). Facility 77 is outfitted with four operating pumps with varying capacities of up to 2,700 gpm each. The pumps at Facility 77 previously discharged directly to the Columbia River through Outfall 002A; however, since the mid-1990s flows collected at Facility 77 are pumped through a 16-inch line to the stormwater treatment system (Facility 73) before being discharged through Outfall 002A.

Outfall 002A

Outfall 002A is a 30-inch outfall to the Columbia River that discharges the water it receives from Facility 73. As described above, treated wastewater from Facility 71 is discharged through Internal Outfall 002B to Facility 77 and is then comingled with the other waters and treated through Facility 73. The average amount of stormwater runoff generated by the basins discharging to Outfall 002A is 166.3 million gallons per year. The combined average flow to the Columbia River through Outfall 002A is 1.46 million gallons per day or 532.9 million gallons per year.

Outfall 003C

Outfall 003C drains through a 2,500-linear foot vegetated conveyance ditch to CDID #1 Ditch 10.

[1] Facility 71 was destroyed in a fire in June 2011 and reconstructed in February 2012.

Former Outfall 004

Former Outfall 004 was rerouted to Facility 77 with the installation of Pump Station 004, and the outfall was closed in 1991. From Facility 77, the water is routed to Facility 73 for treatment and then discharged to the Columbia River through Outfall 002A.

Outfall 005

Outfall 005 drains to CDID #1 Ditch 14. Stormwater runoff from improved areas ponds locally and infiltrates or evaporates. Runoff from larger events may gravity drain to a vegetated ditch and discharge to CDID #1 Ditch 14.

Rerouted Outfall 006

Outfall 006 was created after the current NPDES permit was issued in 1990 and is not described in NPDES permit WA-000008-6. Outfall 006 has been in multiple NPDES renewal applications submitted to the Washington State Department of Ecology (Ecology) since the Outfall was created. Treatment occurs through stormwater passing through the vegetated conveyance swale. Stormwater flows from Outfall 006 are routed to the U-Ditch and then to Facility 77 where the stormwater is pumped to Facility 73 for treatment and then discharged to the Columbia River through Outfall 002A. Treated stormwater runoff from events larger than the 6-month, 24-hour storm may overflow the Outfall 006 Sump/Pump Station and discharge directly into CDID #1 Ditch 14.

Cryolite Area Ditches

Additionally, a series of ditches, referred to as cryolite area ditches, which are not part of the CDID #1 or system that operates under the NPDES, is located on the east side of the Applicant's leased area (Figure 7). These ditches were constructed to control stormwater and perched shallow groundwater. Although the ditches used to discharge into the CDID #1 system, they are now isolated from it; water from these ditches is pumped via Pump Station 004 (Anchor Environmental 2007) to Facility 77 where it is pumped to Facility 73 for treatment prior to discharge through Outfall 002A.

2.2.2.6 Project Area for the Off-Site Alternative

The project area for the Off-Site Alternative is also located on the northeast shore of the Columbia River. Limited site-specific subsurface information was readily available for this project area at the time of preparation of this report. However, it is understood that the project area and broader lease area are currently undeveloped and vegetated, with grassy areas extending to the shoreline of the Columbia River. A portion of the eastern side of the lease area is in agricultural use, while another portion of the site appears to have been used for recreational motocross use. Agricultural uses have historically included pasture, silage/grass/hay, some food crops, commercial Christmas trees, and two golf courses that are considered turf grass crops (URS Corporation 2014e). The activities that previously occurred associated with the agricultural and recreational motocross uses may have included the use of pesticides, herbicides, fuels, and other related contaminants as noted in the NEPA Hazardous Materials Technical Report (ICF International 2016a).

Surrounding land uses include the residential neighborhoods of Barlow Point, Memorial Park, and West Longview to the north and east of the project area, and the closed Mt. Solo Landfill located immediately north-northeast of the project area. The nearest residential community is the West Longview neighborhood located 1 mile north of the project area. The next nearest residential communities, located 1 to 2 miles east of the project area toward the Longview city center, include the Olympic West, Highlands, and Columbia Valley Gardens neighborhoods.

Groundwater conditions are anticipated to be similar to those described for the On-Site Alternative (Section 2.2.2.5) because the CDID #1 ditch system borders both project areas (Figure 3). Thus, the groundwater flow gradient beneath the project area is assumed similar to the On-Site Alternative, but this has not been confirmed. It is understood through data collected from the nearby groundwater monitoring wells installed in conjunction with the post-closure monitoring of the Mt. Solo Landfill, that there may actually be a slight groundwater gradient from the closed Mt. Solo Landfill towards the Off-Site Alternative project area, at least within the shallow aquifer. This could be a result of a more pronounced groundwater flow gradient between the Mt. Solo Landfill and the CDID #1 ditch system, caused by the different topographic reliefs between the two adjacent sites, which is more significant (i.e., the Mt. Solo Landfill is higher in elevation than the Off-Site Alternative project area) than observed across the On-Site Alternative site. Therefore, the CDID #1 ditch system may have a reduced impact upon the shallow aquifer in terms of groundwater gradient within this isolated area.

The Mount Solo Slough is a privately owned drainage ditch that forms the northern boundary of the project area and is near the closed Mount Solo Landfill. It is a highly meandering drainage that has been historically managed as a drainage ditch. It connects to CDID #1 Ditch 14 to the east and CDID #1 Ditch 16 to the north, both of which both connect to CDID #1 Ditch 10 (Figure 3).

2.2.3 Groundwater Quality

Groundwater data in WRIA 25 are extremely fragmented and exist for only a few localized areas near Kelso and Longview (Lower Columbia Fish Recovery Board 2001).

2.2.3.1 Regional

Alluvial (Shallow) Aquifers

According to the Lower Columbia Fish Recovery Board (2001), chemical quality of groundwater ranges from excellent to poor in the alluvium units. Shallow wells near streams and rivers typically have excellent water quality, while deeper wells and/or wells located farther from streams and rivers often produce groundwater of lower quality. The problem constituents are typically iron, manganese, and total dissolved solids found at levels that produce undesirable aesthetic/cosmetic (taste, odor, color, discoloration) effects, but do not necessarily pose health risks (Lower Columbia Fish Recovery Board 2001). The source of these elevated constituents is assumed to arise from bedrock groundwater recharge to the alluvial aquifer and/or long residence time for groundwater within the alluvial aquifer, which allows leaching of these constituents from the sediment that hosts the aquifer.

Another groundwater quality problem associated with alluvial aquifers in this area is the potential presence of phenol compounds. These phenol compounds are produced by the decomposition of vegetative materials because of dewatering volcanic lahars/debris flows[2].

[2] Lahar is an Indonesian term that describes a hot or cold mixture of water and rock fragments flowing down the slopes of a volcano and/or river valleys. As lahars move downstream form a volcano, their size, speed, and amount of water and rock debris/mudflow is constantly changing as it deposits rocks, boulders, and vegetation across the river valley it enters (USGS 2013).

Tertiary Continental Sedimentary Rock Unit

Limited data exist on the chemical quality of groundwater from the formations found in this aquifer unit. The available data suggest that the chemical quality is often poor. The problem constituents are typically iron and manganese found at levels that produce undesirable aesthetic/cosmetic (taste, odor, color, discoloration) effects, but do not necessarily pose health risks. Similar to the alluvium unit, the likely source of these elevated constituents is due to groundwater from older bedrock units that is entering this aquifer and/or long residence time for groundwater within this aquifer, which would allow leaching of these constituents from the sediment that hosts the aquifer (Lower Columbia Fish Recovery Board 2001).

Columbia River Basalt Group

No data on the chemical quality of groundwater from the Columbia Basin Basalt Group were available at the time of preparation of this document. However, the flood basalt flows of this group often serve as good aquifers capable of producing groundwater of typically good chemical quality (Lower Columbia Fish Recovery Board 2001).

2.2.3.2 Local

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 their respective human health screening levels. Kennedy/Jenks Consultants (2012a) 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). These levels were found to be naturally occurring and are characteristic of the regional water supply aquifer (Anchor QEA 2014a). Figure 9 shows the locations of the shallow aquifer monitoring wells and groundwater gradients at the Mint Farm. Figure 10 shows the deep aquifer monitoring wells and groundwater gradients at the Mint Farm.

Figure 9. Mint Farm Shallow Aquifer Monitoring Wells and Groundwater Gradients

Figure 10. Mint Farm Deep Aquifer Monitoring Wells and Groundwater Gradients

2.2.3.3 Project Area for the On-Site Alternative

Historical and Existing Sources of Groundwater Contamination

Industrial use of the Applicant's leased area began in 1941 with the development of the aluminum production operations by Reynolds Metals Company. The manufacturing capabilities were expanded in the 1960s and the operations focused primarily on aluminum production. Historical operations in the Applicant's leased area included aluminum production facilities, cable plant operations, cryolite recovery plant operations, and industrial landfills. Figure 11 shows the facilities in the Applicant's leased area. The NEPA Hazardous Materials Technical Report provides a complete description of the history of contamination in the Applicant's leased area (ICF International 2016a).

Aluminum Production Facilities

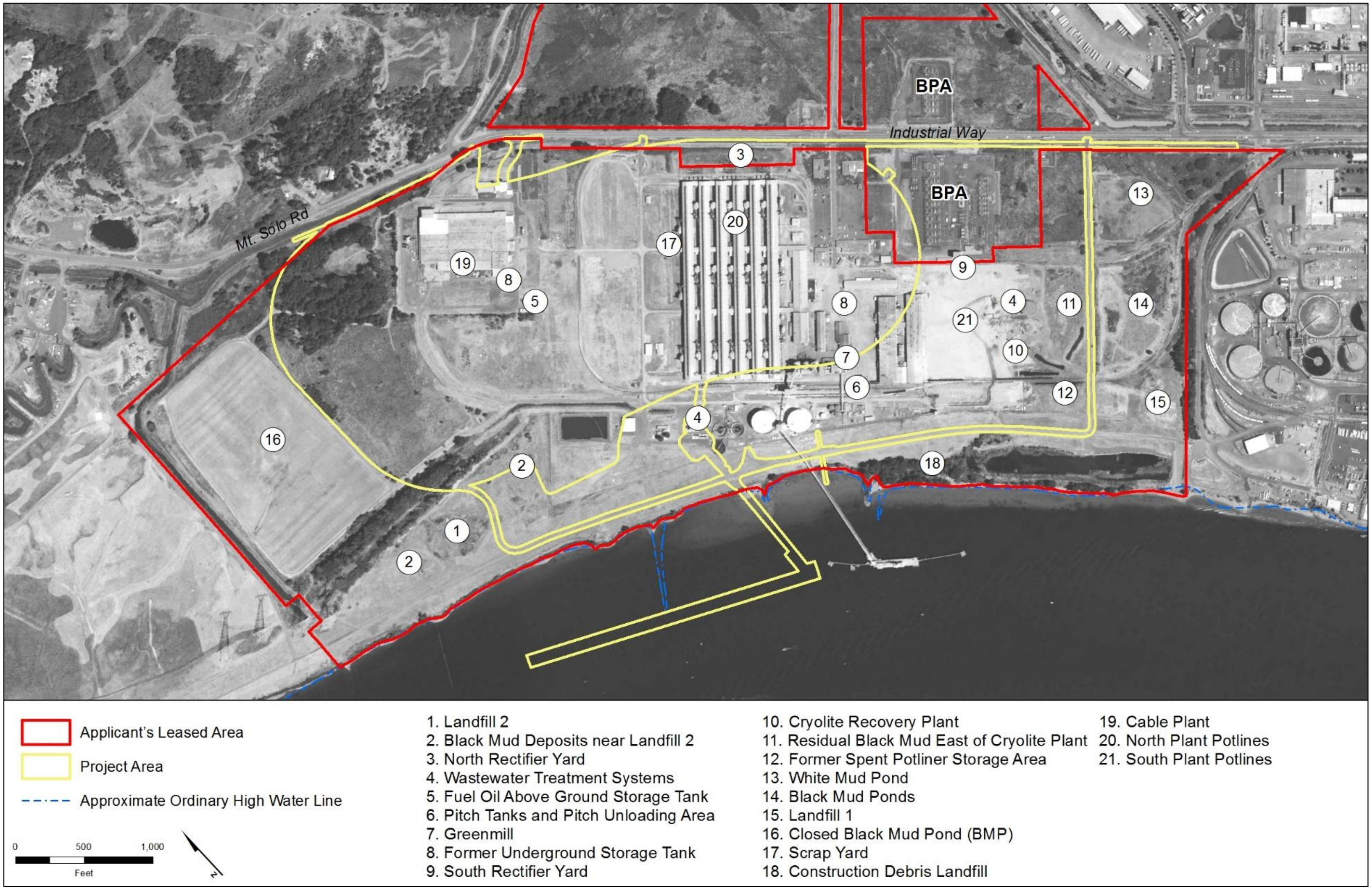
Initial industrial operations in the Applicant's leased area began with the Reynolds Metals aluminum reduction plant in 1941. The plant is located in the eastern portion of the Applicant's leased area (referred to as South Plant) and was used for aluminum smelting and casting operations (Figure 11). In 1967, Reynolds developed the North Plant in the center of the Applicant's leased area for additional aluminum production (Anchor QEA 2014a).

Smelter operations required an extensive dry-materials handling system for raw materials. Raw materials included alumina ore, petroleum coke, coal tar pitch, anthracite coal, cryolite, and aluminum fluoride. Liquid coal tar was unloaded by rail and transferred into storage tanks, which connected to the greenmill by distribution lines. At the greenmill, pitch (which contains polycyclic aromatic hydrocarbons [PAHs]) was used as a raw material for anode and cathode construction. Pitch was also placed on the ground near the rail unloading area (Anchor Environmental 2007). Smelter operations in the Applicant's leased area have been associated with elevated concentrations of fluoride in soils or solid media (Anchor QEA 2014a). Figure 11 shows the location of the aluminum manufacturing facilities: North Plant and South Plant lie within the project area, while the pitch tanks and unloading area lie near the southern boundary of the project area.

Former Cable Plant Operations

The cable plant, constructed in the late 1960s, was located west of the aluminum production facilities and within the project area boundary (Figure 11). The cable plant produced electrical cable products, including aluminum wire, rods, and insulated (polyethylene and polyvinyl) low- and medium-voltage cable. It received molten aluminum from the aluminum production facilities and processed it in three furnaces: a continuous ingot caster, a rolling mill, and wire drawers. Ancillary structures associated with the cable plant included office buildings, a parking lot, and a sanitary wastewater treatment plant.

Figure 11. Former and Existing Facilities in the Applicant's Leased Area for the On-Site Alternative



Cryolite Recovery Plant

The cryolite recovery plant was constructed in 1953 in the South Plant area (Figure 11). The plant was used as a spent potliner (SPL) recovery and recycling facility for the Reynolds facility and other northwest aluminum reduction plants. SPL is a byproduct of the aluminum manufacturing process. It contains fluoride and PAH compounds and, potentially, varying levels of cyanide. The cryolite recovery plant also recovered reusable fluoride compounds, called underflow solids that were eventually used to control air emissions that occurred during the aluminum manufacturing process. The underflow solids were collected in clarifiers (a type of tank) at two unspecified locations in the Applicant's leased area (Anchor Environmental 2007).

The cryolite recovery process involved multiple steps, resulting in a "black mud," which was disposed of in several fill deposits in the Applicant's leased area. The process also required lime to produce the sodium hydroxide solution. After the 1970s, the spent lime facility was combined and managed with the residual carbon facility.

With the increase in regulatory requirements associated with SPL stockpiling and handling in the 1980s, Reynolds began to bury and cover the stockpiled SPL and install groundwater monitoring wells to address concerns regarding potential impacts on groundwater in the area (Anchor QEA 2014a).

In May 1990, the cryolite recovery plant ceased operation. The SPL generated during aluminum manufacturing was removed and shipped to permitted treatment, storage, and disposal facilities. The cryolite recovery plant facilities were removed in May 1990; the area where they once sat is now vacant (Anchor Environmental 2007). No deposits of SPL are known to remain in the Applicant's leased area (Anchor QEA 2014a).

Residual carbon was generated during the cryolite recovery process. Residual carbon typically includes calcium carbonate, alumina, carbon, fluoride compounds, sodium, iron, and sulfate (URS Corporation 2014b). Test results revealed that shallow groundwater at the former location of the cryolite recovery plant contained fluoride-containing solid media and fluoride and alkalinity releases because of the cryolite plant's operations (URS Corporation 2014b). Additional investigations, findings, and cleanup of the residual carbon deposits are discussed below (*Remedial Actions* and *Remedial Investigation Findings*).

Industrial Landfills

Three historical landfills are located in the Applicant's leased area, outside the project area boundary

- Floor sweeps landfill (Landfill 1) is located east of the former cryolite recovery plant.
- The old industrial landfill (Landfill 2) is located on the southwest side of the former Reynolds facility.
- The construction debris landfill (Landfill 3) is located between the Columbia River levee and the Columbia River.

Landfill 1 received dry materials gathered from floors in the potlines, including alumina, bath, cryolite, and aluminum fluoride. By the mid-1970s, Landfill 1 was no longer in use and Landfill 2 began operation. Landfill 2 accepted scrap coke, ore, cryolite, aluminum fluoride, bath, brick, concrete, and debris from miscellaneous maintenance activities. Landfill 3 contains concrete debris and other plant wastes, similar to Landfill 2. Use of these landfills ceased in the 1980s prior to implementation of more restrictive regulations. The landfills are still present in the Applicant's leased area; additional investigations, findings, and cleanup are discussed below (*Remedial Actions* and *Remedial Investigation Findings*). Figure 11 shows the locations of the cryolite recovery plant and the three landfills.

Historical Uses after Closure of the Reynolds Facility

In 2000, Alcoa purchased Reynolds Metals Company, which became a wholly owned subsidiary. As part of this transaction, Reynolds was required to divest of its facility on the Applicant's leased area. It sold the facility to Longview Aluminum in 2001 but retained ownership of the land. Longview Aluminum immediately ceased aluminum production operations, and the facility has not produced aluminum since 2001.

In December 2004, Chinook Ventures Inc. purchased the Applicant's leased area assets from a bankruptcy trustee, which took over operations after Longview Aluminum declared bankruptcy in 2003. CVI entered into a long-term ground lease with Reynolds that ran until September 2005 when ownership of the land transferred from Reynolds to Northwest Alloys, both of which are wholly owned subsidiaries of Alcoa.

CVI was sole operator of the facility and associated Northwest Alloys–owned properties between 2004 and 2011. CVI operated a terminal for the import, handling, and export of dry bulk materials, such as alumina, coal, green petroleum coke, cement, fly ash, slag, and other materials. During this time, CVI also decommissioned the majority of the facilities associated with aluminum manufacturing operations and recycled materials from smelters, which were being decommissioned throughout the northwest region. These activities included the removal and disposal or recycling of alumina, electrolyte bath, coal, and carbon products.

On January 11, 2011, CVI sold its Applicant's leased area assets to the Applicant, which has subsequently removed most of the structures constructed by CVI and has continued facility decommissioning, removal, and cleanup activities.

Remedial Action (Cleanup) Process

In January 2015 a remedial investigation/feasibility study (RI/FS) (Anchor QEA 2014a) was prepared per the requirements of Washington State's Model Toxics Control Act (MTCA), which is implemented by Ecology. Under the MTCA, the RI/FS included two parts: completion of the investigation of potential contaminants in the Applicant's leased area and evaluation of the potential options for cleanup. The selection of a final cleanup action occurs in a separate step and will be documented in an MTCA cleanup action plan.[3]

Prior to preparation of the RI/FS, an initial site assessment was performed by Ecology, which reviewed available data and established the agency's priority ranking for the site investigation and cleanup. During this phase, Ecology ranked the former site as a 5, the lowest priority on its five-point scale.

[3] A draft MTCA Cleanup Action Plan, released by Ecology in January 2016, describes proposed cleanup actions to protect human health and the environment, meet state cleanup standards, and comply with other applicable state and federal laws.

Since completion of the initial assessment and site ranking, a number of investigations and cleanup actions have been completed in coordination with Ecology. The previously completed cleanup actions prior to preparation of the RI/FS have resolved cleanup issues for a number of areas within the Applicant's leased area. Extensive quantities of materials have been appropriately reused, recycled, or disposed of at permitted facilities. These actions have improved safety of the Applicant's leased area and helped to return the property to productive reuse.

After Ecology reviewed information from the previous investigation, cleanup, and closure activities, it defined focus areas for further evaluation and defined specific data gaps and testing requirements to be addressed in the RI/FS. Figure 12 shows the locations of the resulting testing that was implemented as part of the RI/FS. The RI/FS included multiple phases of investigation activity, the scope of which was developed and approved by Ecology (Anchor QEA 2014a).

Final cleanup decisions are to be specified in a final MTCA cleanup action plan. Design and implementation of the cleanup action will be performed after finalization of the cleanup action plan and court approval of the consent decree. Long-term management to monitor and/or clean up persistent water quality issues will be addressed in the cleanup action plan.

The RI/FS provides a detailed description of cleanup and remedial actions conducted in the Applicant's leased area (Anchor QEA 2014a). Figure 13 shows the locations of previous cleanup and removal activities and remedial investigation focus areas.

Remedial Investigation Findings

The following sections summarize the RI/FS (Anchor QEA 2014a).

Screening Levels

The groundwater contained in the fill soil and shallow silt/clay/soils of the upper alluvium or shallow aquifer in the Applicant's leased area is not used as a source for drinking water. Furthermore, the fine-grained texture and low hydraulic conductivities of the upper alluvium, in conjunction with the upward groundwater gradients between the lower water supply shallow aquifer and the upper alluvium, severely limit the potential for this shallow groundwater to affect potential sources of drinking water. Regardless, the RI/FS screening levels included consideration of regulatory requirements applicable to groundwater that is used as a drinking water source and include the following.

- **MTCA Method A Groundwater Cleanup Levels**. These levels consider risks associated with ingestion of drinking water.
- **State Drinking Water Maximum Contaminant Levels**. These levels assume drinking water as the highest beneficial use of groundwater and are typically more stringent than the national drinking water standards.
- **Natural Background**: MTCA regulations consider background chemical concentrations as part of data screening and development of cleanup levels for groundwater.

Table 2 shows the RI/FS screening levels for groundwater for the relevant chemicals of concern discussed below. This table lists the relevant chemicals of concern discussed below in *Source Areas and Chemicals of Concern*. For a list of all parameters tested in the Applicant's leased area, refer to the RI/FS (Anchor QEA 2014a).

Figure 12. Overview of Remedial Investigation Testing Locations in the Applicant's leased area for the On-Site Alternative

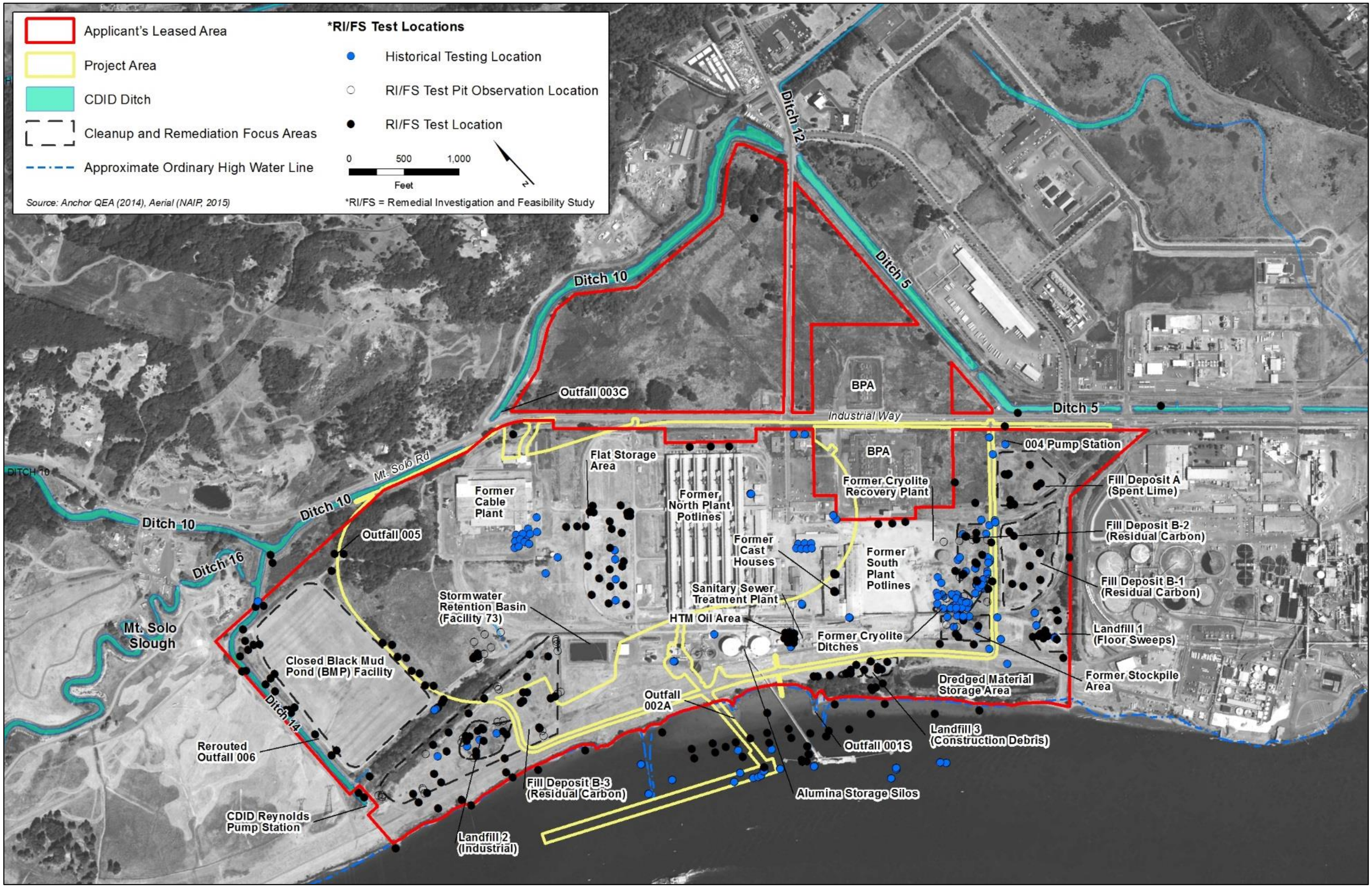


Figure 13. Previous Cleanup, Removal Areas, and Remedial Investigation Areas in the Applicant's leased area for the On-Site Alternative

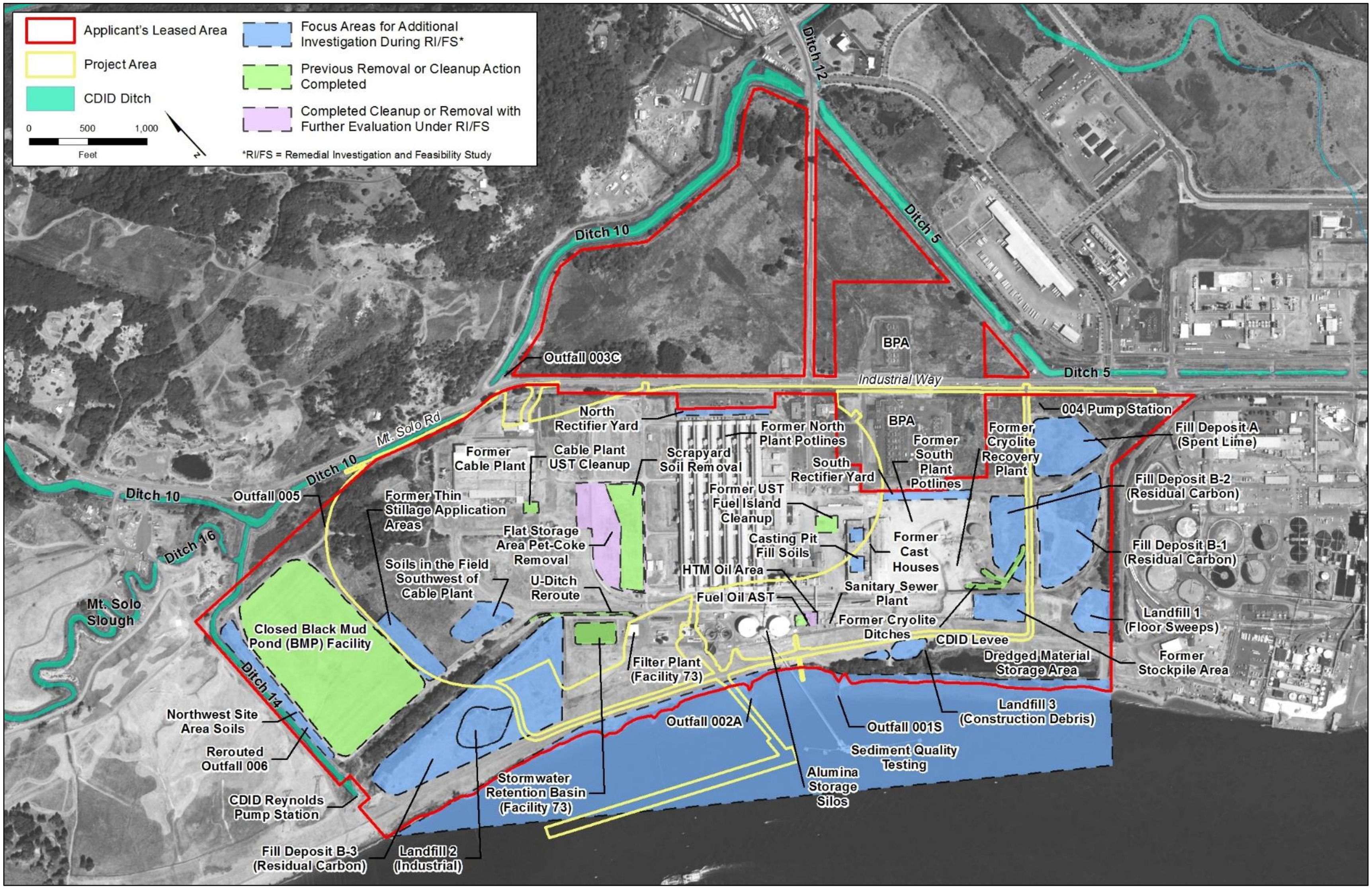


Table 2. Screening Levels for Groundwater

Parameter	Screening Level	Unit[a,b]	ARAR[c,d]
Cyanide	0.2	mg/L	MCL
Fluoride	4.0	mg/L	MCL
Total cPAHs	0.1	µg/L	MTCA Method A
Total PCB Aroclors	0.1	µg/L	MTCA Method A
TPH-Diesel	500	µg/L	MTCA Method A

[a] mg/L = milligrams per liter
[b] µg/L = micrograms per liter
[c] ARAR = Applicable, Relevant, and/or Appropriate Requirement.
[d] MCL = State Drinking Water Maximum Contaminant Level

Source Areas and Chemicals of Concern

Testing of groundwater was conducted over a series of multiple sampling events primarily occurring in September and October 2006, July 2011, October 2011, and October 2012 and primarily outside the boundaries of the project area (Anchor QEA 2014a). Specific testing parameters varied by sampling event and were consistent with Ecology testing requirements defined in the RI/FS Work Plan and Addenda (Anchor QEA 2014a).

Cyanide

Groundwater cyanide concentrations in the study areas are very low and have been decreasing over time. None of the groundwater samples collected in the western portion of the study areas near the closed Black Mud Pond facility and Fill Deposit B-3 exceeded the groundwater maximum contaminant level (MCL) for free cyanide. As shown on Figure 14, 2012 free cyanide concentrations in all samples taken in the western portion of the Applicant's leased area were below the groundwater screening level of 0.2 milligrams per liter.

Groundwater cyanide concentrations in samples collected in the eastern portion of the Applicant's leased area have also been decreasing over time. One of the groundwater samples (located near the Former Stockpile Area in the southeast corner of the project area) slightly exceeded the groundwater MCL in 2006, but concentrations decreased significantly by the 2011 and 2012 sampling events. As shown on Figure 14, the 2012 free cyanide[4] concentrations in most of the eastern portion of the Applicant's leased area were below the groundwater screening level.

Fluoride

Groundwater fluoride concentrations in most of the Applicant's leased area are below the groundwater screening levels. The exceptions are the shallow groundwater located in or immediately adjacent to the landfills and fill deposits (Anchor QEA 2014a). Data from the most recent sample event in 2012 for fluoride are summarized on Figure 15. Green data symbols represent groundwater fluoride concentrations that are below thresholds established for the drinking water MCL.

[4] 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 14. 2012 Groundwater Testing Results in the Applicant's leased area for the On-Site Alternative—Total Free Cyanide

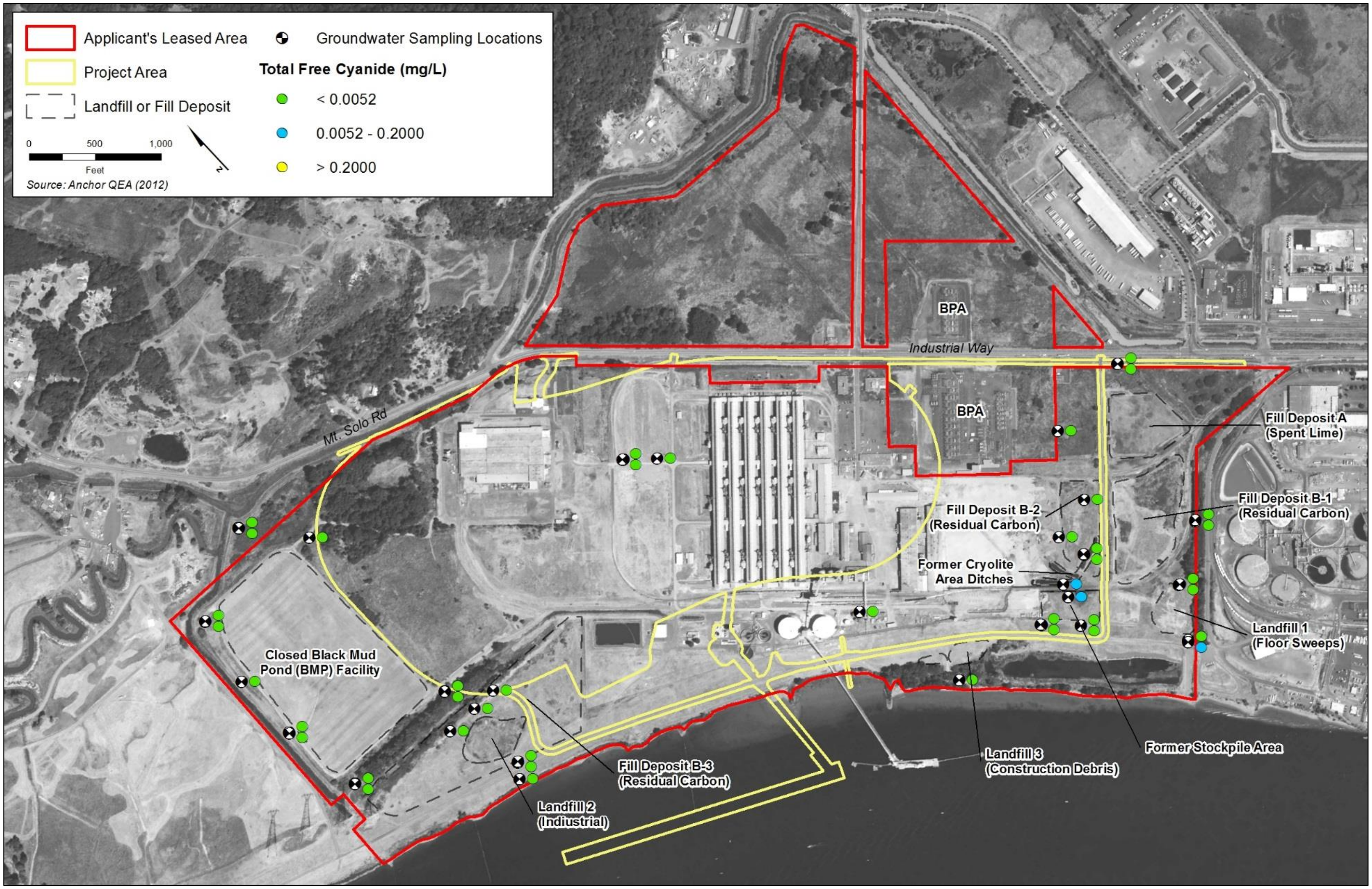
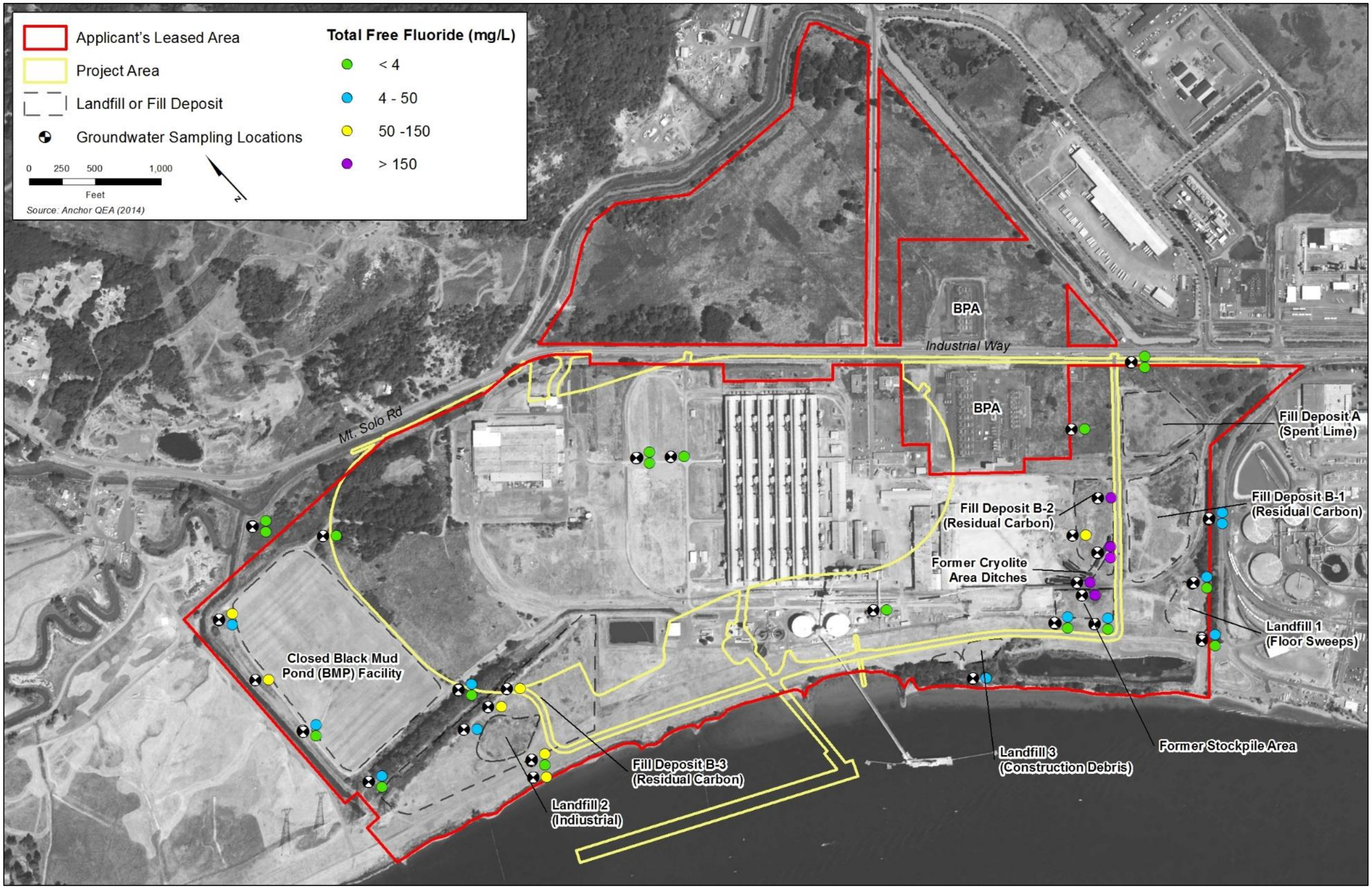


Figure 15. 2012 Groundwater Testing Results in the Applicant's leased area for the On-Site Alternative—Total Free Fluoride



In the western portion of the Applicant's leased area, the highest concentrations of fluoride are measured in wells located in Fill Deposit B-3 and adjacent to Landfill 2 (industrial landfill), and in the wells located immediately downgradient of the closed Black Mud Pond facility.

In the eastern portion of the Applicant's leased area outside of the project area boundary, groundwater monitoring data show that fluoride concentrations attenuate rapidly with distance from the fill and landfill deposits (Anchor QEA 2014a), which are summarized as follows.

- **Fill Deposit A (spent lime) and B-1 (residual carbon).** Groundwater fluoride concentrations immediately downgradient of these deposits comply with the groundwater MCL. This is more than 10-fold to 20-fold lower than the fluoride concentrations measured in the fill deposits.
- **Landfill 1 (floor sweeps).** Two well pairs are located immediately adjacent to this landfill (less than 10 feet from the landfill contents). In both well pairs, the deeper groundwater samples comply with the groundwater fluoride concentration MCL, and the fluoride concentration in the shallower groundwater samples slightly exceed the MCL.
- **Fill Deposit B-2 (residual carbon).** The highest groundwater fluoride concentrations in the Applicant's leased area are located in Fill Deposit B-2, located just east of the former cryolite recovery plant. The groundwater wells in this area are located in the fill deposit and immediately adjacent to the former stockpile area and the cryolite area ditches. Groundwater in this area has elevated alkalinity, which enhances fluoride solubility. In contrast, the groundwater fluoride concentrations immediately downgradient of this deposit are consistently below the MCL, showing that fluoride in this area is relatively immobile.

In consideration with other RI/FS monitoring data, the groundwater data for fluoride concentrations demonstrate that the closure of the closed Black Mud Pond facility has been effective, and that the elevated fluoride concentrations present in shallow groundwater adjacent to the other landfill and fill deposits are localized and relatively immobile. The higher concentrations of fluoride present within Fill Deposit B-2 appear to be a function of the fill deposits and the geochemical properties of this area, including the elevated alkalinity of groundwater (Anchor QEA 2014a).

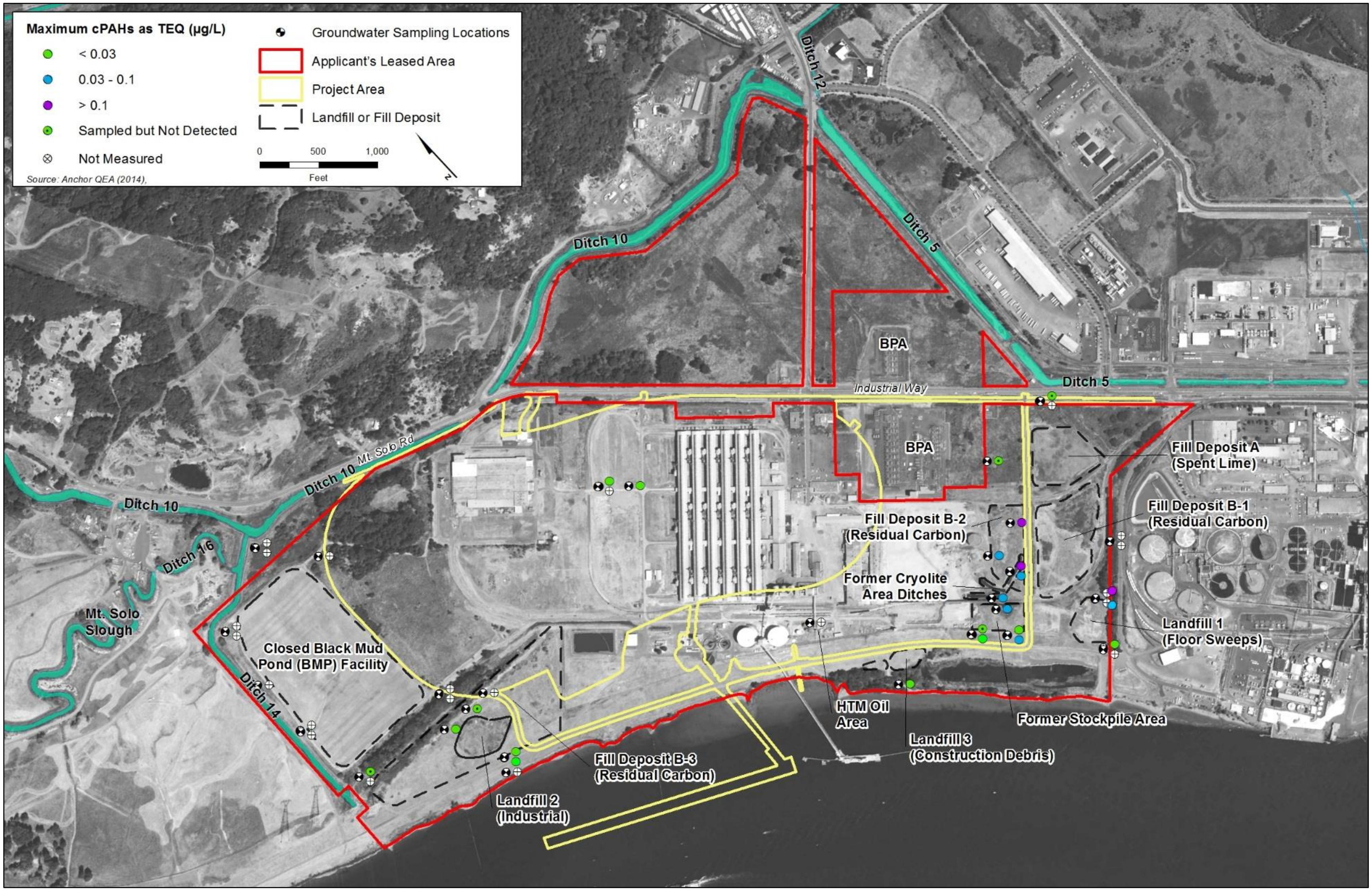
Groundwater fluoride concentrations attenuate rapidly with depth and with distance laterally from these landfills and fill deposits. This has been observed in all parts of the Applicant's leased area, including the areas near Fill Deposit B-2. Surface water monitoring demonstrates the fluoride present in the shallow groundwater is not affecting water quality in the adjacent CDID #1 ditches 10, 5, or 14 (Anchor QEA 2014a).

Polycyclic Aromatic Hydrocarbons

At the request of Ecology, groundwater samples from selected locations were analyzed for PAHs. Figure 16 shows the maximum concentration of carcinogenic PAHs (cPAH)[5] measured during each of the sampling events (2007, 2011, and 2012). None of the measured cPAH concentrations from the western portion of the Applicant's leased area exceeds groundwater screening levels. In the eastern portion of the Applicant's leased area, and outside the project area boundaries, cPAH concentrations during the 2012 sampling events were below the groundwater screening levels in all locations except for the wells located immediately within or adjacent to fill deposits. These three localized

[5] cPAHs were used in the RI/FS because they have the most stringent screening levels.

Figure 16. 2007–2012 Groundwater Testing Results in the Applicant's leased area for the On-Site Alternative—Total cPAHs as Toxic Equivalents



areas (purple circles on Figure 16) include wells located immediately adjacent to Landfill 1 and Fill Deposit B-2. The cPAH concentrations in wells located farther downgradient were less than the groundwater screening level and the surface water screening level.

Polychlorinated Biphenyls

As part of the RI/FS testing program, required testing for polychlorinated biphenyls (PCBs) in groundwater at wells located immediately downgradient of the landfills and fill deposits. No PCBs were detected in any of the groundwater samples analyzed (Anchor QEA 2014a).

Heavy Metals

Sampling for heavy metals in groundwater was performed during 2011 and 2012 at selected locations identified by Ecology. Test findings indicate 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.

Total Petroleum Hydrocarbons

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

Distribution and Movement of Chemicals of Concern

As discussed above, the 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 or surface water quality (Anchor QEA 2014a). Groundwater contamination by fluoride and cyanide could occur during leaching when soils or solid media encounter 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 Reynolds facility. Thus, it is unlikely fluoride and cyanide in the Applicant’s leased area affect the surrounding groundwater (Anchor QEA 2014a).

Final Cleanup Actions

The draft MTCA Cleanup Action Plan for the project area, released in January 2016, describes proposed cleanup actions to be protective of human health and the environment, meet state cleanup standards, and comply with other applicable state and federal laws. Cleanup standards will be consistent with the current and anticipated future land use, which will be based on industrial criteria. Ecology’s comment period on the draft MTCA Cleanup Action Plan ended March 18, 2016, and the issuance of the final plan is currently pending. Cleanup is estimated to be completed by 2019–2020. Although a final cleanup action plan is still pending, this section discusses the site-specific cleanup action requirements applicable to all the cleanup alternatives.

Table 3 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 2014a). 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 2014a).

Table 3. 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	

Source: Anchor QEA 2014a
TPH-D = total petroleum hydrocarbon – diesel
TPH-O = total petroleum hydrocarbon – oil

2.2.3.4 Project Area for the Off-Site Alternative

Groundwater quality in the project area for the Off-Site Alternative was not readily available at the time of preparation of this document. Although there are no known sources of environmental contamination in the project area, farming of agricultural lands and operations and maintenance of the former motocross tracks may have included the use of pesticides, herbicides, fuels, and other related contaminants, which have the potential to affect soil, surface water, and groundwater. It is not known if any residual chemicals remain in the project area.

2.2.4 Water Supply

The following discussion provides a summary of the water supply for the On-Site Alternative.

2.2.4.1 Regional

Communities in WRIA 25 rely upon a variety of systems to meet their needs for domestic, commercial, industrial, and agricultural water supply. These systems include large municipal systems, small public water systems, individual domestic wells, and wells and diversions owned by self-supplied industrial and agricultural users. In general, water needs throughout WRIA 25 are met by a combination of both surface and groundwater supplies (HDR and EES 2006). Note that the proposed project will not withdraw any water from the Columbia River. All water supply needs will be met through existing on-site groundwater wells and above ground water storage facilities.

2.2.4.2 City of Longview

The Mint Farm Regional Water Treatment Plant began operation in January 2013, and replaced the Longview water treatment plant (which was located on the shore of the Cowlitz River and treated surface water drawn from the Cowlitz River for municipal water use). The Mint Farm plant is located in the Mint Farm Industrial Park, approximately 6,000 feet east of the project area for the On-Site Alternative. While the On-Site and Off-Site alternatives' direct impact study areas do not extend to the Mint Farm Regional Water Treatment Plant, the indirect impact study areas include the treatment plant and both the direct and indirect impact study areas for both alternatives are within the treatment plant's wellfield Wellhead Protection Area (i.e., the 5-year Wellhead Protection Plan Source Area); thus, the Mint Farm Regional Water Treatment Plant is considered. Groundwater is tapped from wells in the Mint Farm Industrial Park. The water treatment plant consists of four high-capacity (4,000 gpm) groundwater wells (and associated treatment infrastructure) and supplies the City of Longview and the Cowlitz County Public Utility District with municipal water.

The treatment plant ultimately may have as many as six groundwater production wells at the Mint Farm Industrial Park, although the current operation includes four well casings and four well pumps, each capable of pumping approximately 4,000 gpm. Groundwater modeling conducted to evaluate the sustainability of long-term pumping from the wellfield, which draws from the same deep aquifer that underlies the project areas, calculated approximately 6 feet of drawdown to meet the City's 50-year maximum daily demand. Test pumping of a production well showed no drawdown impact 60 feet or more away from the well. The source of water to the wellfield was found to be the Columbia River (Kennedy/Jenks 2010). A water rights permit has been issued for the treatment plant, which has an instantaneous maximum withdrawal rate of 28,250 gpm and a maximum annual withdrawal rate of 13,500 acre-feet per year (Permit No. G2-30521, priority date June 8, 2009).

Under a Water Service Agreement, the three water purveyors in the Longview/Kelso urban area (City of Longview, Cowlitz County Public Utility District No. 1, and the City of Kelso) have a long-term arrangement whereby the three agencies can share each other's facilities when necessary. This agreement provides backup resources in case of emergency, natural disaster, and for scheduled maintenance outages (City of Longview 2006).

2.2.4.3 Project Area for the On-Site Alternative

The Applicant currently holds several water rights to extract groundwater from the deep aquifer (Kennedy/Jenks 2012b) which have been held since at least 1967. Water use in the State of Washington is subject to the "first in time, first in right" clause, historically established by western water law and adopted into Washington State law (RCW 90.44.050). A senior right cannot be impaired by a junior right. Seniority is established by the date an application was filed for a permitted or certificated water right (priority date) or the date that water was first put to beneficial use in the case of claims and exempt groundwater withdrawals. The Columbia River basin is not closed to new water rights, surface or hydraulically connected groundwater, in this reach. When the Reynolds facility was initially developed in 1941, Reynolds was responsible for developing nine water supply wells, and their names are currently listed on the water rights claims and the water rights certificates. In 1945, the state groundwater code was enacted, which required a water right permit or certificate, unless the user was exempt from state permitting requirements. Three of the water rights claims were acquired in 1941, prior to the 1945 requirements; therefore, these claims are not accompanied with a certificate. Details of the water rights claims and certificates, along with the instantaneous and annual withdrawal amounts are provided in Table 4. It is estimated the

Applicant has an existing demand of 1.53 million gallons per day (Chaney pers. comm). As shown in Table 4, the existing demand is well within the Applicant's water right[6] limits for groundwater pumping. However, if the Applicant does not fully beneficially use each water right within a 5-year period, the Applicant must relinquish the unused portion (RCW 19.14.160).

Table 4. Water Rights Claims and Certificates

Record Number	Certificate Number	Withdrawal		Priority Date
		Instantaneous (gpm)	Annual (acre-feet/year)	
G2-006572CL	-	2,500	2,340	-
G2-006573CL	-	2,500	2,340	-
G2-006574CL	-	2,500	1,614	-
G2-*02244CWRIS	01571	2,500	4,033	1951
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**	

Source: URS Corporation 2014d.

2.2.4.4 Project Area for the Off-Site Alternative

No groundwater wells have been recorded for the project area for the Off-Site Alternative, and no well structures are present on the site.

2.2.4.5 Private Wells

Local industries, small farms, and domestic well users withdraw groundwater from private wells near the project areas. These include the Weyerhaeuser Timber Company and many small farms and exempt domestic well users. The groundwater permit exemption allows certain users of small quantities of groundwater (most commonly, single residential well owners) to construct wells and develop their water supplies without obtaining a water right permit from Ecology (RCW 90.44.050). Any user whose water use that exceeds the exemption limits must apply for and obtain a water right permit before water use is allowed.

A review of Ecology's online Water Rights Tracking System indicated 31 water rights applications were pending in WRIA 25. However, none of these applications was located in the Sections and Townships bordering the project areas (Washington State Department of Ecology 2015).

[6] The Applicant is responsible for maintaining water rights. The Technical Report did not verify water rights are current.

2.2.4.6 Wellhead Protection Areas and Sanitary Control Areas

The Safe Drinking Water Act requires every state to develop a wellhead protection program. The Washington State Department of Health administers the wellhead protection program in the State of Washington.

Most public water supply wells are located in or near communities. Washington's wellhead protection requirements are designed to prevent contamination of groundwater used for drinking water. A wellhead protection area is the surface and subsurface area around a well or wellfield that a community or water system manages to protect groundwater-based drinking water supplies from contamination.

In Washington, wellhead protection areas are based on horizontal time-of-travel rates for groundwater. Depending on the rate of travel, the wellhead protection area is broken into management zones that correspond to an established time-of-travel rate for water within the aquifer. Each of the management zones represents an interval between the time a particle of water is introduced at the zone boundary and its eventual arrival at the well. These zones create an early warning system that gives a public water system time to respond to a contaminant moving within an aquifer before it arrives at the water supply well. A typical wellhead protection area has four or five management zones (Washington State Department of Health 2010).

- Sanitary control area
- Primary zones, based on 1-, 5-, and 10-year time-of-travel rates
- Buffer zone (if necessary)

The management zones are described in more detail below (Washington State Department of Health 2010).

Sanitary Control Area

The sanitary control area is the area immediately around the wellhead. This area should be tightly controlled to minimize any direct contamination at the wellhead. The purpose of this area is to reduce the possibility of surface flows reaching the wellhead and traveling down the well casing. All public water systems are encouraged to enclose wells in a well house and secure them in a fenced area to help protect individual wells from direct introduction of contaminants.

Zone 1

Zone 1 is based on the 1-year horizontal time-of-travel for groundwater. The purpose of Zone 1 is to protect the drinking water supply from viral, microbial, and direct chemical contamination. Literature suggests that bacteria and viruses survive less than 1 year in groundwater Because of Zone 1's proximity to the sanitary control area, it includes an additional 6-month time-of-travel boundary.

Zone 2

Zone 2 is based on the 5-year time-of-travel for groundwater. The purpose of Zone 2 is to control potential impacts on groundwater from chemical contaminants. The primary difference between potential contaminant sources in Zones 1 and 2 is the time available to respond to a release. A release in Zone 2 presents a less acute crisis than a release in Zone 1. All potential contaminant sources within Zone 2 must be identified and managed in a manner that facilitates pollution prevention and risk reduction. Zone 2 also provides information that local planners use to site future high-risk and medium-risk potential contamination sources.

Zone 3

Zone 3 is based on the 10-year time-of-travel for groundwater. Zone 3 is the outer boundary of the wellhead protection area if a Buffer Zone is not present. In Zone 3, potential high- and medium-risk contaminant sources receive increased regulatory oversight and technical assistance, with emphasis on pollution prevention and risk reduction. This allows the community to plan and site future high-risk and medium-risk contamination sources outside the wellhead protection area. It is also used as an educational tool for industry, the public, and others to understand the source of their drinking water and how actions may affect drinking water wells.

Buffer Zone

The buffer zone, if present, is an area of added protection, which helps compensate for error when calculating the time-of-travel boundaries for Zones 1 through 3.The primary goal of the Buffer Zone is to provide information to planners on activities or facilities outside Zone 3 that could release contaminants into the wellhead protection area.

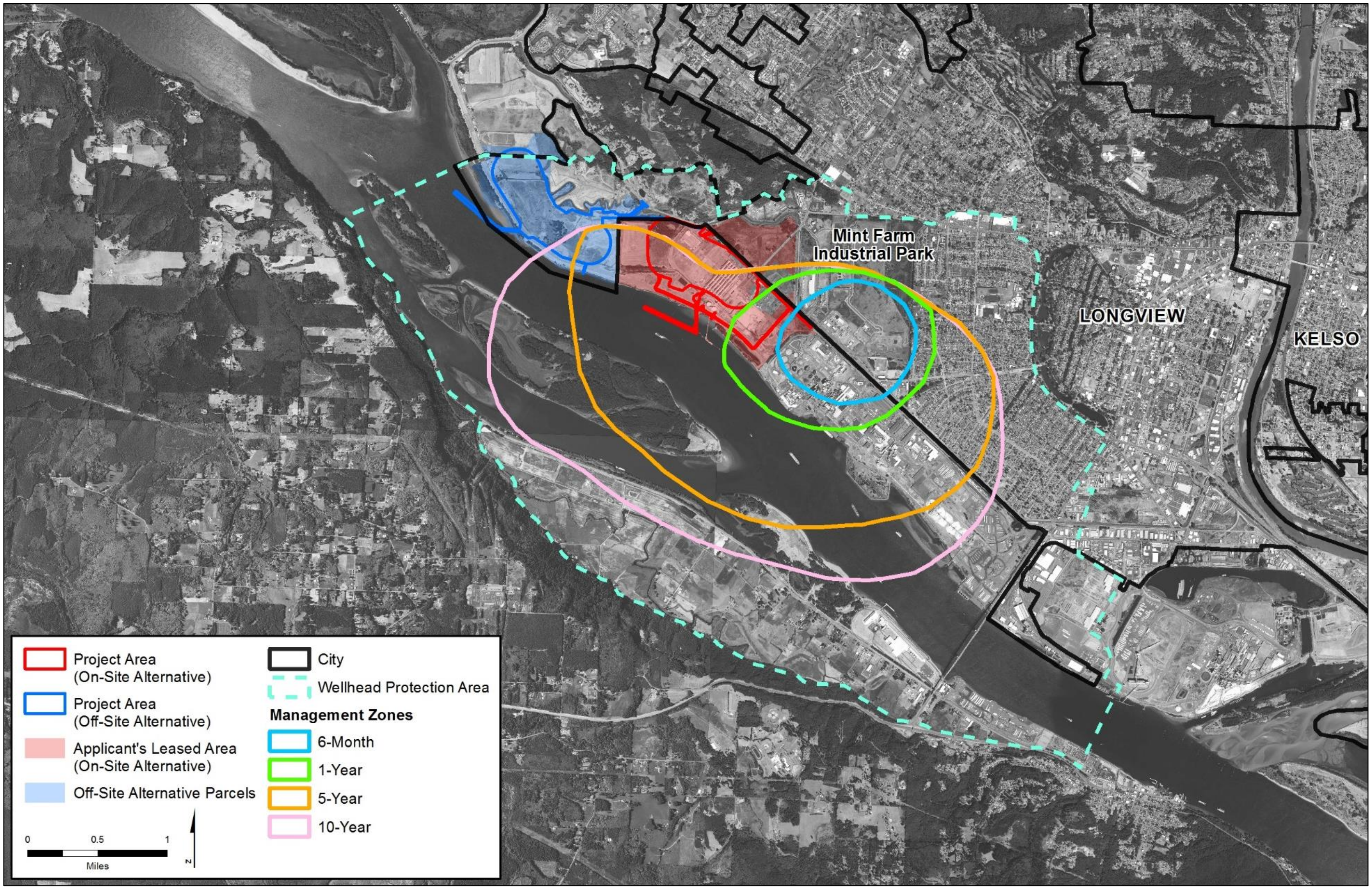
The Washington State Department of Health administers the Wellhead Protection Program, while other state agencies, such as Ecology and the Department of Agriculture, integrate wellhead protection into their programs. Local agencies, such as planning and health departments, play a major role by helping water systems protect their community's drinking water supply and coordinating wellhead protection measures.

2.2.4.7 City of Longview Wellhead Protection Areas

As discussed above, two distinct groundwater systems are present at the city's wellfield: a shallow aquifer and a deep aquifer. A confining unit consisting of clay and silt ranging in thickness from approximately 100 to 200 feet separates the two systems below the project area. The confining unit becomes appreciably thinner beyond the project area, to the north and east near residential areas. Groundwater modeling indicates the source for the deep aquifer is the Columbia River, with a travel time to the wellfield of between 2 and 35 years (Kennedy/Jenks Consultants 2012b). The Columbia River is within approximately 300 feet of the project area's southern boundary.

In 2012, the City of Longview approved its Wellhead Protection Program and established the wellhead protection area, which encompasses and extends beyond the management zones (Figure 17). As shown in Figure 17, the southeast portion of On-Site Alternative project area is within Zone 1 (1-year); most of the On-Site Alternative project area is within Zones 2 and 3 (5- and 10-year, respectively). A southeast portion of the Off-Site Alternative project area is within boundaries of the 5- and 10-year Wellhead Protection Plan Source Area (Figure 17).

Figure 17. City of Longview Wellhead Protection Area



Chapter 3
Impacts

This chapter describes the impacts on groundwater that could result from construction and operation of the On-Site Alternative or the Off-Site Alternative or the conditions under the No-Action Alternative.

3.1 On-Site Alternative

Potential impacts on groundwater from the On-Site Alternative are described below.

The following construction activities could affect groundwater.

- 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.

The following operations activities could affect groundwater.

- Alteration of surface runoff patterns.
- Use of groundwater for dust control, equipment washdown, and cleanup.
- 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 and would be used to store the water for reuse. The capacity of the pond would include a reserve of 0.36 million gallons for fire suppression.

3.1.1 Construction: Direct Impacts

Construction of the On-Site Alternative would result in the following direct impacts.

Affect Groundwater Recharge during Construction

Construction of the On-Site Alternative would involve preloading and installation of vertical wick drains to direct groundwater from the shallow aquifer upward toward the surface during pre-loading, 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. However, as described above, the major sources of groundwater recharge in the project area are the Columbia River, the regional CDID #1 ditch system, and the on-site drainage ditch system. The study area is not considered a major source of groundwater recharge of the deep aquifer through infiltration as the majority of stormwater runoff is managed by the existing NPDES stormwater collection and treatment system with nominal infiltration and evaporation. Therefore, construction of the On-Site Alternative would not be expected to have a measurable impact on groundwater recharge patterns of the deep aquifer.

The shallow groundwater aquifer in the project area is minimally recharged through surface infiltration due to the low recharge rates of the soil characteristics in the study area (URS Corporation 2014c). During construction, impervious surfaces would be sloped to convey surface water 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 within the project area for treatment prior to discharge to the Columbia River. For more information on the project construction NPDES permit, see the NEPA Water Quality Technical Report (ICF International 2016b). Therefore, drainage and groundwater recharge patterns are expected to be similar to those of the current conditions, with runoff directed to collection and treatment facilities and minimal infiltration to groundwater. There could be a slight reduction on groundwater recharge for the shallow aquifer, but the project area is not considered to be a significant source of groundwater recharge through infiltration; any potential impact would be negligible.

Degrade Groundwater Quality during Construction

Any construction-related contaminant accidentally 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 and not the deep aquifer because there is a confining, impervious 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 2014b). However, as discussed above, the majority of stormwater generated during construction would be collected and treated in compliance with the project construction NPDES permit prior to discharge. For more information on the project construction NPDES permit, see the NEPA Water Quality Technical Report (ICF International 2016b). The existing water treatment plant (Facility 73) is anticipated to be adequate to handle the water generated during construction, including removing contaminants and sediment loads from stormwater prior to discharge. In addition, construction of the coal export terminal would adhere to the best management practices (BMPs) developed by the Applicant as part of the project proposal to avoid and minimize potential impacts on surface and groundwater resources. BMPs would include, but 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, including the following.
  - Storage of on-site hazardous materials would be minimized to the extent feasible.
  - Materials would be stored in a designated area, and secondary containment would be installed where needed.
  - Refueling would occur in designated areas with appropriate spill control measures.
- 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 stormwater from concrete waste by conducting washout off site, or performing on-site washout in a designated area to prevent pollutants from entering surface waters or ground water.

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. Wick drains would direct groundwater from the shallow aquifer upward toward the surface during pre-loading, 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. 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 earth materials affected by preloading would be relatively low and thus would not be particularly susceptible to the infiltration of contaminated groundwater. Therefore, construction is not expected to result in groundwater degradation as a result of preloading and vertical wick drains and no long-term effects are anticipated.

In addition, as described in the NEPA Hazardous Materials Technical Report (ICF International 2016a), construction of the On-Site Alternative could encounter previously contaminated areas on the project area that are being addressed by the MTCA Cleanup Action Plan, resulting in degradation of 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 11)—no remedial actions are mandated as part of the final cleanup action plan for the project area. For the Flat Storage Area and Fill Deposit B-3, construction and remediation activities would be coordinated to reduce conflicts and minimize any environmental impact. Also, as mentioned above, fluoride and cyanide levels found in shallow groundwater have limited mobility and are not affecting downgradient groundwater or surface water quality. Furthermore, the final cleanup action plan would include minimum thresholds for cleanup, which would be protective of the environment, comply with applicable state and federal laws, and provide for future compliance monitoring. Therefore, construction of the On-Site Alternative would not result in groundwater degradation as a result of disturbing previously contaminated areas.

Construction would be unlikely to affect the wellfield at the Mint Farm Industrial Park. The wellfield draws water from the deep aquifer, and as previously mentioned, there is a confining, impervious 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. Contaminants from a spill would be unlikely to ever reach the groundwater withdrawn by the wellfield.

Affect Groundwater Supply during Construction

Construction would require groundwater for dust suppression. The maximum amount of water to 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 described above, the Applicant holds water rights for instantaneous extraction from on-site wells of about 23,000 gpm or 31,367 AFY.

A production well from the new Mint Farm Regional Water Treatment Plant was tested by the City of Longview to characterize the deeper confined aquifer. The subsurface conditions within the Mint Farm site are similar to those expected at the Applicant's 540-acre lease area. The production well was drilled to a depth of 385 feet below ground surface and is located approximately 6,000 feet southeast of the Applicant's lease area. The constant rate pumping tests results from this well calculated that the transmissivity values of the aquifer ranged from 3.3 million to 4.5 million gallons per day, per foot, while the hydraulic conductivity values from recovery water level data ranged from 20,000 to 28,000 gallons per day, per foot (2,600 to 3,600 feet per day). The study observed a recharge influent of the Columbia River on the deep aquifer at the production well; this became apparent after approximately 1.5 days of pumping, when drawdown curves became virtually flat (Kennedy/Jenks 2010 in URS 2014b). The Mint Farm Regional Water Treatment Plant has water rights for an instantaneous maximum withdrawal rate of 28,250 gallons per minute and a maximum annual withdrawal rate of 13,500 acre-feet per year (Permit No. G2-30521, priority date June 8, 2009) (URS 2014b). In 2011, the projected average daily demand was 6.7 million gallons per day with a maximum daily demand of 14.06 million gallons per day.

Water demand for construction-related activities and existing operations would represent only 6.5% of the Applicant's groundwater extraction rights. Construction of the On-Site Alternative is expected to have negligible impacts on groundwater supply, based on the Mint Farm constant rate pumping test results and when compared to existing groundwater use.

Excavation activities could intercept 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 will 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.

3.1.2 Construction: Indirect Impacts

Construction of the On-Site Alternative would not result in indirect impacts on groundwater because construction of the export terminal would be limited to the project area.

3.1.3 Operations: Direct Impacts

Operation of the On-Site Alternative would result in the following direct impacts.

Affect Groundwater Recharge during Operations

Operations of the facility could permanently reduce or impede infiltration due to soil compaction or existence of the facility's impenetrable surfaces (e.g. roads, buildings), which could affect groundwater recharge volumes and patterns. The project area would occupy some of the existing drainage basins in the project area (see Figure 7), effectively eliminating a portion of the runoff volume presently handled under the Applicant's existing NPDES Industrial Stormwater Permit; the Applicant would be required to obtain a separate NPDES Industrial Stormwater Permit and would develop a separate system of stormwater collection and discharge regulated by this permit. However, under existing conditions 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). In addition, runoff is currently directed and collected in a ditch system and operations would not significantly change these conditions; the major sources of shallow groundwater recharge in the project area during operations will not change and would continue to primarily be the Columbia River. During operations, runoff would continue to be directed and collected in the same manner as current conditions and little infiltration would occur; therefore, the direction and volume of groundwater recharge is expected to remain relatively constant during operations. Therefore, operation of 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

Spills of contaminants and coal dust generated during operations could potentially degrade groundwater quality if contaminated runoff were to infiltrate into the ground and reach groundwater. However, as described under *Affect Groundwater Recharge during Operations* above, 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). In addition, runoff from the study area, and any contaminants within that runoff, would be directed to on-site drainage systems, treated, and either reused on site or discharged in accordance with a future NPDES permit. Water reused on site would be brought up 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 discharge to permitted outfalls (i.e., Outfall 002A) and discharged to the Columbia River. Discharge of water to the Columbia River during project operations would mostly occur during the rainy season when excess surface water is more likely to be generated on site.

Furthermore, as discussed in the NEPA Water Quality Technical Report (ICF International 2016b), the following BMPs would be part of the On-Site Alternative design to maximize the protection of surface-water quality (and thus groundwater via infiltration).

- Enclosed conveyor galleries.
- Enclosed rotary unloader building and transfer towers.
- 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 BMPs.
- 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 collected waters would be treated before reuse or discharge to the Columbia River under permits, groundwater quality is not expected to be affected by operation of the On-Site Alternative. The potential for infiltration of surface water containing coal dust would be relatively low based on the low recharge rates of the soil characteristics in the study area, the propensity for soil to filter coal dust out of any water that may infiltrate into the ground, and coal dust being washed away in runoff and collected and treated under the NPDES Industrial Stormwater Permit for the terminal. Thus, it would be unlikely that coal dust would infiltrate into the ground and reach groundwater.

The potential for toxic constituents of coal to reach groundwater is also relatively low. Most coal dust would be washed away prior to the constituents becoming soluble in surface water and infiltrating to groundwater. Toxic constituents of coal include PAHs 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. The potential risk for exposure to toxic chemicals contained in coal (e.g. PAHs and trace metals) would be relatively low as these chemicals tend to be bound in the matrix structure and not quickly or easily leached. See the NEPA Water Quality Technical Report (ICF International 2016b) and the SEPA Coal Technical Report (ICF International 2016c) for more information.

In summary, the potential risk for exposure to toxic chemicals contained in coal (e.g., PAHs, trace metals) would be relatively low, as these chemicals tend to be bound in the matrix structure and not quickly or easily leached. Further, particles would likely be transported downstream by the flow of the river and either carried out to sea or distributed over a sufficiently broad area as not to be problematic. See the NEPA Water Quality Technical Report (ICF International 2016b) and the SEPA Coal Technical Report (ICF International 2016c) for more information. In addition, operation of the On-Site Alternative would not encounter or disturb previously contaminated areas that are being addressed by the MTCA Cleanup Action Plan. Operation of the On-Site Alternative would occur concurrently with environmental remediation and monitoring as required in the Final Cleanup Action Plan for the Former Reynolds facility, as described in the NEPA Hazardous Materials Technical Report (ICF International 2016a). The remedial and monitoring activities would be carried out in accordance with all relevant and appropriate regulations, and would be coordinated to avoid further exposure to the environment. Furthermore, the impact of the cleanup activities would result in bringing previously contaminated groundwater to levels that are protective of human health and the environment thereby reducing the potential for exposure for sensitive receptors.

Affect Groundwater Supply during Operations

Process water uses would include dust control, equipment washdown, and cleanup. Water for dust suppression would be applied on the main stockpiles, within unloading and conveying systems, and at the docks. Excess water from dust suppression and washdown would be collected for reuse. Process water supply would come 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 on-site 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 approximately 2,000 gpm during the dry season (approximately 2,034 AFY) would be required on average 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. As mentioned above, the Applicant holds water rights for instantaneous extraction of 23,150 gpm up to a total volume of 31,367 AFY. Combined with the groundwater demand from existing activities in the Applicant's leased area (approximately 1,994 AFY), the total demand on groundwater supplies during operation of the On-Site Alternative would be approximately 3,019 AFY, which is less than 10% of the pumping limit. Therefore, operation of the On-Site Alternative would have a negligible impact on groundwater supply. The Applicant would ensure 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 On-Site Alternative.

3.1.4 Operations: Indirect Impacts

Operation of the On-Site Alternative would result in the following indirect impact on groundwater related to facility operations in the direct impact study area and increased rail traffic on the BNSF Spur and Reynolds Lead (up to 240 unit trains[7] arriving and departing per month) within the direct and indirect impact study areas.

Degrade Groundwater Quality during Operations – Mint Farm Industrial Park

The On-Site Alternative likely would not affect groundwater at the Mint Farm Industrial Park because the wellfield draws water from the deep aquifer, and, as previously mentioned, there is a confining, impervious 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. Contaminants from a spill during operations would be unlikely to ever reach the groundwater withdrawn by the wellfield. The majority of the study area is located within what is referred to as Zone 2 of the Mint Farm Industrial Park's wellhead protection and sanitary control areas (Figure 17).8 Although it would be unlikely a contaminant would ever reach the deep aquifer, should a release of a potential groundwater contaminant occur during operations, cleanup would occur rapidly to reduce potential risk to groundwater. In addition, all surface water generated on the study area would be collected and reused on site or treated before discharge to the Columbia River, further minimizing the potential for contaminants to infiltrate into the ground.

Degrade Groundwater Quality as a Result of a Collision or Derailment

Spills of fuel or other potentially hazardous materials (i.e., lubricants, hydraulic fluids) could occur if rail cars were to collide and/or derail within the direct and indirect impact study areas. The indirect impact study area begins at the west side of the Cowlitz River where the rail line crosses into the City of Longview-Frontal Columbia River Watershed (HUC-12: 170800030602). Similar to day-to-day rail operations, any materials released to the ground resulting from such collision or derailment could be introduced to groundwater through stormwater runoff or surface infiltration and thereby degrade groundwater quality. As discussed in the NEPA

[7] A unit train consists of approximately 125 rail cars and three to four locomotives.

[8] 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.

Hazardous Materials Technical Report (ICF International 2016a), if a release of hazardous materials were to occur, the rail operator would implement emergency response and cleanup actions as required by Occupational Safety and Health Administration rules (29 CFR 1910.120); the Washington State Oil and Hazardous Substance Spill Prevention and Response regulations (90.56 RCW) and the Model Toxic Control Act Cleanup Regulations (Chapter 173-340 WAC). In addition, Federal Railroad Administration accident reporting requirements (49 CFR 225) include measures to avoid or minimize the potential for a spill of fuel or other potentially hazardous materials from affecting groundwater quality, through quick response, containment and cleanup. Thus, a release of potentially hazardous materials would not be expected to affect groundwater.

3.2 Off-Site Alternative

Potential impacts on groundwater from the Off-Site Alternative are described below.

3.2.1 Construction: Direct Impacts

Construction of the Off-Site Alternative would result in the following direct impacts.

Affect Groundwater Recharge during Construction

Construction of the Off-Site Alternative would involve ground-disturbing activities (excavations, grading, filling, trenching, backfilling, and compaction) that would permanently alter the existing drainage and groundwater recharge patterns in the study area. As mentioned above, the project area is currently undeveloped and consists of dense to sparse vegetation and grassy areas. Therefore, it is expected that groundwater recharge occurs in the study area and would essentially be eliminated by construction of a terminal dominated by an impervious surface area.

During construction, a majority of the stormwater runoff would be collected and treated prior to discharge to the Columbia River, which is the major source of groundwater recharge in the area. Although the Off-Site Alternative would permanently modify groundwater recharge through reduced infiltration in the study area, the Off-Site Alternative would still be discharging the majority of construction runoff, after treatment, to the Columbia River, where it would still be available for groundwater recharge.

Degrade Groundwater Quality during Construction

Due to the absence of site-specific groundwater-related information, the quality of groundwater associated with the Off-Site Alternative project area is unknown. Although there are no known sources of environmental contamination on the site, farming of the agricultural lands and the operations and maintenance of the former motocross tracks may have included the use of pesticides, herbicides, fuels, and other related contaminants, which have the potential to affect soil, surface water, and groundwater. It is not known if any residual chemicals remain in the soil. Site assessment would be conducted prior to any ground-disturbing activities, and should any contamination (i.e., soil, surface water, or groundwater contamination) be discovered, the Applicant would be required to coordinate with the appropriate federal, state, and local agencies and identify the appropriate measures to clean up the contamination to acceptable levels.

Furthermore, it is expected impacts on groundwater quality would be minimal due to the required implementation of a construction stormwater pollution prevention plan and BMPs to protect surface waters from discharge of polluted stormwater. Furthermore, similar to the On-Site Alternative, during construction of the Off-Site Alternative, the majority of the stormwater would be collected and treated prior to discharge to any surface water, further reducing the amount of pollutants entering the Columbia River and potentially affecting groundwater quality.

Construction of the Off-Site Alternative could release contaminants into the ground through leaks and spills during construction, similar to the On-Site Alternative, which could be introduced to groundwater through stormwater runoff or infiltration, and potentially degrade groundwater quality. However, as mentioned above, construction activities would be required to comply with a construction stormwater pollution prevention plan and implement BMPs to prevent discharge of polluted stormwater. Furthermore, during construction, a majority of the stormwater would be collected and treated prior to discharge, further reducing the potential for pollutants to enter the Columbia River and/or potentially affect groundwater quality.

Furthermore, similar to the On-Site Alternative, the preparation of the Off-Site Alternative project area for construction would involve the preloading and installation of vertical wick drains to aid in the consolidation of low consistency silt and low-density sand. Some of the construction would occur adjacent to the closed Mt. Solo Landfill. The installation of the vertical wick drains could create a temporary groundwater gradient, or increase the gradient, toward the study area. Due to the proximity of the project area to the closed Mt. Solo Landfill, groundwater quality could be affected. If contaminant concentrations in groundwater are found to be above MTCA screening levels set forth by Ecology, the wick drains would need to be profiled prior to disposal.

Lastly, construction of the Off-Site Alternative is not expected to affect the wellfield at the Mint Farm Industrial Park. While construction-related spills of hazardous materials could occur, the potential consequences of such spills are generally small due to the likely small size of the spills (i.e., less than 50 gallons), as well as the localized and short-term nature of an accidental release. Impacts would be the same as, or similar to, those described above for the On-Site Alternative.

Affect Groundwater Supply during Construction

Less than 40,000 gallons per day would be required for construction of the Off-Site Alternative to minimize the generation of fugitive dust. Water would need to be obtained from a new well or from an off-site source during construction. A new groundwater supply well(s) at the Off-Site Alternative property would require hydrogeology studies and a grant of water rights prior to construction to ensure that groundwater supplies would not be adversely affected.

3.2.2 Construction: Indirect Impacts

No indirect impacts have been identified for groundwater related to construction of the Off-Site Alternative.

3.2.3 Operations: Direct Impacts

Operation of the Off-Site Alternative would result in the following direct impacts.

Affect Groundwater Recharge during Operations

As mentioned above, full build out of the Off-Site Alternative would result in a substantial increase in impervious surfaces compared to current conditions. Stormwater that would have otherwise recharged groundwater through infiltration would be collected at the terminal site and conveyed to a treatment system for reuse related to project operations (i.e., dust suppression, wash-down water, storage) or discharged to the Columbia River. However, the runoff collected in the treatement system and discharged to the Columbia River would be available for groundwater recharge because of the hydrologic connection between the river and the shallow groundwater in the project area. Thus, operation would permanently modify drainage and recharge patterns at the project area.

Degrade Groundwater Quality during Operations

Operation of the Off-Site Alternative could release contaminants onto the ground, which could then infiltrate to groundwater and degrade groundwater quality. However, with the implementation of BMPs, potential impacts are expected to be low and similar to those described above for the On-Site Alternative. Overall, operations of the proposed terminal are not expected to degrade groundwater quality due to the surface runoff drainage and treatment system that would avoid and minimize any infiltration of contaminant-laden runoff into the ground.

Affect Groundwater Supply during Operations

Similar to the On-Site Alternative, operation of the Off-Site Alternative would require process water (e.g., noncontact cooling water, dust control, equipment wash down, cleanup, and fire protection). Implementation of the Off-Site Alternative would require an evaluation of the groundwater hydrology at the site, retention of water rights, and installation of groundwater supply well(s) to accommodate both construction and operations. Therefore, the Off-Site Alternative would affect groundwater supplies through the acquisition of new groundwater rights.

It is anticipated that since the stockpile areas, rail loop, and other impervious surface areas would be similar to the On-Site Alternative, the amount of stormwater generated and water collected for treatment and reuse would also be similar. Operation of the terminal would require process water, which would be drawn, in part, from a new groundwater well; about 334 million gallons per year (MGY) (1,025 AFY) of groundwater would be needed to augment the surface supply. While a new well would tap groundwater supplies, pumping would not be expected to measurably affect groundwater levels given the proximity of the site to the Columbia River and expected recharge rates in the area. In addition, any new wells proposed for the Off-Site Alternative would require an evaluation of the groundwater hydrology at the site, and application and approval for new water rights to ensure there would be no adverse impacts to groundwater supply.

3.2.4 Operations: Indirect Impacts

Operation of the Off-Site Alternative would result in the following indirect impact.

Degrade Groundwater Quality As a Result of a Collision or Derailment

The potential impacts on groundwater quality during operations of the facility and from accidental train collisions or derailment would be the same as those described for the On-Site Alternative (Section 3.1.1.3, *Operations: Indirect Impacts*). A release of potentially hazardous materials would not be expected to affect groundwater.

3.3 No-Action Alternative

Under the No-Action Alternative, the Corps would not issue a Department of the Army permit authorizing construction and operation of the proposed export terminal. As a result, impacts resulting from constructing and operating the export terminal would not occur. In addition, not constructing the export terminal would likely lead to expansion of the adjacent bulk product business onto the export terminal project area. The following discussion assesses the likely consequences of the No-Action Alternative related to groundwater.

Continued use of groundwater would occur under the approved water rights for the existing on-site groundwater wells. The existing NPDES Industrial Stormwater Permit would remain in place, maintaining the water quality of existing stormwater discharges to the Columbia River, which would maintain water quality of groundwater. Any new or expanded industrial uses would trigger a new or modified NPDES permit. Thus, potential impacts on groundwater could occur under the No-Action Alternative similar to those described for the On-Site Alternative, but the magnitude of the impact would depend on the nature and extent of the future expansion.

Chapter 4
Required Permits

The following permits would be required in relation to groundwater.

4.1 On-Site Alternative

The On-Site Alternative would require the following permits related to groundwater.

- Cowlitz County Critical Areas permit 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 would be required to ensure no potential contamination of groundwater resources associated with project construction and operations stormwater discharge.
- National Pollutant Discharge Elimination System (NPDES) Permit would be required for any new stormwater discharges during construction and operation of the export terminal.
- Water Rights—The Applicant would ensure their existing water rights are current prior to use of those rights. If the Applicant's water rights are current, the Applicant must maintain those water rights. If the Applicant's water rights are not current, the Applicant must apply for and obtain the necessary water rights.

4.2 Off-Site Alternative

The Off-Site Alternative would require the following permits related to groundwater.

- City of Longview and Cowlitz County Critical Areas permits may be required to address compliance with the City and County's critical areas ordinances should Critical Aquifer Recharge Areas be located on or adjacent to the Off-Site Alternative.
- Clean Water Act Section 401 Water Quality Certification would be required to ensure no potential contamination of groundwater resources associated with project construction and operations stormwater discharge.
- National Pollutant Discharge Elimination System (NPDES) Permit would be required for any new stormwater discharges during construction and operation of the export terminal.
- Water Rights— The Applicant would ensure water rights are current before exercising those rights; water rights must be maintained for ongoing groundwater use.

Chapter 5
References

5.1 Written References

Anchor Environmental, LLC. 2007. *Remedial Investigation Report*. June. Chinook Ventures, Inc., and Northwest Alloys, Inc. Seattle, WA.

Anchor. 2013. RI/FS Report, Former Reynolds Metals Reduction Plant, Longview, Washington. June. As cited in URS Corporation 2014a.

Anchor QEA. 2014a. *Former Reynolds Metals Reduction Plant—Longview, Draft Remedial Investigation and Feasibility Study*. June. Submitted on behalf of Northwest Alloys, Inc. and Millennium Bulk Terminals—Longview, LLC.

Anchor QEA. 2014b. *Engineering Report for NPDES Permit Application*. July. Prepared for Millennium Bulk Terminals—Longview, LLC, Longview, WA.

City of Longview. 2006. *Comprehensive Plan, Chapter 7 Public Facilities, Utilities, Services.*

City of Longview, Mint Farm Regional Water Treatment Plant, Preliminary Design Report, Part 2A, Hydrogeologic Characterization, March 2010

HDR and EES. 2006. *Gray-Elochoman and Cowlitz Watershed Management Plan WRIAs 25 and 26.* July.

ICF International. 2016a. *Millennium Bulk Terminals— Longview, NEPA Environmental Impact Statement, NEPA Hazardous Materials Technical Report.* September. Seattle, WA. Prepared for U.S. Army Corps of Engineers, Seattle District.

ICF International. 2016b. *Millennium Bulk Terminals— Longview. NEPA Environmental Impact Statement. NEPA Water Quality Technical Report.* September. Seattle, WA. Prepared for U.S. Army Corps of Engineers, Seattle District.

ICF International. 2016c. *Millennium Bulk Terminals—Longview, SEPA Environmental Impact Statement, SEPA Coal Technical Report*. April. Seattle, WA. Prepared for Cowlitz County, Kelso, WA, in cooperation with Washington State Department of Ecology, Southwest Region.

Kennedy/Jenks Consultants. 2010. *City of Longview Mint Farm Regional Water Treatment Plant, Preliminary Design Report, Part 2A Hydrogeological Characterization*. March.

Kennedy/Jenks Consultants. 2012a. *City of Longview Mint Farm Regional Water Treatment Plant, Groundwater Quality Sampling Results, November 2012 – Monitoring Event K/J 0997003*1*. April.

Kennedy/Jenks Consultants. 2012b. *Source Water – Wellhead Protection Program*. Section 5 of 2012 Water System Plan Updated (draft). K/J Project No. 1197009*00. February 1.

Lower Columbia Fish Recovery Board. 2001. *WRIA 25/26 Grays-Elochoman and Cowlitz Watershed Planning Documents Level 1 Assessment.* Report No 4-00-247. August. Available: http://www.lcfrb.gen.wa.us/document_library_2514%20TM.htm. Accessed: April 16, 2014.

URS Corporation. 2014a. *Millennium Coal Export Terminal Longview, Washington*. Affected Environment Analysis – Water Resources. January.

URS Corporation. 2014b. *Millennium Coal Export Terminal Longview, Washington Water Resource Report*. September.

URS Corporation. 2014c. *Millennium Coal Export Terminal Longview, Washington Surface Water Memorandum*. Supplement to Water Resource Report. November.

URS Corporation. 2014d. *Millennium Coal Export Terminal Longview, Washington Surface Water Memorandum, Second Supplement to Water Resource Report Water Collection and Drainage*.

URS Corporation. 2014e. *Millennium Coal Export Terminal Longview, Washington, Off-Site Alternative – Barlow Point, Appendix M, Water Resource Report*.

U.S. Geological Survey. 2001. *What is Ground Water?* Open-File Report 93-643. April. Available: http://pubs.usgs.gov/of/1993/ofr93-643/pdf/ofr93-643.pdf.

U.S. Geological Survey. 2013. *Lahars and Their Effects*. Last revised: February 21, 2013. Available: http://volcanoes.usgs.gov/hazards/lahar/. Accessed: November 7, 2014.

U.S. Geological Survey. 2014. Stream gage data for Beaver Army Terminal near Quincy, Oregon. Available: http://waterdata.usgs.gov/nwis/?provisional.

Washington State Department of Ecology. 2014a. *Groundwater*. Available: http://www.ecy.wa.gov/water/groundwater.html. Accessed: November 6, 2014.

Washington State Department of Ecology. 2014b. *Reynolds Metals Aluminum Smelter*. Available: https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=11796. Accessed: July 16, 2014.

Washington State Department of Ecology. 2015. *Water Right Tracking System*. Available: http://www.ecy.wa.gov/programs/wr/rights/tracking-apps.html. Accessed: February 24, 2015.

Washington State Department of Health. 2010. *Washington State Wellhead Protection Program Guidance Document*. DOH 331-018 (revised). Olympia, WA. June.

5.2 Personal Communications

Chaney, Katy. AECOM, Seattle, WA. January 9, 2015—Email to Chris Soncarty, ICF International, regarding existing water demand.