Columbia River CROSSING

700 WASHINGTON STREET
SUITE 300
VANCOUVER, WA 98660
360-737-2726 | 503-256-2726

January 30, 2013
Randall Overton
Bridge Administrator
Thirteenth Coast Guard District
915 Second Avenue
Seattle, WA 98174-1067

Re: Columbia River Crossing: Mainstem I-5 Bridge Replacement

Dear Mr. Overton:

The Washington Department of Transportation (WSDOT) and Oregon Department of Transportation (ODOT) are submitting the enclosed application package for the Columbia River Crossing Project (Project). The overall Project includes multimodal improvements in the Interstate 5 (I-5) corridor between Victory Boulevard in Portland, Oregon, and SR 500 in Vancouver, Washington. This application package is for one portion of the Project – the replacement of the Interstate Bridge across the main stem of the Columbia River (Columbia River bridge). In the future, a separate application will be submitted for the construction of bridges across the North Portland Harbor of the Columbia River (North Portland Harbor bridges), and this bridge permit will be amended to accommodate that information. WSDOT and ODOT are applying for a Bridge Permit from the United States Coast Guard (USCG) under the authority of the General Bridge Act of 1946.

Construction of the Columbia River and North Portland Harbor bridges sets the sequencing for other project components. The Columbia River bridge and immediately adjacent highway improvements will require the longest construction timelines. In-water construction will begin with the Columbia River bridge, though other elements of the project will be started well before the bridge is finished. Construction of the Columbia River bridge is estimated to occur between 2014 and 2018. To remain on schedule, the Project needs to obtain the permit applied for in this submittal on or before September 30, 2013, in order to incorporate permit conditions into contract documents.

To ensure reasonable construction flexibility, WSDOT and ODOT would like to make the following requests regarding the permit provisions:

1. WSDOT and ODOT request that permit conditions accommodate a design-build scenario pursuant to Chapter 5(F) of the Bridge Administration Manual.

2. WSDOT and ODOT will maintain minimum vertical and horizontal clearances for the permanent structures of the proposed I-5 bridge over the Columbia River, as shown in the permit drawings. However, we request flexibility to continue to refine the bridge design, including the precise location of bridge piers, size of bridge piers, bridge superstructure type, and bridge typical section.

3. WSDOT and ODOT have submitted a construction scenario that is reasonable. However, WSDOT, ODOT and their contractors are still evaluating the type, size, and installed duration of temporary work platforms and temporary work bridges required to construct the I-5 bridge over the Columbia River. We request that the exact locations of the work bridges as shown on the plans are not a requirement of the permit conditions. We will have at least one of the two temporary channels shown in the permit drawings open at all times during construction.

4. Because of the potentially long timeframe for project construction, WSDOT and ODOT request that the USCG issue the permit with a 10-year expiration period.

The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) are the National Environmental Policy Act (NEPA) federal lead agencies. FHWA and FTA issued a Final Environmental Impact Statement (EIS) on September 23, 2011, and signed a Record of Decision (ROD) on December 7, 2011, completing the NEPA process.

Following the ROD, FTA and FHWA prepared a NEPA Re-evaluation in December 2012, covering updated navigation data collected and bridge design refinements made in preparation to submit this application for a General Bridge Permit. The Re-evaluation identified no new significant adverse impacts from the updated information or refined bridge design (the Re-evaluation is Attachment J to this application).

The information in this cover letter is generally organized according to the order of information requested in the USCG Bridge Permit Application Guide, although additional information is also included to address particular navigation-related characteristics of this project. Sections in this cover letter include:

1. Applicant Information
2. Agent Information
3. Project Information
4. Legal Authority
5. Navigation Clearance and Elevation Summary
6. Columbia River Waterway Characteristics
7. Existing and Future River Users/Vessels
8. Navigation Impacts
9. Measures to Avoid, Minimize or Mitigate Long-term Operational and Economic Impacts to River Users/Vessels
10. Economic Impacts and Mitigation
11. Required Agency Authorizations, Permits and Approvals
12. Environmental Effects
13. Responses to USCG Information Requests

In addition to this cover letter, the application package includes several attachments, contained in two binders, as indicated in Table A below. Many of the attachments to this application were prepared for the overall Project and therefore contain information on more than just the proposed Columbia River bridge.

Table A – Bridge Permit Submittal Package Contents

Included Information	Binder #
Cover Letter	Binder 1
Completed Joint Permit Application (JPA) Form – Attachment A	Binder 1
Supplemental Project Description – Attachment B	Binder 1
Columbia River Bridges and Approaches Figures – Attachment C	Binder 1
Alternative Properties Memo – Attachment D	Binder 1
Land Use Analysis Summary and Maps - Attachment E	Binder 1
NEPA Record of Decision – Attachment F	Binder 1
NEPA Final Environmental Impact Statement Executive Summary*– Attachment G	Binder 1
Biological Opinion – Attachment H	Binder 1
Public Notice Mailing List – Attachment I	Binder 1
NEPA Vertical Clearance Re-evaluation – Attachment J	Binder 2
Navigation Impact Report – Attachment K	Binder 2
Information Not Available	**Date Anticipated**
Section 404 and Section 10 Permit	United States Army Corps of Engineers Review of 404 will be concurrent with USCG review.

Note: The full FEIS and printed appendices are provided on DVD.

Further guidance on where to find specific information in this submittal package is included at the end of this cover letter. Please see Section 13 for a detailed "crosswalk" table that guides reviewers to the response(s) to each of the USCG's specific requests for permit-related information. The crosswalk table lists the information requests that the USCG has sent to the project since the preparation of the Record of Decision in December 2011.

Certain information is included herein and identified as confidential [by an associated underline for text, or blocked out in tables]. All of this information is either private non-public information provided by private businesses or is derived from such information. This information is viewed as commercial, trade secret and/or proprietary by the private businesses. The private businesses have provided the information cooperatively only on the condition that the information be maintained as confidential and not be publicly disclosed except as provided by law. In addition, the information derived from the private information may represent opinions or positions subject to debate and/or dispute in ongoing discussion and negotiations between the businesses and the CRC, as opposed to fully agreed conclusions. Public disclosure of the information herein identified as confidential could damage the businesses if publicly revealed, and/or has the potential to adversely influence ongoing discussions/negotiations and would be detrimental to the public. ***This confidential information is contained on pages 32 through 40 of this cover letter.***

This confidential information should be protected from public disclosure under 5 U.S.C. 552(b)(4) (exemption 4), which exempts from public disclosure trade secrets, commercial and financial information not otherwise available and privileged or confidential, and 5 U.S.C. 552(b)(6) (exemption 6), which exempts personnel and other records that would cause a clearly unwarranted invasion of personal privacy if disclosed.

If you have any questions regarding the application or project please contact me at (360) 737-2726 or willsh@columbiarivercrossing.com.

Sincerely,

Heather Wills
Environmental Manager
Columbia River Crossing Project

cc: Document Control

Project File

1. APPLICANT INFORMATION:

Oregon Department of Transportation and
Washington Department of Transportation
700 Washington Street, Suite 300
Vancouver, Washington 98660
Contact: Heather Wills
Columbia River Crossing Project
Email: willsh@columbiarivercrossing.com
Phone: 360-737-2726

2. AGENT INFORMATION:

The Columbia River Crossing project is filing this application on behalf of WSDOT and ODOT.

3. PROJECT INFORMATION:

The Columbia River Crossing (CRC) project is a multimodal project that includes constructing a new bridge over the Columbia River to replace the existing Interstate 5 bridge and bridge approaches. The replacement bridge will be two parallel, fixed-span structures carrying highway traffic, light rail transit, bicyclists, and pedestrians.

3.1 PROJECT LOCATION AND DESCRIPTION

Please see *Attachment B: Supplemental Project Description*, for maps, exhibits and a detailed description of the project.

The Project, as described in the National Environmental Policy Act (NEPA) Record of Decision (ROD), includes multimodal transportation improvements within a 5-mile corridor between Portland, Oregon, and Vancouver, WA, as well as ancillary transportation improvements outside this corridor. The ROD describes the locally preferred alternative (LPA) to include:

- A new river crossing over the Columbia River and I-5 highway improvements.
- Improvements to seven interchanges, from south to north: Victory Boulevard, Marine Drive, Hayden Island, SR 14, Mill Plain, Fourth Plain and SR 500. Related enhancements to the local street network.
- Three new structures over North Portland Harbor associated with I-5, and one new multimodal bridge carrying light rail transit (LRT), local traffic, pedestrians and bicyclists.
- Removal of the existing Columbia River structures.
- A variety of bicycle and pedestrian improvements throughout the project corridor. A multiuse path connecting to the existing system. The path will allow users to travel from north Portland, over Hayden Island and the Columbia River into downtown Vancouver.

- Extension of LRT from the Expo Center in Portland to Clark College in Vancouver and associated transit improvements. Transit stations will be built on Hayden Island, in downtown Vancouver, and a terminus near Clark College. Three park and rides are to be built, Columbia (near the SR 14 interchange), Mill (in uptown Vancouver) and Central (near Clark College). Improvements will be made to the tracks on the Steel Bridge. Also, bus route changes and the expansion of the Ruby Junction LRT maintenance facility.

- Transportation demand and system management measures to be implemented with the project, including the use of tolls, subject to the authority of the Washington and Oregon Transportation Commissions.

The construction of the Project will be phased. In the first phase, WSDOT and ODOT will build the Initial Construction Phase (ICP), which includes the Columbia River bridge, three of the North Portland Harbor bridges, light rail transit, bike and pedestrian improvements, and interstate highway and related local street improvements beginning at the I-5/Victory Boulevard interchange in Portland, Oregon, extending north to the I-5/Fourth Plain Boulevard interchange in Vancouver, Washington. This covers an approximately 3.5-mile section of the I-5 corridor. The ICP includes the following elements:

- Two new, parallel, mid-level structures over the Columbia River. The bridge will carry I-5 traffic, light rail transit, bicyclists, and pedestrians.

- I-5 highway improvements, including improvements to five interchanges, as well as associated enhancements to the local street network.

- Two new structures over North Portland Harbor associated with I-5, and one new multimodal bridge carrying light rail transit, local traffic, pedestrians, and bicyclists.[1]

- Extension of light rail from the Expo Center in Portland to Clark College in Vancouver, and associated transit improvements, including transit stations, park and rides, bus route and station changes, and expansion of a light rail transit maintenance facility.

- Bicycle and pedestrian improvements throughout the project corridor that connect to the transit system.

- Minor track system and electrical upgrades and modifications on the Steel Bridge and modifications to the transit command center, both of which are located in Portland outside the 5-mile CRC corridor.

- Purchase of 19 light rail vehicles, public art and other transit-related procurements.

- Toll system for the river crossing.

- Transportation demand and system management measures to be implemented with the project.

At its northern end, the project area extends west into downtown Vancouver and east to near Clark College to include the light rail transit alignment, transit stations, park and ride locations, and city road improvements included as part of this project. On the Oregon mainland, the project area extends east of I-5 to include local street improvements along

[1] This permit application is requesting approval for the construction of the bridges over the main stem of the Columbia River only. This permit application is not requesting approval for the construction of new bridges over North Portland Harbor (Oregon Slough) at this time. A permit modification request for the North Portland Harbor (NPH) bridges will be submitted subsequently (likely in 2014) and the modified application will request approval for the bridges in the ICP that cross NPH.

Victory Boulevard, and west of I-5 to include local street improvements and the light rail extension from the Expo Center.

The new bridge across the main stem of the Columbia River will be downstream (to the west) of the existing Interstate Bridge (the existing Interstate Bridge, which will be replaced, consists of two parallel structures, one built in 1917 and one in 1958). The new structures will be approximately 15 feet apart (at the superstructure), and each will range from approximately 91 to 136 feet wide. The over-water length of each new mainstem bridge will be approximately 2,700 feet. The existing and replacement Columbia River bridges are located at approximately RM 106 of the Columbia River at 45.6167 latitude and -122.6750 longitude.

The proposed Columbia River mainstem crossing design will include two dual-level bridge structures. The western (downriver) structure will carry southbound I-5 traffic on the top deck, with light rail on the lower deck. The eastern structure will carry northbound I-5 traffic on the top deck, with bicycle and pedestrian traffic on the lower deck.

The new Columbia River bridge will include six in-water pier complexes of two piers each, for a total of 12 in-water piers. Each pier will consist of up to six 10-foot-diameter drilled shafts topped by a shaft cap. In-water pier complexes are labeled pier 2 through pier 7, beginning on the Oregon side. Pier complex 1 is on land in Oregon and pier complex 8 is on land in Washington. Portions of pier complex 7 occur in shallow water (less than 20 feet deep). Piers are designed to withstand the design scour without armor-type scour protection (e.g., riprap).

The new Columbia River bridge will replace the existing Interstate Bridge, which currently carries I-5 traffic and bicycles and pedestrians. The superstructures of the existing Interstate Bridge (which consists of two parallel structures) comprise 11 pairs of steel through-truss spans with reinforced concrete decks, including one pair of movable spans over the primary navigation channel and one pair of 531-foot-long span trusses. The remaining nine pairs of trusses range from 265 feet to 275 feet in length. In addition to the trusses, there are reinforced concrete approach spans (over land) on either end of the existing bridge. The existing Columbia River bridge is functionally obsolete (i.e., the existing configuration does not meet current bridge standards and traffic demand). Raising the lift spans on the existing structures for river traffic and maintenance causes automobile, bicyclist and pedestrian traffic delays and impacts highway safety. Each of the existing structures has three lanes, substandard shoulders, and a bicycle and pedestrian sidewalk that does not meet current Americans with Disabilities Act accessibility standards.

3.1.1 Columbia River Bridge Height

The proposed Columbia River bridge that was analyzed in the CRC Final Environmental Impact Statement (EIS) and selected in the ROD provided a vertical clearance in the primary channel of 95 feet above zero stage, Columbia River Datum (0 CRD). Following the ROD as part of the permitting process, the project collected additional navigation information and developed a Navigation Impact Report (NIR) in November 2012. This information also addressed concerns expressed by the USCG and several river users that the proposed vertical clearance would unreasonably restrict navigation due to changing markets in metal fabrication. The NIR considered new information about river use and evaluated the navigation impacts, costs, and environmental and landside impacts of mid-level bridges ranging from 95 to 125 feet above 0 CRD, and considered high level bridges with vertical clearance up to 178 feet above 0 CRD. Based on the analysis conducted in the NIR, the project refined the vertical clearance of the selected I-5 bridge to 116 feet above 0 CRD because that design balances the needs of navigation and surface transportation, while

minimizing additional landside and environmental impacts, as discussed in the NEPA *Vertical Clearance Re-evaluation* (see Attachment J). A 116-foot vertical clearance bridge would allow the project to avoid or minimize impacts to nearly all river users and vessels, and to mitigate the remaining impacts.

3.1.2 Construction and Demolition Activities

Construction and demolition activities are summarized in Section 8 below and detailed in *Attachment B: Supplemental Project Description.*

Scheduled Construction Commencement Date: Assuming all required permits are obtained, construction of the replacement Columbia River bridge is scheduled to begin in 2014.

Anticipated Completion Date: Construction of the replacement Columbia River bridge, including approaches, is anticipated to be completed by 2018. Demolition of the existing structures is scheduled to be completed by 2022.

Summary of Maintenance of Traffic: Section 8 below summarizes how river traffic will be maintained during construction. This is further detailed in Attachment B *Supplemental Project Description*. In addition, Chapter 3 of the EIS[2] describes how vehicle traffic will be maintained during construction.

3.2 FEDERAL LEAD AGENCIES AND FUNDING

Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) are the joint federal lead agencies and are contributing federal money to the Project. A NEPA Final EIS was issued on September 23, 2011. FHWA and FTA issued a NEPA ROD on December 7, 2011, completing the NEPA process.

FTA and FHWA prepared a NEPA re-evaluation[3] on updated navigation information and on bridge design refinements (increased vertical clearance described above) made after the ROD was issued. Through the *Columbia River Bridge Vertical Clearance NEPA Re-evaluation (*referred to as *the Vertical Clearance NEPA Re-evaluation)*, FHWA and FTA identified no new significant adverse impacts from the updated information or refined bridge design.

The estimated cost of the Columbia River bridge and approaches is $1.2 billion, but the full cost of the project is $3.1 to $3.4 billion for all the improvements identified in the LPA and selected in the ROD. This includes removal of the existing bridge. The proposed new bridge over the Columbia River would allow vertical navigation clearance of 116 feet above 0 CRD and a horizontal navigation clearance of 300 feet (minimum).

The project has not calculated the cost of providing a low-level bridge on the same alignment with only sufficient clearance to pass high water, because that option would not meet the project's purpose and need.

Funds to pay for the construction of the Columbia River bridge are expected to come from a mix of federal, state and local funding sources, including but not necessarily limited to bridge

[2] Attachment G includes the FEIS Summary. The full FEIS is on the disc. The transportation section of the FEIS is at http://www.columbiarivercrossing.org/FileLibrary/FINAL_EIS_PDFs/CRC_FEIS_Chapter3_S1_Transportation.pdf

[3] A NEPA re-evaluation is used to evaluate and determine whether or not the NEPA document, determination or final project decision remains valid for the subsequent federal action, by considering changes that have occurred in the project, resources, regulations or other circumstances. The finding or conclusion of a reevaluation is either that the NEPA decision or documentation is valid or that additional analysis is required. [23 CFR § 771.129(c)]

toll revenues, Section 5309 New Starts grant funds, federal aid highway funds, and funding from the states of Oregon and Washington.

3.3 PURPOSE AND NEED

The Purpose and Need statement developed by the lead agencies, project sponsors, and CRC Task Force is provided below.

The purpose of the proposed action is to improve I-5 corridor mobility by addressing present and future travel demand and mobility needs in the CRC Bridge Influence Area (BIA). The BIA extends from approximately Columbia Boulevard in the south to SR 500 in the north. Relative to the No-Build Alternative, the proposed action is intended to achieve the following objectives: a) improve travel safety and traffic operations on the I-5 crossing's bridges and associated interchanges; b) improve connectivity, reliability, travel times, and operations of public transportation modal alternatives in the BIA; c) improve highway freight mobility and address interstate travel and commerce needs in the BIA; and d) improve the I-5 river crossing's structural integrity (seismic stability).

The specific needs to be addressed by the proposed action include:

- **Growing travel demand and congestion:** Existing travel demand exceeds capacity in the I-5 Columbia River crossing and associated interchanges. This corridor experiences heavy congestion and delay lasting 4 to 6 hours daily during the morning and afternoon peak travel periods and when traffic accidents, vehicle breakdowns, or bridge lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many trips take the longer, alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther King Jr. Boulevard and Interstate Avenue increases local congestion. In 2005, the two crossings carried 280,000 vehicle trips across the Columbia River daily. Daily traffic demand over the I-5 crossing is projected to increase by more than 35 percent during the next 20 years, with stop-and-go conditions increasing to approximately 15 hours daily if no improvements are made.

- **Impaired freight movement:** I-5 is part of the National Truck Network, and the most important freight highway on the West Coast, linking international, national and regional markets in Canada, Mexico and the Pacific Rim with destinations throughout the western United States. In the center of the project area, I-5 intersects with the Columbia River's deep water shipping and barging as well as two river-level, transcontinental rail lines. The I-5 crossing provides direct and important highway connections to the Port of Vancouver and Port of Portland facilities located on the Columbia River as well as the majority of the area's freight consolidation facilities and distribution terminals. Freight volumes moved by truck to and from the area are projected to more than double over the next 25 years. Vehicle-hours of delay on truck routes in the Portland-Vancouver area are projected to increase by more than 90 percent over the next 20 years. Growing demand and congestion will result in increasing delay, costs and uncertainty for all businesses that rely on this corridor for freight movement.

- **Limited public transportation operation, connectivity, and reliability:** Due to limited public transportation options, a number of transportation markets are not well served. The key transit markets include trips between the Portland Central City and the city of Vancouver and Clark County, trips between north/northeast Portland and the city of Vancouver and Clark County, and trips connecting the city of Vancouver and Clark County with the regional transit system in Oregon. Current congestion in the corridor adversely impacts public transportation service reliability and travel speed. Southbound

bus travel times across the bridge are currently up to three times longer during parts of the a.m. peak compared to off-peak. Travel times for public transit using general purpose lanes on I-5 in the BIA are expected to increase substantially by 2030.

- **Safety and vulnerability to incidents:** The I-5 river crossing and its approach sections experience crash rates more than 2 times statewide averages for comparable facilities. Incident evaluations generally attribute these crashes to traffic congestion and weaving movements associated with closely spaced interchanges and short merge distances. Without breakdown lanes or shoulders, even minor traffic accidents or stalls cause severe delay or more serious accidents.
- **Substandard bicycle and pedestrian facilities:** The bike/pedestrian lanes on the I-5 Columbia River bridges are about 3.5 to 4 feet wide, narrower than the 10-foot standard, and are located extremely close to traffic lanes, thus impacting safety for pedestrians and bicyclists. Direct pedestrian and bicycle connectivity are poor in the BIA.
- **Seismic vulnerability:** The existing I-5 bridges are located in a seismically active zone. They do not meet current seismic standards and are vulnerable to failure in an earthquake.

4. LEGAL AUTHORITY

The legal authority for the proposed replacement bridge is found in the General Bridge Act of 1946, as amended. The existing and proposed bridges will be owned by WSDOT and ODOT. WSDOT has been authorized by the state legislature to construct and maintain state highways, including bridges by Revised Code of Washington (RCW) 47.01.260(1). ODOT has been authorized by the state legislature to carry out all duties and responsibilities vested in the Oregon Transportation Commission concerning drivers and motor vehicles, highways, motor carriers, public transit, rail and transportation safety (Oregon Revised Statutes (ORS) 184.615), and more specifically (ORS 381.005). ODOT, in the name of the state, may construct, reconstruct, purchase, rent, lease or otherwise acquire, improve, operate and maintain bridges over the Columbia River to the State of Washington.

5. NAVIGATION CLEARANCE AND ELEVATION SUMMARY

The overall length of the proposed bridge over the main stem of the Columbia River, from abutment to abutment is approximately 2870 feet. Vertical and horizontal clearances of the existing and proposed navigation channels are in the table below.

Table 5-1 Vertical and Horizontal Navigation Clearances

	Vertical Clearance		
	Above zero CRD	At Ordinary High Water	Horizontal Clearance
Existing Columbia River bridge			
Primary Channel (with liftspan closed)	39 ft	23 ft	263 ft
Primary Channel (with liftspan open)	178 ft	162 ft	263 ft
Barge Channel	46 to 70 ft	30 to 54 ft	511 ft
Alternate Barge Channel	72 ft	56 ft	260 ft
Proposed Replacement bridge			
Navigation Channel	116 ft	100 ft	Not less than 300 ft

6. COLUMBIA RIVER WATERWAY CHARACTERISTICS

Chapter 5 of the *Navigation Impact Report* (NIR) (Attachment K) provides a detailed discussion of the relevant Columbia River waterway characteristics. The aspects that are critical to the consideration of a General Bridge Permit for the proposed I-5 replacement bridge are summarized below.

The Columbia River's deep-draft navigation system provides for a 43-foot-deep by 600-foot-wide channel from inside the Columbia Bar upriver to ports on both the Washington and Oregon sides of the river. This channel, known as the Lower Columbia, does not extend to the I-5 bridge; its upriver end stops just downriver from the I-5 bridge.

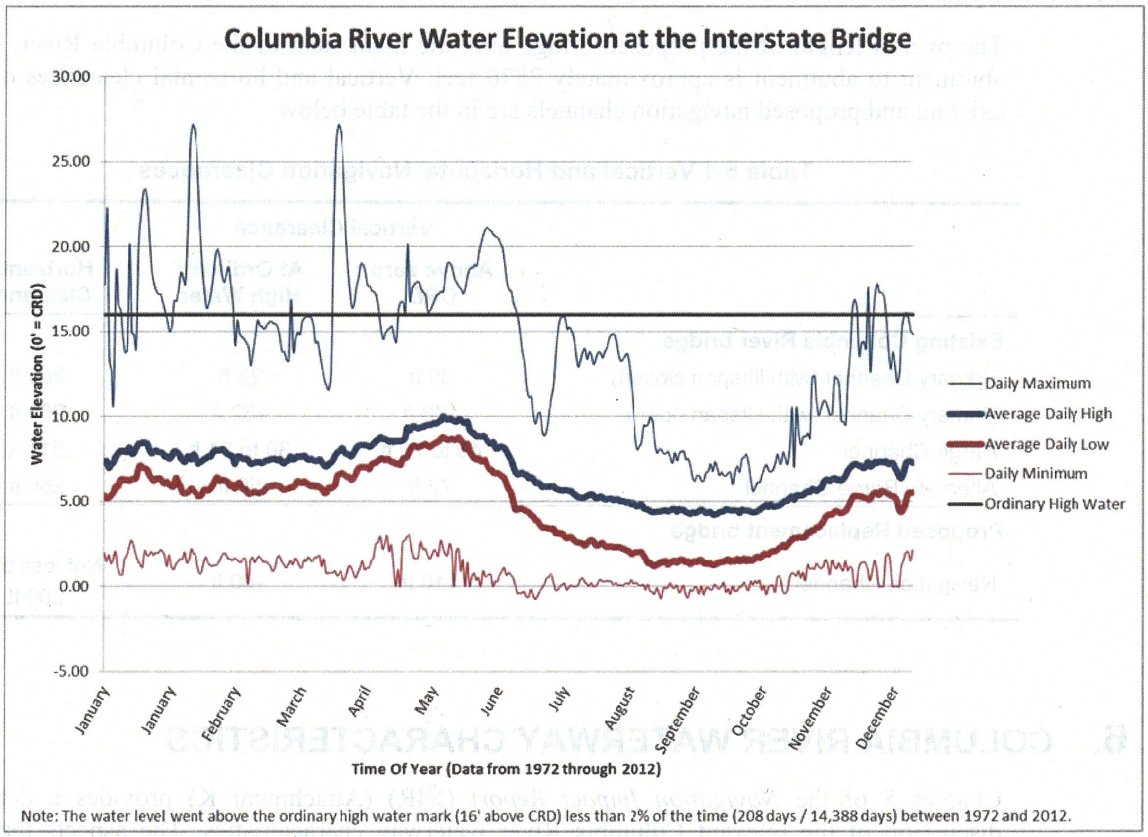
The shallow-draft system begins just downriver from the I-5 bridge and extends through the bridge area upriver to The Dalles lock and dam. The shallow-draft system has a controlling depth of approximately 15 feet.

Three bridges cross the main channel of the Columbia River in the vicinity of the project: the northbound and southbound structures of the I-5 bridge (proposed to be replaced by the CRC project) and the BNSF Railroad Bridge located less than one mile downriver (west). The I-5 bridge is in the shallow-draft section of the system and the BNSF bridge is in the deep-draft section.

A critical factor influencing vertical clearance under the proposed bridge is river water level, which fluctuates daily and over the course of the year and therefore changes the vertical distance between the river and the bottom of the bridge. The NIR (including Appendix F) analyzed 40 years of river water level data collected at the existing I-5 bridge.

Figure 6-1 summarizes the seasonal variability in water levels for the Columbia River at the I-5 bridge from 1972 through 2012. Included in the exhibit are daily maximum, daily minimum, average daily high, and average daily low.

Figure 6-1. Columbia River Water Elevation at the Interstate Bridge (1972-2012) (From the NIR)



In general, the following river water level trends can be observed from the data collected over the past 40 years:

- The highest average daily high is at approximately 10 feet above 0 CRD and occurs in early May.
- The lowest average daily low is at approximately 2 feet above 0 CRD and occurs in early September.
- The ordinary high water (OHW) level, which is the water level that was exceeded less than 2 percent of the time over the past 40 years, is about 16 feet above 0 CRD.

River levels at the I-5 bridge are influenced primarily by variations in runoff. The analysis conducted in the NIR also considered the minor effect of tidal influence, as well as the potential for future changes due to climate change. Briefly, climate change is projected to have little effect on annual precipitation levels but a higher share of winter precipitation is expected to fall as rain rather than snow. This will shift runoff peaks away from the spring and into the winter, and will result in lower runoff levels in the summer. Anticipated sea level rise would have minimal effects on river levels at the bridge, and any such effects would be noticeable only when river water levels are low. Other waterway characteristics at the proposed bridge crossing location include:

- Depth of waterway in the navigation channels range from 43.8 to 46.5 feet below OHW.
- The width of the waterway at the proposed bridge crossing is 2606 feet bank to bank at OHW.

7. EXISTING AND FUTURE RIVER USERS/VESSELS

7.1 EXISTING RIVER USERS

Known Columbia River users who transit under the I-5 bridge were contacted in 2012 and polled about the navigation and dimensional characteristics of their vessels, equipment, or fabrications/shipments. Additional users were sought through placement of announcements in the USCG *Local Notice to Mariners* and numerous other publications. Target mailings were sent out. Of particular interest were the height, breadth, and air gap requirements of the users' vessels or cargo to pass underneath a bridge. All of the information received was self-reported. The air drafts of some of the taller vessels were then verified by measuring their heights with surveying equipment. The full results of this study are located in the NIR Chapter 6 and Appendix B.[4]

The main channel was identified as being the primary route of transit for the majority of the respondents. Very few respondents provided information on Oregon Slough transits. The following summarizes findings for the different vessel classifications:

- Commercial tugs and tows have the greatest frequency of usage on the river and transit year-round. Air drafts for tugs and tows ranged from 28 to 61 feet.
- Recreational sailboats and powerboats typically use the river more frequently between April and October. The sailboats ranged in air draft from 50 to 90 feet. The powerboats ranged from 20 to 25 feet of air draft and were the only users that reported transiting the Oregon Slough.
- Marine contractors reported they use the river on an as-needed basis year-round. Air drafts ranged from 20 feet to 131 feet (excluding two Manson Construction cranes that are not expected to work on the Columbia River). The Port of Portland's Dredge *Oregon* has an air draft of 103 feet.
- The federal government users include USACE Hopper Dredge *Yaquina* with an air draft of 92 feet and Puget Sound Naval Shipyard nuclear transporters that include barges and escorts. The largest transport barge is *Barge 40* with an air draft of 51 feet, and the largest escort is the *YTT 10 Battle Point* with an air draft of 74 feet.
- Marine industries and fabricators ship products or have vessels transiting under the I-5 bridge on an as-needed basis all months of the year. The air drafts ranged from 60 feet to 141 feet.
- Passenger cruise vessels transit the river year-round, but more frequently in the summer months. The upriver motor vessels have air drafts that range from 42 to 65 feet. The Grays Harbor Historical Seaport Authority has two sailing vessels with air drafts of 74 and 85 feet that take passengers upstream typically once in May and June, and twice in October.

Most users/owners requested an air gap between 1 foot and 10 feet. A few users desired larger air gaps up to 20 feet. These air gaps are in addition to the air draft.

[4] The NIR is included in Attachment K to this application.

Additional information on river user data can be found in Chapter 6 of the NIR. Tables of vessel data, sorted by group, listing vessel owner, vessel name, vessel type, length overall, beam, draft, air draft, and frequency of passage, as well as additional information on existing users, are included in the NIR Appendices B, C and J. Figures 7-1 and 7-2, below, show the air drafts for the vessels and shipments that could be impacted by the various vertical clearance bridge options studies in the NIR. Figure 7-1 is based on a river level of 16 feet above 0 CRD and a 10-foot air gap. Figure 7-2 is based on a river level of 8.65 feet and a 5-foot air gap.

7.1.1 Critical Infrastructure, Key Resources and Important US Industrial Capability

USCG requires that bridge permits consider the impact of proposed bridges on critical infrastructure and key resources, and an assessment of industrial facilities that may be unique or one of only a few of the type in the area. The NIR evaluated all properties in the affected area, defined as the river reach from the existing I-5 bridge upriver to the next set of navigation constraints. Within this affected area, the project has given separate and distinct consideration of infrastructure, key resources, and industry. Findings are summarized below, and provided in greater detail in Attachment E.

7.1.1.1 Critical Infrastructure

The Department of Homeland Security (DHS) provides guidance on critical infrastructure. The list of potential facilities considered by the project also includes any infrastructure covered by the more broad USCG definition of critical infrastructure. The USCG headquarters (HQ) staff provided a list of DHS and USCG critical infrastructure. The list identified only the I-5 bridge as being considered Critical Infrastructure.[5] There are no other facilities listed above the I-5 bridge that meet this DHS definition. The critical functions provided by the existing bridge would be improved with the proposed replacement bridge.

7.1.1.2 Key Resources

Application for a USCG General Bridge Permit requires a description of key resources potentially affected by alterations in river navigation. Key resources can include cultural centers, commercial hubs, major universities and research centers, National Parks and Monuments and other resources. Within the affected area, two resources have been identified as potential *key* resources.

In 1948, an Act of Congress authorized the creation of the Fort Vancouver National Historic Monument which could be considered a key resource of this region. It was re-designated as a National Historic Site (NHS) in 1961. The Vancouver National Historic Reserve is located in the Hudson's Bay neighborhood, directly east of I-5 between Mill Plain Boulevard and SR 14. The project has completed an assessment of impacts to the site as part of the NEPA process and through Section 106 of the National Historic Preservation Act. The project will have no navigation-related impacts to the site, but CRC highway improvements will affect an upland portion of the site. This impact, and mitigation, have been documented and agreed to through a Section 106 Memorandum of Agreement, as described in the ROD.

The second key resource is the Columbia River Gorge National Scenic Area (NSA), located about 10 miles upriver of the I-5 bridge. The NSA encompasses 292,500 acres and extends

[5] Critical Bridges Section, Example 7.3 Savings Due to Avoidance of Risk.

along approximately 85 miles of the Columbia River from the Sandy River to the Deschutes River. The effect of the NSA designation most relevant to an assessment of river navigation is the designation's effect on land uses within the gorge. The NSA designation limits most development to within the small areas along the river that are within city boundaries and already established nodes, greatly limiting the potential for new industrial ports, cruise ship ports, or other facilities that could generate or attract tall vessels or cargo that could be impacted by reduced navigational clearances. The design of the new bridge will not adversely impact the NSA.

7.1.1.3 Important or Unique US Industrial Capability

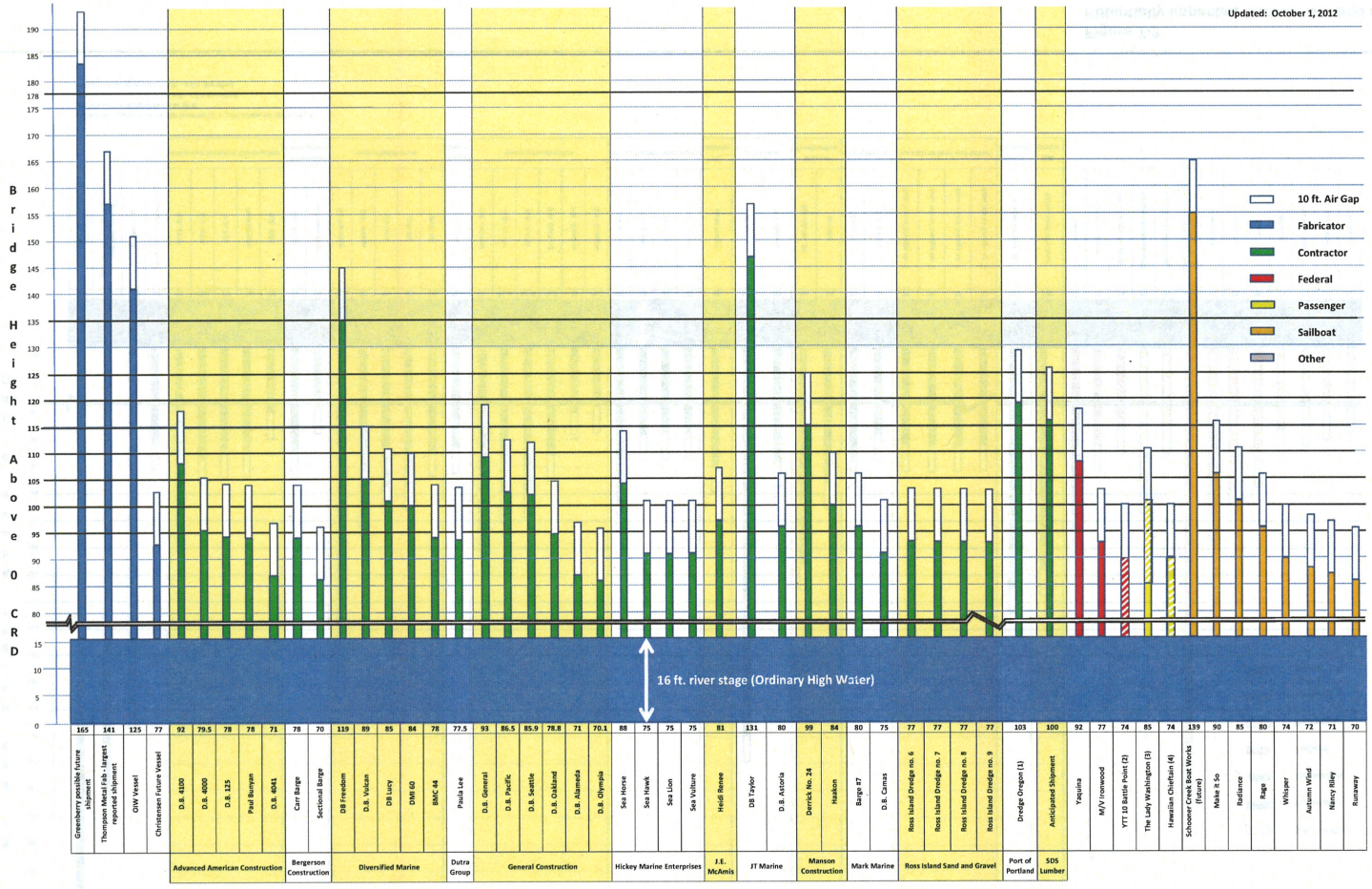
The CBC property is an important local industrial site, but the property itself does not have unique industrial importance at the national or regional scale. The CBC offers a relatively large property (approximately 219 acres, of which approximately 75 percent is zoned heavy industrial) and provides good access by road, rail and water. There are three fabricators that construct and assemble large structures (bridge sections, oil rig modules, and other structures) that are shipped by ocean barge from this site.

The facilities at the CBC that are used by the fabricators (Buildings 40 and 41) were constructed in 1942 and are considered to be in poor condition with substantial deferred maintenance. According to a recent investment review,[6] "The property manager indicated that, due to the ground lease expiry in less than 20 years, it is the sponsor's intent to keep these properties structurally sound and functional for tenants, but not to make significant investments into improvements." The new bridge's vertical clearance will affect some projected future shipments from these fabricators, and the CRC is currently engaged in mitigation discussions with them (as discussed in Sections 8, 9 and10).

A property search and literature review conducted by BST Associates identified multiple waterfront sites (vacant as well as available developed sites) in both Oregon and Washington that are appropriately zoned and have adequate marine, rail and road access to be able to provide marine industrial/fabrication capabilities equivalent to the CBC site. These include multiple port and other sites located on the Columbia River below the I-5 bridge, sites on the Willamette River, sites in Oregon coastal communities, and sites in Grays Harbor and multiple locations on Puget Sound. The documentation of this property search and literature review is in Attachment D to this application.

[6] Source: DBRA, GS Mortgage Securities Trust, Series 2012-GCJ7, page 21, May 2012.

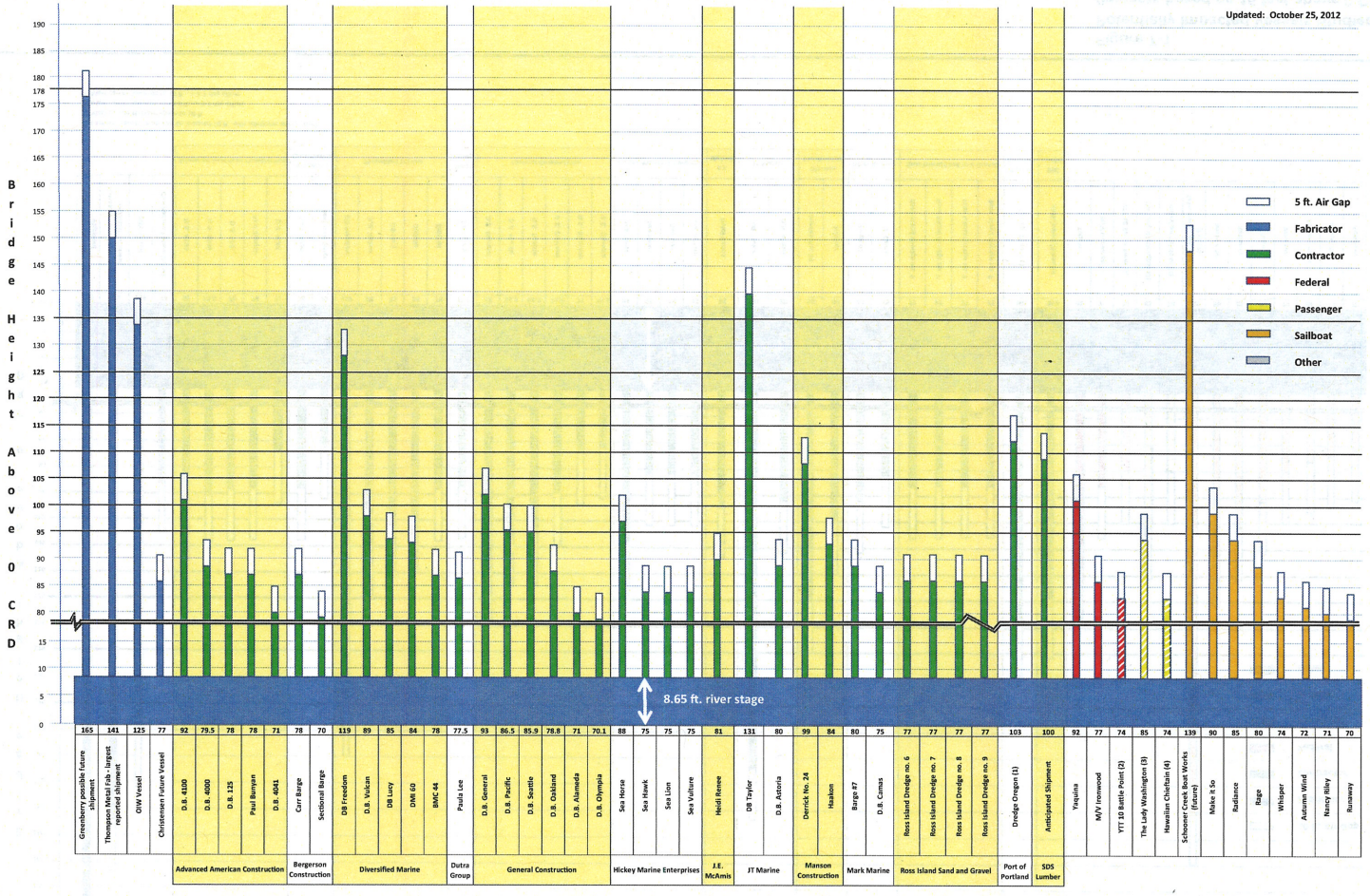
This page intentionally left blank.



(1) Captain reports spuds can be lowered 10 ft. with adequate water depth.
(2) Mast can be stepped down to 58 ft.
(3) Mast can be lowered to 64.8 ft., a 2-3 day effort.
(4) Mast can be lowered to 49 ft. , a 2-3 day effort.

Figure 7-1
Potentially Impacted Vessels Studied in the NIR (impacts based on 16 feet above 0 CRD water level and 10-foot air gap)

Columbia River CROSSING



(1) Captain reports spuds can be lowered 10 ft. with adequate water depth.
(2) Mast can be stepped down to 58 ft.
(3) Mast can be lowered to 64.8 ft., a 2-3 day effort.
(4) Mast can be lowered to 49 ft. , a 2-3 day effort.

Figure 7-2
Potentially Impacted Vessels Studied in the NIR (impacts based on 8.65 feet above 0 CRD river level and 5-foot air gap)

Columbia River CROSSING

7.2 FUTURE RIVER USE

This section summarizes findings regarding future river use, river users and vessels, including:

- Anticipated future vessels/shipments that could be constrained by the vertical clearance of the proposed bridge,
- Anticipated waterway improvement projects and channel improvements that could be relevant to the bridge, and
- The potential that future land uses located upriver could be affected by the vertical clearance constraints of the proposed bridge.

7.2.1 Sources of Information on Future River Users and Land Use Regulations

The information on existing and future river users and vessels, documented in the NIR, is based on information gathered by polling potentially affected businesses, reviewing city and county comprehensive plans, and contacting staff from relevant local agency land use planning departments and ports. Business survey forms, containing information provided by the businesses, are included in the NIR.[7] Businesses provided information on their existing vessels, their needs for transit under the bridge, and their anticipated future vessels or shipments. Businesses provided information on whether or not they had a business plan, and what their business plans (formal or informal) indicated regarding future vessel or other navigation needs.

The Project also reviewed the comprehensive plans and zoning codes, and contacted each of the local jurisdictions with land use planning authority over lands along the Columbia River in the potentially affected area. The findings from that analysis are summarized below and detailed further in the NIR[8] and in Attachment E of this application. Both Oregon and Washington have statewide land-use planning laws that require cities and counties to prepare land use plans and zoning ordinances. Future land use in Oregon and Washington is administered by cities and counties through state-acknowledged comprehensive plans and zoning codes. These codes are the binding land use planning documents and are the primary basis for the evaluation the project team conducted regarding how the vertical clearance limits of the proposed Columbia River bridge could affect future upriver land development.

In addition to contacting the responsible officials at each city or county where land use could potentially be affected, the project team also interviewed the ports in the affected area to determine how their current and projected future operations and business would be affected by the proposed bridge. The information obtained from the ports is described in Chapter 6 of the NIR.[9] Each of the jurisdictions or agencies contacted and/or interviewed is listed in Attachment E to this application.

[7] The completed survey forms are in Appendices B and C to the NIR. The NIR is Attachment K to this application.

[8] This information is in Appendix A of the NIR.

[9] The NIR is Attachment K to this application

7.2.2 Future Vessels/Users

Section 7.4.2 of the NIR describes the information obtained from businesses and other river users regarding their anticipated future vessels and navigation needs. The analysis evaluated the expected impact of a mid-level bridge on identified or anticipated future river users that might transit under the I-5 bridge. Most future vessels are anticipated to have similar height ranges to existing vessels. The exceptions were potentially more marine contractors with large derrick barges within the range of the existing barges; additional very tall fabricated structures (particularly oil rig modules); and a boat builder located downstream of the I-5 bridge indicated an intent to construct a sailboat in the future that would require 139 feet of air draft. The sailboat would be nearly 50 feet taller than the tallest known sailboat currently using the river.

Reported air drafts for the specific future vessels and shipments are shown in Exhibit 7.4-1 of the NIR (Attachment K to this application). Each of these future vessels/users is evaluated in the impact analysis covered in the *Vertical Clearance NEPA Re-evaluation* (Attachment J to this application), and summarized below in Section 8.

7.2.3 Projected Changes in Waterway Usage

Potential changes in waterway usage include increases in waterway usage and the construction of several waterway projects. According to the Columbia/Snake River System and Oregon Coastal Cargo Ports Marine Transportation Study, projected changes include:[10]

> "Baseline forecast projects that traffic will grow modestly, reaching 10.2 million tons by 2020, which amounts to growth of 1.1% per year. Grain and containers are the major growth commodities on the inland waterway. Although not a subject of this study, the volume of passengers carried on cruise ships on the inland waterway has been growing dramatically. These vessels benefit from the same infrastructure maintenance and improvements as maritime cargo. They also contribute economic benefits to the port communities on the river system."

The report identifies waterway projects to support short sea shipping on the mid-Columbia River such as dredging and lock maintenance.

- Mid Columbia & Snake Rivers Navigation Lock Repair & Retrofit
  - Bonneville – North lock wall stabilization and replacement of spillway power distribution equipment ($6.65M)
  - The Dalles – Navigation lock upgrade ($0.3M)
  - John Day – Lock and foundation leaks, new lock gate ($20.3M McNary – Rehab of lock electrical system ($4.0 M); future restoration of downstream lock gate ($7.0 M)
- Columbia & Willamette Rivers Maintenance Dredging
- Mid Columbia & Snake Rivers Navigation Lock Maintenance

Along with the dredging and lock maintenance, repair and retrofit projects and upgrade projects, the following is a list of recently completed, planned, or identified waterway projects which potentially could change the volume of waterway users but not the type of vessels that use this section of the Columbia River.

[10] Source can be found at: http://pnwa.net/ceder/FINAL%20CEDER%20MTS%20Main%20Report.pdf.

- Cascade Locks (Planned originally for within 5-10 years of 2005) – There are plans for a Beach Improvements & Sail Park to turn Cascade Locks into a world-class Sailing Center to attract recreational sailors. The Sail Park would be north of downtown Cascade Locks at Herman Cove. It will include the following improvements:
  - A breach in the existing dike to allow the eastern cove to access the Columbia River channel
  - 30 boat slips
- The Dalles (Construction completed) – The new dock at The Dalles marina is intended for light commercial shipping and as a place for river cruise ships to tie up. The dock is a fixed pier for cargo and includes a jib crane.
- Port of Klickitat (TBD) – Future establishment of a small intermodal container facility complete with mobile harbor crane, reach stacker, side-lift 20-foot to 45-foot container trailer (for local container pickup and delivery), and power hookups for reefers to serve local and regional markets.

Other than a change in the volume of recreational use and barging, no other projected changes in waterway use were identified. None of these would be adversely affected by, or would adversely affect, the proposed replacement bridge.

7.2.4 Land Use and Zoning Along the Waterway

The potential for future land use changes to generate vessels or shipments that could be impaired by the proposed replacement bridge was evaluated and documented in the NIR (see Chapter 7 and Appendix A of the NIR[11]). This analysis considered the potential for future development on all tax lots within 300 feet of the Columbia River within the potentially affected area. The potentially affected area includes land along the Columbia River from the proposed I-5 CRC bridge upriver 95 miles to the BNSF Bridge at Celilo Falls, which has a height restriction that is lower than the vertical clearance of the proposed I-5 replacement bridge.

The majority of the shoreline in the potentially affected area is within the Columbia Gorge National Scenic Area (NSA). The NSA extends about 83 miles from the Sandy River on the west to the Deschutes River on the east in Oregon and from Gibbons Creek in Clark County to a line 4 miles east of Wishram in Washington. The NSA promotes public access to recreation and water-dependent recreation, and does not allow industrial development outside of the Urban Areas. City and county comprehensive plans in both Oregon and Washington must implement and be in compliance with the NSA.

The project team reviewed the comprehensive plans and zoning codes of local planning departments to identify specific plans for these areas, the potential for development, and whether or not the tax lots identified within each jurisdiction are likely to develop with water dependent uses. The project team also contacted the responsible officials of the relevant jurisdictions. The analysis identified focus areas with either existing uses of this type or the potential for future uses of this type to locate there. This analysis is detailed in Appendix A of the NIR, and summarized in Attachment E to this application cover letter.

[11] The NIR is Attachment K of this application and is included in Binder 2.

The analysis of future land use found that:

- Many upriver counties are planning to repurpose vacant or underutilized industrial waterfront parcels with different uses, such as forest products manufacturing (which does not generate tall vessels or shipments) or non-water-dependent uses, including commercial business parks, mixed use residential/commercial developments and tourist centers.
- There are a small number of sites upriver of the bridge (CBC and Sundial sites) that could be developed or redeveloped for metal fabricator use in the future. However, there is also a substantial supply of downriver sites where future uses could locate, as well as locations in other parts of Oregon and Washington.
- There are no known planned developments for additional metal fabricators in the impacted area.
- There are no known planned developments for additional boatyards or shipyards in the impacted area.

The analysis discussed in the NIR, identified the potential for an impact to existing uses at the CBC site, and potential impacts to future uses. The impacts to existing uses are being addressed through the development of mitigation for the impacted users. It is unknown whether any of those existing users will remain in the current locations or will relocate in the future. Should any relocate and a new industrial use locate at CBC, then the 116-foot vertical clearance bridge could restrict the activity of future specific uses that could operate on that property (by restricting the maximum vessel or cargo height that could be generated). However, should any existing uses relocate, the site's zoning designation allows for redevelopment with a variety of uses.

The City of Vancouver rezoned the CBC property from MH (heavy manufacturing) to MC (Manufacturing Commercial) in 1989. The MC designation was changed to the new IL (light industrial) designation in 2004. This zoning designation, and the City's Shoreline Management Program designations covering this area, outline conditions under which the property, with an approved master plan, could be redeveloped with a combination of water-oriented as well as non-water-oriented commercial uses or mixed use (i.e., residential and restaurants, retail or office). The specific future uses at this site will likely be determined by future market trends and other factors that cannot be projected at this time.[12]

8. NAVIGATION IMPACTS

This section describes the impacts of the new bridge on navigation transits. For three users (the fabricators at the CBC site) these navigation transit impacts are expected to result in economic (revenue, employment and income) impacts. Economic impacts, and proposed mitigation for those impacts, are discussed in Section 10, Economic Impacts and Mitigation. The discussion of economic impacts includes proprietary information, provided through non-disclosure agreements by the affected businesses, and is therefore separated from the discussion of the non-economic impact information that can be disclosed.

[12] More specific conditions and restrictions on uses and development can be found in the City of Vancouver's Zoning Code and Shoreline Master Program.

The proposed measures to mitigate the potential adverse effects to JT Marine do not rely on proprietary information and are therefore included below in Section 9, Navigation Mitigation.

8.1 LONG-TERM IMPACTS TO NAVIGATION

The proposed replacement bridge would improve the horizontal clearance and eliminate the "S-curve" maneuver that vessels navigate when transiting through the frequently used alternate barge channel with the existing bridge. In addition, because the new structure will be a fixed-span bridge, it will reduce navigation constraints on vessels that currently must wait for the existing liftspan to open before they can pass.[13]

The replacement bridge would also reduce the maximum available vertical clearance under the Columbia River bridge from 178 feet to 116 feet above 0 CRD. See Section 5 of the CRC *Vertical Clearance NEPA Re-evaluation* (Attachment J) for a detailed analysis of the navigational impacts from the proposed bridge, summarized below.

The vessel/user impact analysis was conducted in three steps. First, each of the known existing and anticipated future vessels was evaluated against a conservative set of assumptions regarding river water level and air gap, to determine which vessels would be potentially impacted. The conservative assumptions assumed a vessel/user to be potentially impacted if, with a 10-foot air gap, their passage would be restricted more than two percent of the days per year. In other words, if a vessel/user could pass under the 116-foot vertical clearance bridge less than 98 percent of the days in a year, then it was considered potentially impacted. This identified 11 vessels/users that would be potentially impacted.

The next step in the analysis was to evaluate each of the potentially affected 11 vessels/users, based on the specific vessel operating requirements, including air gap and time of year they travel. This analysis found that the operating requirements of seven of the 11 vessels/users could be readily served by a 116-foot vertical clearance bridge, as described below:

- Two of the vessels, including Advanced American Construction's *DB 4100*, and General Construction's *DB General,* could pass under the bridge more than 95 percent of the days of the year with a 10-foot air gap (based upon 40 years of recorded water level data from 1972 to 2012), and more than 98 percent of the days of each year with a 5-foot air gap.). With infrequent transits that are scheduled around bidding opportunities for construction work upstream of the bridge, and no planned schedule for transit, any impacts would be negligible.

- Diversified Marine reports a preferred configuration for the crane boom for the *DB Freedom* that results in an air draft of 119 feet. However, they have reported a history of altering their placement of the crane boom to lower it enough to transit in other height constrained circumstances lower than the proposed vertical clearance of the I-5 Bridge. Given that they have a reported history of operating successfully in other height constrained situations, there will be no impacts from the proposed bridge.

- Schooner Creek Boat Works indicated future plans to build a sailboat that would have an air draft of 139-feet. However, it would be constructed downriver of the bridge. The size of this anticipated vessel is typical of ocean-going sailboats and would be unprecedented for recreational sailboats on the river. It is unknown and speculative at this time when this

[13] The existing I-5 bridges opened for vessel traffic an average of 289 times per year over the past 25 years. Over the past five years, the annual average was 209 lifts for vessel traffic (as reported in NIR).

boat will be constructed and if it would be used upriver. Therefore, no impacts are anticipated to result from construction of the proposed bridge.

- The USACE dredge *Yaquina* could pass under the bridge at least 98 percent of the days of the year with an 8-foot air gap based upon the past 40 years of water level data. The 116-foot vertical clearance above 0 CRD was the clearance requirement requested by the USACE in a letter received by the project on February 23, 2012.[14] For this reason, the vessel will not be impacted.

- The highest elements of the Port of Portland's dredge *Oregon* are the raised spuds.[15] With the spuds up, the *Oregon's* passage would be restricted by the 116-foot vertical clearance. However, the owner has suggested that an acceptable solution would be to lower their spuds for passage under the bridge. At ordinary high water (16 feet above 0 CRD) and a 5-foot air gap, the spuds can be lowered by 8 feet to transit under the bridge. With this procedure, the dredge *Oregon* could pass more than 98 percent of the days of the year, based upon the past 40 years of water level data. The dredge *Oregon* has worked upriver of the Columbia River Bridge 6 times in the last 30 years and anticipates working upriver rarely in the future. The operational adjustment for this vessel is considered reasonable, and therefore there will be no operational impacts from the proposed bridge.

- SDS Lumber has reported a future possible shipment with a 100-ft air draft. They operate as a commercial tug service, and their only operations that would involve height constrained shipments would be moving a barge for one of the three fabricators located at the Columbia Business Center. Potential impacts to the three fabricators are discussed in Section 10.

The remaining four vessels/users were found to be too tall to pass under the 116-foot vertical clearance bridge at any time, including:

- The tallest future shipments of Greenberry Industrial (a fabricator)
- The tallest future shipment of Oregon Iron Works a (fabricator)
- The tallest reported past shipment by Thompson Metal Fab (a fabricator), and
- A marine contractor vessel in its current configuration (JT Marine *DB Taylor*)

Through non-disclosure agreements, Thompson Metal Fab, OIW and Greenberry have provided the project with proprietary information regarding their potentially affected, future business activities, in order to allow the project to evaluate the operational and economic impacts to these users, and to determine appropriate mitigation. Where this information is needed to initiate USCG review of the permit application, it is being provided to the USCG in Section 10 (Economic Impacts and Mitigation) of this cover letter. The proprietary information that is subject to the non-disclosure agreements has been identified in Section 10 as exempt from public disclosure.

The proposed measures to mitigate the potential adverse effects to JT Marine do not rely on proprietary information and are therefore included below in Section 9, Navigation Mitigation.

[14] The letter from the USACE regarding the *Yaquina* is in Appendix B of the Navigation Impact Report, which is Attachment K to this cover letter.

[15] A spud is a moveable vertical pile that is lowered into the river bottom to anchor the vessel when working and raised when in transit.

8.2 TEMPORARY IMPACTS TO NAVIGATION

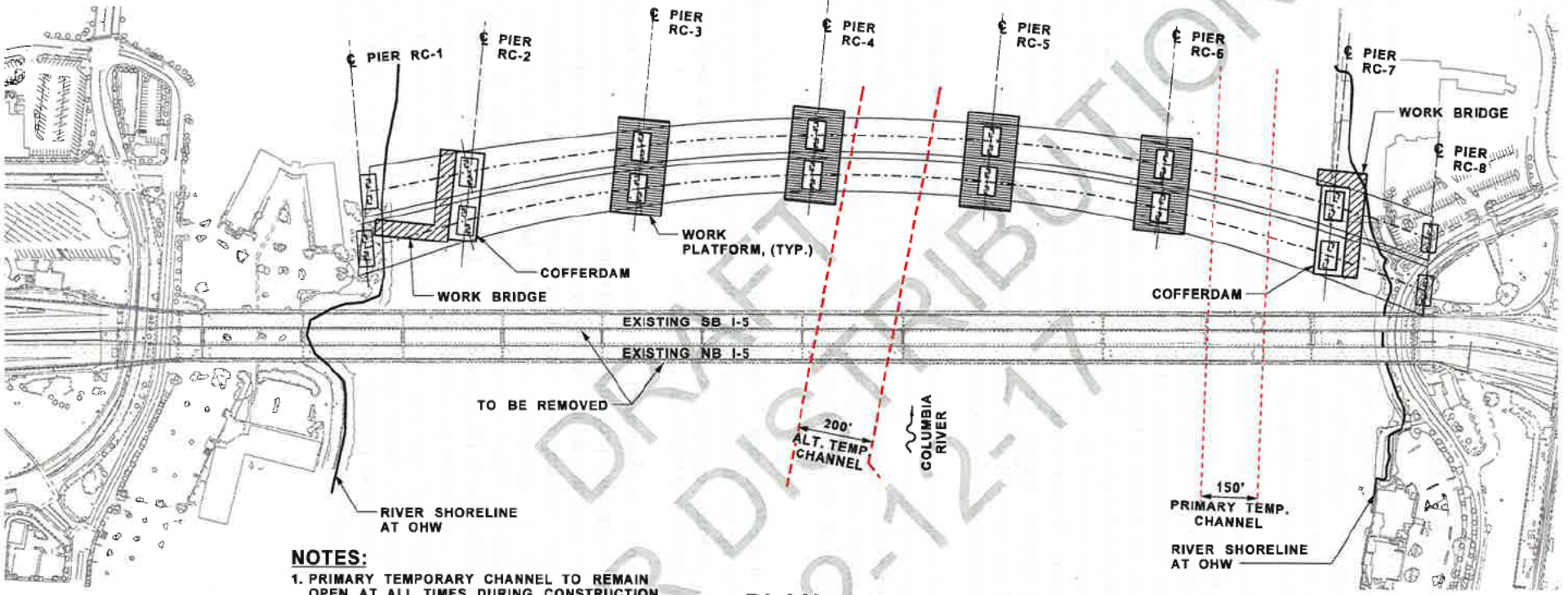
Bridge construction will have various effects on navigation that will be mitigated to the extent practicable. A detailed description of the construction sequencing, timing, and impacts is included in Attachment B: *Supplemental Project Description* (see Section 4.2 of that Attachment). The following identifies potentially adverse temporary effects to navigation and summarizes the proposed measures to minimize effects:

- Construction activities would result in temporary effects to river navigation. Construction would be staged so that at least one navigation channel would be open at all times. A primary temporary channel will be provided during construction, typically in the location of the current primary channel (drawings of the primary temporary channel and alternate temporary channel can be found in Figure 8-1 below and in Attachment C: Columbia River Bridges and Approach Figures). Before the steel truss of the new bridge is erected over the existing primary channel, the vertical clearance will be controlled by the existing bridge vertical lift span (178 feet above 0 CRD). Once the steel truss is erected over the new span across the primary channel, the vertical clearance will be temporarily reduced to approximately 98 feet above 0 CRD until the new I-5 navigation channel is open, at which time the vertical clearance will become 116 feet above 0 CRD.

- There could be some temporary restrictions to the primary temporary channel due to blockages from barges and cranes used to construct piers and lift bridge segments into place. It is estimated that there could be three separate 2 to 3 week closures of the primary temporary channel. During these closures, vessels will use a temporary alternate channel, which will provide 200 feet of horizontal clearance and 72 feet above 0 CRD of vertical clearance.

- During construction of the ICP, some of the new bridge piers, outside of the navigation channel, would not line up with the existing bridge piers. While the new crossing is under construction and the existing crossing is still operational, this would result in more obstacles in the river and more difficulty in navigation.

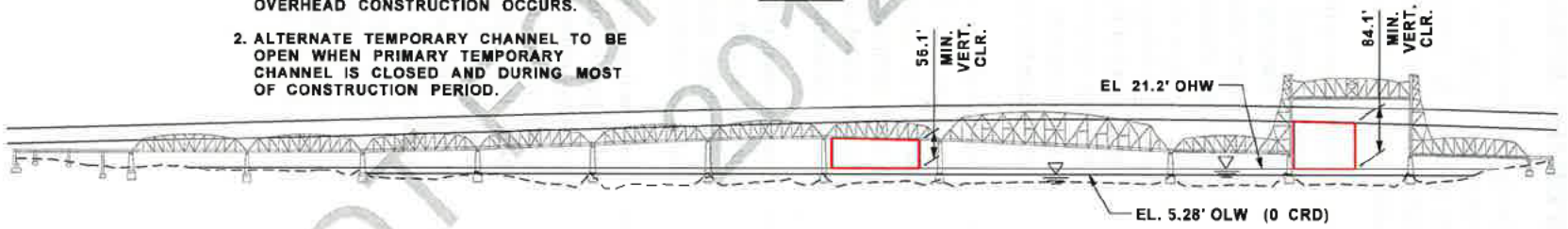
- Construction staging would be planned to minimize adverse effects to river navigation. Public involvement and education programs would be used to provide information to tug operators, pilots, and the general public. Closures or restrictions on river traffic would be communicated in advance, enabling river users to accommodate their schedules without undue interruption. During construction, should there be occasion that the one open channel has height/width clearance constraints, these periods would be coordinated closely with the USCG District 13 through the weekly Local Notice to Mariners (LNM). The contractor will be required to provide the LNM no less than 2 weeks prior to the week of the event. Additional tugs may be needed to assist vessels through areas of reduced clearances, especially during times of high water. The USCG will review construction plans to determine potential effects. Conditions of this USCG General Bridge Permit will be incorporated into construction contract specifications as applicable.



PLAN

NOTES:

1. PRIMARY TEMPORARY CHANNEL TO REMAIN OPEN AT ALL TIMES DURING CONSTRUCTION EXCEPT FOR SHORT PERIODS OF TIME WHILE OVERHEAD CONSTRUCTION OCCURS.
2. ALTERNATE TEMPORARY CHANNEL TO BE OPEN WHEN PRIMARY TEMPORARY CHANNEL IS CLOSED AND DURING MOST OF CONSTRUCTION PERIOD.



ELEVATION

DATUM
NAVD 1988

0 200 400
FEET

UNITED STATES COAST GUARD BRIDGE PERMIT DRAWINGS

COLUMBIA RIVER CROSSING
INTERSTATE 5 OVER COLUMBIA RIVER, MILE 106.4 AT
VANCOUVER, WA (CLARK COUNTY) & PORTLAND, OR (MULTNOMAH COUNTY)

APPLICATION BY: WASHINGTON STATE DEPARTMENT OF TRANSPORTATION & OREGON DEPARTMENT OF TRANSPORTATION
ROUTE: INTERSTATE 5 **DATE:** JAN. 2013

TEMPORARY STRUCTURES/FALSEWORK PLAN

SHEET 4 OF 6 SHEETS

DATE: Mon, Dec 17, 2012 TIME: 3:35:40 PM PLOTTED BY: deguzma FILE NAME:c:\aswork\pw_work\crc\deguzmana\dms03873\CRC_PS_BG_USCG_Permit_04.dgn

9. MEASURES TO AVOID, MINIMIZE OR MITIGATE LONG-TERM OPERATIONAL AND ECONOMIC IMPACTS TO RIVER USERS/VESSELS

This section discusses mitigation measures to address the operational impacts to JT Marine's *DB Taylor*.

The mitigation for the impacts to the three fabricators is based on compensation for projected economic impacts, and includes proprietary information that has been provided by the affected businesses through non-disclosure agreements. This information cannot be released publicly at this time and is therefore included in a separate section (see Section 10, Economic Impacts and Mitigation). The proprietary information in that section will be redacted for public release.

Table 9-1. Measures to Avoid, Minimize or Mitigate the Operational and Economic Impact to JT Marine's Construction Barge

User/Vessel	**JT Marine; *DB Taylor***
Impact to User/Vessel	JT Marine operates from moorage and upland facilities just upstream of the I-5 bridge in the Columbia Business Center. Virtually all of their project work occurs downstream of the bridge. Regular and frequent passage under the bridge is required. The *DB Taylor* - JT Marine's tallest vessel is a construction barge with a very large derrick crane. In its existing configuration, the *DB Taylor's* crane boom can only be lowered to a height of 131 feet above the water line (air draft of 131 feet). This air draft is too high to pass under the proposed 116-foot vertical clearance bridge at any time.
General Description of the Proposed Mitigation Measures	The project will provide compensation to JT Marine to retrofit the crane on the *DB Taylor* to allow the boom to be lowered sufficiently to transit under the bridge at least 98 percent of the year. Working with a naval architect, the project and JT Marine are jointly developing plans for compensation to reconfigure the crane to ensure it can pass under the proposed bridge while retaining the same lifting capacity and reach.
Post-mitigation Impacts	With the proposed mitigation, operational and economic impacts to JT Marine would be avoided.
Mitigation Assurance	CRC is working with a naval architect and JT Marine to jointly develop plans for compensation to reconfigure the crane to ensure it can pass under the proposed bridge while retaining the same lifting capacity and reach. The current status of assuring mitigation includes: • A concept plan identifying a feasible and practicable retrofit for the crane has been prepared by a naval architect and discussed with JT Marine. • A work plan and schedule to further develop and evaluate the retrofit concepts is scheduled to be prepared by February 2013. • Both parties have agreed to work toward completing the mitigation agreement by August, 2013. • Project and owner are working toward a joint affidavit to confirm the above.

Mitigation Timeline (items completed and projected)	**Date**
Talks initiated with owners	November 2012
Hire naval architect for vessel retrofit consultation	July 2012
Site visit to inspect vessel	November 2012
Develop initial conceptual design of vessel retrofit	November 2012
Signed DOT/owner acknowledgement of ongoing mitigation negotiations	February 2013
Signed binding legal agreement	August 2013

In addition to the *DB Taylor* discussed above and the three fabricators discussed in Section 10 below, no additional mitigation is proposed. Preliminary analysis had identified seven other vessels that could be potentially impacted. However, as demonstrated in Section 8, additional analysis based on 40 years of river level data and the operational needs of each vessel, demonstrated that none of these seven vessels would be impacted and therefore no additional mitigation is proposed.

10. ECONOMIC IMPACTS AND MITIGATION

Certain information is included herein and identified as confidential [by an associated underline for text, or blocked out in tables]. All of this information is either private non-public information provided by private businesses or is derived from such information. This information is viewed as commercial, trade secret and/or proprietary by the private businesses. The private businesses have provided the information cooperatively only on the condition that the information be maintained as confidential and not be publicly disclosed except as provided by law. In addition, the information derived from the private information may represent opinions or positions subject to debate and/or dispute in ongoing discussion and negotiations between the businesses and the CRC, as opposed to fully agreed conclusions. Public disclosure of the information herein identified as confidential could damage the businesses if publicly revealed, and/or has the potential to adversely influence ongoing discussions/negotiations and would be detrimental to the public.

This confidential information should be protected from public disclosure under 5 U.S.C. 552(b)(4) (exemption 4), which exempts from public disclosure trade secrets, commercial and financial information not otherwise available and privileged or confidential, and 5 U.S.C. 552(b)(6) (exemption 6), which exempts personnel and other records that would cause a clearly unwarranted invasion of personal privacy if disclosed.

10.1 INTRODUCTION

This section provides an economic impact analysis for the impacted users, including information related to proposed mitigation for these impacts. This section also provides quantified total economic activity impacts of the proposed reduced vertical clearance on present and prospective upstream commercial development following the user specific analysis. Finally, there is a summary of the economic benefits of the CRC project in order to understand the tradeoffs of economic costs versus benefits of the project.

10.2 SUMMARY

The Columbia River Crossing project will produce transportation-related economic benefits for highway users, transit riders, and marine commerce of $5-$8 billion, expressed as the net present value of the increased economic activity generated by the project from 2018-2050. At the same time, with a new bridge crossing the Columbia River at a vertical clearance of 116-feet above 0 CRD, the project will also constrain the height of maritime shipments to less than what can pass through the lift spans of the existing bridges (at 178 feet above 0 CRD). Based on a review of current and projected river use, the change in vertical clearance is anticipated to impact four river users to the extent that mitigation may be needed. One of the impacted users is a marine construction firm, JT Marine, whose derrick barge the *DB Taylor* cannot pass under the proposed bridge without modification. Discussions are underway with the firm to reach agreement on the modifications needed, cost, and schedule for the

modifications to occur. Mitigation for the *DB Taylor* is discussed above in Section 9. Once the *DB Taylor* has been modified, there will be no impact to the anticipated operations of the firm.

The four users also include three metal fabrication firms located at the Columbia Business Center (CBC) in Vancouver, Washington, a short distance upstream of the I-5 Bridge. For the period 2002-2012, approximately 9-10 percent of the fabricators' products, revenue, and employment would have been affected by the proposed bridge. The height constrained activity averages 1-2 shipments per year, generating an average of $18 million in business revenues, $6 million in direct employee compensation, and approximately 80 direct jobs (represented as full time equivalents for the period of one year). Mitigation for those impacts is anticipated to be based on an estimate of lost profits from future contracts related to height constrained products. Mitigation discussions are ongoing, and no agreements have been reached to date. However, at this point total mitigation costs are estimated to range between $30 million (low) to $116 million (high).

Potential business impacts have also been considered in the context of the overall economic activity generated by marine commerce on the Columbia River. Of 28,000 vessel entrances to the Columbia River for 2002-2012, approximately 18 were associated with contracts for height-constrained products. The value of cargo operations entering and leaving the Columbia River averages $21 billion (adjusted for inflation in 2012 dollars), with approximately 0.1 percent of that total associated with height constrained fabricated products constructed at the CBC.

10.3 POTENTIALLY IMPACTED RIVER USERS

As stated in Section 8 of this document, initial analyses identified eleven potentially impacted vessels/river users with a vertical clearance of 116-feet above 0 CRD. Based on the specific vessel operating requirements, and allowing less than a ten foot air gap, it was found that operating requirements of 7 of the 11 vessels/users could be accommodated by a 116-foot vertical clearance above 0 CRD, and no mitigation would be required:

- Advanced American Construction's *DB 4100*
- General Construction's *DB General.*
- Diversified Marine's *DB Freedom.*
- Schooner Creek Boat Works future sailboat.
- The USACE dredge *Yaquina.*
- The Port of Portland's dredge *Oregon.*
- SDS Lumber future possible shipment.

Four vessels/users have reported and/or been assessed by CRC to have need for some transits that would be too tall to pass under the 116-foot vertical clearance, including:

- The tallest future shipments of Greenberry Industrial (fabricator)
- The tallest future shipment of Oregon Iron Works a (fabricator)
- One marine contractor vessel in its current configuration (JT Marine *DB Taylor*)
- The tallest reported past shipment by Thompson Metal Fab (fabricator).

This section of the application focuses on business related impacts and mitigation for the three fabricators, Thompson Metal Fab, Greenberry Industrial and Oregon Iron Works. JT Marine is discussed in Sections 8 and 9 of the permit application and pending permit approval, would be mitigated through vessel modification; therefore, there will be no adverse impacts because the mitigation would be complete prior to the vessel being height constrained by the new I-5 bridge with a vertical clearance of 116-feet above 0 CRD. The rest of this section refers to impacts being "height constrained" in the past or future. For this section, height constrained refers to the completed Columbia River Crossing Project with a vertical clearance of 116-feet above 0 CRD.

10.4 COLUMBIA RIVER ECONOMICS

10.4.1 Value of Marine Cargo

Approximately 40.6 million tons of marine cargo flowed through the mouth of the Columbia River in 2010, which is the last year of data available for domestic cargo operations. In addition, approximately 3.3 million tons of cargo moved internally[16] in the river system and was consumed or used in local markets.

Foreign trade accounts for the greatest share of traffic. Exports accounted for 32.4 million tons valued at $10.4 billion in 2010. A significant share of these exports consists of products that are grown or produced in the Pacific Northwest and then exported to world markets. This includes agricultural exports (wheat, potatoes, legumes, fruit, animal feeds and a wide variety of other products), forest products (logs, pulp, paper, lumber, structural building components and other products), and a variety of other products (petroleum coke et al).

Imports accounted for 5.2 million tons valued at $9.6 billion in 2010. Imports include consumer products as well as inputs to local production. Examples of the consumer goods include footwear, apparel, electronic equipment and fully assembled automobiles that are destined for both local and national retail outlets. The inputs to production include fertilizers used by regional farmers, chemicals used by forest products and other manufacturers, steel coil and slabs used at the steel mills and a variety of other products.

Domestic trade accounts for the rest of the traffic, accounting for approximately 14 percent of the tonnage and 22 percent of the value. The U.S. Army Corps of Engineers does not provide dollar estimates of domestic cargo. BST Associates applied appropriate values per ton from international trade to provide estimates of the value of domestic cargo.

Coastwise receipts in 2010, which include cargo that originates in other areas of the U.S. and terminates in the Columbia River, accounted for 2.6 million tons valued at an estimated $1.8 billion. This includes petroleum products that come from U.S. West Coast refineries for use in areas served by Columbia River ports, logs and other products bound for mills and markets in the region.

Coastwise shipments, which refer to cargo originating in the Columbia River that is destined for other areas of the U.S., accounted for 372,000 tons valued at an estimated $284 million. This includes forest products manufactured in the Pacific Northwest that are transported to California and Hawaii, among other products. Coastwise shipments also include the metal

[16] Steps were taken to eliminate double counting of commodities. As an example, cargo that was barged from upriver sources and was ultimately exported (e.g., wheat and other similar products) was excluded from the estimates. In addition, since internal shipments also represented internal receipts in the river system, the estimated values attributed to these commodities only included one direction of the movement.

structures that are fabricated upriver of the I-5 bridge at the Columbia Business Center (CBC) that are destined for Alaska, California and other parts of the U.S. In 2010, fabricated metal products produced upriver of the I-5 Bridge were reported as 7,300 tons and valued at approximately $134 million. These shipments were a subset of coastwise shipments. However, fabricated shipments moving by water were a fairly small portion of the cargo base in the Columbia/Snake River system, representing 0.02 percent of the tonnage and 0.53 percent of the value of waterborne trade.

There were an estimated 28,000 entrances[17] by vessels in the Columbia River between 2002 and 2012, ranging from around 2,000 to nearly 4,000 annually, including self-propelled vessels (passenger and dry cargo vessels, tankers and tugs) and non-self-propelled vessels (dry cargo barges and tank barges). The U.S. Army Corps of Engineers prepares annual reports of the number of vessels that enter and clear (leave) the entrance of the Columbia River. The database is current through 2010. The cargo volumes for 2011 and 2012 are comparable to 2010, so the 2010 entrance estimates are used as a surrogate value for operations during the last two years.

Of the 28,000 total vessel entrances between 2002 and 2012, it is estimated that 90 were generated by the fabricators identified above, all three of whom are located at the Columbia Business Center (CBC) as well as by other shippers using the barge slip at the CBC. These fabricators will be referred-to as the CBC fabricators. These 90 transits include six that would have been height constrained with the proposed bridge. Of the remaining 84, an additional 12 were associated with contracts that included one or more height-constrained shipments. As shown in Table 10-1, the 90 transits associated with the fabricators and other shippers at the CBC accounted for approximately 0.4 percent of total entrances and leaves at the mouth of the Columbia River for the period from 2003 through 2012.[18]

The value of cargo operations entering and leaving the Columbia River ranges annually from $14 billion to $26 billion, averaging $21.3 billion per year in inflation adjusted 2012 dollars.[19] This is based upon data from the WISER[20] databases that identify the value of imports and exports. BST Associates estimated the value of domestic trade (coastwise shipments and receipts) based upon the value per ton in international transits. Of the $213 billion in total cargo value between 2002 and 2012 ($234 billion in 2012$), the estimated combined value of the height constrained transits from the affected fabricators at CBC was $179 million ($193 million in 2012$), or about 0.1 percent of the total value of cargo entering and leaving the mouth of the Columbia River.

[17] Vessels enter and exit the Columbia River system in approximately the same numbers. Entrances were used to estimate transits because they represent a round trip vessel call, which avoids double counting.

[18] The comparison of transits uses the period from 2003 to 2012 because data was not available for CBC barge activity in 2002.

[19] The CPI for the Portland Metro area, as determined by the U.S. Bureau of Labor Statistics, was used to adjust for inflation.

[20] WISER, the World Institute for Strategic Economic Research (based at Holyoke Community College in Massachusetts) was designated in 1988 by the US Census Bureau to be a Business and Industry Data Center, with special focus on foreign trade statistics. WISER maintains several time series of trade data based on United States trade statistics.

Table 10-1. Columbia River Transits and Value of Cargo Entering and Leaving the mouth of Columbia River (CBR)[21]

	Transits			Value of Transits ($millions)		
Year	CBR Entrance	Estimated Transits at CBC	Percent of CBR	CBR Entrance	Estimated Height-Constrained Transits at CBC	Percent of CBR
2002	3,829	NA	NA	$14,312	$6	0.0
2003	2,737	9	0.3	$15,048	$0	0.0
2004	2,807	12	0.4	$16,063	$0	0.0
2005	2,713	4	0.1	$15,566	$8	0.1
2006	2,628	11	0.4	$22,810	$9	0.0
2007	2,718	6	0.2	$26,429	$8	0.0
2008	2,470	12	0.5	$17,241	$27	0.2
2009	1,937	11	0.6	$20,023	$62	0.3
2010	2,044	12	0.6	$22,102	$52	0.2
2011 (est)	2,044	9	0.4	$22,102	$6	0.0
2012 (est)	2,044	4	0.2	$22,102	$0	0.0
Total	**27,971**	**90**	**0.4%[22]**	**$213,797**	**$179**	**0.1%**

10.4.1.1 CBC Fabricators

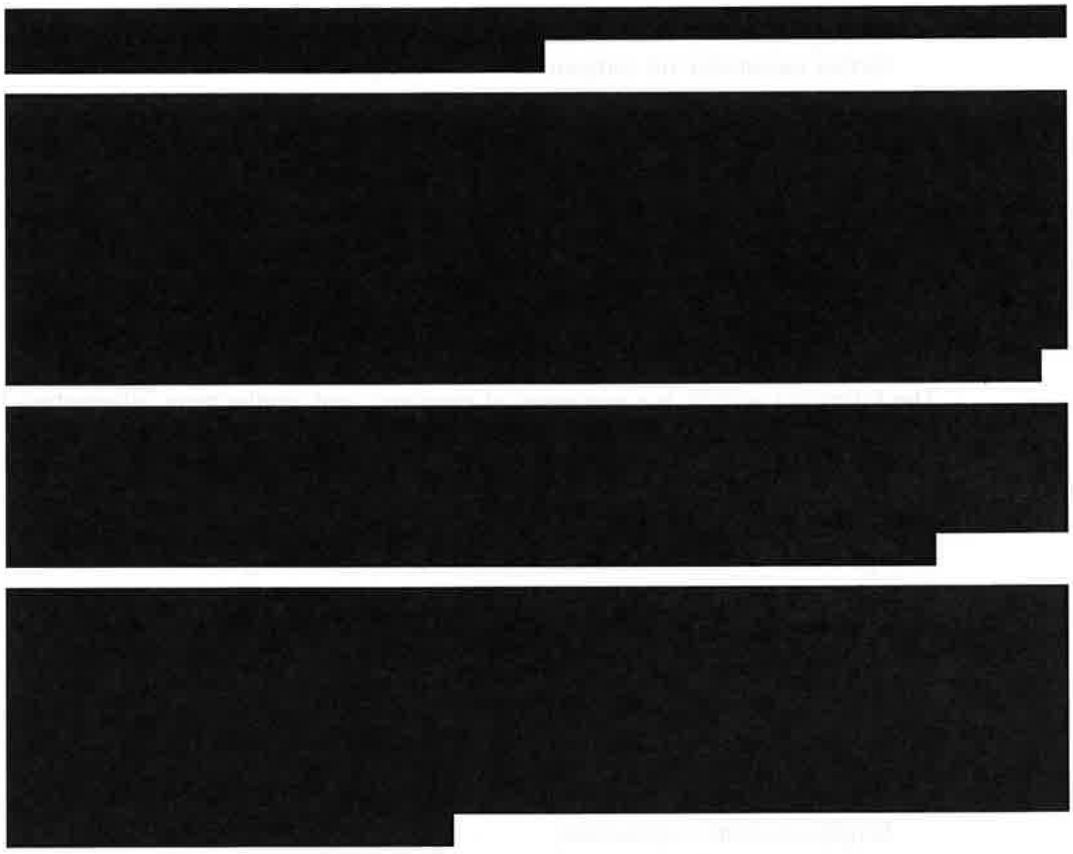
As described above, there are three fabricators located at the Columbia Business Center (CBC), located in Vancouver, WA, that will be impacted by the proposed height constrained I-5 bridges. This section describes operational impacts due to the loss of height constrained business and resulting economic impacts for these three fabricators. The range of mitigation costs for these impacts are also described.

[redacted]

[redacted]

[21] Source: USACE, WISER, BST Associates.

[22] Since the number of transits from the CBC in 2002 is not available, the percent is calculated for the period 2003 to 2012.



10.4.1.2 Oil Rig Fabrication

Although TMF has fabricated approximately one-third of the existing oil rigs in Alaska it is not certain this level of work will continue. The large oil rig fabrication business is very competitive, and Greenberry is a direct competitor. The need for these large oil rigs will continue to increase along with the competitiveness. There are several factors that indicate there will be increased oil exploration and production in Alaska. These include:

- Oil companies are taking out large and costly leases in the North Slope and in Cook Inlet, Alaska. Unlike in prior years, the current leases require that the oil companies exercise their leases by undertaking exploration activities. Oil companies have begun to exercise the existing leases and more leases are expected in the near future.
- New technologies, requiring large oil rigs, enable vertical and horizontal drilling to allow a much larger area to be developed from a single footprint, which reduces the environmental impacts around the drilling sites. Larger oil rigs are required to service these operations, which must have state of the art cold climate technology, be environmentally sound and be able to operate over multiple years. The fabricators located at the CBC have substantial experience in fabrication of these oil rigs.
- The volumes of crude oil transiting the Trans-Alaska Pipeline have decreased significantly, which is causing concern about cost effective functioning of the pipeline. Oil exploration and production accounts for approximately one-third of the economic

[23] Source: John Rudi, CEO of Thompson Metal Fab

activity in Alaska. As a result, the State of Alaska is seeking to modify its tax system to further incentivize oil companies to increase production.

However, there is also significant uncertainty about future oil development in Alaska because it is expensive and environmentally sensitive. In addition, crude oil and gas production in other areas of North America (particularly in Alberta, North Dakota and Montana, among other locations) is growing rapidly and could compete with production from Alaska, As an example, most of the petroleum refineries located in Washington State have initiated systems to receive crude oil from North Dakota and Montana via railroad.

10.4.2 Total Economic Activity

The following section is a summary of economic and employment information for all three fabricators combined. This information is based on past and current business, not future projected shipments. The combined operations of the three fabricators are presented in Table 10-2. Because the height-constrained component of the fabricators' operations has been very cyclical, an average annual estimate was developed for this analysis for the period 2002 through 2012. A height-constrained project is one requiring one or more height-constrained shipments under the bridge with a vertical clearance of 116-feet above 0 CRD. Approximately 9 to 10 percent of the revenues from these firms during the past eleven years would have been height constrained.

During the period from 2002 through 2012, metal fabricators generate an annual average (adjusted for inflation in 2012 dollars) of:

- Direct employment of approximately 859 FTEs; 78 that may have been associated with height constrained operations,
- Direct employee compensation of $64.2 million; $6.1 million that would have been height constrained at CBC,
- Business revenues of $188.3 million; $17.5 million that would have been height constrained at CBC.

The proposed bridge would affect approximately 9 to 10 percent of the fabricators' employment, compensation, and revenues listed above.

The business activities for the fabricators have economic impacts within and beyond the greater Portland/Vancouver region. Goods and services purchased by the fabricators and their employees create income for other firms and additional jobs in the community and region. Including a suitable multiplier to take such effects into account, the impact from fabricator operations is estimated (adjusted for inflation in 2012 dollars) as:

- Total employment of approximately 1,822 FTEs; 165 that may have been height constrained at CBC,
- Total income of $124.8 million; $11.9 million that would have been height constrained at CBC.

Fabricator operations are estimated to generate approximately $11.6 million in state and local taxes ($1.1 million associated with height constrained operations) on an average annual basis for the period from 2002 through 2012.

Table 10-2. Aggregated Fabricator Operations (Annual Averages for 2002-2012 in $2012)

	All Activities at CBC		Height Constrained by 116-foot Vertical Clearance			
Category	Direct	Total	Direct	Total	% Direct	% Total
Revenue ($mils)	$188.3		$17.5		9.3%	
Employment	859	1,822	78	165	9.0%	9.0%
Employee Compensation ($mils)	$64.2	$124.8	$6.1	$11.9	9.5%	9.5%
State/Local taxes ($mils)		$11.6		$1.1		9.5%

Source: BST Associates

Note: Direct refers to direct economic effects; total refers to direct, indirect and induced effects this table presents an annual average calculated for the period 2002 to 2012, expressed in 2012 dollars.

The bridge is not expected to impact any other height-constrained economic activity upriver from the CBC, including future development (as discussed in the future land use analysis summarized in Section 6 of the permit application cover letter, and detailed in Attachment A to the Navigation Impact Report). Therefore the estimated impact to annual direct revenues of approximately $17.5 million represents the total potential impact on upstream economic activity for that same period.

10.4.3 Gross Revenues

Table 10-3 shows the company-wide gross revenues of the three impacted fabricators and the estimated gross revenues associated with height restricted projects at the CBC from 2002 to 2012. The combined gross revenues of the three fabricators, across all locations of each firm,[24] increased dramatically between 2002 and 2012, growing from $83.4 million in 2002 to an estimated $321.5 million in 2012 or at an average annual growth rate of 14.4 percent per year (unadjusted for inflation). The growth in gross revenues is due to expansion of all three companies beyond the Oregon and Washington region, including the Alaskan North Slope development.

During the eleven year period (2002 to 2012), the estimated revenues associated with height constrained projects at CBC amounted to $179 million ($193 million in 2012$ adjusted for inflation), or an average of about $16 million per year ($18 million adjusted for inflation). This represents an average of 9.3 percent of the combined gross revenues of all three firms at all company locations.

[24] As described in Section 1.1, TMF only operates at the CBC in Vancouver but OIW and Greenberry both have facilities in other locations. The comparisons presented in this report compare overall company-wide operations as well as the height constrained activity that occurs in Vancouver.

Table 10-3. Gross Revenues by Impacted Fabricators (million$[25])

Year	Company-wide			Total	Height Constrained at CBC by 116-foot Vertical Clearance						Total
2002				$83.40							$5.90
2003				$97.00							$0.00
2004				$111.70							$0.00
2005				$118.60							$8.10
2006				$151.10							$9.20
2007				$193.80							$8.40
2008				$216.80							$27.30
2009				$212.50							$62.40
2010				$197.30							$52.20
2011				$194.30							$5.50
2012est				$321.50							$0.00
Total				$1,898.10							$179.00
% Total				100%							100%

Source: Individual firms, BST Associates

10.4.4 Employment

Table 10-4 provides an aggregated estimate of the full-time equivalent employees at the three fabricators. Company-wide (including all locations), employment at the three firms increased from 519 employees in 2002 to 1,329 employees in 2012 (estimated) or at an average annual growth rate of 9.8 percent per year.

During the eleven year period (2002 to 2012 est.), employment associated with height constrained projects at the CBC, aggregated, amounted to 854 jobs, or an average of about 78 FTEs per year, which represents 9.0 percent of the combined employment of all firms at all company locations.

[25] Unadjusted for inflation

Table 10-4. Employment by Impacted Fabricators (full-time equivalent jobs, FTEs)

Year	Company-wide			Total	Height Constrained at CBC by 116-foot Vertical Clearance						Total
2002				519							39
2003				607							0
2004				638							0
2005				635							36
2006				784							46
2007				1,023							41
2008				995							114
2009				995							287
2010				966							260
2011				958							30
2012est				1,329							0
Total				9,451							854
% Total				100%							100%

Source: Individual firms, BST Associates

10.4.5 Employee Compensation

Table 10-5 provides the estimated fabricator's employee compensation, both company-wide and the estimated employee compensation associated with height restricted projects at the CBC. Employee compensation (direct wages and fringe benefits), for the three firms (across all company locations) also increased dramatically between 2002 and 2012, growing from $30.6 million in 2002 to $92.8 million in 2012 (estimated) or at an average annual growth rate of 11.7 percent per year.

[redacted]

During the eleven year period (2002 to 2012 est.), employee compensation associated with height constrained projects at the CBC amounted to $62 million ($67 million in 2012 dollars, adjusted for inflation), which represents 9.5 percent of the combined employee compensation of all of the firms at all company locations. [redacted]

Table 10-5. Employee Compensation by Impacted Fabricators (million$[26])

	Company-wide				Height Constrained at CBC by 116-foot Vertical Clearance						
Year	[redacted]			Total	[redacted]						Total
2002				$30.60							$2.50
2003				$36.60							$0.00
2004				$39.80							$0.00
2005				$40.50							$2.60
2006				$53.30							$3.40
2007				$67.10							$3.20
2008				$71.80							$8.00
2009				$73.90							$20.90
2010				$71.40							$19.80
2011				$66.90							$1.90
2012est				$92.80							$0.00
Total				$644.80							$62.10
% Total				100%							100%

Source: Individual firms, BST Associates

10.4.6 Annual Shipments

As noted in Table 10-6, the Columbia Business Center generated a total of 90 marine shipments for the period 2002-2012. Of those shipments, six would have been height constrained, representing an average of 0.6 shipments per year. An additional 12 shipments were produced under contracts that also included height-constrained shipments. In total, 18 shipments over that period could have potentially been affected by a 116-foot vertical clearance, representing an average of 1.6 shipments per year. Table 10-6 provides a breakdown of the shipments by year and by fabricator.

[26] Unadjusted for inflation

Table 10-6. Total and Height-Constrained Shipments from the Columbia Business Center, 2002-2012

	Total Shipments from CBC	Height-Constrained Shipments	Total
2002	N/A		N/A
2003	9		0
2004	12		0
2005	4		1
2006	11		2
2007	6		0
2008	12		0
2009	11		3
2010	12		6
2011	9		6
2012	4		0
Total	**90**		**18**

Source: Individual firms, BST Associates

1 Related shipments were non height-constrained shipments produced under contracts that also included height-constrained shipments.

2 Greenberry contributed to shipments in 2011 that were under the overall direction of TMF.

10.4.7 Estimated Lost Future Profits and Proposed Mitigation

As a result of the proposed 116-foot vertical clearance for the I-5 Bridge, the impacted fabricators could experience a loss of height-constrained business opportunities and associated future profits. The proposed mitigation is based on the estimated loss of future profits. The methodology for estimating these losses consists of projecting height-constrained revenues, applying a profit margin to estimate future profits and then discounting the stream of future profits to net present value based upon the cost of capital.

The assessment of lost profits due to the impact of height constraints assumes that none of the fabricators make an adjustment to devote their capacity to other endeavors or otherwise mitigate the impact of the height restriction, for the foreseeable future. This is, therefore, believed to be a conservative estimate intended to serve dual purposes: one, to assess the impact on the actual CBC fabricators; and two, to provide an indication of the loss of industrial production due to the height constraint, which is independent of the individual fabricators presently engaged in such production upstream from the proposed I-5 bridge.

The estimates of lost future profits associated with height constraints imposed by the proposed bridge are pre-negotiated calculations based upon acceptable industry standards and are expected to be revised through negotiations. The net present value of the lost profits from lost height constrained business for the three fabricators is estimated to range between $30 million (low) to $116 million (high).

The net present value of the lost profits from lost height constrained business is estimated as follows and summarized in Table 10-7:

- The preliminary estimate of combined economic impact for all three firms ranges from $30 million (low) to $116 million (high).
  - [redacted]
  - [redacted]
  - [redacted]

Table 10-7. Preliminary Estimate of Economic Damages and Proposed Mitigation from Loss of Height Constrained Business ($millions)

	Estimated NPV of Lost Business ($millions)	
Firm	[redacted]	[redacted]
TMF	[redacted]	[redacted]
OIW	[redacted]	[redacted]
Greenberry	[redacted]	[redacted]
Total	**$30**	**$116**

Source: Individual firms, HSNO, Morones Analytics, LLC, BST Associates

10.4.8 Status of Mitigation Discussions

Sensitive negotiations are underway with the three fabricators at the CBC with a goal of identifying the actual amount of consideration necessary to mitigate the impact on their businesses. [redacted]

10.4.9 Total Impact on Fabrication Relative to Economic Activity of Other River Users

Over the period from 2002 to 2012, the fabrication at the CBC that would have been height constrained by the new bridge equates to about 0.6 percent of the total business revenues ($2.9 billion) generated by Columbia River marine activity conducted by metal fabricators, marine cargo terminals,[27] boat/ship yards,[28] and recreational boating activity.[29] The $2.9 billion total does not include revenue from passenger vessels, commercial fishing boats, marine construction firms or government/research vessels, among others because relevant economic data were not available. That total also does not include the value of cargo shipped, only the revenues generated by activity of the user (such as cargo operations related to marine terminals).[30]

The industrial/fabrication capability of the CBC is the only upstream area identified to be limited due to the height constraint of the I-5 bridges. As shown in the Alternative Properties Memo and vessel survey in the Navigation Impact Report, Attachments D and K respectively, no other upstream land interests indicated any expectation of impediment due to the vertical clearance.

Table 10-8 compares the estimate of the business revenue, employment, income and tax potentially generated by the height constrained fabrication at the CBC, to that generated by the primary navigation users listed above (including marine cargo terminals, boat/ship yards, recreational boats and metal fabricators).

The combined operations of these user groups are estimated to generate the following effects on an average annual basis for 2002 to 2012 and normalized in 2012$:

- Direct employment of approximately 14,243 FTEs
- Direct employee compensation of $743 million
- Business revenues of $2.9 billion.

Including the multiplier effects, the impact from these user groups is estimated to be:

- Total employment of approximately 33,791 FTE
- Total income of $2.4 billion.

These activities are estimated to generate $228 million in state and local taxes on an average annual basis for 2012. Because the height constrained component of the CBC has been cyclical in the past, an average annual estimate over the last eleven years was developed for

[27] Economic impacts associated with marine cargo operations in the Columbia River include activity occurring at public and private terminals on the Columbia/Snake River system. These estimates are based upon recent economic impact assessments conducted for the Port of Portland (2011), Port of Vancouver (2010) and Port of Astoria (2009). Sources: Martin Associates, The Local and Regional Economic Impacts of the Port of Portland, March 2012 and The Local and Regional Economic Impacts of the Vancouver Harbor, August 2011; BST Associates, Port of Astoria Economic Impacts, April 2010.

[28] These estimates are based upon Dun and Bradstreet records for firms engaged in ship and boat repair and construction along the river system, which provide information on business revenues and employment. Multiplier effects were estimated using the IMPLAN Model.

[29] Economic impacts associated with recreational boat operations in the Columbia River are based upon recent boating use activity surveys by the Oregon State Marine Board, data on registered boats from the Oregon State Marine Board and Washington State Department of Licensing, and updated assessments of average expenditures per trip for boat ownership and use. Multiplier effects were estimated using the IMPLAN Model.

[30] The value of cargo entering and leaving the Columbia River (ranging annually from $14 billion to $26 billion per year over the last eleven years) is significantly larger than the operations-generated revenue.

this analysis for the period 2002 through 2012. Approximately 9 percent of the revenues from this industrial site during the past eleven years would have been height constrained. The annual average impact of the height constraints is estimated to be:

- Approximately $18 million in business revenues; 0.6 percent of total estimated revenues from these businesses
- Estimated 78 direct jobs; 0.5 percent of all direct jobs from these businesses
- 165 total jobs including multiplier effects; representing 0.5 percent of all direct, indirect and induced jobs from these businesses
- $6 million in direct income; 0.8 percent of all direct income generated by these businesses
- $12 million in total income; including multiplier effects; representing 0.5 percent of all direct, indirect and induced income, and
- $1 million in estimated state and local taxes; 0.5 percent of taxes generated by these businesses.

Table 10-8. Summary Comparison of Economic Impacts for Columbia River navigation users and height constrained shipments at the Columbia Business Center for 2002-2012

	All Activities		Height Constrained			
Category	Direct	Total	Direct	Total	% Direct	% Total
Revenue ($mils)	$2,858.8	-	$17.5	-	0.6%	-
Employment	14,243	33,791	78	165	0.5%	0.5%
Income ($mils)	$742.6	$2,434.6	$6.1	$11.9	0.8%	0.5%
State/Local taxes ($mils)	-	$228.4	-	1.1	-	0.5%

Note: Table includes the following navigation users of the Columbia River (including marine cargo terminals, boat/ship yards, recreational boats and metal fabricators).

Direct refers to direct economic effects; total refers to direct, indirect and induced effects Source: BST Associates

As noted above, for this analysis data for the time period 2002-2012 was used. That eleven year time period was selected because it is consistent with the data provided by the fabricators and provides a reasonable basis for understanding long-term trends. That time period also demonstrates the very cyclical nature of the height constrained business at the CBC, with three years having no reported height constrained activity.

Analysis of a shorter time period further emphasizes the cyclical nature of the industry, with short-term peaks. Table 10-9 presents a similar comparison of revenues, employment, income and taxes for the 2009-2012 time period. TMF and Greenberry were fabricating oil rigs for BP, Parker Drilling, and Doyon between 2009-2011, which generated 15 of the 18 height constrained and related shipments that were reported for the entire 2002-2012 period of analysis. It is also noteworthy that there were no height constrained fabrication or shipments in 2012.

Table 10-9. Summary Comparison of Economic Impacts for Columbia River navigation users and height constrained shipments at the Columbia Business Center for 2009 to 2012

	All Activities		Height Constrained			
Category	Direct	Total	Direct	Total	% Direct	% Total
Revenue ($mils)	$2,909.3	-	31.8	-	1.1	-
Employment	14,445	34,221	144.4	306.3	1.0	0.9
Income ($mils)	$757.3	$2,463.1	11.3	21.9	1.5	0.9
State/Local taxes ($mils)	-	$231.1	-	2.0	-	0.9

Note: Direct refers to direct economic effects; total refers to direct, indirect and induced effects Source: BST Associates

It is important to note that while the new bridge would prohibit the transit of fully manufactured height-constrained fabrications, these fabrication activities, and the business revenue, employment, income and tax revenue associated with them, will still occur. Fabrication of height constrained shipments could occur at multiple other locations downstream of the I-5 bridges and at other waterfront industrial sites in Oregon and Washington, as discussed in Attachment K to the permit application. At least one of the affected fabricators has conducted height-constrained fabrication at a site other than the CBC, demonstrating that there are other potential locations for these projects.[31]

10.5 ECONOMIC BENEFITS OF THE CRC PROJECT

The selection of the CRC preferred alternative in the ROD is the result of extensive analyses considering how to meet the project's Purpose and Need while balancing the sometimes competing needs of various user groups (including auto, truck and bus highway users, light rail transit users, freight rail, marine transportation, aviation and bicyclists and pedestrians) and environmental and community benefits and impacts. For example, alternatives that lower the bridge height reduce potential impacts to aircraft but increase the number of potentially impacted river users. In considering those trade-offs between users, it's important to also consider the very significant economic benefits of the project to the region, the West Coast, and the United States. Those benefits derive from reduced congestion and decreased travel times, improved safety for motorists, and improved safety and efficiency for marine navigation. Those direct benefits to transportation system users in turn will result in economic benefits to the region by improving access to job opportunities throughout the region, reducing business costs, and improving access to goods and services both domestically and internationally. This section provides a brief overview of those benefits. It is worth noting that this analysis estimates the economic impacts associated with the project's operational benefits for all users, whereas the FEIS included estimates of economic impacts that would result from construction-related activities.

10.5.1 Methodology

The economic benefits of the CRC project have been estimated by utilizing the Transportation Economic Development Impact System (TREDIS) model to provide the

[31] Greenberry undertook the rebuilding of the Arctic Challenger in Bellingham, which had an estimated gross revenue of $100 million. If built at the CBC, this project would have been height constrained by a 116-foot I-5 bridge. The fact that it was not undertaken at the CBC indicates there are other potential locations for these projects.

overall economic benefits of the preferred alternative versus the No-Build Alternative. The TREDIS model has been widely and successfully used in many previous Portland regional, Oregon state and national studies. Inputs to the model were derived from information in the CRC FEIS documents. The TREDIS model estimates traveler benefits and any added benefits from the impacts of investments on improved market access and improved connectivity. It has been used to compare what happens to the future economies of the region, the rest of Washington, the rest of Oregon, and California under the preferred alternative versus the No-Build Alternative. Its findings can be found as an appendix to the Economic Benefits Report, published October 31, 2012 and is available on the CRC website.

10.5.2 Summary of Project Economic Benefits

Project-related economic benefits are a summary of landside traveler savings, marine navigation savings, and the economic effects of improved market access and connectivity. The net present value to the economy of the preferred alternative versus the No-Build Alternative is estimated in the TREDIS model by comparing the time streams of costs and benefits for each option, using a discount rate for future years.

Combining all traveler benefits categories over the 2018 to 2050 time horizon results in a present value of $5.37 billion using a five-percent discount rate, and $7.87 billion present value using a three-percent discount rate. These compare favorably to the present value of LPA costs, which is roughly $3 B using both 5 percent and 3 percent discount rates. The project's discounted net present value is therefore highly positive and its benefit cost ratio is much greater than 1, indicating that the LPA is a desirable investment (versus the no-build scenario).

The discounted present value of the additional gross regional product (GRP) for the Portland region plus the rest of the West Coast with the LPA versus the No Build is also highly positive, indicating that the LPA is a very desirable investment. Using a 5 percent discount rate, the present value of additional GRP through 2050 would be more than $4 billion; with a 3 percent rate, the present value is more than $6 billion. In terms of an impact-to-cost ratio for the project, this added GRP from the LPA is in excess of costs, indicating ratio greater than 1. The LPA is thus a highly justified investment in terms of its economic impacts.

TREDIS also produces additional economic measures for future years. The combined net economic impacts of the traveler savings and the market access and connectivity impacts of the preferred alternative will also result in the addition of 4,200 jobs and $231 million in additional wages in 2030 under the preferred alternative compared to the No-Build Alternative. All net benefits are the net total increases after taking into account the costs of the project itself.

Traveler savings and market access impacts are described in more detail in the following paragraphs. In addition, the benefits derived from reducing a risk of catastrophic loss of a bridge are also discussed.

10.5.3 Landside Traveler Savings

By 2030, the estimated annual traveler landside savings due to the preferred alternative versus the No-Build Alternative will exceed $435 million per year. These savings accrue to highway, transit, and marine users.

Landside transportation benefits include substantial savings in highway travel times and transit travel times, with about 6.8 million hours per year in auto and truck delay savings on the facility itself for automobile and truck users for the preferred alternative versus the

No-Build Alternative, both from less congestion delay during peak periods and due to fewer bridge closures during off-peak periods. There is also substantially less daily congestion on other highway facilities. The diversion of travelers to transit with the much better transit service under the preferred alternative also provides substantial portions of these savings.

Landside transportation benefits also include the savings in accident costs which will be achieved by the preferred alternative compared with the No-Build Alternative, with 510 to 540 fewer crashes per year, with resulting dollar savings in accident costs. Landside transportation benefits also include lower vehicle miles traveled and lower vehicle operating costs for autos and trucks.

10.5.4 Marine Navigation Benefits and Costs

Transportation benefits to the marine industry also accrue because elimination of bridge closures will provide greater flexibility for marine traffic to achieve future efficiencies due to the removal of constraints on daytime travel. Although closures are relatively few, marine productivity savings could be achieved and are estimated very conservatively at about $137,000 per year.

10.5.5 Economic Benefits due to Improved Market Access

In addition to the direct transportation benefits, there are further significant benefits resulting from the impacts of the preferred alternative on freight and personal travel access and connectivity.

Because the daily duration of congestion decreases with the project, the number of trucks operating during periods of congestion will drop very substantially under the preferred alternative, by 60 percent or more, preserving and enhancing the key freight industries, such as lumber and wood, food and farm products, distribution, transportation and equipment, and high-tech products, which are highly dependent on the level of service on the CRC.

Person throughput (the number of people that can cross the bridge over a specified time period) will be enhanced. Person throughput for the corridor will be enhanced by one-third during the AM peak period and by 40 percent during the PM peak period, due largely to the greater multimodal person capacity. This enhanced throughput will also enhance the economic competitiveness of the region and the states by enhancing market access and connectivity.

The preferred alternative improves labor and business market access and improves connections, stimulating additional economic activity. Matching employees and their unique skills to employer needs, enhancing supplier connections, supply chain coordination, and overall knowledge sharing are the results of improved market access and connectivity. These market access and connectivity benefits under the preferred alternative generate 1,700 (out of 4,200) additional jobs and $111 million (out of $231 million) in added wages in 2030, with the Portland Metro area receiving the majority of these benefits.

10.5.6 Eliminating the Risk of Catastrophic Loss of the Existing Bridges

An equally important potential economic benefit of the preferred alternative is that its implementation will avoid the risk of an economic catastrophe. The current structures are nearly 100 years old and nearly 60 years old and are not designed to meet current seismic standards. In a major earthquake, one or both structures could be rendered inoperable. The failure of one or both I-5 structures would have disastrous economic consequences until

replacement facilities could be built on an emergency basis. Other regions have chosen not to take these risks.

The No-Build Alternative actually includes the probability that the project would have to be implemented on an emergency basis at some time. Under those circumstances, it would be implemented in a manner that avoided the future risk of structural or seismic failure meaning that something similar to or identical to the preferred alternative would be implemented. The No-Build Alternative thus includes the risk of a very major economic disaster lasting at least several years until emergency construction could be completed, followed by a similar but later future with the preferred alternative finally being implemented.

10.5.7 Conclusion

The project has taken measures to design the bridge, both as defined in the ROD and through subsequent vertical clearance refinements, to address all the river users that could be reasonably accommodated while still meeting the Purpose and Need of the project. Even with these refinements, there are still four users that will be impacted. The impacts to one of the users (JT Marine) will be fully mitigated through vessel modifications. The other three users will be economically impacted and mitigated.

As demonstrated in this permit application, the economic impacts to these three users are a very small share of the total economic activity associated with river navigation. Of 28,000 vessel entrances/exits to the Columbia River for 2002-2012, 18 (6 directly, and 12 in assistance of height constrained final products) were associated with fabricator contracts to deliver height-constrained products, an average of only 1 to 2 per year. Furthermore, the value of cargo operations entering and leaving the Columbia River ranges annually from $14 billion to $26 billion, with approximately 0.1 percent of that total associated with height constrained fabricated products.

The economic impacts to these three users are also very small compared to the total economic benefits of the project. Over the last eleven years the height constrained shipments are associated with approximately 78 jobs per year, whereas, the increased economic activity from improved access and mobility of the project is estimated to add 4,200 jobs and $231 million in additional wages in 2030 under the preferred alternative.

The project is proposing to mitigate the impacts to these three users through compensation for lost business. Once final mitigation agreements are reached with the fabricators, and once the physical improvements for JT Marine are completed, the CRC project will have addressed all known and anticipated navigation needs.

11. REQUIRED AGENCY AUTHORIZATIONS, PERMITS AND APPROVALS

In addition to the USCG Bridge Permit, the project will require the following permits and approvals.

11.1 US ARMY CORPS OF ENGINEERS

- Clean Water Act (CWA) Section 404 Permit
- Rivers and Harbors Act, US Code 33, Section 408 for Navigation

- Rivers and Harbors Act, US Code 33, Section 408 for Modification/Alteration of Levee

11.2 FEDERAL AVIATION ADMINISTRATION

- 7460-1 Notice of Proposed Construction or Alteration

11.3 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION-FISHERIES SERVICE

- Endangered Species Act Biological Opinion (issued January 2012)
- Marine Mammal Protection Act Letter of Authorization

11.4 OREGON DEPARTMENT OF STATE LANDS

- Oregon Removal and Fill Permit
- Lease/Easement Application

11.5 WASHINGTON DEPARTMENT OF NATURAL RESOURCES

- Lease/Easement Application
- Archaeological Application for Authorization on State Owned Land

11.6 OREGON DEPARTMENT OF FISH & WILDLIFE

- Oregon Fish Passage Act Compliance

11.7 WASHINGTON DEPARTMENT OF FISH & WILDLIFE

- Hydraulic Project Approval

11.8 OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

- CWA Section 401 Water Quality Certification
- Oregon 1200-C Construction Permit
- Oregon Stationary Source Permit

11.9 WASHINGTON DEPARTMENT OF ECOLOGY

- CWA Section 401 Water Quality Certification (Washington)
- Shoreline Management Act Substantial Development Permit
- Construction Stormwater General Permit
- Washington Stationary Source Permit

11.10 OREGON STATE HISTORIC PRESERVATION OFFICE

- Archaeological Excavation Permit

11.11 WASHINGTON DEPARTMENT OF ARCHAEOLOGY AND HISTORIC PRESERVATION

- Section 106 Archaeological Treatment Plan

11.12 CITY OF PORTLAND

- Land Use Review

11.13 CITY OF VANCOUVER

- Critical Areas Ordinance Permit
- Shoreline Management Act Substantial Development Permit
- Land Use Review

12. ENVIRONMENTAL EFFECTS

12.1 SIGNIFICANT EFFECT(S) ON THE ENVIRONMENT

The FHWA and FTA as NEPA lead agencies prepared a draft (May 2008) and final (September 2011) environmental impact statement for the Columbia River Crossing Project, which includes the replacement of the existing Columbia River bridge. FHWA and FTA signed the project's Record of Decision on December 7, 2011. Following the ROD, FHWA and FTA prepared a NEPA re-evaluation (Attachment J) covering updated navigation information and bridge vertical clearance refinements made in preparation for submitting an application to the USCG for a General Bridge Permit.

Through avoidance, minimization and mitigation, the project will have no significant adverse effects on the environment.

12.2 ENVIRONMENTAL REGULATORY COMPLIANCE AND DOCUMENTATION

12.2.1 Alternatives

Chapter 2 of the Final EIS summarizes the alternatives evaluated for this project and the process used to develop them. Prior to publication of the DEIS in May 2008, the FHWA, FTA, WSDOT and ODOT engaged in an extensive screening process of potential transportation alternatives, options and components. Many of these alternatives and options were eliminated prior to the DEIS because of significant engineering problems, environmental impacts, cost, and/or failure to meet the project's purpose and need.

These early screening efforts identified several promising possibilities for further study. The best river crossing types appeared to be a replacement bridge or a supplemental arterial or

highway bridge. Express bus, bus rapid transit, and light rail were the most promising transit modes for meeting the purpose and need of this project. In July 2006, project staff created 12 alternative packages by combining different river crossing types and transit modes, as well as specific designs to improve safety, freight movement, highway operations, and bicycle and pedestrian access.

Evaluation of these 12 Alternative packages revealed that multimodal packages performed best. Alternatives that did not include a combination of both highway and transit improvements, such as just an aggressive transportation demand management/transportation system management approach or a highway-only investment, were not recommended to be carried into the DEIS. The project team, working with CRC Task Force members and intensive engagement of the public and other stakeholders, developed the range of alternatives evaluated in the DEIS:

- Alternative 1: No-Build
- Alternative 2: Replacement crossing with bus rapid transit
- Alternative 3: Replacement crossing with light rail
- Alternative 4: Supplemental crossing with bus rapid transit
- Alternative 5: Supplemental crossing with light rail

12.2.1.1 Locally Preferred Alternative

The following are the primary transportation improvements included in the Locally Preferred Alternative (LPA):

- The new river crossing over the Columbia River and the I-5 highway improvements, including improvements to seven interchanges, north and south of the river, as well as related enhancements to the local street network.
- Extension of light rail from the Expo Center in Portland to Clark College in Vancouver, and associated transit improvements, including transit stations, park and rides, bus route changes, and expansion of a light rail transit maintenance facility.
- Bicycle and pedestrian improvements throughout the project corridor.
- A toll on motorists using the river crossing.
- Transportation demand and system management measures to be implemented with the project.
- The LPA included two design options and a construction phasing option. The two design options, referred to as LPA Option A and LPA Option B, are the result of substantial public input and additional analysis and design work around the Hayden Island and Marine Drive interchanges. The preferred option, which is described in this FEIS as LPA Option A and is most similar to the Project, includes local vehicular access between Marine Drive and Hayden Island on a local multimodal bridge. LPA Option B does not have traffic lanes on the light rail bridge, but instead provides direct auto access between Marine Drive and the island with collector-distributor (CD) lanes on the two new bridges that would be built adjacent to I-5.
- In addition to the two design options, this FEIS also evaluated the potential for phasing construction that is, building part of the project in an initial phase and constructing the

remaining elements of the project at a later date. The ICP as presented in this application represents phased construction.

12.2.2 Water Quality Certification

Water Quality Certification will be obtained from the Oregon Department of Environmental Quality (DEQ) and Washington State Department of Ecology (Ecology). A Joint Permit Application (JPA) was submitted to DEQ and a Joint Aquatic Resources Permit Application (JARPA) was submitted to Ecology for the overall CRC Project in January 2013.

To mitigate the effect of pollutants in runoff from additional impervious surface area, the project team has prepared a conceptual stormwater management design. The design was prepared to meet the requirements of ODOT and WSDOT for those portions of the project along I-5. After consultation with and agreement from WSDOT and State of Washington regulatory agencies, the project has adopted ODOT's technical memorandum on stormwater quality on a project-wide basis to provide a standard approach to determining types of water quality facilities. The memorandum is the result of a collaborative effort by ODOT, FHWA, and the following natural resource agencies: NMFS, DEQ, US Fish and Wildlife Service (USFWS), EPA, and ODFW. The decision to use this approach on the Project has been endorsed by WSDOT and the Washington Department of Ecology.

The Cities of Portland's and Vancouver's regulations, found in the 2008 City of Portland Stormwater Management Manual and 2005 Stormwater Management Manual for Western Washington, respectively, will be implemented for those portions of the project along city managed roads.

12.2.3 Coastal Zone Management Plan: N/A

12.2.4 Floodplains

Portions of the I-5 highway and supporting infrastructure currently exist within the Columbia River's floodplain and within the river itself, including portions of the highway system that will experience an increased footprint as a result of the Project. A flood-rise analysis will be conducted during final project design, when the bridge design is further advanced. The more complete design information will enable the project team to more precisely calculate the impact that the Project, including the Project's piers in the water, would have on flood elevation, in accordance with local and state regulations and Executive Order 11988. Given available information, it is reasonable to assume that formal hydraulic analysis will conclude that there would be no flood-rise, or if analysis indicates that any rise would occur, it would be very small. Should flood-rise be projected or the existing floodplain be otherwise negatively impacted, additional mitigation would be identified to negate the impacts.

12.2.5 Historic Preservation

The Project has consulted with Washington State Department of Archaeology and Historic Preservation (DAHP) and the Oregon State Historic Preservation Office (SHPO) because the project has the potential to affect properties that are listed or eligible for National Register of Historic Places listing. Consultations and coordination also involved interested parties, including the Chinook Tribe, City of Portland, City of Vancouver, Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Colville Reservation, Confederated Tribes of the Grand Ronde Community of Oregon, Confederated Tribes of the Siletz Reservation, Confederated Tribes of the Umatilla Reservation, Confederated Tribes of Warm Springs Reservation of Oregon, Cowlitz Indian Tribe, National Park Service (NPS), Nez

Perce Tribe of Idaho, Spokane Tribe of the Spokane Reservation, Nisqually Indian Tribe, USACE, and Washington Department of Natural Resources.

Three NRHP-listed or eligible historic resources will be adversely affected by the Project. These properties are listed below:

- Pier 99 Building
- Historic I-5 Bridge
- Vancouver National Historic Reserve

A total of 32 archaeological NRHP-listed or eligible sites, as listed in the FEIS, will be affected by the Project.

Adverse effects to the above historic and archaeological resources are addressed by the Section 106 Memorandum of Agreement (MOA) dated September 8, 2011. This MOA was developed in consultation with the SHPOs, tribes, and consulting parties. The MOA stipulations include: general requirements and standards, mitigation for adverse effects, the significant archaeological resources in the project area and principles on how to complete archaeological investigations, dispute resolution, and duration, amendment and termination agreements for the MOA.

12.2.6 Wetlands

The Project footprint would not encroach upon any delineated wetlands and would not discharge untreated stormwater runoff into any wetlands. Based on mapped soils, aerial photographs, and observations from the public right-of-way, a wetland may exist between Vancouver Way and Marine Drive, and it may be impacted by the Project. However, because Project staff did not receive permission from the property owner to enter this property, the presence of a wetland could not be verified. Following the ROD, ODOT and FHWA will secure right-of-entry to the property containing the potential Vancouver Way Wetland in order to confirm the presence or absence of a wetland at this location. If presence is confirmed, then the Project would comply with the relevant regulatory and permitting requirements, including avoiding, minimizing, and mitigating wetland impacts.

12.2.7 Threatened and Endangered Species/Essential Fish Habitat

ESA-related approval of the project has been obtained through NMFS's issuance of a Biological Opinion (BO) and USFWS's issuance of a concurrence letter for threatened and endangered species and their habitats that may be affected by the project. NMFS has required in the BO that certain terms and conditions be met in order to provide clearance of the project. The BO requires that impact pile driving would be completed during an in-water work window between September 15 and April 15. There are limits on the sound levels of impact pile driving, as described in the BO. The BO was issued on January 19, 2011. The concurrence letter was issued by USFWS on August 27, 2010.

As described in the Final EIS, the BO and USFWS's concurrence letter determined that permanent and temporary project actions may affect and would likely adversely affect listed Chinook (*Oncorhynchus tshawytscha*), sockeye (*Oncorhynchus nerka*), coho (*O. kisutch*), chum (*O. keta*), steelhead (*O. mykiss*), eulachon (*Thaleichthys pacificus*), and Steller sea lion (*Eumetopias jubatus*) and their designated critical habitat, if present. It was determined that the project may affect but would not likely adversely affect bull trout (*Salvelinus confluentus*), green sturgeon (*Acipenser medirostris*), and killer whale (*Orcinus orca*), and their designated critical habitat, if present. The Project would have no effect on listed plant

species, as no listed plant species occur within the Project footprint. The Project would not jeopardize the existence of any listed species, nor adversely modify or destroy critical habitat.

As required by Section 7 of the ESA, NMFS also provided an incidental "take" statement with the BO. The incidental take statement describes reasonable and prudent measures NFMS considers necessary or appropriate to minimize the impact of incidental take associated with the Project. The take statement sets forth nondiscretionary terms and conditions, including reporting requirements, that the Project must comply with to carry out these reasonable and prudent measures. Accordingly, FHWA and FTA find that, with the incorporation of the terms and conditions contained in the BO into this ROD and with the issuance of a USFWS concurrence letter, the Section 7 consultation requirements have been met and ESA has been satisfactorily addressed.

NMFS proposed critical habitat for eulachon (*Thaleichtys pacificus*) on January 5, 2011. NMFS designated critical habitat, including portions of the project's action area, on October 20, 2011. The final rule takes effect on December 19, 2011. After coordination with NMFS, FHWA and FTA sent correspondence to NMFS on November 28, 2011 stating their intention to reinitiate consultation to address potential project effects on eulachon critical habitat.

Additionally, on January 10, 2011, NMFS proposed critical habitat for lower Columbia River coho salmon (*O. kisutch*). Proposed critical habitat is within the project's action area. FHWA and FTA will consider the status of lower Columbia River coho salmon's critical habitat at the time of the reinitiation of the eulachon critical habitat to determine the proper course of action for evaluating project effects to this habitat including whether its critical habitat has been formally designated.

12.2.8 Migratory Bird Treaty Act

As described in the Final EIS, construction activities would impact migratory birds, including peregrine falcons, through noise impacts and removal or degradation of habitat. Mitigation measures to address these impacts include impact avoidance and impact minimization. Impact avoidance would be addressed by timing vegetation removal to occur outside of nesting seasons for migratory birds. Demolition of existing structures would likely be scheduled outside of nesting seasons for native migratory birds to avoid direct impacts to active nests. If demolition activity is to occur during nesting season, and migratory bird nesting is deemed likely, exclusionary measures or other methods to prevent active nesting will be implemented. In very rare cases, removal of active nests may occur through permits held by USDA/Wildlife Services.

12.2.9 Noise Impacts

The project will result in both construction and operational noise impacts. The Final EIS identifies a number of mitigation measures for long-term noise impacts, including potential noise walls for highway impacts and booted track and building sound insulation for transit impacts. With these mitigation measures, the number of expected highway noise impacts would be reduced substantially relative to the No-Build Alternative throughout the project area. The number of expected moderate and severe transit noise impacts would be the same for both the Project and the No-build Alternative – no impacts.

Construction activities will comply with local jurisdictions maximum noise criteria or obtain appropriate variances. ODOT's Section 292.32 identifies a variety of construction noise abatement measures that will also apply to the Project. Although WSDOT does not have construction standard specifications, WSDOT would voluntarily comply with Section 292.32

for work completed in Washington. In addition to Section 292.32, ODOT and WSDOT would also implement additional noise abatement methods, as described in the Final EIS.

12.2.10 Clean Air

Because the Project is a part of the conforming regional transportation plans (RTP and MTIP) for the Portland metropolitan area, and because the Project will not create new localized violations of NAAQS, worsen an existing violation, or delay timely attainment of NAAQS, the FHWA and FTA found that the Project conforms with the Portland and Vancouver Maintenance Plans in accordance with EPA regulations governing such determinations.

12.2.11 Prime and Unique Farmland: N/A

12.2.12 Wild and Scenic Rivers: N/A

12.2.13 Relocation

The Final EIS discusses the acquisition impacts from the project. 59 residential displacements, 69 commercial displacements and two public use displacements will result from the project.

12.2.14 Cumulative and Secondary Impacts

Cumulative and secondary impacts from the project are discussed in detail in the Cumulative Effects Technical Report and Indirect Effects Technical Report and summarized in the Final EIS and ROD. The analyses found that the project would result in minor increases in cumulative adverse effects on acquisitions, ecosystems, cultural resources, and irreversible and irretrievable commitments of resources, while providing small net decreases in cumulative adverse effects on water resources, air quality, greenhouse gas emissions, recreation, and transportation. Secondary impacts associated with land use are likely to occur, but these effects on long-term land use patterns would be consistent with the region's growth management policies.

12.2.15 Navigation

Navigation impacts from the project are summarized above in Section 8 and discussed in detail in the 2012 Navigation Impact Report (Attachment I) and the *Vertical Clearance NEPA Re-evaluation* (Attachment J).

12.2.16 Fill

As described in the JPA form (Attachment A), fill material associated with the main river crossing is approximately 1.555 acres and 46,375 cubic yards of permanent fill and 0.947 acres and 60,348 cubic yards of temporary fill. The project will have 0.638 acres and 43,868 cubic yards of permanent removal and no temporary removal associated with the main river crossing.

12.2.17 Adjacent Property Owners within ½ mile radius

Adjacent property owners are listed in Attachment C.

12.2.18 Underlying Studies and Information

- Table A, above, lists several underlying studies and information that are included as attachments to this application.
- Extensive information on the project description, impacts, and mitigation is contained in the Final EIS (2011).

13. RESPONSES TO USCG INFORMATION REQUESTS

The table below provides a detailed "crosswalk" that guides reviewers to the responses to each of the USCG's specific requests for permit related information. This crosswalk table lists the substantive requests for permit related information that have been received by the project from the USCG since the issuance of the Record of Decision in December 2011, and indicates where to find the project's related response within this cover letter or the attachments to it.

Table 13-1. Crosswalk of CRC Responses to USCG Requests in the General Bridge Permit Application

Date of Letter	Comment Reference	Comment	Where to find response
7 Dec 2011	Memo from Sally Brice-O'Hara to John D. Porcari USCG Comment 1	Provide information on Thompson Metal Fabricators (TMF) and updated clearance requirements.	See Navigation Impact Report (NIR) Section 7.2 and Appendix B2. See GBP application cover letter Sections 8 and 10.
7 Dec 2011	USCG Comment 1	Provide source of vessel passage frequency data.	2004 Parsons Brinckerhoff Boat Survey.
7 Dec 2011	USCG Comment 1	Address whether LPA will block access to the customers of Schooner Creek Boat Works. Address any minimization, avoidance or mitigation measures for Schooner Creek Boat Works.	See NIR Section 6. Minimization, avoidance, mitigation and/or compensation measures are discussed in *Vertical Clearance Re-evaluation* Section 6.2 and GBP application cover letter Section 9.
7 Dec 2011	USCG Comment 1	Assess the impact to vessels unable to pass under 95 foot (CRD) vertical clearance.	See NIR Section 7.2.
7 Dec 2011	USCG Comment 1	Address questions on critical infrastructure, key resources, and important/unique US industrial capability.	See GBP application cover letter Section 7.1.1.
7 Dec 2011	USCG Comment 1	Address the vertical clearance provided by the LPA at various water stages of the Columbia River and impacts to navigation.	See the NIR. Section 5 includes information on water levels. Section 7 describes impacts to vessels, based on 40 years of water level data.
7 Dec 2011	USCG Comment 1	Provide data regarding frequency of use, and clearance requirements for all vessels transiting the waterway.	See NIR Section 6 and Appendices B and C.
7 Dec 2011	USCG Comment 1	Provide information on vessels that require a bridge opening.	See NIR Section 6 and Appendix E.
7 Dec 2011	USCG Comment 1	Provide information on the vessels that will no longer be able to transit the LPA.	See NIR Section 7 and Appendices B and J.
7 Dec 2011	USCG Comment 2	Provide documentation on vessels or cargos that will need to partially disassemble in order to transit the LPA, and any increase in operating costs to those users.	Dismantling is no longer proposed. Impacts and mitigation for such cargo is in Section 10 of the bridge permit application cover letter.
7 Dec 2011	USCG Comment 3	Address the high-level bridge alternative's long-term effects based on updated vessel clearance requirement data and information on upstream growth and development.	See NIR Sections 7.2 and 7.3.
7 Dec 2011	USCG Comment 3	Provide information on the impact on upstream growth and development.	See NIR Section 7.4 and Appendix A. See the GBP application cover letter Section 7.2 and Attachment E.
7 Dec 2011	USCG Comment 3	Provide available vertical clearance during various times of the year. Include daily water levels.	See NIR Sections 5 and 7 and *Vertical Clearance Re-evaluation* Section 5.
7 Dec 2011	USCG Comment 4	Address mitigation for vessels and users that will no longer be able to transit.	See GBP application cover letter Sections 9 and 10.

Date of Letter	Comment Reference	Comment	Where to find response
7 Dec 2011	USCG Comment 4	Provide updated Air Draft Analysis. Discuss minimization, avoidance, and mitigation.	See air draft analysis in the NIR. See mitigation in the *Vertical Clearance Re-evaluation* and GBP application cover letter Sections 9 and 10.
7 Dec 2011	USCG Comment 5	Address impact on present and prospective upstream commercial activity.	See NIR Section 7.4, and GBP application cover letter Section 7.2.
8 June 2012	Letter from D.A. Goward to Peter Rogoff and Victor Mendez	Develop a navigation "Impact Analysis Report." Develop a comprehensive administrative record supporting the permit decision.	NIR submitted to USCG on November 2, 2012. The administrative record is compiled in the General Bridge permit application package.
10 Sept 2012	Letter from K. A. Taylor to Paula Hammond and Matt Garrett – Overview	Provide information on mitigation measures to impacted river users. The proposed bridge design should avoid, minimize and mitigate the impacts to reasonable needs of navigation.	See mitigation in the GBP application cover letter, Sections 9 and 10. See *Vertical Clearance Re-evaluation,* Section 6.
10 Sept 2012	Background Section Third Bullet	Concern that 2004 boat survey data did not capture all of the current impacted users."	The NIR and the *Vertical Clearance Re-evaluation* describe impacts based on updated 2012 Vessel Survey.
10 Sept 2012	Background Section Fifth Bullet	Provide analysis of various bridge heights including avoidance and minimization.	See NIR Chapter 7.
23 Oct 2012	Letter from D.A. Goward to Gloria Shepard—NIA and Measures for Impacted River Users Bullet	Include a description of measures needed to avoid, minimize or mitigate impacts to navigation...Address future use of the river.	See mitigation in NIR Chapter 9 and GBP application cover letter Sections 9 and 10. See future use in NIR Chapter 7 and in GBP application cover letter Section 7 and Attachment E.
23 Oct 2012	Bridge Heights Bullet	Consider bridges up to the existing navigation clearance of 178' above CRD."	See NIR Chapter 7.
29 Oct 2012	Levels of Mitigation Assuredness	Provide mitigation discussion at different levels of detail at different stages of project development including in the NIR, the Re-evaluation, the permit application and prior to issuing the bridge permit.	See the NIR Chapter 9, the *Vertical Clearance Re-evaluation* Section 6, and the GBP application cover letter, Sections 9 and 10. Additional detail will be provided during the permit review process.
Dec 6 2012	Letter from J.A. Servidio to Nancy Boyd and Kris Strickler – request #1.d.	Provide information on reasonably anticipated waterway improvement projects.	See Section 7.2.3 of the GBP application cover letter.
Dec 6 2012	All other requests in this letter	(Note: all other information requests in this letter were repeated or further clarified in the 23 Jan 2013 punchlist.)	See the responses below to the 23 Jan 2013 Punchlist information requests.

Date of Letter	Comment Reference	Comment	Where to find response
23 Jan 2013	CRC Punchlist #1	Provide quantified operational and economic impacts for each of the potentially impacted waterway users.	See the GBP application cover letter, Section 10.
		Potentially impacted users to be mitigated by the project.	Sections 8.1, 10.3, 10.4.
		Economic impacts to waterway users.	Section 10.4.
		Potentially impacted users that do not warrant mitigation.	Section 8.1.
23 Jan 2013	CRC Punchlist #2	Identify whether or not any of the potentially impacted waterway users are considered critical infrastructure or important/unique US industrial capabilities.	See the GBP application cover letter Section 7.1.
23 Jan 2013	CRC Punchlist #3	Provide information on proposed mitigation measures.	See GBP application cover letter Sections 8, 9 and 10.
		a. Range of anticipated mitigation costs for all users.	Section 10.4.7 and Table 1-7.
		b. Statement that mitigation is feasible for each user.	Sections 10.4.7 and 10.4.8.
		c. Explanation why mitigation is not provided for those waterways not planned for mitigation.	Section 8.1 and 10.3.
23 Jan 2013	CRC Punchlist #4 and #5	Provide documentation of contacts with applicable state, county and local entities. Provide maps showing the parcels evaluated.	See Attachment E to the GBP application cover letter.
23 Jan 2013	CRC Punchlist #6	Quantify total economic activity impacts of the proposed reduced vertical clearance.	See GBP application cover letter Section 10.
23 Jan 2013	CRC Punchlist #7	Provide additional years for table 5.1 in the *Vertical Clearance Re-evaluation.*	See GBP application cover letter Section 10.
23 Jan 2013	CRC Punchlist #8	Label any information that CRC believes is exempt from public disclosure.	Information exempt from public disclosure is labeled.

This page intentionally left blank.