Millennium Bulk Terminals—Longview NEPA Environmental Impact Statement

NEPA Water Quality 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 Water Quality Technical Report.* September. (ICF 00264.13.) Seattle, WA. Prepared for U.S. Army Corps of Engineers, Seattle District.

Contents

Tables

Figures

Acronyms and Abbreviations

Applicant	Millennium Bulk Terminals—Longview, LLC
BMP	best management practice
BNSF	BNSF Railway Company
CDID	Consolidated Diking and Improvement District
cfs	cubic feet per second
Corps	U.S. Army Corps of Engineers
CRD	Columbia River Datum
DDT	dichlorodiphenyltrichloroethane
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FNU	formazin nephelometric units
g/cm^3	grams per cubic meter
g/L	grams per liter
$g/m^2/year$	grams per square meter per year
LVSW	Longview Switching Company
mg/L	milligrams per liter
NPDES	National Pollution Discharge Elimination System
Oregon DEQ	Oregon Department of Environmental Quality
PAH	polyaromatic hydrocarbon
PBDE	polybrominated diphenyl ether
PCB	polychlorinated biphenyl
Reynolds facility	Reynolds Metals Company facility
SWPPP	stormwater pollution prevention plan
TCDD	tetrachlorodibenzo-p-dioxin
TEEC	trace elements of environmental concern
TMDL	total maximum daily load
UP	Union Pacific
USGS	U.S. Geological Survey
WDNR	Washington State Department of Natural Resources
WRIA	Water Resources Inventory Area

Chapter 1
Introduction

This technical report assesses the potential water quality impacts of the proposed Millennium Bulk Terminals—Longview project (On-Site Alternative), Off-Site Alternative, and No-Action Alternative. For the purposes of this assessment, water quality refers to the overall quality of the water resources of the project area and study area. This report describes the regulatory setting, establishes the method for assessing potential water quality impacts, presents the historical and current water quality conditions in the study area, and assesses potential impacts on water quality.

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),[1] 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.

[1] LVSW is jointly owned by BNSF Railway Company (BNSF) and Union Pacific Railroad (UP).

Figure 1. Project Vicinity

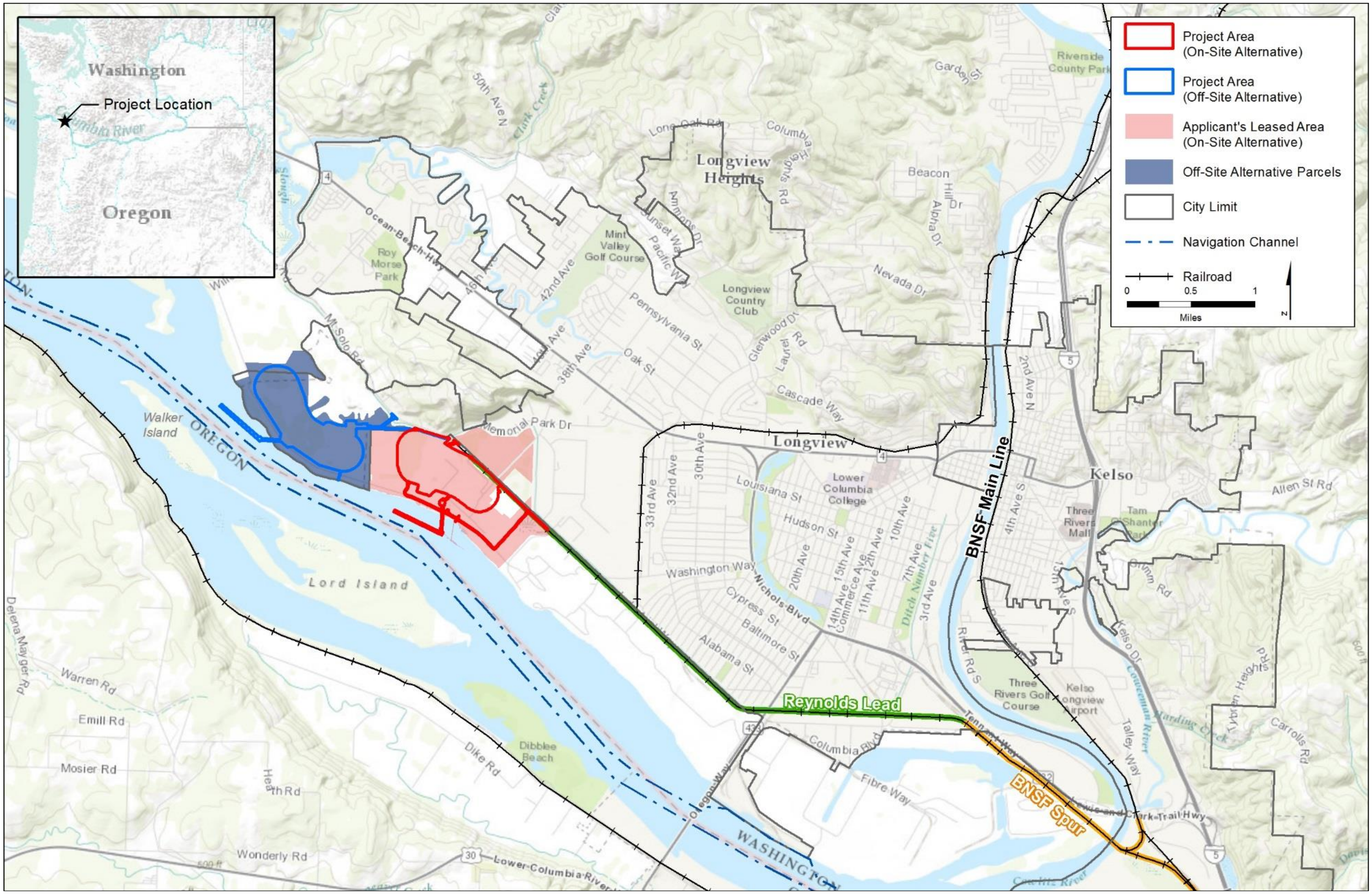
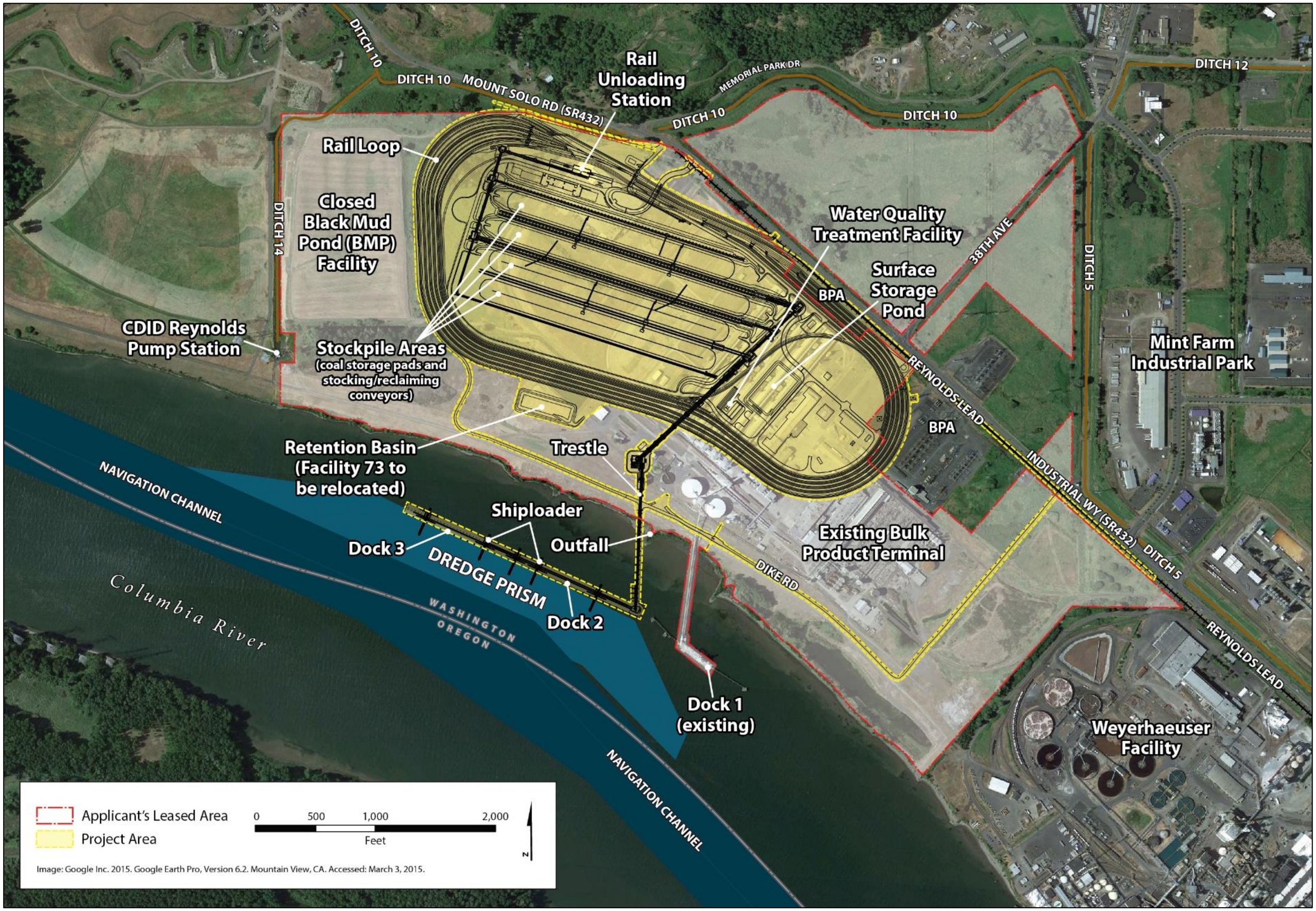


Figure 2. On-Site Alternative



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.[2] 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

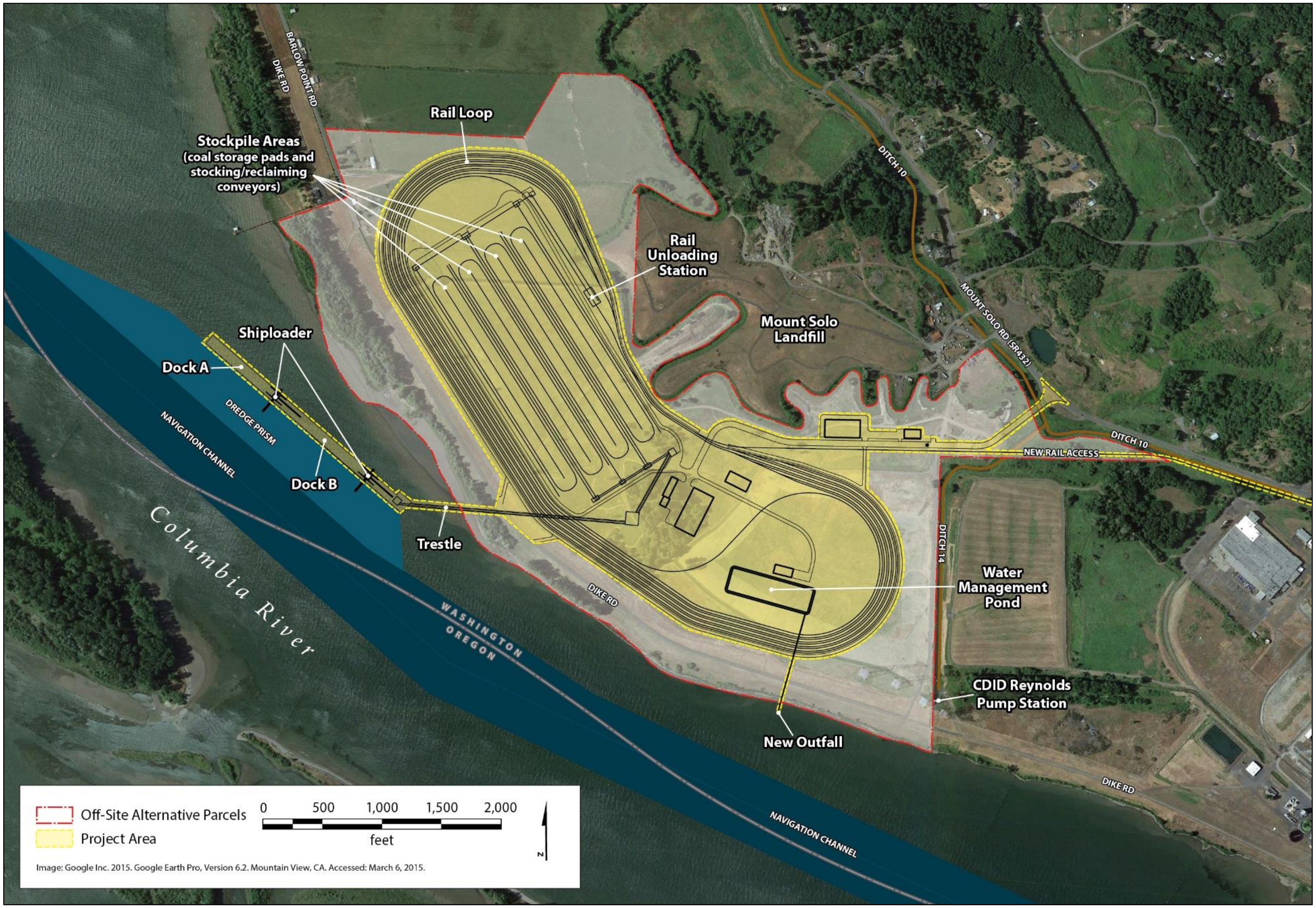
Under the Off-Site Alternative, the export terminal would be developed on an approximately 220-acre site adjacent to the Columbia River, located in both Longview, Washington, and unincorporated Cowlitz County, Washington, in an area commonly referred to as Barlow Point (Figure 3). The project area for 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.

[2] A metric ton is the U.S. equivalent to a tonne per the International System of Units, or 1,000 kilograms or approximately 2,204.6 pounds.

Figure 3. Off-Site Alternative



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.

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

Different jurisdictions are responsible for the regulation of water quality. These jurisdictions and their regulations, statutes, and guidance that apply to water quality are summarized in Table 1.

Table 1. Regulations, Statutes, and Guidance for Water Quality

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).

Regulation, Statute, Guideline	Description
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.
Clean Water Act (33 USC 1251 *et seq*.)	Authorizes EPA to establish the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters.
Safe Drinking Water Act (42 USC 300f *et seq*.)	Requires the protection of groundwater and groundwater sources used for drinking water. Also, requires every state to develop a wellhead protection program. EPA is the responsible agency.
National Pollutant Discharge Elimination System Permit (40 CFR 122)	Controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Authorized by the Clean Water Act. EPA is the responsible agency but delegates the authority to state resource agencies.
National Pollutant Discharge Elimination System Vessels Program	Regulates incidental discharges from the normal operation of vessels. These incidental discharges include, but are not limited to, ballast water, bilgewater, graywater (e.g., water from sinks, showers), and antifoulant paints (and their leachate). Such discharges, if not adequately controlled, may result in negative environmental impacts via the addition of traditional pollutants or, in some cases, by contributing to the spread of aquatic invasive species. Authorized by the Clean Water Act. EPA is the responsible agency.
Washington 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.
Clean Water Act Section 401 Water Quality Certification	Requires a water quality certificate to ensure that a project does not violate state or tribal water quality standards. The CWA directly grants all states Section 401 certification authority. In Washington, Ecology administers the Section 401 Water Quality Certification program. A Section 401 Water Quality Certificate must be issued prior to the issuance of a Section 404 permit or Section 402 permit.
Drinking Water/Source Water Protection (RCW 43.20.050)	Ensures safe and reliable public drinking water supplies in cooperation with local health departments and water purveyors. Ecology is the responsible agency.
Model Toxics Control Act (RCW 70.105D)	Requires potentially liable persons to assume responsibility for cleaning up contaminated sites. Ecology is the responsible agency.
State Water Pollution Control Law (RCW 90.48)	Provides Ecology with 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 forth fundamental policies for the state to ensure that waters of the state are protected and fully used for the greatest benefit. Ecology is the responsible agency.
Water Quality Standard for Surface Waters of the State of Washington (WAC 173-201A)	Establishes water quality standards for surface waters of Washington State. Ecology is the responsible agency.

Regulation, Statute, Guideline	Description
Ballast Water Management (RCW 77-120)	Governs discharge of ballast water into waters of the state. Includes reporting and testing requirements. WDFW is the responsible agency.
Washington Administrative Code (WAC 173-340-300)	Requires reporting of hazardous substance releases if they may constitute a threat to human health or the environment.
Washington Administrative Code (WAC 173-204)	Establishes administrative procedural requirements and criteria to identify, screen, evaluate, prioritize, and clean up contaminated surface sediment sites.
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.
Oregon State	
Treatment Requirements and Performance Standards for Surface Water, Groundwater Under Direct Influence of Surface Water, and Groundwater (OAR 333-061-0032)	Establishes water quality standards for groundwater to meet current state and federal safe drinking water standards. Oregon DEQ is the responsible agency.
Oregon Drinking Water Quality Act (ORS 448.119 to 448.285; 454.235; and 454.255)	Ensures safe and reliable public drinking water supplies in cooperation with local health departments and water purveyors. Oregon DEQ is the responsible agency.
Water Quality Standards: Beneficial Uses, Policies, And Criteria for Oregon Oregon State Legislature: Turbidity Rule (OAR 340-041-0036)	Establishes the following turbidity standard: No more than a 10% cumulative increase in natural stream turbidities may be allowed, as measured relative to a control point immediately upstream of the turbidity-causing activity. However, limited-duration activities necessary to address an emergency or to accommodate essential dredging, construction or other legitimate activities and which cause the standard to be exceeded may be authorized provided all practicable turbidity control techniques have been applied. Oregon DEQ is the responsible agency.
Local	
Cowlitz County SEPA Regulations (CCC Code 19.11)	Provide for the implementation of SEPA in Cowlitz County.
Cowlitz County Stormwater Ordinance (CCC 16.22)	Establishes minimum standards to guide and advise all who make use of, contribute to, or alter the surface waters and stormwater drainage systems in Cowlitz County.
Cowlitz County Critical Areas Ordinance (CCC 19.15)	Requires Cowlitz County to designate critical areas such as wetlands, aquifer recharge areas, geologically hazardous areas, fish and wildlife habitat, and frequently flooded areas; and adopt development regulations to ensure the protection of such areas.
City of Longview Stormwater Ordinance	Establishes methods for controlling the introduction of runoff and pollutants into the municipal storm drain system (MS4) in order to comply with requirements of the Western Washington Phase II Municipal Stormwater NPDES Construction Stormwater General Permit process.

Regulation, Statute, Guideline	Description
Cowlitz County Phase II Municipal Stormwater Management Plan	Requires the Cowlitz County to develop a SWMP and update it at lease annually. The SWMP incorporates BMPs to reduce the discharge of pollutants from the regulated area to the maximum extent practicable in order to protect water quality.

Notes:
USC = United States Code; NEPA = National Environmental Policy Act; CFR = Code of Federal Regulations; Corps = U.S. Army Corps of Regulations; CEQ = Council on Environmental Quality; EPA = U.S. Environmental Policy Act; NPDES = National Pollutant Discharge Elimination System; WAC = Washington Administrative Code; Ecology = Washington State Department of Ecology; RCW = Revised Code of Washington; Oregon DEQ = Oregon Department of Environmental Quality; ORS = Oregon Revised Statutes; NTU = nephelometric turbidity units; WDFW = Washington Department of Fish and Wildlife; OAR = Oregon Administrative Rules; CCC = Cowlitz County Code; SWMP = stormwater management plan; BMP = best management practice,

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 water quality is the project area and an area extending 300 feet from the project area into the Columbia River. This portion of the study area accommodates the analysis of in-water construction and dredging impacts on water quality associated with suspended sediment and elevated turbidity. The study area also incorporates potential in-river dredged material disposal sites and an area extending 300 feet downstream of each disposal site (Figure 4).

The study area for indirect impacts on water quality incorporates the project area, the Consolidated Diking and Improvement District (CDID) #1 stormwater system drainage ditches adjacent to the project area, the Columbia River up to 1 mile downstream of the project area, and potential in-river dredged material disposal sites plus an area extending 300 feet downstream of each disposal site.

1.3.2 Off-Site Alternative

The Off-Site Alternative study area for direct impacts on water quality is the project area and the mixing zone in the Columbia River within 300 feet of the project area, as well as the dredge disposal sites, as described for the On-Site Alternative (Figure 5).

For indirect impacts, the study area includes the project area, CDID #1 stormwater system drainage ditches adjacent to the project area, the Columbia River up to 1 mile downstream of the project area, and potential in-river dredged material disposal sites plus and area extending 300 feet downstream of each disposal site. This study area includes Mount Solo Slough due to its proximity to the Off-Site Alternative project area.

Figure 4. Water Quality Study Area for the On-Site Alternative

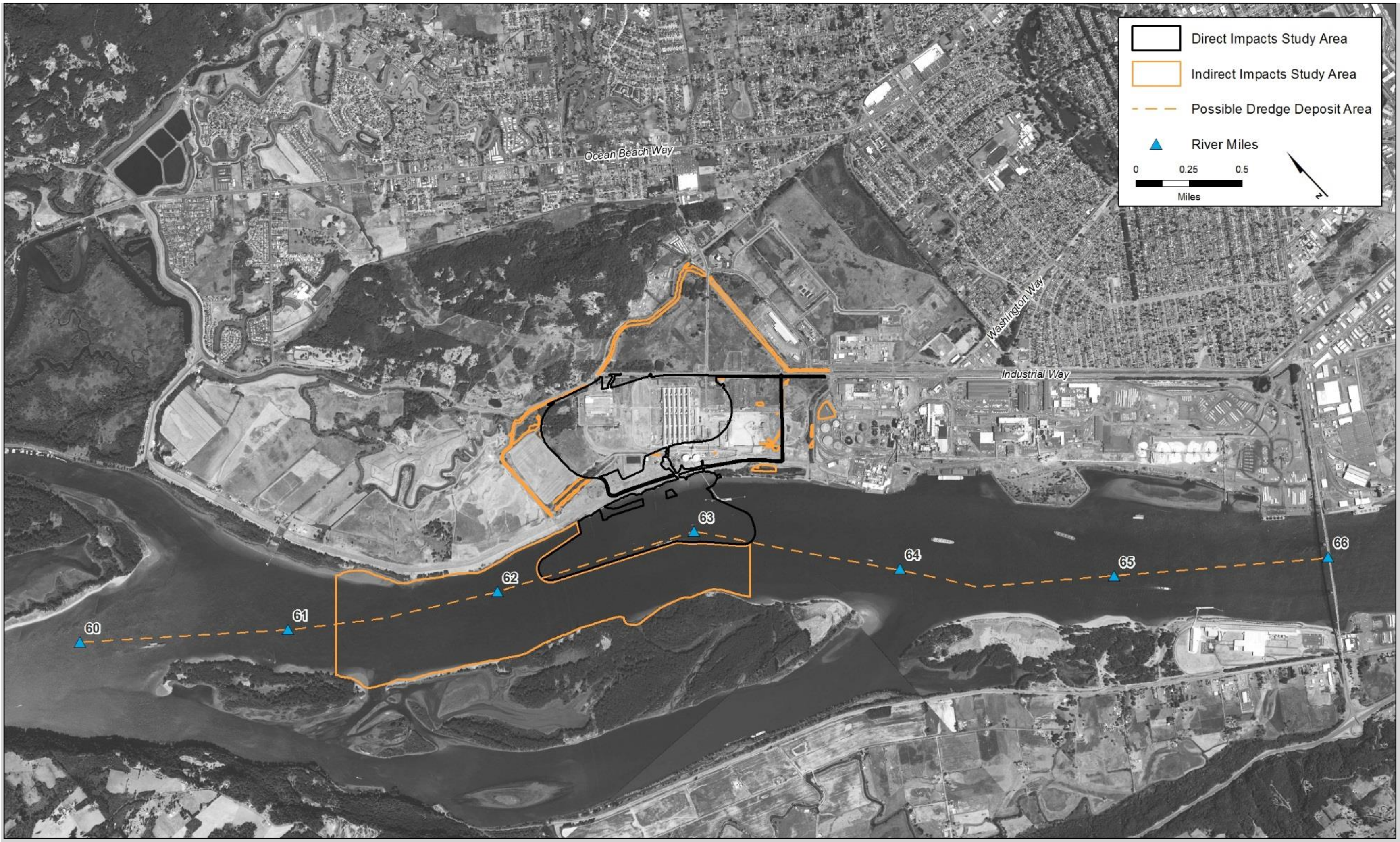
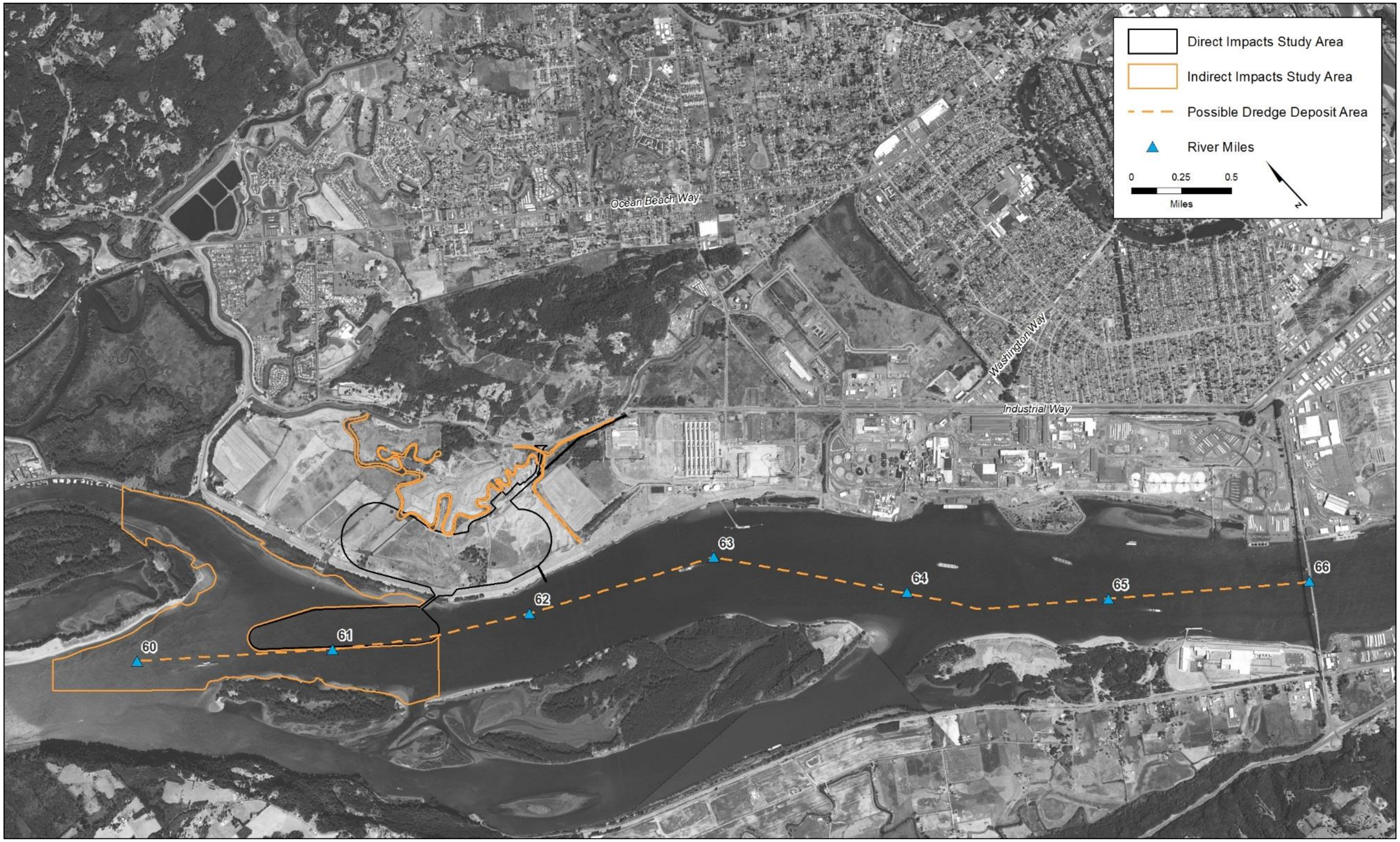


Figure 5. Water Quality Study Area for the Off-Site Alternative



Chapter 2
Affected Environment

This chapter describes the methods for assessing the affected environment and determining impacts, and the affected environment in the study area as it pertains to water quality.

2.1 Methods

This section describes the methods used to characterize the affected environment and assess the potential impacts of the On-Site Alternative, Off-Site Alternative, and No-Action Alternative on water quality.

2.1.1 Data Sources

The following sources of information were used to evaluate the characteristics of the study area.

- Anchor QEA. 2011. *Engineering Report for NPDES Application Millennium Bulk Terminals.* Longview, WA. September 2011. Established the baseline water conditions for each project area.
- U.S. Environmental Protection Agency. 2009. *Columbia River Basin: State of the River Report for Toxics.* EPA 910-R-08-004.
- Ewing, Richard. 1999. *Diminishing Returns: Salmon Declines and Pesticides.* Available: http://www.pcffa.org/salpest.pdf. Accessed: October 20, 2014.
- Grette Associates, LLC. 2014a. *Millennium Coal Export Terminal Longview, Washington: Permanent Impacts to Aquatic Habitat*. September 2014.
- Grette Associates, LLC. 2014b. *Millennium Coal Export Terminal Longview, Washington: Docks 2 and 3 and Associated Trestle Direct Effects of Construction.* September 2014.
- Grette Associates, LLC. 2014c. *Millennium Coal Export Terminal Longview, Washington: Bulk Product Terminal Wetland and Stormwater Ditch Delineation Report – Parcel 61953. September 2014.*
- National Marine Fisheries Service. 2011. *Columbia River Estuary ESA Recovery Module for Salmon and Steelhead.* Portland, OR. January 2011.
- Oregon Department of Environmental Quality. 2003. *Designated Beneficial Uses Mainstem Columbia River (340-41-0101)*.
- Oregon Department of Environmental Quality. 2012. *303(d)/305(b) Integrated Water Quality Assessment Report.* Established the baseline water conditions for the Columbia River.
- Oregon State Marine Board. 2012. *Best Management Practices (BMP) White Paper for Recreational Boating Facility Construction and Replacement.*
- URS Corporation. 2014a. *Millennium Coal Export Terminal Longview, Washington. Affected Environment Analysis – Water Resources*. January.

- Washington State Department of Ecology. 2014. *Stormwater Management Manual for Western Washington.* Publication No. 14-10-055. Olympia, WA. Established the baseline water conditions for the Columbia River.
- Washington Department of Natural Resources. 2008. *Creosote Cleanup of Puget Sounds and its Beach*. Sedro-Woolley, WA.
- Other sources of relevant information, as cited in the text.

2.1.2 Impact Analysis

The following methods were used to evaluate the potential impacts of the On-Site Alternative, Off-Site Alternative, and No-Action Alternative on water quality. Potential impacts on the quality of groundwater are described in more detail in the NEPA Groundwater Technical Report (ICF International 2016b).

Impacts are based on how the On-Site Alternative, Off-Site Alternative, and No-Action Alternative would consume and discharge water and affect water quality relative to the affected environment and assuming compliance with regulations. Potential water quality impacts were evaluated with respect to existing water quality conditions and project-related water usage and discharge. The assessment also assumes the proposed project would comply with all applicable laws and regulations regarding water quality. For the purposes 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).

The impact assessment assumes that the On-Site Alternative and Off-Site Alternative would include the following elements.

On-Site Alternative:

- An individual National Pollution Discharge Elimination System (NPDES) Construction Stormwater General 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.
- Water management would include the collection, conveyance, treatment, and reuse of water. Any water discharged to adjacent waters would be treated prior to discharge.

Off-Site Alternative:

- An individual National Pollution Discharge Elimination System (NPDES) Construction Stormwater General Permit for stormwater discharges during construction and operations.
- Water management would include the collection, conveyance, treatment, and reuse of water. Any water discharged to adjacent waters would be treated prior to discharge.

2.2 Affected Environment

The affected environment related to water quality in the study area is described below.

2.2.1 On-Site Alternative

The project area for the On-Site Alternative is located along the north shore of the Columbia River and lies in CDID #1[3]. The project area is generally flat at an elevation of +5 to +12 feet above the Columbia River Datum (CRD) and is drained by a system of National Pollution Discharge Elimination System (NPDES) permitted ditches to the Columbia River following treatment and to CDID ditches. Discharges to the Columbia River and CDID (Ditches 10 and 14) are monitored as part of the existing NPDES permit.

2.2.1.1 Project Area Characteristics

The water quality characteristics of the On-Site Alternative project area are described below.

Drainage

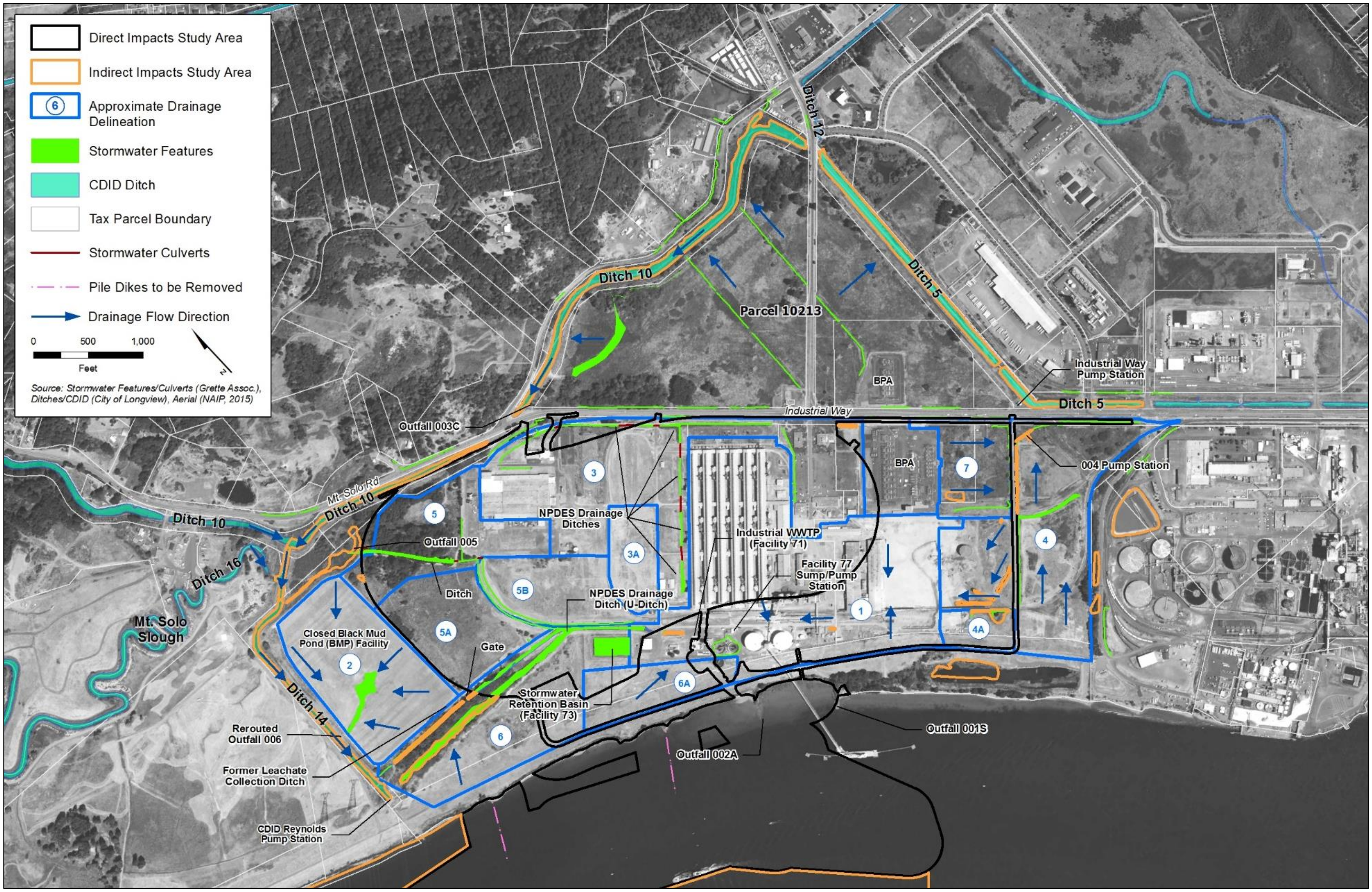
Stormwater and shallow groundwater drainage for the Applicant's leased area is controlled by a system of ditches, pump stations, treatment facilities, and outfalls. As shown in Figure 6, all of these facilities operate under a single NPDES permit. All of the Applicant's leased area drainage is either held onsite and evaporates, discharged to surrounding CDID #1 ditches (Ditches 10 and 14) that eventually flow to the Columbia River, or is treated and discharged through Outfall 002A to the Columbia River.

The following is a brief description of drainage components within the Applicant's leased area.

- **Sheet flow and infiltration.** Subbasin 4A, 5, 5A, 5B, 6A, and 7 receive sheet flow from storm events, which subsequently infiltrates or evaporates.
- **Columbia River discharge.** Subbasins 1, 2, 3A, 4, and 6 are conveyed via pumped systems or gravity to Facility 73, where they are treated and then discharged to the Columbia River via Outfall 002A.
- **CDID discharge.** Subbasin 3 flows through a vegetated ditch that discharges to CDID Ditch 10 through Outfall 003C. During larger storm events, a portion of the flows from Subbasin 2 and Subbasin 5 can discharge to the CDID ditch system. Subbasin 2 overflows the rerouted 006 pump station and is discharged to CDID Ditch14 through Outfall 006. This is a designed overflow system and it is equipped with a high flow alarm to alert staff when it is activated. Subbasin 5 flows can enter a vegetated ditch that discharges to CDID Ditch 10 through Outfall 005. Ultimately, all CDID ditch flows discharge to the Columbia River.

[3] Consolidated Diking Improvement District No. 1 (CDID #1) is a special purpose district pursuant to Chapter 85.15 of the Revised Code of Washington (RCW). CDID #1 was formed in 1923 as a consolidation of seven smaller diking and drainage districts in the area. (http://cdid1.org/)

Figure 6. Drainage Features of the On-Site Alternative



- **Drainage features on Parcel 10213**. These features include three vegetated ditches, two unvegetated ditches, and a shallow stormwater pond. Two of the vegetated ditches run north-south across the two larger portions of Parcel 10213. They are narrow and linear and convey stormwater to a culvert approximately 16 inches in diameter located at the north end of these ditches which then empties into CDID Ditch 10. The third vegetated ditch consists of three segments of linear vegetated ditches adjacent to Industrial Way. These three ditches are connected by two culverts that are beneath the site's access roads. This feature likely collects stormwater from Industrial Way and adjacent areas and conveys it to CDID Ditch 10.

  One unvegetated ditch runs parallel to CDID Ditch 10 and consists of two sections of a narrow ditch that was likely constructed to intercept shallow groundwater affecting agricultural use of the site. This unvegetated ditch is several feet deep, nearly vertical along its sides, and is bisected by one of the vegetated ditches that runs parallel across the site; however, there is no surface hydrology connection between these two ditches. The other unvegetated ditch serves as the outlet channel for the stormwater pond. This ditch is located at the northeast end of the stormwater pond and conveys excess stormwater from the pond to CDID Ditch 10 through a 16-inch culvert. All six features are privately owned and are not managed by CDID #1.

Consolidated Diking Improvement District # 1

CDID is a secondary permittee on the Cowlitz County/Kelso/Longview Municipal NPDES permit. The CDID system is a series of levees that contain approximately 35 miles of drainage ditches that protect from external flooding (rivers), internal flooding (storm drainage runoff), and flooding from lands adjacent to the levee system (groundwater). The project area lies within the areas served by the CDID series of levees and ditches, which protect the area from flooding.

Water from Ditches 5, 10 and 14 in the study area was tested in 2006, 2011, and 2012 to determine levels of cyanide and fluoride (contaminants associated with the site cleanup). Total suspended solids were also tested. The results showed that water quality standards were met and that there were no exceedances or violations of established Washington State water quality standards (Anchor QEA 2011). The entire CDID #1 ditch system discharge to the Columbia River.

Columbia River

The Columbia River flows along the southwest project area boundary. This part of the river is freshwater and tidally influenced. Washington State Department of Ecology (Ecology) has established instream flow requirements for several locations on the Columbia River. Instream flows are specific streamflow levels that are regulated to protect fish, wildlife, recreation, aesthetics, water quality, and navigation (Washington State Department of Ecology 2014a). The project area is located at approximately river mile 64. The mean annual flow of the Columbia River, measured at the Beaver Army Terminal near Quincy, Oregon (river mile 53.8) is approximately 236,000 cubic feet per second (cfs). The river's annual discharge rate fluctuates with precipitation, snowmelt, and reservoir releases. Flows in the river range from 63,600 cfs to 864,000 cfs depending on conditions in the watershed (U.S. Geological Survey 2014). The Columbia River's annual cycle is driven by snowmelt and general climate of the Pacific Northwest, which produces high flows during the spring snowmelt period and low flows during the late summer and early fall. The river's flow, however, is highly managed through the operations of the many hydroelectric and irrigation dams that exist throughout the basin. The average annual discharge ranges from about 120,000 cfs during a low water year to about 260,000 cfs during a high water year (Washington State Department of Ecology 2016a).

2.2.1.2 Water Quality Characteristics and Criteria

Water quality characteristics and criteria are described below.

Designated Beneficial Uses

Designated beneficial uses for a water body, as established in the Clean Water Act, are used to design protective water quality criteria, to assess the general health of surface waters, and to establish thresholds for future permit limits. Table 2 provides a list of the beneficial uses for the Columbia River as defined by Ecology and the Oregon Department of Environmental Quality (Oregon DEQ). A designated beneficial use provides a waterbody's assessed function or utility, and if a waterbody fails to meet the established water quality standards, the waterbody's designated use can be adversely affected.

Table 2. Beneficial Uses for the Columbia River

Washington State Department of Ecology[a]	Oregon Department of Environmental Quality[b]
Domestic water supply	Public domestic water supply; private domestic water supply
Industrial water supply	Industrial water supply
Agricultural water supply	Irrigation
Stock water supply	Livestock watering
Spawning/rearing uses for aquatic life	Fish and aquatic life
Harvesting	Fishing; wildlife and hunting
Boating	Boating
Primary contact for recreation uses	Water contact recreation
Commerce/navigation	Commercial navigation & transportation
Aesthetics	Aesthetic quality

Notes:

a Washington State Department of Ecology (2012) approved uses for the Columbia River from its mouth to river mile 309.3

b Oregon Department of Environmental Quality (2003) approved uses for the Columbia River from its mouth to river mile 86 (2003)

Anticipated Designated Beneficial Uses of the Columbia River near the On-Site Alternative

Weyerhaeuser Longview, which is located at river mile 63.5, discharges wastewater from two treatment plants into the Columbia River. Weyerhaeuser's NPDES Permit WA0000124 (Weyerhaeuser 2014) included designated beneficial uses. Because of the proximity of the Weyerhaeuser Longview facility to the project area it is anticipated that the uses and criteria established for Weyerhaeuser may be applicable to the project area. The Weyerhaeuser uses and associated water quality criteria are provided below in Tables 3 and 4.

Table 3. Freshwater Aquatic Life Uses (Weyerhaeuser Longview)

Salmonid Spawning, Rearing, and Migration	
Parameter	**Water Quality Criteria**
Temperature Criteria – Highest 1-DAD MAX	• 1-day maximum (1-DMax) of 20.0 °C • When natural conditions exceed 1-DMax, no temperature increase will raise the receiving water temperature by greater than 0.3 °C
Dissolved Oxygen Criteria – Lowest 1-Day Minimum	To exceed 90 percent saturation
Turbidity Criteria	• 5 NTU over background when the background is 50 NTU or less; or • A 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
Total Dissolved Gas Criteria	Total dissolved gas must not exceed 110 percent of saturation at any point of sample collection.
pH Criteria	The pH must measure within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.5 unit.

Table 4. Recreational Uses (Weyerhaeuser Longview)

Parameter/Use	Water Quality Criteria
Primary Contact Recreation	Fecal coliform organism levels must not exceed a geometric mean value of 100 colonies /100 mL, with not more than 10 percent of all samples (or any single sample when less than ten sample points exist) obtained for calculating the geometric mean value exceeding 200 colonies /100 mL

In addition to the designated beneficial uses listed in Tables 3 and 4, water supply uses established for Weyerhaeuser include domestic, agricultural, industrial, and stock watering and miscellaneous freshwater uses include wildlife habitat, harvesting, commerce and navigation, boating, and aesthetics.

Water Quality Impairments in the Study Area

The Columbia River faces water quality issues that endanger the health of important habitats found throughout the basin. Land use practices have increased the level of nutrients and pesticides and water temperature and instream structures such as dams and irrigation impoundments have affected water quality by inhibiting mixing, introducing dissolved gases, and trapping contaminated sediments. Industrial, municipal, and agricultural practices have introduced toxic contaminants from point and nonpoint sources (U.S. Geological Survey 2005).

Portions of the Columbia River are considered impaired for a number of water quality factors, according to the EPA-approved 303(d) lists for Washington and Oregon. Table 5 shows the 303(d) listed impairments for water quality factors in the study area. The State of Washington recently finalized the state's 2012 water quality assessment 303 (d) list of impaired waters. According to the 303(d) list, in the study area the Washington State portion of the Columbia River is impaired (i.e., Category 5) for water temperature and bacteria (Washington State Department of Ecology 2016b). In addition, Ditch 5 in the study area is impaired by bacteria. Oregon has listed the Columbia River in the study area as impaired for arsenic, DDE 4,4, and PCB. Arsenic, fecal coliform (indicator of bacteria), and dioxin were detected during monitoring of existing outfalls that would drain the project area (Anchor QEA 2014a).

Sediment sampling from within, adjacent to, and upstream of the Project area (to approximately River Mile (RM) 68, has demonstrated that in deepwater areas of the Columbia River, sediments are typically composed of silty sands with a low proportion of fines and very low total organic carbon. Further, sediments sampled from deepwater areas in the vicinity of the proposed export terminal have consistently met suitability requirements for flow lane disposal or beneficial use in the Columbia River (Grette 2014a: Appendix B). Sediment testing performed by the Applicant in the project area has revealed no exceedance of sediment-management standards at any nearshore or offshore location, except for in a localized area immediately adjacent to the existing Outfall 002A. Testing criteria were exceeded at one location downstream of the outfall, but did not exceed criteria for human health protection (Anchor QEA 2014b in Grette 2014b: Appendix B). The distribution of contamination was limited in area and depth to an isolated layer six inches in thickness, and the contamination source was identified as a historical discharge and not the result of an ongoing release (Grette 2014b: Appendix B).

Table 5. 303(d) Listed Impairments for Surface Waters in the Study Area

	Washington		Oregon[c]
Parameter	**Columbia River**	**Ditch 5**	**Columbia River**
Arsenic	-	-	5
Bacteria	5[a]	-	-
DDE 4,4	-	-	5
Dioxin (2,3,7,8-TCDD)	-	-	4A[b]
Dioxin	4A[b]	-	-
Dissolved Oxygen	-	5	-
PCB	-	-	5
Temperature	5	-	-
Total dissolved gas	-	-	4A[b]

Notes:

a Category 5 waters are impaired 303(d) waters, which means water quality standards have been violated for one or more pollutants and a TMDL or other water quality improvement is required.

b Category 4A listing indicates a TMDL has been developed and is actively being implemented.

c Oregon 2012 303(d) list is currently pending approval from the EPA. The 2010 effective list for this segment of the Columbia River is the same as the 2014 list that is currently pending approval by EPA.

Sources: Washington State Department of Ecology 2016b; Oregon Department of Water Quality 2012

DDE = Dichlorodiphenyldichloroethylene; TCDD = Tetrachlorodibenzo-p-dioxin; PCB = polychlorinated biphenyl

Baseline Water Quality Conditions in Broader Columbia River Basin

General baseline conditions for the broader Columbia River basin and Lower Columbia River and Estuary near the project are described below, followed by a discussion of specific water quality attributes. These attributes are discussed quantitatively where feasible and qualitatively otherwise. The purpose of this section is to provide some context for the water quality conditions of the study area by describing the conditions of the greater Columbia River basin because the impairments of surface waters in the study area are not entirely connected to activities only occurring in the project area, but can be related to the practices that degrade water quality throughout the greater basin.

Columbia River Basin

A significant focus has been placed on toxics reduction in the Columbia River basin. While many contaminants are found in the Columbia River basin, four main contaminants are found throughout the basin at levels that could adversely affect people, fish, and wildlife: mercury dichlorodiphenyltrichloroethane (DDT) and its breakdown products, polychlorinated biphenyls (PCBs), and polybrominated diphenyl ether (PBDE) flame retardants. Other contaminants found in the basin include radionuclides, lead, pesticides, industrial chemicals, and newly emerging contaminants such as pharmaceuticals (U.S. Environmental Protection Agency 2009).

Lower Columbia River and Estuary near the Project Area

The lower Columbia River and Estuary is the 235-kilometer reach from the Bonneville Dam downstream to the Pacific Ocean. Monitoring results have shown high levels of contaminants such as PCBs, polyaromatic hydrocarbons (PAHs), DDT, and PBDEs in juvenile salmon tissue, water, and sediment. Studies have shown that flame-retardants and endocrine-disrupting compounds in water, sediment, fish, and osprey eggs increase downstream from Skamania to Longview (Lower Columbia Estuary Partnership 2015). Arsenic is most frequently detected metal in the lower Columbia.

Trace metals such as aluminum, iron, and manganese are predominantly transported in the suspended phase, whereas arsenic, barium, chromium, and copper are transported in the dissolved phase. Highest water temperatures in the lower Columbia generally occur in August where daily mean water temperatures often exceed 20^{0}C. Data collected on September 11, 2015 at river mile 53, near the Beaver Army Terminal, indicated an oxygen saturation of 85.5% (9.17 mg/l), temperature of 20.03^{0}C, and turbidity of 1.61 nephelometric turbidity units (NTUs). For contrast, data collected just below the Bonneville Dam at river mile 145 indicated an oxygen saturation of 97.9% (10.5 mg/l), temperature of 20.07^{0}C, and turbidity of 2.27 NTUs (Center for Coastal Margin Observation and Prediction 2016).

On a more localized basis near the project area, the following average values were recorded in the lower Columbia: oxygen saturation of 73.62% (7.9 mg/l), temperature of 20.96^{0}C, and turbidity of 9.9 NTUs (Weyerhaeuser NPDES 0000124).

Water Quality Attributes

Water Clarity

Water clarity refers to the amount of light that can penetrate water. Water clarity is an important parameter for assessing baseline water quality because lower clarity increases water temperatures, reducing the water’s capacity to hold dissolved oxygen; and adversely affects photosynthesis, reducing the production of dissolved oxygen. Suspended sediment can clog the gills of fish and reduce their resistance to disease, cause lower growth rates, and affect egg and larval development. While both suspended sediment concentration and turbidity are common metrics of water clarity, turbidity data are available from a nearby U.S. Geological Survey (USGS) station and are used to characterize baseline conditions.

Background levels of turbidity in the Columbia River vary by season and weather patterns. USGS provisional data from the 2014 water year, collected at Beaver Army Terminal near Quincy, Oregon, reported elevated turbidity[4] (U.S. Geological Survey 2015) that was generally higher than during the 2007 water year, when water clarity was rated as poor (U.S. Environmental Protection Agency 2007). However, elevated turbidity levels or poor water clarity in rivers such as the Columbia River

[4] The USGS data presented is defined as “Turbidity, water, unfiltered, monochrome near infra-red LED light, 780-900 nm, detection angle 90 +-2.5 degrees, formazin nephelometric units (FNU).”

are a natural condition that occurs during storm events and periods of high seasonal runoff and does not necessarily mean the water quality conditions are poor.

Biological Indicators

EPA and the Lower Columbia Estuary Partnership reported the following additional parameters in 2007 (U.S. Environmental Protection Agency 2007).

- **Dissolved nitrogen and phosphorus:** 100% of the estuarine area was rated *good* for dissolved nitrogen while 70% of the estuarine area was rated *fair* for dissolved phosphorus.
- **Chlorophyll *a*:** 29% of the estuarine area was rated *fair* for this indicator, with the remaining 71% of the area rated *good*.
- **Dissolved oxygen:** 99% of the estuarine area was rated *good* for this indicator.
- **Sediment quality:** 89% of the estuary as a whole was rated *good* while 11% was rated *poor*. The sediment quality index is rated based on three component indicators: sediment toxicity, sediment contaminants, and sediment total organic carbon. The estuarine area rated *poor* exceeded thresholds for one or more of these indicators.

Temperature

Water temperature is an important parameter for assessing baseline water quality. The Columbia River is impounded at many locations. These impoundments contribute to elevated water temperature by ponding water and increasing exposure to solar radiation. Although EPA and the Lower Columbia Estuary Partnership did not rate the Columbia River Estuary with respect to water temperature, because water temperature affects the water's capacity for dissolved oxygen, if dissolved oxygen levels are considered good, water temperatures are also fairly good.

Chemical Indicators

USGS conducted a survey of water quality in the Columbia River estuary with data from 2004 and 2005. Major findings of this study are as follows (U.S. Geological Survey 2005).

- The median copper concentration was 1.0 microgram per liter, a level shown to have inhibitory effects on juvenile coho salmon.
- Of the 173 pesticides and degradation products analyzed, 29 were detected at least once, oftentimes with two or more products occurring in a sample together. Fourteen samples with multiple products were detected (no concentrations were provided).
- Of the 54 wastewater products analyzed, eight were detected at least once, usually at trace levels. The known endocrine disruptor, bisphenol A, was detected.
- Of the 24 pharmaceuticals analyzed, acetaminophen, a common analgesic, and diphenhydramine, a widely used antihistamine, were detected. This is an indicator of human sources of water contamination, likely from wastewater treatment plant effluent.
- During the seasonal samplings of suspended sediment at all four sites, no organochlorine compounds or polyaromatic hydrocarbons (PAHs) were detected.

Wetlands

Wetlands provide multiple ecological functions including water purification, flood protection, shoreline stabilization, groundwater recharge, and streamflow maintenance. They can also provide fish and wildlife habitat, recreational opportunities, and aesthetics benefits.

Approximately 96.9 acres of wetland occur in the Applicant's leased area. Ecology requires that all wetlands be rated on three functions: water quality, hydrology, and habitat based on site potential, landscape position, and value of each function. The rating system uses the combined function shores to categorize wetlands. Ecology's wetland categories are summarized in Table 6.

Table 6. Ecology's Wetland Categories Based on Functions

Wetland Category	Total Score for Functions	Category Description
Category I	≥ 70	1. Represent a unique or rare wetland type; or 2. Are more sensitive to disturbance than most wetlands; or 3. Are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or 4. Provide a high level of functions.
Category II	51-69	1. Difficult but not impossible to replace, and 2. Provide a high level of some functions.
Category III	30-50	1. Provide a moderate level of functions, 2. Can often be adequately replaced with a well-planned mitigation project, and 3. Interdunal wetlands between 0.1 and 1 acre in size.
Category IV	< 30	1. Often heavily disturbed, 2. May provide some level of functions, and 3. Should be able to replace, and in some cases be able to improve.

Source: Washington State Department of Ecology 2014b.

Based on Ecology's rating system, the wetlands in the project area scored between 20 to 46, indicating that wetlands in the project area are rated as Category III and IV and provide low to moderate water quality functions, low hydrologic functions, and low to moderate habitat functions (Grette Associates 2014d). Additional information on wetlands is described in the NEPA Vegetation Technical Report (ICF International 2016c).

Practices that Degrade Water Quality

Human activity has degraded water quality in the Columbia River estuary. Higher water temperatures, increased nutrient loading, reduced dissolved oxygen, and increases in toxic contaminants pose risks to fish and wildlife, as well as people. Sources of these contaminants include agricultural practices, urban and industrial practices, and riparian practices (National Marine Fisheries Service 2011). Refer to the NEPA Fish Technical Report (ICF International 2016d) for information regarding fish and potential impacts on fish and fish habitat.

Agricultural Practices

Agricultural practices contribute nutrients (i.e., nitrogen and phosphorus), sediment, and organic compounds (e.g., pesticides) and trace metals to runoff (U.S. Environmental Protection Agency

2014). Increased nutrient loads have been found to result in increased phytoplankton concentrations, increased turbidity, and depressed dissolved oxygen levels, especially in areas with lower flows and warmer water temperatures (Fenn et al. 2003). Increased sediment loads into surface waters can cause potential adverse impacts to aquatic resources. Common sediment impacts include deposition and scouring that can smother or dislodge benthic organisms; effects of turbidity (suspended sediment) which can affect aquatic organisms (e.g., clogging fish gills), alter water temperatures (by absorbing and scattering sunlight), and reduce light penetration which alters primary productivity and affects plants' ability to photosynthesize; and sediment binding to chemicals that can have toxic effects on organisms.

Banned pesticides, including DDT, persist in the environment and pesticides currently in use continue to run off into the estuary (Ewing 1999). The pesticides atrazine, simazine, metolachlor, *S*-ethyl dipropylcarbamothioate, dimethyl tetrachloroterephthalate, and diuron are present at sites throughout the Columbia River estuary, often in combination (U.S. Environmental Protection Agency 2009). Pesticides have the potential to harm benthic invertebrates, fish, amphibians, and various stream microbes.

Trace metals can affect aquatic organisms depending on the metal, the species, and the environment in which it is deposited. Excessive concentrations of some metals can lead to dysfunction of the endocrine system, of reproduction, and growth. Moreover, those metals that can be accumulated in tissues and organs may adversely affect cellular functions by interacting with enzymes, which can lead to disturbances of growth, reproduction, the immune system, and metabolism (Jakimska et al. 2011).

Urban and Industrial Practices

Pollutants sources that affect water quality are separated into two groups, *point sources* and *nonpoint sources*. Point sources are easily identified by a concentrated outlet to a receiving water, where the origin of flow is single known source (e.g., municipal wastewater treatment plant). Nonpoint sources contribute from a variety of locations in a given area. Eventually, nonpoint sources can be concentrated through a single outlet to a receiving water, but each source is not known or difficult to determine (e.g., lawn fertilizer from one or many unknown homes within a watershed).

The Columbia River from Bonneville Dam to the estuary is the most urbanized stretch in the entire basin. Over 100 point sources discharge directly into this stretch, including chemical plants, hydroelectric facilities, pulp and paper mills, municipal wastewater treatment plants, and seafood processors (Ewing 1999).

The largest point source discharger in the Columbia River basin is Portland's wastewater treatment plant (approximately 40 miles upstream of the project area). Nutrient loads from the plant account for 2 to 3% of the annual in-stream nutrient loads at the Beaver Army Terminal water quality sampling site in Quincy, Oregon, downstream of the project area. Another major source of aquatic pollution is the effluent from existing pulp and paper mills, which is highly toxic and contains dioxins and chlorinated phenols. (Ewing 1999). Pulp mill effluent is generally high in organic content and contains pollutants such as absorbable organic halide, toxic dyes, bleaching agents, salts, acids, and alkalis. Heavy metals such as cadmium, copper, zinc, chromium are often also present (Oberrecht 2014). Effluents from these point sources are regulated under NPDES permits and violations can incur significant fines.

Riparian Practices

Shoreline modifications, timber harvest, and agricultural activities in riparian zones and residential, commercial, and industrial development along the Columbia River have resulted in a substantial loss of riparian habitat function in the area (Ewing 1999). Healthy riparian habitat conditions (connected, forested riparian zones) may help to regulate water temperatures (depending on the size of the stream and the extent of shading) and contribute to aquatic habitat conditions and complexity (woody debris, bank stability, allochthonous inputs). In the study area, riparian habitat conditions the functions provided by riparian habitat are degraded. (Ewing 1999).

2.2.2 Off-Site Alternative

The 220-acre project area for the Off-Site Alternative is located along the north shore of the Columbia River and lies in CDID #1. Characteristics of the project area are similar to those described for the On-Site Alternative (Section 2.2.1, *On-Site Alternative*).

The Applicant would be required to lease or purchase various parcels adjacent to the project area to construct and operate the Off-Site Alternative. 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 is located in the City of Longview and owned by the Port of Longview. The remainder of the project area is in unincorporated Cowlitz County and privately owned.

2.2.2.1 Project Area Characteristics

The water quality characteristics of the Off-Site Alternative project area are described below.

Project Area Drainage

Stormwater and shallow groundwater drainage for the Off-Site Alternative project area is managed by infiltration and evaporation with overflow directed to the CDID ditches via a network of small excavated conveyance ditches and Mount Solo Slough (Figure 7). The conveyance ditches flow toward Mount Solo Slough, which discharges to Ditch 14, where water is eventually pumped to the Columbia River by the CDID #1 system. The stormwater is not managed under an NPDES permit. Surface water features on or adjacent to the project area include the Columbia River, Mount Solo Slough, and CDID Ditches 10, 14, and 16.

Mount Solo Slough

Mount Solo Slough forms the northern boundary of the project area and is near the closed Mount Solo Landfill. It is a highly meandering drainage that connects to CDID Ditch 14 to the east and CDID Ditch 16 to the north, both of which both connect to CDID Ditch 10.

Figure 7. Drainage Features for the Off-Site Alternative

Consolidated Diking Improvement District # 1

The project area is in CDID #1, which is as described for the On-Site Alternative (Section 2.2.1.1, *Project Area Characteristics*). The study area includes CDID #1 Ditch 14, Ditch 10, and Ditch 16. Ditch 14 crosses a short section of the eastern portion of the project area (for the rail access extension), just south of its confluence with Ditch 10. Ditch 16 extends between the northern end of Mount Solo Slough and Ditch 10, which runs along Mt. Solo Road.

Columbia River

The Columbia River characteristics are the same as described for the On-Site Alternative (Section 2.2.1.1, *Project Area Characteristics*).

2.2.2.2 Water Quality Characteristics and Criteria

All water quality impairments for the Columbia River in the study area are the same as described for the On-Site Alternative's study area (Section 2.2.1.2, *Water Quality Characteristics and Criteria*).

Chapter 3
Impacts

This chapter describes the impacts on water quality that would 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 water quality from the On-Site Alternative are described below.

The following construction activities of the On-Site Alternative could affect water quality.

- Ground disturbance associated with construction of the proposed export terminal
- Delivery, handling, and storage of construction materials and waste
- Use of heavy construction equipment
- In- and above-water work and dredging activities
- Demolition of existing structures

The following operations activities of the On-Site Alternative could affect water quality.

- Coal spills from rail and vessel loading and unloading
- Transport of airborne fugitive coal dust from stockpiles
- Operation and maintenance of heavy equipment and machinery
- Maintenance dredging

3.1.1 Construction: Direct Impacts

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

Construction projects in Washington State that include clearing, grading, and excavating activities that disturb 1 acre or more and discharge stormwater to surface waters of the state are required to obtain an NPDES Construction Stormwater General Permit from Ecology. Prior to issuance of permits, sites with known contaminated soils or groundwater are required to provide a list of contaminants with concentrations, depths found and boring locations shown on a map with an overlay of where excavation or construction may occur. Additional BMPs may be necessary based on the contaminants and how contaminated construction stormwater would be treated. The permit requires the preparation of a temporary erosion and sediment control plan,[5] a construction stormwater pollution prevention plan (SWPPP) and BMPs to avoid and minimize the risk of erosion. Guidance for the design and implementation of these BMPs would be sourced from the *2012*

[5] Temporary erosion and sediment control plans are developed and implemented to comply with stormwater pollution prevention planning (SWPPP), discharge sampling and reporting requirements in the National Pollutant Discharge Elimination System (NPDES) construction stormwater general permit, issued by the Washington State Department of Ecology

Stormwater Management Manual for Western Washington (Washington State Department of Ecology 2014a), including but not limited to those developed by the Applicant. The selected BMPs would represent the best available technology that is economically achievable and the best conventional pollutant control technology to reduce pollutants. BMPs would include a wide variety of measures to reduce pollutants in stormwater and other nonpoint source runoff. Construction practices would include measures to avoid and minimize erosion of soils associated with land disturbance and subsequent discharge of sediment-laden stormwater to adjacent surface waters. These requirements were considered when evaluating the potential direct impacts associated with construction.

Temporarily Increase Surface Water Turbidity Because of Upland Soil Disturbance

Construction of the On-Site Alternative would include ground-disturbing activities that would expose soils and generate soil stockpiles. Rain could erode soil and carry it into adjacent waterways (e.g., Columbia River and CDID ditches) and temporarily increase turbidity.

Although background turbidity in the Columbia River may change by orders of magnitude following storm events, if increased turbidity is sustained for several days it could affect surface water quality through interference with photosynthesis, oxygen exchange, and the respiration, growth, and reproduction of aquatic species. The potential for erosion during most ground-disturbing activities is considered low because the project area is relatively level and appropriate erosion and sediment control measures would be required through the NPDES Construction Stormwater General Permit, thus reducing the potential for impacts on water quality.

Both Ecology and Oregon DEQ have standards for turbidity increases from construction (Section 1.2, *Regulatory Setting*). These include the Water Quality Standards for Surface Waters of the State of Washington; Water Quality Standards: Beneficial Uses, Policies, and Criteria for Oregon; and Oregon State Legislature: Turbidity Rule. A project of this size can exceed the standards if erosion control measures are not implemented correctly. Monitoring is required downstream and at an upstream station to establish a baseline to determine if standards are met during construction. Discharge monitoring is required at all discharge points. If turbidity changes violate either Oregon's or Washington's standards, improvements must be made immediately, and all modifications, improvements, and repairs to erosion and sediment controls are to be recorded on the monitoring forms. Violations can result in civil penalties up to $10,000 per day for violation of a term, condition, or requirement of a permit.

The Applicant identified the following BMPs as an initial list of measures to be implemented during construction to avoid and minimize potential impacts on water quality. This list may be expanded (Millennium Bulk Terminals Longview 2013).

- BMP C105: Stabilized Construction Entrance/Exit—would be installed and maintained through the duration of demolition, site preparation, preloading, and construction.
- BMP C106: Wheel Wash—would be installed and used at the entrance of the project area to prevent sediment from being tracked off site.
- BMP C107: Construction Road/Parking Area Stabilization—roads, parking areas, and other on-site vehicle transportation routes would be stabilized to reduce erosion caused by construction traffic or runoff.

- BMP C140: Dust Control—would be used to prevent wind transport of dust from disturbed soil surfaces. Either water or polyacrylamide would be used prevent soil erosion.
- 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.
    - Storage of hazardous materials onsite 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: 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 groundwater.
- BMP C162: Scheduling—would reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking.
- BMP C200: Interceptor Dike and Swale—a ridge of compacted soil or a ridge with an upslope swale would be provided at the top or base of a disturbed slope or along the perimeter of a disturbed construction area to convey stormwater. The dike or swale would be used to intercept the runoff from unprotected areas and direct it to areas where erosion can be controlled. This would be used to prevent storm runoff from entering the work area or sediment-laden runoff from leaving the construction site.
- BMP C203: Water Bars—a small ditch or ridge of material would be constructed diagonally across roads as needed to prevent gullying.
- BMP C207: Check Dams—would be constructed to reduce the velocity of concentrated flow and dissipates energy at the check dam.
- BMP C209: Outlet Protection—would prevent scour at conveyance outlets and minimizes the potential for downstream erosion by reducing the velocity of concentrated stormwater flows.
- BMP C220: Storm Drain Inlet Protection—would be installed at several locations across the project area to prevent coarse sediment from entering drainage systems prior to permanent stabilization of the disturbed area.
- BMP C233: Silt Fence—would be constructed around the entire project area to reduce the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.
- BMP C241: Temporary Sediment Pond(s) —would be designed and constructed to remove sediment from runoff originating from disturbed areas of the project area.

Implementation of BMP C241 Temporary Sediment Pond would result in the creation of five water quality ponds (wetponds) based on the proposed site grading and drainage areas. These wetponds would be sized to treat the volume and flow from a water quality design storm event (72% of the 2-year storm). Additional storage would be provided within the coal storage area such that the runoff would always be treated within the stockpile area, even for larger storm events.

These wetponds are part of Facility 73 and would be designed to provide sufficient capacity for sediment settlement as the stormwater flows through the ponds during construction. Weekly inspection and inspection within 24 hours of a rain event would be required under the NPDES Construction Stormwater General Permit. The inspections would be performed by a Certified Erosion and Sediment Control Lead. In the event that the wetponds reach their capacity, existing wetponds would be expanded or additional wetponds would be constructed sufficient to handle the amount of stormwater and sediment generated. Oil and grease components would be removed by mechanical skimmer. If treatment through the wet ponds is insufficient, filtration treatment would further remove suspended solids, associated particulate metals, and oil and grease. Filtration is initiated when effluent is greater than 15 NTU for 20 minutes; otherwise, if stormwater is below 15 NTU following settling, the filtration plant is bypassed. Subsequently, treated water would be conveyed downstream to the existing pump station outfall 002A that discharges into the Columbia River via an existing 30-inch steel pressure line or harvested for circulation around the site for multiple uses, including dust control measures.

CDID ditches are used for controlling floods, removing stormwater from areas that are protected behind levees, and conveying and discharging that stormwater to the Columbia River. The CDID ditches collect water from roads, parking lots, yards, and other land uses that contribute to elevated turbidity levels and pollutants that are discharged in the Columbia River. Because runoff from the project area would be required to meet the terms and conditions of all permits issued for the On-Site Alternative, construction may provide some improvement to the quality of water that is discharged from the site to the CDID ditches.

Overall, the construction activities associated with the On-Site Alternative would not be expected to cause a measurable impact on water clarity, water quality, or biological indicators; nor would construction affect designated beneficial uses.

Temporarily Release Contaminants Associated with Equipment and Material Use

The delivery, handling, and storage of construction materials and waste, as well as the use of heavy construction equipment could provide sources for stormwater contamination. Use and maintenance of heavy equipment could result in leaks or spills of vehicle fluids (i.e., fuel, lubricants, hydraulic fluid) on exposed parts of the equipment or onto the ground, where it could enter nearby surface water bodies through surface runoff. Constituents in vehicle fluids such as fuel, oil, hydraulic fluid, and grease can be acutely toxic to aquatic organisms and could degrade water quality and bioaccumulate in the environment. Chemicals typically used during construction including paints, solvents, and cleaning agents, which could also enter ground and surface waters through infiltration and stormwater runoff if such substances are spilled or exposed to precipitation. These substances can also be toxic to aquatic organisms and can degrade water quality. Construction waste such as metal, welding waste (e.g., scrap electrodes, slag, flux), and uncured concrete could be a potential source of pollution to water resources. Waste metals and welding wastes contain heavy metals and other chemicals and uncured concrete has a high pH, all of which can degrade water quality and be harmful to aquatic organisms (Washington State Department of Ecology 2014a). Additionally, staging areas or building sites can be sources of pollution because of the use of paints, solvents, cleaning agents, and metals during construction. Impacts associated with metals in stormwater include bioaccumulation and toxicity to aquatic organisms and contamination of drinking supplies.

Development and implementation of a site-specific construction SWPPP that includes BMPs for material handling and construction waste management would reduce the potential for water quality impacts from these sources because water entering the CDID ditches from the project area would be treated. Typical SWPPP BMPs that would help prevent releases to surface waters include:

- All fuel and chemicals would be stored and handled properly to ensure no opportunity for entry into the water.
- No land-based construction equipment would enter any shoreline body of water except as authorized.
- Equipment would have properly functioning engine closures (i.e., hydraulic, fuel, lubricant reservoirs) according to federal standards; the contractor would inspect fuel hoses, oil or fuel transfer valves, and fittings on a regular basis for drips or leaks in order to prevent spills into the surface water.
- The contractor would have a spill containment kit, including oil-absorbent materials, on site to be used in the event of a spill or if any oil product is observed in the water.

Furthermore, the spill response time would be relatively quick and proper spill response equipment would be labeled and available. Quantities of hazardous materials is likely to be relatively small during construction (i.e., typically fewer than 50 gallons). If this volume were discharged directly to the Columbia River, it could affect water quality.

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

Temporarily Mobilize Pollutants or Increase Turbidity from In-Water Work and Dredging

The On-Site Alternative would dredge an estimated 500,000 cubic yards of sediment from the Columbia River to provide berthing at Docks 2 and 3. The work necessary to construct the approach trestle and entire dock structures for Docks 2 and 3 would require in-water work that could resuspend pollutants and sediment and increase turbidity.

Dredging would permanently deepen a 48-acre area, all of which is in deep water (at least -20 feet) to a target depth of -43 feet CRD with a 2-foot overdredge allowance. The deepening would require dredging depths that range from as little as a few feet to approximately 16 feet. It is anticipated that the sediment within the dredge prism[6] for Docks 2 and 3 would be deemed suitable for flow-lane disposal or beneficial use in the Columbia River. Dredging would be conducted using a barge-mounted mechanical clamshell dredge with material loaded into a bottom-dump barge for transport to an approved dredge material disposal site once the barge is full. Dredging could also be conducted using a hydraulic dredge. These methods do not require dewatering.

[6] Total volume, typically trapezoidal in shape of the channel bottom to be removed by the dredging process.

Dredged material would be suitable for flow-lane disposal or beneficial use in the Columbia River based on recent sediment sampling that suggests that sediments from the deepwater areas of the Columbia River are composed of silty sands with a low proportion of fines and low total organic carbon (Grette Associates 2014e). The Sediment Evaluation Framework for the Pacific Northwest was developed by EPA and the Corps as a toolbox for determining the proper disposal method for dredge material including flow-lane disposal. This framework is designed to allow for project-specific concerns and can adapt to projects of any size. Generally, the framework outlines the level of detail required for the sediment characterization study to determine the presence or extent of contamination based on initial sampling. The disposal area for this dredging action is anticipated to be approximately 80 to 110 acres, based on recent flow-lane disposal for disposing of material from the adjacent Dock 1 (Grette Associates 2014a). However, the actual acreage of the disposal site would be determined by the permitting agencies and would be based on sediment characteristics (i.e., consistency and density of sediments). Recent authorizations for flow-lane disposal of dredged materials in the Columbia River near the project area were generally in or adjacent to the navigation channel between approximately river mile 60 and 66) (Grette Associates 2014c).

Dredging and in-water work would result in temporary increases in turbidity. Sediment sampling from within, adjacent to, and upstream of the project area has demonstrated that in deepwater areas of the Columbia River, sediments are typically composed of silty sands with a low proportion of fines (e.g., silt or mud) and very low total organic carbon. Further, sediments sampled from deepwater areas near the project area have consistently met suitability requirements for flow-lane disposal or beneficial use in the Columbia River (Grette Associates 2014c). Thus, it is anticipated that sediment within the dredge prism for Docks 2 and 3 would be deemed suitable for flow-lane disposal or beneficial use in the Columbia River. However, prior to obtaining any permit for the On-Site Alternative, including dredging, the Applicant would conduct site-specific sediment sampling to characterize the proposed dredge prism and ensure compliance with the Dredged Materials Management Plan (Grette Associates 2014c).

Standard BMPs for working in aquatic areas would be followed to maintain acceptable water-quality conditions, including but not limited to maintaining appropriate standards for construction-related turbidity (including during active dredging and flow-lane disposal), minimizing the risks of unintended discharges of materials such as fuel or hydraulic fluid, and managing construction debris. In addition, typical construction BMPs for working over, in, and near water would be applied, including checking equipment for leaks and other problems that could result in discharge of petroleum-based products, hydraulic fluid, or other material to the Columbia River. The following BMPs related to in-water work so apply during the construction period:

- The contractor would use tarps or other containment methods when cutting, drilling, or performing over-water construction that might generate a discharge to prevent debris, sawdust, concrete and asphalt rubble, and other materials from entering the water.
- The contractor would to retrieve any floating debris generated during construction using a skiff and a net. Debris would be disposed of at an appropriate upland facility. If necessary, a floating boom would be installed to collect any floated debris generated during in-water operations.

Construction of the approach trestle and entire dock structure for Docks 2 and 3 would require construction activities both in-water and over-water and waterward of the ordinary high water line, which is 11.1 feet CRD. The Applicant currently anticipates the in-water work will require up to 2 years (over two approved in-water work windows) to complete Docks 2 and 3 and the associated trestlework, depending on permit restrictions. Work windows would be scheduled to avoid and minimize impacts on various natural resources, most notably federally protected fish species, as described in the NEPA Fish Technical Report (ICF International 2016d). In-water construction would primarily involve dredging, pile driving and removal of pile dikes and would use barge-based equipment and purpose-built vessels, although some work would likely be supported from land. A total of 603 of the 622 36-inch diameter steel piles required for the trestle and docks would be placed below the ordinary high water mark, permanently removing an area equivalent to 0.10 acre (4,263 square feet) of river bottom. The construction would also remove 225 feet of the deepest portion of timber pile dikes (Grette Associates 2014a). Piles would be driven and removed via vibratory methods. Piles would be driven and removed using vibratory methods. Vibratory methods are likely to result in localized, short-term resuspension of sediment but to a lesser extent than would be caused by impact methods. Vibration methods reduce friction between the pile and substrate to avoid disturbing large amounts of sediment (Oregon State Marine Board 2012).

According to hydrodynamics modeling from Grette Associates (2014a), strong down-current flow is evident by erosional scour marks along the dredge cut. Therefore, contaminants disturbed during dredging activities would be expected to move downstream. However, initial sediment physical and chemical characterization at the project area shows sediments are typically silty sands with low proportions of fines and organic material, thus reducing the potential to increase turbidity as compared to silty mud or sediments with high concentrations of organic material. Therefore, the period of increased turbidity at the project area is anticipated to be relatively short as sandy particles settle out of suspension more quickly than fine-grained materials. Furthermore, the vast majority construction would occur at relatively deep (less than 20 feet CRD) locations, which also reduces the potential for sediment disturbance during vessel maneuvering (Grette Associates 2014a).

The remobilization of nutrients would be temporary and not likely in quantities large enough to cause algal blooms due to the river's continual flow. Furthermore, dissolved oxygen depletion during dredging is not typically a concern in the Columbia River because of the sandy characterization of river sediments. Any in-water construction impacts would be highly localized and confined within the area around the in-water work. Furthermore, the Applicant identified the following BMPs to avoid and minimize potential impacts from pile removal and installation activities.

- Pile would be removed slowly to minimize sediment disturbance and turbidity in the water column.
- Prior to pile extraction the operator would vibrate the pile to break the friction between the pile and substrate to minimize sediment disturbance and to avoid pulling out large blocks of soil.

Another potential water quality impact from in-water work is the possibility for creosote releases resulting from the removal of existing creosote-treated timber piles associated with two pile dikes. Creosote is a wood preservative that has been used for over a century to treat wood, including piles. Creosote is composed of more than 300 chemicals, including PAHs. PAHs at sufficient levels have been shown to be fatal to marine life (Washington Department of Natural Resources 2008). The removal of creosote-treated piling would result in temporary suspension of sediments and a potential long-term increase in the exposure of creosote in the study area. Over the long-term, the source of creosote would be removed or capped by the sediment falling into the hole left by the extracted pile. The concentration of creosote in the sediment would decrease, water quality would improve, and the pathway of exposure for fish through contamination of prey would be reduced. The exposure of creosote would be caused by the removal of piles that have been buried in an anoxic zone that leaves the creosote highly volatile when re-exposed to water. This creosote could be suspended in the water column and contaminate the adjacent sediments. Additionally, droplets of previously unexposed creosote could be released from the piling into the surrounding sediments because the droplets are heavier than water. To minimize this impact, the contractor would follow the following standard BMPs for removal of creosote-treated wooden piles.

- Pile removal. Vibratory extraction is the preferred method of pile removal. A creosote release to the environment may occur if equipment (bucket, steel cable, vibratory hammer) pinches the creosoted piling below the water line. Therefore, the pile extraction equipment must be kept out of the water to the extent practicable to remove the piling. Cutting is necessary if the pile has broken off at or near the existing substrate, which means it cannot be removed without excavation, or below the water line. Pile cutoff is an acceptable alternative if vibratory extraction or pulling is not feasible. The piling would be cut two feet below the riverbed and the subsequent hole would be capped/filled with clean sand.
- Disposal of piling, sediment, and construction residue. Pulled pile would be placed in a containment basin to capture any adhering sediment. This would be done immediately after the pile is initially removed from the water. Containment basins typically have continuous sidewalls and controls as necessary (e.g., straw bales, oil absorbent boom, plastic sheeting) to contain all removed materials and prevent re-entry into the water. The type and location (e.g., barge, land) of the containment basin would be determined when the contractor's work plan is developed. Piling would be cut into 4-foot lengths with a standard chainsaw. Cut-up piling, sediments, construction residue, and plastic sheeting from the containment basin would be packed into a container. For disposal, materials would be shipped to Rabanco/Seattle, Weyco facility at Longview Washington, or to another facility complying with federal and state regulations.

Above-water work would include installing the pile-supported elements of the dock structures and coal-handling infrastructure and equipment. Some concrete components (such as the dock decking, crane rail supports, and pile caps) would need to be cast in place. Appropriate techniques and BMPs, such as the use of a bib, would minimize the potential for wet or uncured concrete to encounter the Columbia River.

Materials handling infrastructure and equipment such as shiploaders and conveyors would be delivered by barge and off-loaded by crane directly to the docks and trestle. Barges would not offload materials or equipment to any area below the ordinary high water mark of the Columbia River. As much as practicable, infrastructure would be prefabricated so that above-water work would largely consist of installation and assembly.

Impacts on water quality from in-water and over-water work would be addressed in the Water Quality Monitoring and Protection Plan to be prepared by the Applicant. Impacts on water quality from dredging would be minimized with the implementation of a dredging and disposal quality control plan in compliance with the dredged material management program as required by State agencies (Ecology and Washington State Department of Natural Resources) and federal agencies (the Corps and EPA). Dredging and disposal activities would be assessed and evaluated in the dredged material management program based on established policies and guidelines. The *Dredged Material Management Program User Manual* provides technical and policy guidance on the preparation of the quality control plan.

The quality control plan would include dredging methods and procedures to minimize water quality impacts, disposal protocols (whether upland or in-water), a water quality monitoring plan, and contingencies for water quality exceedances. Adhering to the plan would avoid and minimize impacts, ensuring potential impacts are temporary and localized in nature. No long-term changes in the baseline conditions within the study area would be expected to occur.

Temporarily Introduce Hazardous or Toxic Materials from Demolition Activities

Demolition of the existing structures in the project area (e.g., cable plant building, potline buildings, and small ancillary structures) has the potential to affect water quality by disturbing soil or building parts and debris that may contain hazardous or toxic materials. The existing structures are primarily made from steel, aluminum, concrete, and wood and may contain asbestos and lead. As discussed in the NEPA Hazardous Materials Technical Report (ICF International 2016e), a survey of each existing on-site structure has identified if asbestos or lead is present. In addition to disturbing soil, demolition of the existing buildings would result in a substantial amount of debris that may contain hazardous materials such as asbestos or lead. Demolition of buildings with concrete components would also generate concrete dust.

Concrete dust from demolition produces a strong alkaline solution that can drastically increase pH and cause chemical burns to fish, insects, and plants. If concrete dust is not properly contained during demolition, it can run off in stormwater and cause substantial harm to aquatic environments and organisms.

This impact would be minimized by the collection and removal of all concrete and other structural debris and the collection and treatment of all stormwater from the site prior to discharge to surface waters. The implementation of BMPs in compliance with the NPDES Construction Stormwater General Permit that would be obtained for the On-Site Alternative would reduce the potential for demolition-related pollutants to enter and contaminate surface waters. Overall, the demolition activities associated with the On-Site Alternative would not be expected to cause a measurable impact on water quality or biological indicators, nor would they affect designated beneficial uses.

3.1.2 Construction: Indirect Impacts

Construction of the On-Site Alternative would not result in indirect impacts on water quality because construction impacts are immediate and no construction impacts would occur later in time or farther removed in distance than the direct impacts.

3.1.3 Operations: Direct Impacts

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

Although most operations impacts would be as described below, relatively large-scale coal spills could occur in the study area. The trains proposed to bring coal to the project area would hold approximately 122 tons per car and there would be 125 cars per train. The Panamax shipping vessels, with an average capacity of 65,000 deadweight tonnage would be used to transfer the coal to its final destination (Maritime Connector 2015). A large-scale coal spill could affect water resources for extended periods. Refer to the NEPA Rail Transportation Technical Report and the NEPA Vessel Transportation Technical Report for more discussion of potential spills.

Introduce Contaminants from Stormwater Runoff

Stormwater would be managed in accordance with the requirements of a new NPDES Industrial Stormwater Permit obtained for the water management facilities of the proposed export terminal. Contaminants such as oil and grease, coal dust, and other chemicals could accumulate on the ground and facility surfaces and become constituents of site stormwater. All stormwater runoff would be collected for treatment before reuse or discharge to the Columbia River. Coal particulates would be removed from stormwater by allowing the coal dust to settle out in stormwater ponds. The coal dust would be removed from the stormwater ponds and placed back in the coal stockpile area during regular maintenance of the stormwater ponds. Other solids accumulated in the treatment systems not acceptable for reuse would be periodically collected and disposed of at an appropriate off-site disposal site.

The following BMPs may be part of the Applicant's facility design.

- Enclosed conveyor galleries to allow for collection of washdown water.
- 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 BMP training appropriate to their work activities.
- Design of docks to contain spillage, with rainfall runoff and washdown water contained and pumped to the upland water treatment facilities.

Design of system to collect and treat all runoff and washdown water for either reuse for onsite (dust suppression, washdown water, or fire system needs) or discharge offsite.

As shown in Table 5, the Columbia River and Ditch 5 are listed as impaired for pollutants. Some of these pollutants may be introduced from stormwater runoff from the project area. The following pollutants were detected during monitoring of existing outfalls that would drain the project area: arsenic, fecal coliform (indicator bacteria), and dioxin (Anchor QEA 2014a). These pollutants may continue to be introduced as a result of the On-Site Alternative although maximum reported outfall concentrations for these pollutants fall below established water quality standards. Continued discharges at existing levels would not cause a measureable increase in chemical indicators in the Columbia River and would not cause a measurable impact on water quality or biological indicators, nor would they affect designated beneficial uses. Any changes in concentrations of these pollutants that may occur during operations would be addressed under the NPDES Industrial Stormwater Permit to ensure water quality standards continued to be met prior to discharge to the Columbia River.

3.1.4 Operations: Indirect Impacts

Operation of the On-Site Alternative would result in the following indirect impacts on water quality, which could arise as a result of the increase in vessel and rail traffic.

Introduce Contaminants from Coal Spills and Coal Dust

Coal and coal dust could enter the Columbia River directly or via the surrounding drainage channels from accidental spills during loading or through airborne transport of coal dust during operations. The extent of average annual coal dust deposition was modeled and mapped (Figure 8). Coal dust is anticipated to deposit a maximum of 1.45 grams per square meter per year (g/m^2/year) adjacent to the project area. The area of coal dust deposition extends past the project area into the Columbia River, with deposition rates decreasing as the distance from the project area increases.

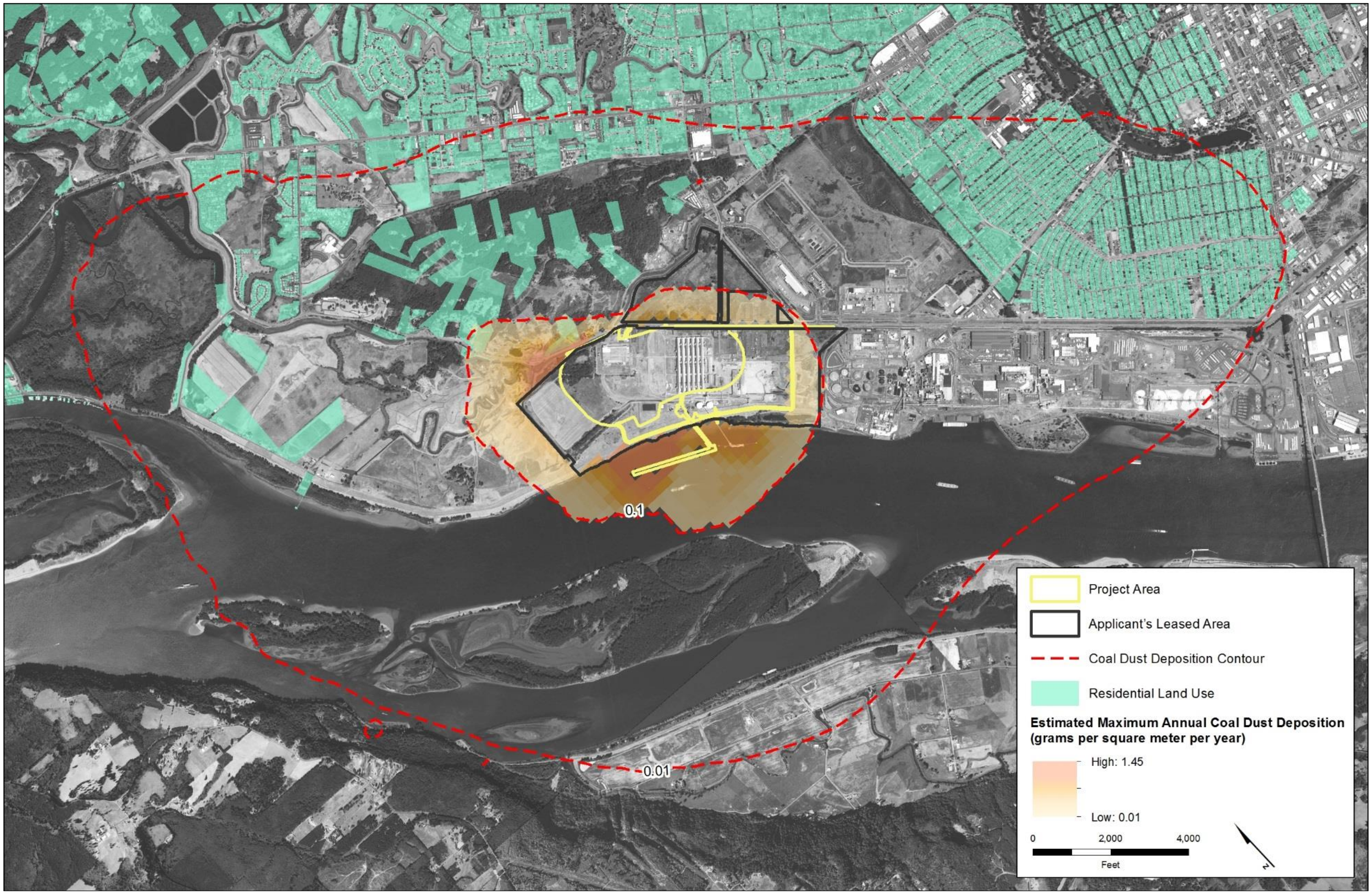
At sufficient quantities, coal and coal dust in marine and estuarine environments have similar adverse effects as elevated levels of suspended sediments on water quality (Ahrens and Morrisey 2005). During periods of lower flow, a smaller amount of coal dust could have a greater impact on water quality. Impacts include increased turbidity, which can interfere with photosynthesis and increase water temperatures (Ahrens and Morrisey 2005). Coal and coal dust in the water column can also affect marine organisms through abrasion of tissue, smothering and clogging of respiratory and feeding organs (Ahrens and Morrisey 2005). However, at a maximum deposition rate of 1.45 g/m^2/year adjacent to the project area, and at the minimum flow[7] recorded over the 23-year period of record for 1 day, coal dust deposition directly into the river assumed to be an area of approximately 3 million square meters (1.16 square miles) in the study area would result in a change in suspended sediment concentration of less than 1 part per 10 billion (7.5e-05 milligrams per liter (mg/L). This change would not be measureable and is not anticipated to increase turbidity or water temperature, or affect marine organisms.

Coal and coal dust captured in stormwater (precipitation that falls on the stockpile areas and water used for dust suppression) would be collected within the stockpile pads, conveyed within an enclosed stormwater system and treated at Facility 73 in settling ponds before being discharged from the site. Some settled coal dust from the project area could discharge to the Columbia River through the CDID #1 system. If coal dust from the project area accumulated without being disturbed throughout the dry season (assumed 120 days), the anticipated change in suspended sediment concentration in the Columbia River within the study area for the minimum recorded flow over one day would be 0.0192 mg/L. Again, this change would not be measureable and would not likely increase turbidity or water temperature, or affect marine organisms.

The On-Site Alternative would employ dust suppression systems throughout the proposed export terminal, including the tandem rotary dumpers, all conveyors, stockpile pads, surge bins, transfer towers, and trestle. Approximately 4,900 linear feet of the 16,100 linear feet of conveyor belts would be enclosed, as would the shiploaders, to limit the release of coal dust. The dust suppression system would employ sprayers and foggers to capture coal dust. Dust suppression water would be collected and conveyed through the stormwater collection,

[7] The minimum recorded flow at the Columbia at Beaver Army Terminal, Quincy, OR is 65,600 cfs (1969 to 2014).

Figure 8. 3-Year Annual Average Coal Dust Deposition Millennium Bulk Terminal – Longview



conveyance, and treatment system. Once treated the water would be reused or, if not needed, discharged to the Columbia River. All water discharged to the Columbia River would be required to meet specific water quality standards in the NPDES permit prior to discharge. The specific standards would be defined within the NPDES Construction Stormwater General Permit to be obtained for the project.

Coal contains trace amounts of toxic elements, but coal is a naturally occurring substance that has not been identified to be toxic or hazardous. Coal has a heterogeneous chemical composition; therefore, specific impacts related to the toxic contaminants of coal are highly dependent on coal composition and source (Ahrens and Morrisey 2005). The majority of coal transloaded at the proposed terminal is expected to be mined in the Powder River Basin, with lesser amounts sourced from the Uinta Basin in Utah and Colorado. Trace elements of environmental concern (TEEC) in Powder River Basin and Uinta Basin coal include antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, selenium, and uranium. These elements are generally low in coals from both of these basins compared to other mining regions, although exact concentrations are not reported (U.S. Geological Survey 2007). Table 7 presents the average concentrations of each TEEC sampled in parts per million. However, at a maximum coal deposition rate of 1.45 $g/m^2/year$ adjacent to the project area and at the minimum flow recorded over the 23-year period of record for 1 day, TEEC deposition directly into the Columbia River assumed to be an area of approximately 3 million square meters (1.16 square miles) in the study area would result in unmeasurable changes in concentration for each of the elements of concern on the order of $1x10^{-13}$ to $1x10^{-15}$ g/L. If coal dust from the project area accumulated without being disturbed throughout the dry season (assumed to be 120 days long), the anticipated change in TEEC concentration for the minimum recorded flow over one day would be on the order of $1x10^{-10}$ to $1x10^{-12}$ g/L. Again, this change would not be measureable and is not anticipated to affect human health or affect marine organism functions (respiration, feeding).

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. Some PAHs are known to be toxic to aquatic animals and humans.

Metals and PAHs could also leach from coal to the pore water of sediments. However, the low aqueous extractability and bioavailability of the contaminants minimizes the potentially toxic effects. Furthermore, the type of coal anticipated to be exported from the proposed export terminal is alkaline and low in sulfur and trace metals. The conditions to produce concentrations in pore waters are not present in a dynamic riverine environment. This would further support the view of Ahrens and Morrisey (2005) that the bioavailability of such toxins would likely be low.

In summary, coal dust from project operations is not expected to have a demonstrable effect on water quality. Additionally, 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.

Coal spilling into the Columbia River could occur during vessel loading operations. Cleanup efforts would be implemented quickly and it would be expected the majority of the spilled coal would be recovered. However, because toxic chemicals in coal tend to be bound to the matrix structure of the coal and are not quickly or easily leached, they would likely not result in a substantial increase in chemical indicators in the Columbia River and would likely not cause a measurable impact on water quality or biological indicators nor would they affect designated beneficial uses.

The concentration of PAHs in Powder River Basin Coal was not investigated for this report.

Because the rate of coal dust deposition is so low, it is likely unmeasurable and the concentration of TEEC are considered low. Therefore, impacts of dispersed coal, coal dust, and coal dust constituents on water quality are anticipated to be low.

Table 7. Average Concentration of Trace Elements in Wyodak and Big George Coal Beds, Powder River Basin, Wyoming and Miscellaneous Uinta Basin Coal Beds in Colorado Plateau

Trace Element of Environmental Concern	Average Concentration in Sampled Coal (ppm)	
	Powder River Basin [a, b]	Uinta Basin [b]
Antimony	0.10	0.7
Arsenic	1.43	2.2
Beryllium	0.18	1.5
Cadmium	0.06	0.1
Chromium	2.63	6.1
Cobalt	1.93	2.0
Lead	1.26	13.9
Manganese	10.05	28.2
Nickel	1.58	4.5
Selenium	0.57	1.4
Uranium	0.46	1.8

Sources:
[a] U.S. Geological Survey 2007
[b] Pierce and Dennen, 2009

As part of operations, any stormwater runoff from the storage and stockpile areas would be collected and conveyed to water quality treatment facilities. Stormwater would be treated prior to discharge to surface waters to avoid and minimize water quality degradation. Approximately 4,900 linear feet of the 16,100 linear feet of conveyor belts would be enclosed, as would the shiploaders to limit the potential for coal or coal dust to affect water quality.

Introduce Contaminants from Maintenance Operations

Potential contaminants, including diesel fuel, oils, grease, and other fluids would be required for the operation and maintenance of heavy equipment and machinery used to transport, store, move, and load coal at the proposed terminal. Normal operations and maintenance activities would not result in a direct discharge of pollutants or process water into surface water. Most operation-related impacts would result from inadvertent spills of potentially hazardous materials such as petroleum products (fuel, lubricants, and hydraulic fluids) or industrial solvents either directly into surface waters or in locations where they could be transported and discharged to surface water or groundwater. These potential releases are likely to be relatively small (less than 50 gallons) and limited in their extent and duration (localized and short-term).

Locomotives have a fuel capacity of 5,000 gallons and could also potentially release fuel during operations. Also, fuel trucks would visit the site as required during operations; the frequency would vary based on usage and could range from as often as once or twice per day to once or twice per week. Fuel trucks typically would have a 3,000-to-4,000-gallon capacity. A spill could have potential impacts on water quality. A spill that occurred would be contained, conveyed, and treated within the proposed stormwater system (i.e., material spilled within the project area would be contained and would not be discharged to surface waters outside the project area). The Applicant would be required to manage contaminated stormwater in accordance with the requirements of the NPDES Industrial Stormwater Permit and avoid and minimize impacts on water quality.

Maintenance dredging for Docks 2 and 3 would be expected to occur every few years. Maintenance dredging impacts on water quality would be similar to those discussed for dredging during construction but to a lesser magnitude because the dredging volumes would be considerably smaller than the initial dredging action during construction. Preparation and implementation of a dredging and disposal quality control plan, discussed above for construction dredging, would also be employed for maintenance dredging. Similarly to construction related dredging activities, no long-term changes in the baseline conditions within the study area would be expected to persist because of maintenance dredging.

Sediment accretion in the proposed dredge prism would most likely occur because of bedload transport due to river currents local scour, and sediment redistribution resulting from propeller wash. Hydrodynamic modeling and sediment transport analysis was conducted for the proposed Docks 2 and 3 berthing/navigation basin. Sedimentation is complex in a newly dredged basin. Specific morphologic data are unavailable for the proposed new dredging basin; therefore the rate of accretion can only be estimated. Based on current accretion estimates, a rough estimate for annual accretion height is 0.16 feet (0.07 to 0.26 feet range) and annual accretion volume is 11,675 cubic yards (ranging from 4,670 to 23,350 cubic yards). Maintenance dredging would likely be required on a multiyear basis or following occasions with extreme flow events. Small-scale maintenance dredging could be needed more frequently, especially in the early years following the initial dredging work when higher than normal accretion is more likely (WorleyParsons 2012).

Introduce Contaminants from Shipping Vessels or Rail Transport

Coal would be transported to the terminal via rail, then loaded onto vessels and transported as directed by the purchasers or owners of the coal to its final destination overseas. Water quality could be indirectly affected as a result of transportation of coal within the study area. These impacts are summarized below. Details regarding an operations oil spill while vessels are at dock and bunkering or as a result of a vessel collision are available in the NEPA Vessel Transportation Technical Report (ICF International 2016a). Details regarding a release of hazardous materials during rail operations and accidental collision or derailment are discussed in the Hazardous Materials Technical Report (ICF International 2016e).

- **Propeller wash.** Vessels produce propeller wash, which is the continuous current of fast-moving water generated by a ship’s propeller. The propeller wash increases the potential for scour and erosion of the dredged slopes and bottom of the navigation channel, and result in temporary, localized increases in turbidity. The On-Site Alternative would result in increased vessel and increased propeller wash, and in impacts on erosion and turbidity, particularly from pilot vessels maneuvering near Docks 2 and 3. Cargo vessels are more likely to create turbulence that can erode bottom sediments because the large propellers on these ships are closer to the seafloor as they travel through the Columbia River. The propeller wash from tugboats is nearer the surface so it has less of an erosion effect on bottom sediments. The likelihood of temporary, localized increases in turbidity resulting from propeller wash is considered low based on the magnitude of dredging that would result from the On-Site Alternative. Furthermore, the dredge prism would tie into the navigation channel, thus reducing the potential for propeller wash during vessel movements at Docks 2 and 3. Vessels calling at Docks 2 and 3 would have sufficient depth to minimize the potential for propeller wash. Any increase in turbidity would be temporary, localized, and not expected to be measureable beyond the study area.

- **Ballast water.** Vessels would be expected to discharge ballast water during the loading process to compensate for the cargo being loaded. Ballast water discharges can often contain materials that can harm surface waters. Common contaminants include invasive marine plants and animals, bacteria, and pathogens that can harm or displace native aquatic species. This contaminated water would then be discharged into the Columbia River during coal loading, where it could degrade water quality and harm aquatic organisms. On vessels with segregated ballast tanks, ballast water is kept completely separate from cargo.

While these situations could affect water quality in the Columbia River, the likelihood of such occurrences is considered low. Federal and state regulations protect against the threat of contaminated ballast water and the introduction of exotic species via ballast water (RCW 77.120). Oversight of federal ballast water regulations is provided by the U.S. Coast Guard and the EPA, while Washington State regulations are administered by the Washington Department of Fish and Wildlife. Discharge of ballast water into waters of the state is not allowed unless there has been an open sea exchange (replacing coastal water with open-ocean water to reduce the density of coastal organisms) or the vessel has treated its ballast water to meet state and federal standards set by the U.S. Coast Guard (33 USC 1251–1387). Table 8 identifies the U.S. Coast Guard ballast water treatment standards.

Table 8. U.S. Coast Guard Ballast Water Treatment Standards

Organism Size Class	Biological Discharge Standards
Organisms greater than 50 μm in minimum dimension	< 10 viable organisms/cubic meter
Organisms less than 50 μm and greater than or equal to 10 μm in minimum dimension	< 10 viable organisms/mL
Indicator organisms must not exceed:	
• Toxicogenic *Vibrio cholera* (Serotypes 01 and 0139):	< 1 cfu/100 mL or <1 cfu/gram wet weight zoo plankton samples
• *Escherichia coli:*	< 250 cfu/100 mL
• Intestinal enterococci:	< 100 cfu/100 mL

Source: Grette Associates 2014f
μm = micrometer; mL = milliliter; cfu = colony-forming unit

In addition, the U.S. Coast Guard sets forth its reporting and recordkeeping requirements in 33 USC 151.2060 and 151.2070 which include the maintenance of written records for 2 years and available upon request.

- **Spills from vessels.** Coal and fuel spills could occur if the cargo tanks on a vessel are ruptured during such events as a grounding or collision. A grounding is when the vessel makes contact with a seabed or channel bottom. The potential for a vessel rupture incident is low. The NEPA Vessel Transportation Technical Report (ICF International 2016a) evaluates the risk of vessel-related incidents. The NEPA Hazardous Materials Technical Report (ICF International 2016e) discusses actions to be taken for emergency response and cleanup. A spill from a vessel could have substantial impacts on water quality based on the location, quantity, and response actions taken.
- **Day-to-day rail operations.** Day-to-day rail operations could release contaminants to stormwater, including coal dust, metals, hydraulic and brake fluid, oil, and grease from track lubrication. If a release of hazardous materials were to occur, the rail operator would implement emergency response and cleanup actions per Federal Railroad Administration requirements and state law, including Washington State regulations under Revised Code of Washington (RCW) 90.56.
- **Spill from train collision or derailment.** Fuel or hazardous material spills could occur if trains or rail cars collide or derail. As discussed in the NEPA Hazardous Materials Technical Report (ICF International 2016e), if a release of hazardous materials were to occur, the rail operator would implement emergency response and cleanup actions as required by the Federal Railroad Administration requirements and state law, including Washington State regulations under RCW 90.56. The NEPA Hazardous Materials Technical Report (ICF International 2016e) also discusses actions to be taken for emergency response and cleanup. Spills of coal from a rail car could affect water quality based on the location, quantity spilled, and response actions taken. While temporary degradation of water quality conditions could result from a spill or release of hazardous materials, it would be expected that cleanup actions would reduce the magnitude of the spill such that no long-term degradation of water quality conditions persisted.

3.2 Off-Site Alternative

Potential impacts on water quality 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.

Required features and construction plans for the Off-Site Alternative would be similar to the On-Site Alternative. Therefore, the impacts would be similar to those described for the On-Site Alternative. Substantial differences are identified where applicable.

Increase Surface Water Turbidity Because of Soil Disturbance

The Off-Site Alternative would disturb a smaller area of soil than the On-Site Alternative. The smaller area would result in lower volumes of sediment potentially being mobilized and discharged to surface waters. Like the On-Site Alternative, this potential impact would be temporary and last only for the duration of construction.

Introduce Pollutants Associated with Equipment and Material Use

Impacts on water quality associated with equipment and material use would be similar to the On-Site Alternative. Runoff from the project area during construction would be required to meet the terms and conditions of all permits issued for the Off-Site Alternative; thus, water quality conditions would be expected to be maintained and temporary release of contaminants associated with equipment and material use during construction is not be expected to cause a measurable effect on water quality or affect designated beneficial uses.

Mobilize Pollutants or Increase Turbidity from In-Water Work and Dredging

The Off-Site Alternative would involve dredging an estimated 50,000 cubic yards of material from the Columbia River compared to the 500,000 cubic yards for the On-Site Alternative. This smaller volume of dredged material would likely require less dredging time, resulting in a shorter period of temporary impact to water quality compared to the On-Site Alternative.

Introduce Hazardous or Toxic Materials from Demolition Activities

Current land use at the Off-Site Alternative location is substantially different and the potential for pollution related to demolition would not be the same as the On-Site Alternative. The Off-Site Alternative is primarily vegetated and does not have an existing facility to be demolished in the study area like the On-Site Alternative. Further, no existing hazardous or toxic materials are known to occur at the Off-Site Alternative. Therefore, this potential impact is not anticipated to occur to the extent that it could at the On-Site Alternative.

3.2.2 Construction: Indirect Impacts

Construction of the Off-Site Alternative would not result in indirect impacts on water quality because construction impacts are immediate and no construction impacts would occur later in time or farther removed in distance than the direct impacts.

3.2.3 Operations: Direct Impacts

Direct operations impacts on water quality associated with introduction of contaminants from coal spills and coal dust, maintenance and operations, and stormwater runoff would be similar to the impacts described for the On-Site Alternative. Contaminants in stormwater runoff could reach surface waters and degrade water quality. However, stormwater would be managed in accordance with the requirements of a new NPDES Industrial Stormwater Permit obtained for water management facilities of the proposed export terminal to ensure water quality standards are met prior to discharge to any surface water.

3.2.4 Operations: Indirect Impacts

Indirect operations impacts on water quality associated with introduction of contaminants from coal spills and coal dust, maintenance and operations, and shipping vessels or rail transport would be similar to the impacts described for the On-Site Alternative.

Coal dust is anticipated to deposit a maximum of 1.83 grams per square meter per year ($g/m^2/year$) within the direct and indirect impact study areas, including the Columbia River within the study areas. Coal dust from operations of the terminal is not expected to have a measureable effect on water quality. Additionally, 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 are not quickly or easily leached.

A contaminant spill during maintenance and operations could potentially reach a surface water. However, inadvertent spills in the project area would be contained, conveyed and treated within the proposed stormwater system and not be discharged to surface waters outside the project area. Maintenance dredging impacts on water quality would be similar to those discussed for the On-Site Alternative.

Potential contaminant spills, propwash impacts, and ballast impacts related to shipping vessels and rail transport would be short-term and temporary and would be minimized through the appropriate state and federal regulations specific to each of these potential impacts.

3.3 No-Action Alternative

Under the No-Action Alternative, the Applicant would not construct the proposed export terminal and impacts on water quality related to the On-Site Alternative and Off-Site Alternative would not occur. The Applicant would continue with current and future operations in the On-Site Alternative project area. If existing industrial import and export activities located adjacent to the On-Site Alternative project area expanded, impacts on water quality could be similar to those described for the On-Site Alternative with respect to potential oil and grease spills from equipment or other raw materials shipped from the terminal. The existing NPDES permit would remain in place, maintaining the water quality of existing stormwater discharges. Maintenance dredging at Dock 1 would likely continue, with dredging occurring every 2 to 3 years. Any new or expanded industrial uses would likely trigger a new or modified NPDES permit. Upland buildings could be demolished and replaced for new industrial uses. Ground disturbance would not result in any impacts on waters of the United States and would not require a permit from the Corps. Any new impervious surface area would generate stormwater, but all stormwater would be collected and treated to meet state and federal water quality requirements prior to discharge to the Columbia River.

If the Off-Site Alternative were developed in the future for industrial uses the potential water quality impacts would be similar to the impacts described for the Off-Site Alternative.

Chapter 4
Required Permits

The On-Site Alternative or Off-Site Alternative would require compliance with the following permits related to water quality.

- **NPDES Construction General Permit.** The construction of the On-Site Alternative would result in an area of ground disturbance greater than 1 acre and would require a construction general permit. This permit is administered by the Washington State Department of Ecology.
- **NPDES Industrial Stormwater Permit.** The On-Site Alternative would result in industrial activities such as the operation of transportation facility or bulk station and terminal and would require an industrial stormwater permit. This permit is administered by the Washington State Department of Ecology.
- **Clean Water Act Section 404—U.S. Army Corps of Engineers.** Construction of the proposed terminal requires Department of the Army authorization from the Corps under Section 404 of the Clean Water Act.
- **Clean Water Act Section 401—Washington State Department of Ecology**. An Individual Water Quality Certification from Ecology under Section 401 of the Clean Water Act and a NPDES permit under Section 402 of the Clean Water Act would also be required for construction of the On-Site Alternative.
- **Rivers and Harbors Act—U.S. Army Corps of Engineers.** Construction of the proposed terminal requires Department of the Army authorization from the Corps under Section 10 of the Rivers and Harbors Act. The Rivers and Harbors Act authorizes the Corps to protect commerce in navigable streams and waterways of the United States by regulating various activities in such waters. Section 10 of the act (33 USC 403) specifically regulates construction, excavation, or deposition of materials into, over, or under navigable waters, or any work that would affect the course, location, condition, or capacity of those waters.
- **Hydraulic Project Approval—Washington Department of Fish and Wildlife.** The On-Site Alternative would require a Hydraulic Project Approval from the Washington Department of Fish and Wildlife. The approval would consider impacts on riparian and shoreline/bank vegetation in issuance and conditions of the permit, including for the installation of the proposed docks and piles, as well as for project-related dredging activities and other project-related in-water work.

The Applicant identified the following measures to be implemented during construction and/or operation. These measures are assumed conditions or requirements of permits identified above that would be required for the project, and thus are described here. These measures were considered when evaluated the potential impacts of the On-Site Alternative.

- Stormwater, sediment, and erosion control BMPs would be installed in accordance with the *Stormwater Management Manual for Western Washington and Cowlitz County*. Water quality management would be performed in accordance with the requirements of the NPDES Industrial Stormwater General Permit. The site's SWPPP will provide details of the site best management practices.

  - Drainage systems would be designed such that runoff within the construction site would be collected and treated as necessary before reuse or discharge.
  - The treatment facility could treat surface runoff and process/construction waters with capacity to store the water for reuse.
- Water quality management would be performed in accordance with the requirements of the NPDES Industrial Stormwater General Permit. The stormwater pollution prevention plan will provide details of the project area BMPs.
- Construction would be performed in accordance with the requirements of the NPDES Construction Stormwater General Permit
- Drainage systems would be designed such that runoff in the construction site would be collected and treated as necessary, before reuse or discharge.
- The treatment facility could treat surface runoff and process/construction waters with capacity to store the water for reuse.
- Treatment may be as required to meet reuse quality or Ecology requirements for offsite discharge.
- 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.
  - Storage of hazardous materials onsite 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.
  - Typical construction BMPs for working over, in, and near water would be applied, including checking equipment for leaks and other problems that could result in discharge of petroleum-based products, hydraulic fluid, or other material to the Columbia River.
- BMP C154: Concrete Washout Area—Concrete waste and washout waters would be either carried out off site or disposed of in a designated facility on site designed to contain the waste and washout water.
- Based on site grading and drainage areas, five water quality ponds (wetponds) would treat runoff based on Ecology requirements. In general, the ponds are sized for treatment of the volume and flow from the water quality design storm event (72% of the 2-year storm). Additional storage would be provided in the coal storage area so that the runoff is always treated within the stockyard area, even for larger storm events. The ponds are designed to provide settlement as the water passes through. Subsequently, water released from these ponds would be conveyed downstream to the existing pump station outfall 002A that discharges into the Columbia River via an existing 30-inch steel pressure line. The ponds that treat runoff from the coal stockyard would harvest water for circulation around the site for multiple uses, including dust control measures. The Ecology criteria would be used as the basis of design, which uses the Western Washington Hydrology Model computer simulation for facility sizing. Because of the flat nature of the site, some surface ponding would occur in both the yard areas and open conveyance systems. The piped conveyance systems would be sloped at .50% minimum.

- The surface drainage system and features would be designed and constructed in accordance with the *Stormwater Management Manual for Western Washington.*
- The water treatment facility would be designed to treat all surface runoff and process water with capacity to store the water for reuse. Treatment would be as required to meet reuse quality or Ecology requirements for offsite discharge.
- Additional water storage would be provided within the coal storage area in the event of a larger storm event. Water volumes exceeding the demands for reuse would be discharged offsite via the existing outfall 002A into the Columbia River. Water released offsite would be treated and would meet the requirements of Ecology and required discharge permits.
- The water system would be designed and constructed in accordance with or consideration of the latest edition of the following standards, where applicable. In the event of conflict between codes and technical specification, the requirements would be reviewed and a decision made on the action to be implemented with agency of jurisdiction.
    - International Building Code
    - National Fire Protection Association
    - Washington State Department of Ecology *Stormwater Design Manual*
    - U.S. Department of Health, Occupational Safety and Health Standards
    - Washington State Department of Health
- Where possible, pile extraction equipment would be kept out of the water to avoid “pinching” pile below the water line in order to minimize creosote release during extraction
- During pile removal and pile driving, a containment boom would be placed around the perimeter of the work area to capture wood debris and other materials released into the waters as a result of construction activities. All accumulated debris would be collected and disposed of upland at an approved disposal site. Absorbent pads would be deployed should any sheen be observed.
- The work surface on barge deck or pier would include a containment basin for pile and any sediment removed during pulling. Any sediment collected in the containment basin would be disposed of at an appropriate upland facility, as would all components of the basin (e.g., straw bales, geotextile fabric) and all pile removed.
- Upon removal from substrate the pile would be moved expeditiously from the water into the containment basin. The pile would not be shaken, hosed off, stripped, scraped off, left hanging to drip or any other action intended to clean or remove adhering material from the pile.
- Project construction (including pile removal) would limit the impact of turbidity to a defined mixing zone and would otherwise comply with WAC 173-201A
- All dredged material would be contained within a barge prior to flow-lane disposal; dredged material would not be stockpiled on the riverbed.
- The contractor would remove any floating oil, sheen, or debris within the work area as necessary to prevent loss of materials from the site. The contractor would be responsible for retrieval of any floating oil, sheen, or debris from the work area and any damages resulting from the loss.
- Flow-lane disposal would occur using a bottom-dump barge or hopper dredge. These systems release material below the surface, minimizing surface turbidity.

- For work adjacent to water, proper erosion control measures would be installed prior to any clearing, grading, demolition, or construction activities to prevent the uncontrolled discharge of turbid water or sediments into waters of the state. Erosion control structures or devices would be regularly maintained and inspected to ensure their proper functioning throughout this project
- Project construction would be completed in compliance with Washington State Water Quality Standards WAC 173-201A, including but not limited to prohibitions on discharge of oil, fuel, or chemicals into state waters, property maintenance of equipment to prevent spills, and appropriate spill response including corrective actions and reporting as outlined in permits and authorizations (Corps permit, HPA, 401 Water Quality Certification).
- The contractor would have a spill containment kit, including oil-absorbent materials, on site to be used in the event of a spill or if any oil product is observed in the water.
- The contractor would be required to retrieve any floating debris generated during construction using a skiff and a net. Debris would be disposed of at an appropriate upland facility. If necessary, a floating boom would be installed to collect any floated debris generated during in-water operations.
- All fuel and chemicals would be kept, stored, handled, and used in a fashion that assures no opportunity for entry of such fuel and chemicals into the water.
- The contractor would use tarps or other containment methods when cutting, drilling, or performing over-water construction that might generate a discharge to prevent debris, sawdust, concrete and asphalt rubble, and other materials from entering the water.
- The water treatment facility would be designed to treat all surface runoff and process water with capacity to store the water for reuse. Treatment would be as required to meet reuse quality or Ecology requirements for offsite discharge.
- Up to five ponds would treat the runoff. In general, the ponds would be sized for the treatment of the volume and flow from the water quality design storm event (72% of the 2-year storm). The ponds would be designed to be long and narrow to provide sufficient settlement time to clarify the water as it passes through the pond. The ponds that treat runoff from the coal stockyard would harvest water via pump systems to supplement the water supply for dust control measures.
- Additional water storage would be provided within the materials storage area in the event of a larger storm event. Water volumes exceeding the demands for reuse would be discharged offsite treatment via the existing outfall 002A into the Columbia River. Water released offsite would be treated and would meet the requirements of Ecology and required discharge permits. Additional water storage would be provided within the materials storage area in the event of a larger storm event.
- No land-based construction equipment would enter any shoreline body of water except as authorized.
- Equipment would have properly functioning mufflers, engine-intake silencers, and engine closures according to federal standards; the contractor would inspect fuel hoses, oil or fuel transfer valves, and fittings on a regular basis for drips or leaks in order to prevent spills into the surface water.

Chapter 5
References

5.1 Written References

Agency for Toxic Substances and Disease Registry. 1992. *Toxicological profile for Vinyl Acetate.* Atlanta, GA: U.S. Department of Health and Human Services, Public Health Services.

Ahrens, Michael J. and Donald J. Morrisey. 2005. Biological Effects on Unburnt Coal in the Marine Environment. *Oceanography and Marine Biology: An Annual Review. 43: 69–122.*

Anchor QEA. 2011. *Engineering Report for NPDES Application Millennium Bulk Terminals.* Longview, WA. September 2011.

Anchor QEA. 2014a. *Engineering Report Update for NPDES Application Millennium Bulk Terminals*. Longview, WA. Prepared for Millennium Bulk Terminals—Longview, LLC. Portland, OR. September 2011. July 2014.

Anchor QEA. 2014b. Former Reynolds Metals Reduction Plant – Longview, Draft Remedial Investigation and Feasibility Study. June 2014. Prepared for Washington State Department of Ecology on behalf of Northwest Alloys, Inc. and Millennium Bulk Terminals – Longview, LLC. Anchor QEA, LLC, Seattle, Washington.

Center for Coastal Margin Observation and Prediction. 2016. *Land/Ocean Biogeochemical Observatory.* Available: http://columbia.loboviz.com/.

Ewing, Richard. 1999. *Diminishing Returns: Salmon Declines and Pesticides.* Available: http://www.pcffa.org/salpest.pdf. Accessed October 20, 2014.

Fenn, Mark E., Jill S. Baron, Edith B. Allen, Heather M. Rueth, Koren R. Nydick, Linda Geiser, William D. Bowman et al. Ecological effects of nitrogen deposition in the western United States. *BioScience* 53, no. 4 (2003): 404-420.

Grette Associates, LLC. 2014a. *Millennium Coal Export Terminal Longview, Washington: Permanent Impacts to Aquatic Habitat.* September 2014.

Grette Associates, LLC. 2014b. *Millennium Coal Export Terminal Longview, Washington: Docks 2 and 3 and Associated Trestle Direct Effects of Construction.* September 2014.

Grette Associates, LLC. 2014c. *Millennium Coal Export Terminal Longview, Washington: Bulk Product Terminal Wetland and Stormwater Ditch Delineation Report – Parcel 61953. September 2014.*

Grette Associates, LLC. 2014d. Millennium *Coal Export Terminal Longview, Washington: Coal Export Terminal Wetland Impact Report – Parcel 619530400.* September 2014.

Grette Associates. 2014e. *Millennium Coal Export Terminal: Docks 2 and 3 and Associated Trestle – Direct Effects of Construction. Appendix B: Recent Sediment Characterizations near Millennium Bulk Terminals – Longview.* September 2014. Prepared for Millennium Bulk Terminals – Longview, LLC. Grette Associates, LLC, Wenatchee, Washington.

Grette Associates, LLC. 2014f. *Millennium Coal Export Terminal Longview, Washington: Docks 2 and 3 and Associated Trestle Indirect Effects of Structures and Site Operations.* September 2014.

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

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

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

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

Jakimska, Anna. Piotr Konieczka, Krzysztod Skora, Jacek Nameiesnik. 2011. *Bioaccumulation of Metals in Tissues of Marine Animals, Part I: the Role and Impact of Heavy Metals on Organisms.* Polish Journal of Environmental Studies. Vol. 20, No. 5, pages 1117-1125. Available: http://www.pjoes.com/pdf/20.5/pol.j.environ.stud.vol.20.no.5.1117-1125.pdf Accessed: April 8, 2016.

Lower Columbia Estuary Partnership 2015. *20 years of the Estuary Partnership: Did You Know:* Available: http://www.estuarypartnership.org/20-years-estuary-partnership-did-you-know-toxics.

Maritime Connector. 2015. *Ship Sizes*. Available: http://maritime-connector.com/wiki/ship-sizes/. Accessed: February 12, 2015.

Millennium Bulk Terminals Longview, LLC. 2013. Millennium Coal Export Terminal Longview, Washington: *Applicant's Purpose and Need Expanded Project Description Alternatives Considered*. Longview, WA. December 2013.

National Marine Fisheries Service. 2011*. Columbia River Estuary ESA Recovery Module for Salmon and Steelhead.* Portland, Oregon. January 2011.

Oberrecht, Kenn. 2014. *Effects of Pulp Mill Effluent*. Available: http://www.oregon.gov/dsl/SSNERR/docs/EFS/EFS14pulpmill.pdf

Oregon Department of Environmental Quality. 2003. *Designated Beneficial Uses Mainstem Columbia River* (340-41-0101).

Oregon Department of Environmental Quality (OR DEQ). 2012. *Oregon's 2012 Integrated Report Assessment Database and 303(d) List.* Available: http://www.deq.state.or.us/wq/assessment/rpt2012/search.asp. Accessed: February 11, 2015.

Oregon Department of Water Quality. 2012. *Water Quality Assessment – Oregon's 2010 Integrated Report Assessment Database and 303(d) List.* Submitted to EPA in May 2011. Approved by EPA on March 15, 2012. Available: http://www.deq.state.or.us/wq/assessment/2010Report.htm

Oregon State Marine Board. 2012. *Best Management Practices (BMP) White Paper for Recreational Boating Facility Construction and Replacement.*

Pierce, B.S., and Denne, K.O., eds., 2009. *The National Coal Resource Assessment Overview: U.S. Geological Survey Professional Paper* 1625–F, 402 p.

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

U. S. Environmental Protection Agency. 2007. *Chapter 6: West Coast National Estuary Program Coastal Condition, Lower Columbia River Estuary Partnership*. Available: http://water.epa.gov/type/oceb/nep/upload/2007_05_09_oceans_nepccr_pdf_nepccr_nepccr_west_partc.pdf

U. S. Environmental Protection Agency. 2009. *Columbia River Basin: State of the River Report for Toxics. Publication* No. EPA 910-R-08-004. EPA Region 10.

U. S. Environmental Protection Agency. 2014. *Water: Polluted Runoff, Agriculture.* Last revised: July 9, 2014. Available: http://water.epa.gov/polwaste/nps/agriculture.cfm. Accessed: February 10, 2015.

U.S. Geological Survey. 2005. Water-Quality Data, Columbia River Estuary, 2004-05. Available: http://pubs.usgs.gov/ds/2006/213/#download

U.S. Geological Survey. 2007. *Coal Quality and Major, Minor, and Trace Elements in the Powder River, Green River, and Williston Basins, Wyoming and North Dakota.* Virginia. 2007-1116.

U.S. Geological Survey. 2014. *USGS 14246900 Columbia River at Beaver Army Terminal near Quincy, OR.* Available: http://wdr.water.usgs.gov/wy2013/pdfs/14246900.2013.pdf?1423677243767.

U.S. Geological Survey. 2015. *National Water Information System: USGS 14246900 Columbia River @ Beaver Army Terminal NR Quincy, OR.* Last Revised: February 11, 2015. Available: http://waterdata.usgs.gov/nwis/inventory/?site_no=14246900&agency_cd=USGS. Accessed February 11, 2015.

Washington State Department of Ecology. 2012. *Water Quality Standards for Surface Waters of the State of Washington.* Chapter 173-201A WAC. Revised January 2012. Publication No. 06-10-091. Olympia, WA.

Washington State Department of Ecology. 2014a. 2012 *Stormwater Management Manual for Western Washington*, as Amended in December 2014. Publication No. 14-10-055. Olympia, WA.

Washington State Department of Ecology. 2014b. *Washington State Wetland Rating System for Western Washington.* 2014 Update. Publication No. 14-06-029. Olympia, WA.

Washington State Department of Ecology. 2016a. *Columbia River Facts and Maps.* Available: http://www.ecy.wa.gov/programs/wr/cwp/cwpfactmap.html. Accessed: April 6, 2016.

Washington State Department of Ecology. 2016b. 2012 *Washington State Water Quality Assessment and 303(d) List of Impaired Waters.* Available: http://www.ecy.wa.gov/programs/wq/303d/currentassessmt.html. Accessed September 1, 2016.

Washington Department of Natural Resources. 2008. *Creosote Cleanup of Puget Sounds and its Beach.* Sedro-Woolley, WA.

Weyerhauser 2014. NPDES Permit 0000124

WorleyParsons. 2012. Millennium Bulk Terminals, Longview, LLC. *Hydrodynamic Modeling and Sediment Transport Analysis.*