Appendix H
Proposed Export Terminal Design Features

Table H-1 provides a summary of detailed design features for the proposed export terminal provided by the Applicant.

Table H-1. Applicant-Provided Export Terminal Design Features

Topic or Environmental Element	Description	Project Design Features
Design Life of Export Terminal	Reduce the need to replace major equipment, reducing additional construction impacts	**Design Life for Various Components** • Major Equipment Structures (shiploader, stacker, reclaimer, rail car rotary dumper): 30 years • Mechanical Components (reducers, bearings, pumps. etc.): 80,000 hours • Structural (storage building, conveyors, marine): 50 years • Marine Fender Systems: 25 years Achieving the design service life for the above components requires regular maintenance and inspection to identify any deterioration, wear and tear, or damage, and the undertaking of repairs of identified items. In addition to regular inspection and maintenance, it is anticipated that all plant and equipment will require periodic major refurbishment to reinstate protective coating systems and upgrade control/electrical systems.
Applicable Codes, Standards, and Agencies	Applicable codes, standards, and agency oversight are anticipated to reduce or eliminate many potential impacts that could otherwise occur	**Agencies** Equipment shall comply with the present environmental requirements as specified by the following agencies: • Cowlitz County • City of Longview • Washington State Department of Ecology (Ecology) • U.S. Environmental Protection Agency, Region 10 (EPA) • Southwest Clean Air Agency • U.S. Army Corps of Engineers (Corps) • U.S. Fish and Wildlife Service (USFWS)

Topic or Environmental Element	Description	Project Design Features
		• National Oceanic and Atmospheric Administration (NOAA Fisheries) • Washington Department of Fish and Wildlife (WDFW) • Washington State Department of Transportation (WSDOT) **Codes and Standards** • ASTM: American Society for Testing and Materials • ASME: American Society of Mechanical Engineers • ANSI: American National Standards Institute • AGMA: American Gear Manufacturer's Association • NFPA: National Fluid Power Association and National Fire Protection Association • JIC: Joint Industry Conference • SAE: Society of Automotive Engineers • AREMA: The American Railway Engineering and Maintenance-of-Way Association • AASHTO: American Association of State Highway and Transportation Officials • FUS: Fire Underwriters Survey, 1999 Edition • AISC: Steel Construction Manual, 13th Edition • AWS: American Welding Society • AWS A5.X: Arc Welding Electrodes and Fluxes (Various Standards) • ANSI / AISC 360-05: Specification for Structural Steel Buildings (Allowable Stress Design) • 80552-design criteria-rep-0901 (2).docx Page 4 80528 : Rev B : October 27, 2010 • A6 / A6M-09: General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling • ASTM A529 / A529M: High-Strength Carbon-Manganese Steel of Structural Quality • ASTM A123 / A123M: Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products • AASHTO HB-17: Standard Specifications for Highway Bridges, 17th Edition

Topic or Environmental Element	Description	Project Design Features
		• ASCE 7-05: Minimum Design Loads for Buildings and Other Structures • AISC 360-05: Steel Construction Manual • ACI 318-08: Building Code Requirements for Structural Concrete • ASCE 8-02: Design of Cold-Formed Stainless Steel Members • ASTM A615 / A615M-09b: Deformed and Plain Billet-Steel Bars for Concrete Reinforcement • ASTM A1023 / A1023M: Stranded Carbon Steel Wire Ropes for General Purpose • ASME B20.1: Safety Standard for Conveyors and Related Equipment • CEMA: Conveyor Equipment Manufacturers Association; Belt Conveyors for Bulk Materials • ISO R773/4: International Standards Organization, Recommendations for Keys and Key Seats • MSHA: US Department of Labor, Mine Safety and Health Administration, C.F.R. 30, Part 18.65; Fire Resistance of Conveyor Belting • SSPC Standards: Steel Structures Painting Council – Painting Manual Volumes I and II • ASTM A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless • ASTM A325: Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength • ASTM A307: Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength • ASTM A504: Standard Specification for Wrought Carbon Steel Wheels • IBC: International Building Code and Washington State Amendments • MOTEMS: Marine Oil Terminal Engineering and Maintenance Standards • OSHA: Occupational Safety and Health Act • WISHA: Washington Industrial Safety and Health Act

Topic or Environmental Element	Description	Project Design Features
		• API 650: Welded Steel Tanks for Oil Storage • NEMA: National Electrical Manufacturers Association • MPTA: Mechanical Power Transmission Association • NFPA 70: National Electrical Code • NFPA 70E: Standard for Electrical Safety in the Workplace • ICEA: Insulated Cable Engineers Association • IES: Illumination Engineering Society • ISA: International Society of Automation • ISO: International Organization for Standardization • NEC: National Electrical Code • NESC: National Electrical Safety Code • UL: Underwriters Laboratories • CoV's (USA) Electrical Code • IEEE: Institute of Electrical and Electronic Engineers • FEM: Fédération Européenne de la Manutention, Section II, Document 2 131/2 132, Rules for the Design of Mobile Equipment for Continuous Handling of Bulk Materials • ISO / 5049-1: Mobile Equipment for Continuous Handling of Bulk Materials, Part 1 – Rules for the Design of Steel Structures
Aesthetics, Light, and Glare	**Operation –** Prevent potential spillage of light off of project site	• Typical industrial lighting would be provided and installed in a manner so as to prevent light and glare from spilling off of the area • Night lighting would be restricted to the minimum required for operational and safety requirements and would be directed away from roads and sensitive viewpoints, where practicable • Light shields would be used to limit the spill of lighting where practicable • Project lighting would be directed downward to minimize off-site light spill
Air Quality	**Construction –** Prevent creation of dust and wind-borne soil erosion	• Demolition activities would be carried out in accordance with the best management practices listed in the Stormwater Manual for Western Washington. These practices include, but are not limited to:

Topic or Environmental Element	Description	Project Design Features
		• **BMP C105:** Stabilized Construction Entrance / Exit – stabilized entrance and exit would be installed and maintained through the duration of demolition, site preparation, preloading and construction
	Construction – Reduce or eliminate the potential tracking of soils off site	• **BMP C106**: Wheel Wash – would be used if the stabilized construction entrance/exit is not preventing sediment from being tracked off site
	Operation – Reduce or eliminate the potential for dust and soil erosion from internal roadways	• All regularly used roads accessing the buildings and facilities within the site will be sealed with asphalt pavement, other roads will be gravel
		• All sealed roads would be frequently and routinely swept to collect airborne dust
		• Vehicle access to unsealed areas would be controlled to limit airborne dust
	Operation – Reduce or eliminate potential for coal dust during unloading and loading	• The equipment design would incorporate features to minimize dust emissions to the air that could otherwise occur from the use of loaded rail cars, the use of transfer equipment to unload rail cars, the use of conveyors to transfer product, stockpiling of product and the use of equipment to load ships. The design of the terminal incorporates best available practices for control of dynamic and fugitive dust. The design of the terminal would allow for the safe operation and safe maintenance of the plant and equipment using current best available control technologies, and in compliance with the latest OSHA and NFPA requirements.
		• Industrial water would be used for process water and fire protection; process water uses include dust control, stockpile sprays, washdown and cleanup
	Operation – Dust control measures included in design for rail car unloaders	• At the unloading station, two rail cars at a time would be positioned inside the fully enclosed metal clad unloading building where they would be rotated to discharge the material from the cars into a large hopper • A water spray system and/or dry fog system would be used at the tandem rotary unloader to control dust • Unloaders within an enclosed building

Topic or Environmental Element	Description	Project Design Features
		• Dry fog system • Water spray system
	Operation – Dust control measures included in design for conveyors	• All belt conveyors would be fully enclosed, except for the stockyard and shiploading conveyors, which would be open due to their operational requirements • Water spray system would be used at the conveyor transfer points • Enclosed conveyors and transfer points (except for stockyard and shiploader conveyors) • Regular washdown and under-belt plating • Monitoring status of conveyors • Washdown collection and containment • Cleanup using high pressure water • Belt cleaners to control and collect any dust
	Operation – Dust control measures included in design for transfer points	• All transfer points would be fully enclosed, except for the stockyard and shiploader conveyors which would be open due to their operational requirements • Water spray system would be used at the conveyor transfer points • Skirting would be installed at transfer points to control coal flow and spillage • Transfer chutes enclosed in transfer towers • Soft flow transfer chutes • Inlet and outlet curtains and side skirts • Water spray systems • Regular washdown and under-belt plating • Washdown water collection and containment • Cleanup using high pressure water • Enclosed transfer towers
	Operation – Dust-control measures included in design for stockpiles	• A stockpile spray system would be installed to wet the coal surface to control fugitive dust • The stockpile spray system would be controlled by an on-site and remote weather monitoring system to ensure system is operating before wind may arrive at the site

Topic or Environmental Element	Description	Project Design Features
		• Control of drop height from stackers • Cleanup along conveyor berms and sealed roadways • Vehicle access would be limited in the stockpile areas
	Operation – Dust control measures included in design for shiploading	• Vertically adjustable loading boom to decrease drop height • Enclosed shiploader boom • Enclosed loading spout • Discharge below deck of vessel • Cleanup and washdown by high pressure water • Capture and containment of washdown water
	Operation – Diesel particulate matter from trains. Based on information contained in our Air Quality Resource Report, the emission of diesel particulate matter from trains at the site and on the short line were included in the air quality modeling. The estimate impact would be minimal (less than a 1% increase) over countywide 2011 concentrations, and countywide emissions would be expected to remain below the federal and state standards. Because there would be minor or minimal impacts which would not create an exceedance of any standards, no mitigation is required.	• Emissions from rail are mobile and would be spread along the short line, making it unlikely that a localized concentration would exceed 1-hour standards. There are no local or state regulations for diesel particulate emissions from mobile sources.
Aquatic Habitat, general	Shading design considerations for Docks 2 and 3 and the associated trestle	• Trestle has been designed to be long and narrow, and at a height above ordinary high water to minimize shading in shallow water areas. From shore, the trestle would measure 24 feet in width for 700 feet, and 51 feet in width for the final 150 feet. The top of the deck would be at +22 feet Columbia River datum (CRD) and the bottom of the deck at +19.5 feet CRD. Therefore, the bottom of the deck would be more than 8 feet above ordinary high water.
	Structural design considerations for Docks 2 and 3 and the associated trestle	• Trestle has been designed to minimize overall impact in shallow water areas, including impacts on habitat connectivity along the shoreline • Docks 2 and 3 will be located entirely in deep water habitat to locate structure and terminal activities away from shallow water areas

Topic or Environmental Element	Description	Project Design Features
	Dredging design considerations for Docks 2 and 3 and the associated trestle	• The berthing area will be located at depths that are currently at least -20 feet CRD to avoid habitat conversion from shallow to deep during dredging • Location of the berthing area in deep water closer to the navigation channel will minimize the scope of future maintenance dredging
	General habitat-related design considerations for Docks 2 and 3 and the associated trestle	• Flow lane disposal (initial and maintenance dredging) will be used to keep dredged materials in aquatic areas, maintaining sediment transport processes and aquatic habitats in the lower Columbia River
		• Project lighting will be directed downward or at structures, and will incorporate shielding to avoid spillage of light into aquatic areas
		• The end of the shiploading boom will include a pinpoint light source that will be aimed straight down into the ship hold area, avoiding a broader beam that could cause light spillage
		• Pile caps will be used to minimize opportunities for piscivorous birds to perch
Aquatic Species	**Construction –** General	• The Applicant has developed a series of activity-specific work windows that are designed to minimize specific impact mechanisms as they affect individual species (or populations within those species) of concern • These proposed work windows are protective of the species of concern while providing feasible construction periods for the in-water portion of the Proposed Action over a 2-year schedule
Aquatic Species (includes federally-listed species)	**Construction -** General (regulatory consideration)	• Timing restrictions specifying that in-water construction must occur when species of concern (i.e., salmonids, eulachon, green sturgeon) are absent or present in very low numbers in the adjacent waterbody would be strictly observed. All timing restrictions that may be established by WDFW, the Corps, NOAA Fisheries, or USFWS would be strictly observed (Corps permit and Hydraulic Project Approval
Earth	**Construction –** Reduce the potential for soil erosion	• **BMP C107:** Construction Road/Parking Area Stabilization - roads, parking areas, and other onsite vehicle transportation

Topic or Environmental Element	Description	Project Design Features
		routes would be stabilized to reduce erosion caused by construction traffic or runoff
	Construction – Minimize impacts of disposal of dredge materials	• Dredging would use in-river flow lane disposal;
		• Dredged material that meets environmental standards may be used to construct habitat mitigation sites
		• Should relevant conditions allow, dredge materials may be disposed of upland for preloading the stockpile area
	Operation – Reduce or eliminate the potential for dust and soil erosion from internal roadways	• All regularly used roads accessing the buildings and facilities within the site will be sealed with asphalt pavement, other roads will be gravel
Noise	**Operation –** General	• Operational noise levels at all noise receivers are anticipated to be below both Class A EDNA and Class C EDNA receiver limits, with the exception of the ST5 location. Day and nighttime noise levels at ST5 are compliant with the Class C EDNA receiver limits.
	Operation – Noise control measures to limit sound of rail car unloading	• Rail car unloading would be within an enclosed building • Track lubricators would be installed to control rail and wheel noise
	Operation – Noise control measures to limit sound from conveyors	• Incorporation of "quiet conveyor technologies" (i.e., quiet drives, quiet idlers, and controlled idler harmonics) • Engineered startup and travel alarms • Cladding is proposed to enclose the transfer tower structures and several conveyors to reduce operational noise levels
	Operation – Noise control measures to limit sound from stackers and reclaimers in stockyard	• Incorporation of "quiet technology" • Engineered travel and startup alarms
	Operation – Noise control measures to limit sound from shiploading	• Incorporation of "quiet technology" • Engineered travel and startup alarms
Pubic Services and Utilities	**Construction and Operation –** Maintain or provide for pedestrian, vehicular, and rail access to Bonneville Power Administration (BPA)-owned property	• BPA will be granted access to the Proposed Action's access road, which will be located around the outside of the rail loop. In addition, the Applicant will construct an access road between the access road for the Proposed Action and the BPA yard, and install a gate to the BPA yard at a location to be determined by BPA.

Topic or Environmental Element	Description	Project Design Features
	Operation – Fire Protection – Provide adequate access for fire vehicles in the case of an emergency	• Longitudinal grades of roads will not exceed 10% where fire access is anticipated
	Operation – Fire Protection – Provide for adequate fire flow in case of an emergency	• The firewater system will be fed from on-site wells, filling a 4-hour storage tank as recommended by the National Fire Protection Association 307 "Standard for the Construction of Fire Protection of Marine Terminals, Piers, and Wharves" Chapter 7
Sustainability, Public Utilities, Hazardous Materials	**Construction –** Disposal of demolished structures in a manner to reduce or eliminate impacts	• The materials from the demolition would be recycled (on site or off site) or disposed of at an appropriate waste facility
Traffic and Transportation	**Construction –** Reduce or eliminate potential land use and transportation impacts from off-site construction parking	• Parking would be provided for construction workers
	Operation – Reduce impacts from on- and off-site transportation	• Access to the site is from an existing arterial (Industrial Way). The main access includes an elevated bridge crossing the rail corridor. An additional elevated bridge would be provided to cross the railway and access the easterly yard area.
		• Access to the site would be from Industrial Way (SR 432) either using the existing entrance at the intersection with 38th Avenue or via a new entrance located west of the existing entrance
		• Access to the site would be from a single entry point, with authorized vehicles being able to enter the train unloading and storage facilities, or the marine facilities
	Operation – On-Site Roadways – Provide for safe vehicular movements on site	• The on-site roadways would cross above the rail tracks (grade-separated) to allow for safe and efficient access to the site
		• Overpasses shall be constructed to WSDOT standards for roads and bridges and allow for maximum emergency vehicle loadings
		• Access roads would be designed to allow two-way traffic for standard vehicles
		• All regularly used roads accessing the buildings and facilities within the site would be sealed with asphalt pavement; other roads would be gravel
		• Paved road cross sections will be sloped at 2% minimum

Topic or Environmental Element	Description	Project Design Features
		• Longitudinal grades of roads will not exceed 10% where fire access is anticipated
		• All roadways, parking areas, and paving shall be designed and constructed to WSDOT standards
		• Paving shall be designed to accommodate the appropriate mobile equipment loadings for the particular use of that portion of the site, and asphalt or concrete pavement shall have a design life of 20 years
		• Surfacing of unpaved areas shall be used in order to control soil erosion by wind and water, be able to support pedestrians and light vehicles, including 4-wheel drive vehicles and repress undesirable vegetation
	Operation – Rail – Provide adequate space on site to allow rail to move off the main line and Reynolds Spur to eliminate potential conflicts with other rail users	• Design includes a rail loop with arrival and departure tracks to include one operating track (turn around track) and eight rail storage tracks
Water Quality, Aquatic Habitat, Aquatic Species	**Construction –** Pile Removal and Installation	• A decision was made to use 36-inch rather than 48-inch piles to reduce impacts on aquatic habitat • Vibratory pile-driving/removal will be used to the extent possible to minimize potential injurious or disturbing noise levels on fish species
Water Quality, Aquatic Habitat, Aquatic Species	**Construction –** Dredging and Flow Lane Disposal	• Flow lane (i.e., in-water) disposal of dredged material is proposed as an avoidance/minimization measure. Flow lane disposal keeps the dredged material in aquatic areas and maintains sediment transport processes that build and maintain dynamic aquatic habitats. This is consistent with the Corps' requirements and practices in the Columbia River.
Water Quality	**Construction and Operation –** Reduce or eliminate potential impacts on water quality	• Stormwater, sediment, and erosion control best management practices 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 NPDES Stormwater Pollution Prevention Plan will provide details of the site best management practices.

Topic or Environmental Element	Description	Project Design Features
	Construction – Reduce or eliminate the potential for sediment to enter surface or	• Stormwater, sediment, and erosion control best management practices would be installed in accordance with the Stormwater Management Manual for Western Washington and Cowlitz County
		• Construction would be performed in accordance with the requirements of the NPDES Construction Stormwater General Permit
		• 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
		• Treatment could be as required to meet reuse quality or Ecology requirements for off-site discharge
		• **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 and/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.
	Construction – Reduce or eliminate the potential for pollutants to reach surface or	• **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 on site 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

Topic or Environmental Element	Description	Project Design Features
		• Typical construction best management practices for working over, in, and near water will 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
	Operation – Control of surface drainage to prevent erosion and release of pollutants	• Based on site grading and drainage areas, five water quality ponds (wetponds) will 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 will be provided within 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 will be conveyed downstream to the existing pump station outfall 002A, which 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 will be used as the basis of design, which uses the Western Washington Hydrology Model (WWHM) computer simulation for sizing. Because of the flat nature of the site, some surface ponding will occur in both the yard areas and open conveyance systems. The piped conveyance systems will be sloped at 0.50% minimum.
		• The surface drainage system and features will be designed and constructed in accordance with the Ecology Stormwater Management Manual for Western Washington
		• Based on site grading and drainage areas, water quality ponds (wetponds) will treat runoff based on Ecology requirements

Topic or Environmental Element	Description	Project Design Features
		• The Ecology criteria will be used as the basis of the design, which uses the WWHM computer simulation for sizing
		• The pads and berms would be made of low permeability engineered material. The use of low permeability engineered materials for formation of the pads and berms would control water from entering subsurface soil or groundwater
		• The stockyard and berms would be graded to allow the water to drain and be collected for treatment and reuse
	Operation – Drainage and treatment of water to prevent on- and off-site impacts on water quality	Drainage systems would be designed such that runoff within the terminal site would be collected for treatment before reuse or discharge. Best management practices that would be part of the terminal design to maximize the availability of water for reuse include: • Enclosed conveyor galleries • Enclosed rotary unloader building and transfer towers • Washdown collection sumps for settlement of sediment • Regular cleanout and maintenance of washdown collection sumps • Containment around refueling, fuel storage, chemicals and hazardous materials • Oil/water separators on drainage systems and vehicle washdown pad • Requirement that all employees and contractors receive training, appropriate to their work activities, in the site best management practices • Design of docks to contain spillage, with rainfall runoff and washdown water contained and pumped to the upland water treatment facilities • Design of system to collect and treat all runoff and washdown water either to be reused on site (dust suppression, washdown water or fire system needs) or to be discharged off site
		• The wharf area would be sealed to capture the washdown water and stormwater runoff, preventing it from flowing to the Columbia River without treatment

Topic or Environmental Element	Description	Project Design Features
		• 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 off-site 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 off site via the existing outfall 002A into the Columbia River. Water released off site would be treated and would meet the requirements of Ecology and required discharge permits
	Operation – Design of water system to provide fire and health protection	The water system shall be designed and constructed in accordance with or consideration of the latest edition of the following standards, where applicable: • International Building Code • National Fire Protection Association • Washington State Department of Ecology Stormwater Design Manual • United States Department of Health – Occupational Safety and Health Standards • Washington State Department of Health • In the event of conflict between codes and technical specification, the requirements will be reviewed and a decision made on the action to be implemented with the agency of jurisdiction
Water Supply	Use of industrial water to limit impacts on public water supply	• Industrial water supply needed for process and fire protection would be supplied from treated water from the water treatment facility. During times of dry weather, water would be supplemented from on-site wells.
		• A storage reservoir would be included to provide water required for normal operations and water required to be on reserve for fire demand, should the need arise.
		• A separate pumping system would be provided for the fire system, where appropriate, to provide redundancy and to supply additional pressure where needed